Enniskerry Road / Glenamuck Road Junction Upgrade

Part 8 Environmental Report

VOLUME 1

May 2017
Enniskerry Road / Glenamuck Road Junction Upgrade

(Golden Ball Junction)

Environmental Report

June 2017

Department of Infrastructure and Climate Change
# Enniskerry Road / Glenamuck Road Junction Upgrade

## Environmental Report

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Chapter 1: Introduction

1.1 Introduction

This Environmental Report (ER) has been prepared by Dun Laoghaire Rathdown County Council (DLRCC) as part of the documentation to accompany a Part 8 planning process for the proposed ‘Enniskerry Road / Glenamuck Road Junction Upgrade’. The ER documents the assessment of the impact of the proposed development on the environment in the vicinity of that development.

Photo 1.1 - View of existing junction from Enniskerry Road

1.2 Planning Process

The planning for the proposed scheme is undertaken in accordance with the legislative requirement under Section 179 of the Planning & Development Act, 2000 as amended. The proposed development is included in the class of development permitted under Part 8 of the Planning and Development Regulations 2001 as amended.

Under the Part 8 process, the Local Authority is required to make details of the proposed development available for public inspection and to prepare a report in relation to the proposal which can include an Environmental Impact Statement or Report. This Environmental Report is therefore prepared to satisfy these...
requirements. The assessment detailed herein, contains information on the potential environmental impacts of the proposed development.

Photo 1.2 – View of existing junction from Glenamuck Road
Chapter 2: Background to Scheme

The County Development Plan 2016 – 2022 includes the Glenamuck Road South (this scheme) along with the Glenamuck District Distributor Road Scheme and Enniskerry Road as Six-Year Road Objectives (See also Map No.9 of the Development Plan). The overall Glenamuck District Distributor Road Scheme includes for two major roads, the District Distributor Road (GDDR) and the Link Distributor Road (GLDR) – see Figure 1 below. The above roads are also included in the Kilternan Glenamuck Local Area Plan 2013 (LAP) as road infrastructure provisions (see Section 5.3 of the LAP). The LAP provides for the GDDR Scheme as part of the Primary Road Network, and also includes for improvements to the existing road network that form the secondary tier of roads in the area.

The LAP notes that 'the existing Glenamuck Road, irrespective of the new roads network, requires upgrading in terms of footpath improvements and/or installation, re-surfacing and,
most importantly, improvements to address the ‘pinchpoint’ which restricts traffic movements at a location at the western end of Glenamuck Road, adjacent to Cromlech Close’. The LAP also notes that the delivery of the GDDR may require a considerable lead-in time and that some interim development is desirable in order to begin to meet the central objectives of the wider County Development Plan. The LAP further notes that some interim development can be facilitated on an upgraded existing road network. These upgrades include the improvement of the Glenamuck Road (improved pedestrian / cycle facilities and the removal of the pinch-point at the Golden Ball end).

Photo 2.1 - View of ‘pinch-point’ on Glenamuck Road - looking east

It is now proposed to proceed with the upgrading of the Glenamuck Road / Enniskerry Road Junction (including the removal of the pinch-point) – this will improve pedestrian and cycle facilities as well as greatly improving traffic flows through this junction, and will facilitate some interim development in the area in advance of the construction of the GDDR, as outlined in the LAP.
Chapter 3: Description of Proposed Scheme

The site is located at the junction of the Enniskerry Road (R117) and Glenamuck Road, and is often referred to as the Golden Ball Junction.

As part of the proposed scheme the carriageway cross section will be widened through the provision of additional road width for vehicles and bicycles, increased footway provision and improved lighting. The Glenamuck Road will be widened by up to 9m on the southern side of the road, and new boundary treatment will be provided along the south side of the road (opposite Cromlech Close). A traditional metal Parkland fencing boundary will be provided from the Enniskerry Road junction for a distance of approximately 45 metres and will form the boundary to the Country Market as shown in the Kilternan Neighbourhood Framework Plan. This type of fencing will reinforce the rural character of the area. Beyond this point a granite boundary wall will be provided for approximately 100 metres to a point opposite the end of the new stone wall to Cromlech Close. From the end of this new proposed wall to the ‘Rockville House’ boundary the existing grassed side slope will be maintained.

On the northern side of the road, to the east of the recently constructed boundary wall to Cromlech Close, the road corridor will be widened for a distance of 85 metres by up to 6 metres to incorporate new cycle lanes and footpaths and to improve the road alignment. This widening will also remove the existing ‘pinch point’. It is proposed to erect a timber post and rail fence at the back of the footpath along this section. The land behind this fencing will be sloped back to maintain a stable side slope.

Further details of the visual aspects of the scheme are included in Chapter 8.

In summary, the proposed development generally comprises: -

- Glenamuck Road approach to junction: provision of left and right turning lanes
- Enniskerry Road - southern approach to junction – provision of new right turning lane
- Improved pedestrian crossings incorporated within signalised junction including new crossings on the northern and western sides of Enniskerry Road.
- Cycle lanes / cycle tracks on Glenamuck Road
- General upgrading of the junction to provide improved pedestrian and cycle facilities
- Removal of the pinch-point on Glenamuck Road adjacent to Cromlech Close
- Upgraded public lighting

The scheme is shown on the attached drawings in Appendix B.
Chapter 4: Traffic Impacts

The LAP notes that the delivery of the GDDR may require a considerable lead-in time and that some interim development is desirable in order to begin to meet the central objectives of the wider County Development Plan. The LAP further notes that up to 700 dwelling units could be accommodated on an upgraded existing road network in advance of the construction of the GDDR. A traffic analysis of the proposed scheme is therefore necessary to determine how the junction would perform with these additional housing units in place. In order to achieve a robust analysis, a traffic analysis was carried out for the development of the 700 units mentioned above with an additional 50%, for a total of 1050 units. The LAP includes a Phasing Map for this Phase 1 development that allocates the 700 units between Areas ‘A’, ‘B’ and ‘C’, and these areas are shown in Figure 4.1 below. For modelling purposes the additional 50% mentioned above has been distributed across these three areas.

![Figure 4.1 – Local Area Plan 2013 Phasing Map](image)

This section of the report details the traffic surveys carried out and summarises the main results of the traffic analysis carried out.

Technical Guidance and Analysis Software
The following guidance documents were referenced in preparation of this Technical Note:

- LinSig V3.2 User Guide
In order to assess the impact of the future development zoned lands a combination of tools were utilised as follows:

- TRICS Database: To assess the trip generation;
- LinSig V3: To develop a local area network in order to assign background traffic and development traffic flows;
- Linsig V3: To assess the operation of the Golden Ball traffic signal junction.

**Existing Junction Baseline Year**

**Traffic Data**

Traffic flow inputs were sourced from traffic counts undertaken on Thursday the 21st May 2015 over a 12 hour period. Manual Classified Counts (MCC) were undertaken at the following locations:

- Golf Lane / Glenamuck Road roundabout junction
- R117 Enniskerry Road / Glenamuck Road traffic signal junction (Golden Ball junction)
- R117 Enniskerry Road / R116 Bishops Lane priority junction
- R117 Enniskerry Road / Ballycorus Road traffic signal junction

The MCC data commissioned as part of this study has been collected in fifteen minute intervals. The traffic flows as recorded have been classified into seven vehicle categories. These have been converted to Passenger Carrier Units (PCU) as follows:

- Car / Van                 = 1.0 PCUs
- Goods Vehicle 1      = 1.5 PCUs
- Goods Vehicle 2      = 2.3 PCUs
- Bus                          = 2.0 PCUs
- Pedal Cyclist           = 0.2 PCUs
- Motor Cyclist           = 0.4 PCUs

The AM and PM peak periods of operation have been determined from this data as being:

- AM: 08:00 – 09:00
- PM: 17:00 – 18:00

**Road Geometry & Existing Traffic Operation**

The geometry entered into the LinSig model has been based on topographical survey measurements supplemented by site visits to ensure that the geometry entered into the traffic model is accurate. The Golden Ball junction currently operates as a traffic signal junction with single lane entries on all arms. Observations indicate that the junction operates under Vehicle Actuation (VA) wherein the green times are determined by real time traffic flows via detection loops in the road pavement on approach to the junction. Figure 4.2 and Figure 4.3, below, indicate the existing traffic flows occurring during the AM and PM peak hour periods for the 2015 base year.
Figure 4.2: Existing Golden Ball Junction – Base Traffic Flows 2015 AM

Figure 4.3: Golden Ball Junction – Base Traffic Flows 2015 PM
Capacity Assessment

An assessment was undertaken on the existing junction layout. A LinSig junction model was created based on existing road geometry, traffic flows and staging plans for the peak hours of 08:00-09:00 and 17:00 – 18:00.

During the morning peak hour no demand was observed on the access serving the Golden Ball car park. During the evening peak a total of 8 vehicles were recorded on this arm of the junction which is equivalent to one vehicle movement for every five cycles of the traffic signals. It is therefore appropriate to exclude this stage from the overall staging plan. Figure 4.4 and Figure 4.5 illustrates the staging plan used for the base year model scenarios during the AM and PM peak hours.

The junction was observed to operate as Vehicle Actuation (VA) using detectors inserted in the road pavement. LinSig can only model fixed time cycles, and thus provides a picture of the typical operation of the junction. As such through observations on site and detailed review of the video footage captured during the traffic count surveys, the maximum cycle time for the AM and PM peak hour has been used for the base model assessment. These were observed as 110 seconds during the AM peak hour and 80 seconds during the PM peak hour. The existing model has been optimised for PRC.

Table 4.1 below details the results of this assessment which incorporates the following terminology:
Assessment Terminology

**Degree of Saturation (DoS):** The ratio of flow to capacity on a lane. If a lane has a degree of saturation of 90% or over, the link is considered to be over-capacity. Measured as a percentage.

**Mean Max Queue (MMQ):** The sum of the maximum queue on a lane (including uniform, random and oversaturation queues) averaged over all the cycles in the modelled time period. Measured in passenger car units (pcu).

**Delay:** The aggregate delay to all traffic on a lane caused by queuing. Measured in passenger car unit hours (pcu.hrs).

**Practical Reserve Capacity:** A measure of how much additional traffic could pass through the junction whilst maintaining a maximum degree of saturation of 90% on all lanes. Measured as a percentage.

**Total Delay:** The aggregate delay to all traffic at the junction, measured in pcu.hrs.

**Average Delay:** The average delay for every passenger car unit. Measured in seconds per passenger car unit (s/pcu). The delay figures are obtained from total delay figure (pcu.hrs) divided by the summation of the all approach arm flows (pcu) to give the delay for each pcu (hrs), and then multiplied by 3,600 to give the delay for each pcu (secs).

<table>
<thead>
<tr>
<th>Results Per Lane</th>
<th>DoS (%)</th>
<th>MMQ (pcu)</th>
<th>Delay (pcuHr)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>AM</td>
<td>PM</td>
<td>AM</td>
</tr>
<tr>
<td>Glenamuck Road</td>
<td>68.2</td>
<td>72.8</td>
<td>7.9</td>
</tr>
<tr>
<td>R117 Enniskerry Road (North)</td>
<td>70.0</td>
<td>73.7</td>
<td>13.1</td>
</tr>
<tr>
<td>R117 Enniskerry Road (South)</td>
<td>69.9</td>
<td>73.9</td>
<td>8.2</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Results Over All Lanes</th>
<th>Cycle Time (s)</th>
<th>Total Demand (pcu)</th>
<th>Practical Reserve Capacity (%)</th>
<th>Total Delay (pcu.hrs)</th>
<th>Average Delay (s/pcu)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>110</td>
<td>1199</td>
<td>28.6</td>
<td>11.5</td>
<td>34.5</td>
</tr>
</tbody>
</table>

**Table 4.1: Golden Ball Junction – Base Traffic Flows 2015**

The above results indicate that the current junction layout, with single lane approaches on all arms, is adequate to accommodate the base year 2015 flows. In overall junction terms, there is an average delay of 32s/pcu during the AM peak and an average delay of 34s/pcu during the PM peak. The junction is operating well within its capacity with a minimum practical reserve capacity of 21.8% in the PM peak.
Network Model Development

Design Periods and Assessment Years

The LinSig models which have been developed are based on the identified peak hour of 08:00-09:00 and 17:00-18:00. The opening year of the Phase 1 lands has been identified as being 2017. The standard practice for traffic studies is to assess the opening year, opening year + 5 and opening year + 15. However, the objective of this analysis is to demonstrate that a quantum of approximately 1,050 residential units (700 units as per LAP + 50%) can be accommodated on the local road network with the Glenamuck Road junction upgrade, but without the GDDR or GLDR.

For a design year of opening + 15, it would be envisaged that the GDDR and GLDR would be in place. The assessment of this scenario is therefore considered to be beyond the scope of this analysis and the assessment years are thus:
- Opening Year = 2017
- Opening Year + 5 = 2022

Growth rates

In order to assess the future impact of the proposed development land zones, traffic growth rates have been applied for 2017 and 2022. The NRA Project Appraisal Guidelines document “Unit 5.5 Link-Based Traffic Growth Forecasting” has been utilised to determine these growth rates. From this document a medium growth rate for Region 2, Dublin County has been applied.

Based on the growth rates it is estimated that in 2017, traffic growth will increase by 1.8% for light vehicles and 4.5% for heavy vehicles in relation to 2015. By 2022, traffic growth will increase by 5% for light vehicles and 12% for heavy vehicles in relation to 2015.

Trip Generation

The TRICS (Trip Rate Information Computer System) database was utilised to determine the potential trip generation associated with the residential zoned lands. An analysis of the housing types for development sites already planned in the area was carried out to provide an estimate for the zoned lands. This indicated that on an overall basis the zoned lands will consist of approximately 72% housing units, 13% duplex units and 14% apartment units. Table 4.2 below details the associated vehicular arrival and departure rates for each unit type:

<table>
<thead>
<tr>
<th>Land Use</th>
<th>AM</th>
<th>PM</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Arrive</td>
<td>Depart</td>
</tr>
<tr>
<td>Houses / Duplex</td>
<td>0.152</td>
<td>0.406</td>
</tr>
<tr>
<td>Privately Owned</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Apartments</td>
<td>0.049</td>
<td>0.177</td>
</tr>
<tr>
<td>Privately Owned</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Table 4.2: Trip Rates per Residential Unit
Traffic Generation
The arrival and departure traffic during the AM and PM peak hour periods has been estimated for the additional development, as detailed in Table 4.3 below:

<table>
<thead>
<tr>
<th>Areas</th>
<th>Units</th>
<th>AM</th>
<th>PM</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>House/Duplex</td>
<td>Apartment</td>
<td>Arrive</td>
</tr>
<tr>
<td>A, B &amp; C</td>
<td>885</td>
<td>169</td>
<td>143</td>
</tr>
</tbody>
</table>

Table 4.3: Traffic Generation

Traffic Distribution and Assignment
The distribution of development traffic arriving and departing the local road network has been assumed to correspond to existing traffic patterns on the local road network. The extent of the local road network was determined and a cordon created. Five relevant cordon zones were identified (See Figure 4.6 below) and the proportions of existing traffic arriving to and departing from the cordon was calculated. These are as follows:

<table>
<thead>
<tr>
<th>Zone</th>
<th>Road</th>
<th>AM</th>
<th>PM</th>
</tr>
</thead>
<tbody>
<tr>
<td>J</td>
<td>Glenamuck Road East</td>
<td>Arrive (%)</td>
<td>22%</td>
</tr>
<tr>
<td>L</td>
<td>Ballycorus Road</td>
<td>8%</td>
<td>7%</td>
</tr>
<tr>
<td>M</td>
<td>Enniskerry Road South</td>
<td>16%</td>
<td>6%</td>
</tr>
<tr>
<td>N</td>
<td>Bishops Lane</td>
<td>17%</td>
<td>15%</td>
</tr>
<tr>
<td>P</td>
<td>Enniskerry Road North</td>
<td>38%</td>
<td>24%</td>
</tr>
</tbody>
</table>

Table 4.4 – Trip Distribution to Existing Road Network Cordon
An origin and destination matrix was then developed from the demand spreadsheet to determine the distribution of development traffic arriving to the network from each cordon zone to each zoned land plot and departing from each zoned land plot to each cordon zone. A network model reflective of the local road network was then constructed in LinSig. The development traffic distribution flows as determined from the matrix exercise was then input to the network model. The flows were then assigned from the Origin / Destination Matrix to the local area network using the LinSig assignment tool. The development traffic flows at the Golden Ball junction were then determined.
Local Area Network

Figure 4.6 below details the Local Area Network constructed within LinSig. The network incorporates a cordoned area comprising of five external zones, identified in Table 4.4, labelled from J through to P. There are then nine internal zones which correspond to the approximate location of the Phase 1 residential zoned land plots. These are labelled A through to I.
Upgraded Junction Analysis

Upgraded Junction Layout
The proposed upgrade to the Golden Ball junction, as shown on drawing ‘RPO 16-28-01’ generally consists of the following improvements:

- Glenamuck Road Arm: 30m long left turn lane.
- R117 (Southern approach): 40m long right turn lane.
- R117 (Northern approach) 12m long right turn lane.
- Revised staging plan.
- Improved pedestrian crossing incorporated within signalised junction including new crossings on the northern and western sides of Enniskerry Road.
- Cycle lanes / cycle tracks on Glenamuck Road.
- Improved junction geometry.

Junction Model
A cycle time of 120 seconds has been selected for all scenarios. This has been determined as a suitable cycle time from a review of the LinSig cycle time optimiser. The traffic signal junction has been assessed based on optimisation for PRC. The UK Department of Transport Traffic Advisory Leaflet 1/06 recommends that cycle times in excess of 120 seconds are not used, as the overall capacity of the junction could be increased but the delay per vehicle would also be increased.

Planning permission was recently granted by An Bord Pleanala for new development at the Golden Ball Public House that includes access to the site directly from the Golden Ball Public House arm of the traffic signal junction. Therefore this traffic impact assessment includes for this planning approval and access provision.

Whilst the proposed future development zoned lands would be envisaged to notably increase pedestrian demand at the junction, it would not be expected that this demand would be of the order that would see the ‘all pedestrian’ stage called for every cycle during the AM and PM peak hours. Nevertheless, this stage has been conservatively included in the staging plan and assumed to be called up in each cycle of the signals. Figure 4.7 illustrates the modelled staging plan.

![Figure 4.7: Golden Ball Junction – Proposed Staging Plan](image-url)
The upgraded junction was modelled for the following scenarios

- **2015 Base Year:** Base Year Flows
- **2017 Opening Year:** Without Development
- **2017 Opening Year:** With Development
- **2022 Opening Year +5:** Without Development
- **2022 Opening Year +5:** With Development

The Golden Ball arm is operational in all 'With Development' scenarios but is not included in any 'Without Development scenarios, consistent to the base traffic model.

The summary of the junction performance for each of these scenarios is set out below and the relevant junction turning movements, in passenger car units, for the 2017 and 2022 assessment years are illustrated in Appendix A.

### 2015 Base Year

<table>
<thead>
<tr>
<th>Results Per Lane</th>
<th>DoS (%)</th>
<th>MMQ (pcu)</th>
<th>Delay (pcuHr)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>AM</td>
<td>PM</td>
<td>AM</td>
</tr>
<tr>
<td>R117 (N) Right Ahead Left</td>
<td>43.3%</td>
<td>50.6%</td>
<td>8.7</td>
</tr>
<tr>
<td>R117 (S) Right Ahead Left</td>
<td>40.9%</td>
<td>28.1%</td>
<td>4.8</td>
</tr>
<tr>
<td>Glenamuck Road Right Left Ahead</td>
<td>41.0%</td>
<td>50.3%</td>
<td>4.5</td>
</tr>
<tr>
<td>Golden Ball Arm (W) Right Left Ahead</td>
<td>0.0%</td>
<td>0.0%</td>
<td>0.0</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Results Over All Lanes</th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>AM</td>
<td>PM</td>
<td></td>
</tr>
<tr>
<td>Cycle Time (S)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Total Demand (pcu)</td>
<td>1199</td>
<td>1143</td>
<td></td>
</tr>
<tr>
<td>PRC (%)</td>
<td>107.6%</td>
<td>78.0%</td>
<td></td>
</tr>
<tr>
<td>Total Delay (pcuHr)</td>
<td>7.3</td>
<td>9.0</td>
<td></td>
</tr>
<tr>
<td>Average Delay (s/pcu)</td>
<td>21.9</td>
<td>28.4</td>
<td></td>
</tr>
</tbody>
</table>

**Table 4.5: Golden Ball Junction – 2015 Baseline Year Without Development**

The above results indicate that the proposed junction layout improves upon the capacity currently offered by the existing layout, with PRC of the order of 108% for the AM and 78% for the PM. In overall junction terms, delay associated with the existing layout in 2015 indicates an average delay of 35s/pcu during the AM peak and an average delay of 34s/pcu during the PM peak. In comparison, the proposed layout reduces delay during the AM peak to 22s/pcu, an improvement of 37% and to 29s/pcu during the PM peak, an improvement of 15%.
### 2017 Opening Year

<table>
<thead>
<tr>
<th>Results Per Lane</th>
<th>DoS (%)</th>
<th>MMQ (pcu)</th>
<th>Delay (pcuHr)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>AM</td>
<td>PM</td>
<td>AM</td>
</tr>
<tr>
<td>R117 (N) Right Ahead Left</td>
<td>44.1%</td>
<td>51.6%</td>
<td>9.0</td>
</tr>
<tr>
<td>R117 (S) Right Ahead Left</td>
<td>41.7%</td>
<td>29.0%</td>
<td>5.0</td>
</tr>
<tr>
<td>Glenamuck Road Right Left Ahead</td>
<td>42.4%</td>
<td>51.2%</td>
<td>4.6</td>
</tr>
<tr>
<td>Golden Ball Arm (W) Left Right Ahead</td>
<td>0.0%</td>
<td>0.0%</td>
<td>0.0</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Results Over All Lanes</th>
<th>AM</th>
<th>PM</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cycle Time (S)</td>
<td>120</td>
<td>120</td>
</tr>
<tr>
<td>Total Demand (pcu)</td>
<td>1221</td>
<td>1165</td>
</tr>
<tr>
<td>PRC (%)</td>
<td>104.1%</td>
<td>74.4%</td>
</tr>
<tr>
<td>Total Delay (pcuHr)</td>
<td>7.5</td>
<td>9.3</td>
</tr>
<tr>
<td>Average Delay (s/pcu)</td>
<td>21.1</td>
<td>28.7</td>
</tr>
</tbody>
</table>

**Table 4.6: Golden Ball Junction – 2017 Opening Year Without Development**

The results of the 2017 opening year without development for both AM and PM scenarios indicate that the junction is operating comfortably within capacity with PRCs of the order of 104% in the AM and 74% in the PM. The highest DoS estimated from the model is on the R117 (N) at 51.6% during the PM peak, with a corresponding queue of 9.6pcu.

<table>
<thead>
<tr>
<th>Results Per Lane</th>
<th>DoS (%)</th>
<th>MMQ (pcu)</th>
<th>Delay (pcuHr)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>AM</td>
<td>PM</td>
<td>AM</td>
</tr>
<tr>
<td>R117 (N) Right Ahead Left</td>
<td>71.3%</td>
<td>76.9%</td>
<td>16.8</td>
</tr>
<tr>
<td>R117 (S) Right Ahead Left</td>
<td>71.9%</td>
<td>51.3%</td>
<td>10.6</td>
</tr>
<tr>
<td>Glenamuck Road Left Right Ahead</td>
<td>72.4%</td>
<td>76.1%</td>
<td>7.4</td>
</tr>
<tr>
<td>Golden Ball Arm (W) Left Right Ahead</td>
<td>14%</td>
<td>12.3%</td>
<td>0.5</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Results Over All Lanes</th>
<th>AM</th>
<th>PM</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cycle Time (S)</td>
<td>120</td>
<td>120</td>
</tr>
<tr>
<td>Total Demand (pcu)</td>
<td>1556</td>
<td>1540</td>
</tr>
<tr>
<td>Practical Reserve Capacity (%)</td>
<td>24.4%</td>
<td>17.0%</td>
</tr>
<tr>
<td>Total Delay (pcuHr)</td>
<td>17.2</td>
<td>17.8</td>
</tr>
<tr>
<td>Average Delay (s/pcu)</td>
<td>39.8</td>
<td>41.6</td>
</tr>
</tbody>
</table>

**Table 4.7: Golden Ball Junction – 2017 Opening Year With Development**

The 2017 with development scenario also operates well within capacity. It can be seen that the peak hours are being impacted due to more development traffic being distributed through the Golden Ball junction during this peak hour. The PRC during the AM peak is in the order of 24% and 17% during the PM peak. The highest recorded DoS occurs on the R117 (N)
approach to the junction, at 77% during the PM peak, with a corresponding queue of 15.3pcu.

In comparison to the 2015 baseline existing junction, the AM peak average delay for the junction in this scenario is 40s/pcu as opposed to 35s/pcu. During the PM peak average delay is 42s/pcu as opposed to 34s/pcu.

2022 Opening Year +5

<table>
<thead>
<tr>
<th>Results Per Lane</th>
<th>DoS (%)</th>
<th>MMQ (pcu)</th>
<th>Delay (pcuHr)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>AM</td>
<td>PM</td>
<td>AM</td>
</tr>
<tr>
<td>R117 (N) Right Ahead Left</td>
<td>46.1%</td>
<td>54.0%</td>
<td>9.6</td>
</tr>
<tr>
<td>R117 (S) Right Ahead Left</td>
<td>45.0%</td>
<td>30.8%</td>
<td>5.5</td>
</tr>
<tr>
<td>Glenamuck Road Right Left Ahead</td>
<td>44.5%</td>
<td>53.7%</td>
<td>4.9</td>
</tr>
<tr>
<td>Golden Ball Arm (W) Left Right Ahead</td>
<td>0.0%</td>
<td>0.0%</td>
<td>0.0</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Results Over All Lanes</th>
<th>AM</th>
<th>PM</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cycle Time (S)</td>
<td>120</td>
<td>120</td>
</tr>
<tr>
<td>Total Demand (pcu)</td>
<td>1282</td>
<td>1221</td>
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<tr>
<td>Practical Reserve Capacity (%)</td>
<td>95.1%</td>
<td>66.8%</td>
</tr>
<tr>
<td>Total Delay (pcuHr)</td>
<td>8.1</td>
<td>9.9</td>
</tr>
<tr>
<td>Average Delay (s/pcu)</td>
<td>22.8</td>
<td>29.2</td>
</tr>
</tbody>
</table>

Table 4.8: Golden Ball Junction – 2022 Design Year Without Development

The results of the 2022 without development for both AM and PM scenarios illustrates that the junction is operating comfortably within capacity with PRCs of the order of 95% during the AM peak and 67% during the PM peak. The highest DoS estimated from the model is on the R117 (N) arm at 54.0% during the PM peak.
<table>
<thead>
<tr>
<th>Results Per Lane</th>
<th>DoS (%)</th>
<th>MMQ (pcu)</th>
<th>Delay (pcuHr)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>AM</td>
<td>PM</td>
<td>AM</td>
</tr>
<tr>
<td>R117 (N) Right Ahead Left</td>
<td>74.0%</td>
<td>79.6%</td>
<td>17.9</td>
</tr>
<tr>
<td>R117 (S) Right Ahead Left</td>
<td>77.9%</td>
<td>54.2%</td>
<td>11.6</td>
</tr>
<tr>
<td>Glenamuck Road Right Left Ahead</td>
<td>74.6%</td>
<td>78.4%</td>
<td>7.8</td>
</tr>
<tr>
<td>Golden Ball Arm (W) Left Right Ahead</td>
<td>14%</td>
<td>12.3%</td>
<td>0.5</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Results Over All Lanes</th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Cycle Time (s)</td>
<td>AM</td>
<td>PM</td>
</tr>
<tr>
<td>Total Demand (pcu)</td>
<td>1617</td>
<td>1596</td>
</tr>
<tr>
<td>Practical Reserve Capacity (%)</td>
<td>15.6%</td>
<td>13.1%</td>
</tr>
<tr>
<td>Total Delay (pcuHr)</td>
<td>18.7</td>
<td>19.1</td>
</tr>
<tr>
<td>Average Delay (s/pcu)</td>
<td>41.6</td>
<td>43.1</td>
</tr>
</tbody>
</table>

Table 4.9: Golden Ball Junction – 2022 Design Year With Development

The 2022 with development scenario also operates well within capacity. The peak hours are being impacted due to more development traffic being distributed through the Golden Ball junction during this peak hour. The PRC during the AM peak is 16% and 13% during the PM peak. The highest recorded DoS occurs on the R117 (N) approach arm in the AM at 79.6% with an associated queue of 17.9pcu.

Comparing the 2022 ‘with development’ scenario to the 2015 baseline existing junction, the AM peak average delay per vehicle is 42s as opposed to 35s/pcu. During the PM peak, average delay is 43s/pcu as opposed to 34s/pcu. This represents an increase in overall average delay at the junction of 20% during the AM and 26% during the PM when compared to the baseline year of the existing junction.

**Conclusion**

This analysis demonstrates that the proposed upgraded junction layout at the Golden Ball junction can adequately cater for both the increase in background traffic and the additional development traffic of approximately 1050 residential units distributed onto the local road network as associated with the initial phase of development of residential zoned lands outlined in the Glenamuck LAP.

**Delay**

Comparing the 2022 ‘with development’ scenario to the 2015 base year existing junction, the AM peak average delay per vehicle is 42s as opposed to 35s, this represents an increase of 20%. The average delay during the PM peak is 43s as opposed to 34s, representing an increase of 26% during the PM over the baseline year of the existing junction.

20
Practical Reserve Capacity

Comparing the 2022 'with development' scenario to the 2015 baseline existing junction, the AM peak PRC for the junction is 15.6% as opposed to 28.6% and 13.1% compared with 21.8% during the PM peak. Therefore the 2022 scenario offers slightly reduced capacity during both the AM and PM peaks but the upgraded junction still operates well within capacity.

Based on these findings it can be concluded that the upgrade of the Golden Ball junction can adequately cater for the additional traffic generated prior to the opening of the Glenamuck District Distributor Road and the Glenamuck Link Distributor Road.
Chapter 5: Impact on Human Beings

5.1 Construction Phase

Impacts on human beings during the construction phase that may be potentially relevant include:

- Short-term negative impacts due to temporary traffic management to facilitate construction works;
- Short-term negative impacts on the immediate environment due to locally concentrated noise and dust;
- Positive impacts due to construction employment and local expenditure by those working on the scheme;
- Positive impacts due to the purchases of local materials and services.

5.2 Operational Phase: Impact on Vehicular Traffic

The proposed scheme will have a positive impact on road safety with improved alignment, greater forward visibility increased turning lane provision. There will be an overall positive impact on journey times due to improved traffic control measures and increased junction capacity. Photo 5.1 below illustrates the pinch point bend on Glenamuck Road that will be removed as part of the proposed scheme.

![Photo 5.1: ‘Pinch Point’ - to be removed](image-url)
5.3. Operational Phase: Impact on Vulnerable Road Users

There will be an overall positive impact on road safety for vulnerable road users, with the provision of dedicated cycle lanes and footways along the extents of the scheme on Glenamuck Road. A widened southern footpath will be provided and a new northern footpath will extend the existing footpath that currently terminates at the entrance to Cromlech Close. The provision of new controlled crossings, new and widened footways, tactile paving and dropped kerbs at all controlled and uncontrolled crossing points will have an overall positive impact on visually and mobility impaired road users.

5.4. Operation Phase: Impact on Modal Split and Public Transport

The scheme will have an overall positive impact on healthier and more sustainable modes of travel through the improvement (and hence encouragement) of pedestrian and cycling facilities.

It is proposed to remove one bus stop on Glenamuck Road as part of the proposed scheme. This bus stop (No. 3279) is located on the westbound side of Glenamuck Road approximately 55m from the Enniskerry Road junction and serves Route No.63 (Dun Laoghaire towards Kilternan) only. Due to the proximity of this stop to the terminus of this route at Ballycorus Road, it is most likely that passengers will mainly be getting off the bus at this stop and that very few passengers will be boarding. There would be minimal inconvenience to bus users if this stop is removed as there is another bus stop serving this route (Stop No. 3478) located on the Enniskerry Road just 45m south of the Glenamuck Road junction (i.e approximately 100metres away). For safety and traffic capacity reasons it is considered appropriate to remove this bus stop.

Photo 5.2 – Bus Stop No. 3279 on Glenamuck Road – to be removed
Bus Stop No. 3478 on Enniskerry Road – to remain in service
Chapter 6: Environmental Issues

Introduction

This chapter outlines the effects of the scheme and proposes mitigation measures required to ameliorate these effects, under the following headings:

- (a) Noise & Vibration
- (b) Air Quality and Climate;
- (c) Hydrology & Hydrogeology;
- (d) Soils & Geology

6.1 Noise and Vibration

There are no material impacts predicted in terms of noise and vibration levels. Due to the low speeds in this urban environment the impact of increased noise and vibration on the adjacent properties is predicted to be negligible.

During the construction works, noise and vibration levels will be increased; however these will be monitored as part of the construction contract and maximum levels will be subject to the limitations dictated by industry standards and best practice most suitable to the proposed site. Normal working times will, in general, be during daytime hours 08:00 to 19:00hrs Monday to Friday and 08.00 to 14.00 hrs on Saturday (no works on Sundays or Bank Holidays). Works other than the pumping out of excavations, security and emergency works will not be undertaken outside these working hours without the written permission of the Engineer.

6.2 Air Quality and Climate

There is no material longer term negative impact predicted in terms of air quality. In the short term the road will be subject to an increase in traffic due to earlier stages of development of lands within the Kiltiernan / Glenamuck Local Area Plan (2013). However the substantive development of the Local Area Plan lands will not take place until the Glenamuck District Distributor Road and the Glenamuck Link Distributor Road have been constructed. The roads are planned to substantially remove through traffic volumes along Glenamuck Road and Enniskerry Road.

The improvements in cycle and pedestrian infrastructure should result in the scheme having an overall positive impact on climate, through the encouragement of these environmentally-friendly modes of travel.

A localised, concentrated and short-term decline in air quality may be expected with any construction project due to dust etc. during the works, however this will be appropriately mitigated through the use of dust suppression where necessary.
6.3. Hydrology and Hydrogeology

Following a desktop study of current and historical mapping the proposed scheme does not impact on any known open water channels. Any existing groundwater features will be investigated during the detailed design stage and the design will take into account any existing groundwater protection schemes, groundwater source protection zones and/or the likely impacts that the scheme may have on groundwater.

The impact of hydrological linkages between the proposed site and potential Natura 2000 sites is addressed in the Provision of Information for Appropriate Assessment Screening.

The road drainage system will be designed in accordance with sustainable urban drainage systems (SUDS) best practice. Surface water will be collected in standard road gullies and will be discharged to the existing ditch on Glenamuck Road at the eastern extent of the proposed scheme. It is intended to include for the construction of the first phase of the SUDS Attenuation Ponds for the future GDDR Scheme within this proposed scheme. This is to be achieved by the construction of Pond G3a as shown on the attached Drawing No. RPO16-28-00. The surface water flows from the existing ditch will be temporarily diverted to this pond for attenuation. The surface water drainage for the full extent of Glenamuck Road West from the Golden Ball Junction to the junction with the future GLDR will be connected to the future GDDR drainage scheme when constructed.

6.4. Soils & Geology

The Kiltiernan / Glenamuck Local Area Plan identifies the soils to the east of Enniskerry Road as generally derived from till of Irish Sea origin. The excavations and soil disturbance required as part of the proposed scheme will be concentrated to small areas for works related to the road widening and retaining wall construction. Excavated and imported soils will be dealt with so as to comply with industry standards and best practice. As such the proposed scheme will have no predicted material impact on the soils of the area.

Granite is a notable feature of the geology of the area around Kiltiernan (which sits within the broader area comprising the Northern Liffey Valley Pluton). Given the relatively shallow road construction depths that would be required as part of the proposed scheme, the impact on this feature is predicted to be minimal. There will be rock removal required for road widening along the northern and southern road boundaries however these volumes are anticipated to be relatively small and, by the very nature of the scheme, very localised.

The detailed design stage of the proposed scheme will include more specific information as to the nature and location of soils and geological features, and their appropriate treatment as required.
Chapter 7: Flora and Fauna

Introduction

This section of the report has been prepared by Faith Wilson (an independent ecological consultant and licensed bat specialist) who was appointed by Dun Laoghaire Rathdown County Council to carry out an ecological impact assessment for the proposed scheme.

7.1 Relevant Legislation

7.1.1 Nature Conservation Designations

International Conservation Designations

The lands proposed for road widening at Glenamuck Road (henceforth referred to as the site) are not currently designated for any nature conservation purposes under international conservation legislation. A number of Natura 2000 designated sites occur within a 15km radius of the site. These include;

- Ballyman Glen SAC (Site Code: 000713)
- Knocksink Wood SAC (Site Code: 000725)
- Bray Head SAC (Site Code: 000714)
- South Dublin Bay SAC (Site Code: 000210)
- North Dublin Bay SAC (Site Code: 000206)
- Glenasmole Valley SAC (Site Code: 001029)
- Glen Of The Downs SAC (Site Code: 00719)
- Wicklow Mountains SAC (Site Code: 002122)
- Rockabill to Dalkey Island SAC (Site Code: 003000)
- Dalkey Islands SPA (Site Code: 004172)
- South Dublin Bay and River Tolka Estuary SPA (Site Code: 004024)
- Wicklow Mountains SPA (Site Code: 004040)
- North Bull Island SPA (Site Code: 004006)

There are nine Special Areas of Conservation (SAC) within a 15km radius of the site as detailed above and shown on Figure 7.1 below. The closest of these is Knocksink Wood SAC, which is c.3.1km to the south. There are four Special Protection Areas (for birds) (SPAs), the closest of these is the Wicklow Mountains SAC, which is within 4.1km to the west.

Special Areas of Conservation (SACs) are habitats of international significance that have been identified by NPWS and submitted for designation to the EU. SAC is a statutory designation, which has a legal basis under the EU Habitats Directive (92/43/EEC) as transposed into Irish law through the European Communities (Natural Habitats) Regulations, 1997, which were amended in 1998, 2005 and 2011. The European Communities (Birds and Natural Habitats) Regulations 2011 consolidate the European Communities (Natural Habitats) Regulations 1997 to 2005 and the European Communities (Birds and Natural Habitats)(Control of Recreational Activities) Regulations 2010, as well as addressing transposition failures identified in the Court of Justice of the European Union (CJEU) judgements.

A Special Protection Area (SPA) is a statutory designation, which has a legal basis under the EU Birds Directive (79/409/EEC). The primary objective of SPAs is to maintain or enhance the favourable conservation status of the birds for which the SPAs have been designated.
**Figure 7.1.** Designated areas in the vicinity of the site at Glenamuck Road (Source: National Parks and Wildlife Service). The indicative location of the site is shown by the red arrow.

**National Conservation Designations**

The boundary of the Dingle Glen pNHA is within 300m of the boundaries of the Kiltiernan – Glenamuck LAP 2013-2019.

Proposed NHAs are habitats or sites of interest to wildlife that have been identified by NPWS. These sites become NHAs once they have been formally advertised and land owners have been notified of their designation. NHAs are protected under the Wildlife (Amendment) Act, 2000, from the date they are formally proposed. NHA is a statutory designation according to the Wildlife (Amended) Act, 2000 and requires consultation with NPWS if any development impacts on a pNHA.

Some of the SAC and SPA sites, and a number of other sites in the general area are designated as proposed Natural Heritage Areas (23 in total). These include:

- Ballybetagh Bog pNHA (Site Code: 0001202)
- Ballyman Glen pNHA (Site Code: 000713)
- Booterstown Marsh pNHA (Site Code: 001025)
- Bray Head pNHA (Site Code: 000714)
- Dalkey Coastal Zone And Killiney Hill pNHA (Site Code: 001206)
- Dargle River Valley pNHA (Site Code: 001754)
- Dingle Glen pNHA (Site Code: 001207)
- Dolphins, Dublin Docks pNHA (Site Code: 000201)
- Fitzsimon’s Wood pNHA (Site Code: 001703)
- Glen of the Downs pNHA (Site Code: 000719)
- Glenasmole Valley pNHA (Site Code: 001209)
- Glencree Valley pNHA (Site Code: 001755)
- Grand Canal pNHA (Site Code: 002104)
- Great Sugarloaf pNHA (Site Code: 001769)
- Kilmacanogue Marsh pNHA (Site Code: 000724)
- Knocksink Wood pNHA (Site Code: 000725)
- Loughlinstown Woods pNHA (Site Code: 001211)
- Lugmore Glen pNHA (Site Code: 001212)
- North Dublin Bay pNHA (Site Code: 000206)
- Powerscourt Waterfall pNHA (Site Code: 001767)
NHAs are considered to be of national importance, while SACs and SPAs are of international importance for nature conservation.

A report for Screening for Appropriate Assessment to assess any potential impacts of the proposed development on any Natura 2000 sites has been completed for the project.

7.1.2 Bats

Eleven species of bats occur in Ireland and all are protected under both national and international law.

Wildlife Act 1976
In the Republic, under Schedule 5 of the Wildlife Act 1976, all bats and their roosts are protected by law. It is unlawful to disturb either without the appropriate licence. The Act was amended in 2000.

Bern and Bonn Convention
Ireland has also ratified two international conventions, which afford protection to bats amongst other fauna. These are known as the 'Bern' and 'Bonn' Conventions. The Convention on the Conservation of European Wildlife and Natural Habitats (Bern Convention 1982), exists to conserve all species and their habitats, including bats. The Convention on the Conservation of Migratory Species of Wild Animals (Bonn Convention 1979, enacted 1983) was instigated to protect migrant species across all European boundaries, which covers certain species of bat.

EU Habitats Directive
All bat species are given strict protection under Annex IV of the EU Habitats Directive, whilst the lesser horseshoe bat (Rhinolophus hipposideros) and greater horseshoe bat (Rhinolophus ferrumequinum) are given further protection under Annex II of the EU Habitats Directive. Both are listed as a species of community interest that is in need of strict protection and for which E.U. nations must designate Special Areas of Conservation (SACs). The latter is only known from a single site and no breeding populations have been recorded to date. The former are a species of the western seaboard of Ireland and have not yet been recorded on the east coast.

The principal pressures on Irish bat species have been identified as follows:

- urbanized areas (e.g. light pollution);
- bridge/viaduct repairs;
- pesticides usage;
- removal of hedges, scrub, forestry;
- water pollution;
- other pollution and human impacts (e.g. renovation of dwellings with roosts);
- infillings of ditches, dykes, ponds, pools and marshes;
- management of aquatic and bank vegetation for drainage purposes;
- abandonment of pastoral systems;
- speleology and vandalism;
- communication routes: roads; and
- inappropriate forestry management.
7.1.3 **Badgers**

Badgers (Meles meles) are common and widespread in Ireland, and are found in all lowland habitats where the soil is dry and not subject to flooding (Hayden and Harrington, 2000). Badgers are social animals that live in complex underground tunnel systems called setts. Badger territories may vary in size from about 60-200 ha (Smal, 1995).

Badgers and their setts legally are protected under the provisions of the Wildlife Act, 1976, and the Wildlife Amendment Act, 2000. It is an offence to intentionally kill or injure a protected species or to wilfully interfere with or destroy the breeding site or resting place of a protected wild animal. It is standard best practice to ensure that mitigation measures are taken to limit impacts on badgers and badger populations during developments.

The removal of badgers from affected setts and subsequent destruction of these setts must be conducted under licence by experienced badger experts or other suitably qualified personnel. The National Parks and Wildlife Service (NPWS) of the Department of the Environment, Heritage and Local Government grant licences to the experts undertaking the badger operations and not to the developer or contractor. An application for a wildlife licence should be submitted to the NPWS with the relevant ecological information from the detailed badger survey. At least three weeks is normally required to process a licence application, but early discussions with NPWS can expedite the procedure. Conditions are usually attached to each wildlife licence granted in respect of badgers. It is normal practice to impose seasonal constraints e.g. that breeding setts are not interfered with or disturbed during the badger breeding season (December to June inclusive). No active sett should be interfered with or disturbed during the breeding season as any sett category may contain cubs. Closure of setts during the breeding season requires monitoring to demonstrate no sett activity occurs.

7.1.4 **Invasive Species**

Until recently there has been no legal framework for the control or eradication of non-native invasive species in the Republic of Ireland. The Birds and Habitats Regulations (2011) which were signed on 21st September 2011 by the then Minister for Arts, Heritage and the Gaeltacht Jimmy Deenihan, included new legislation on invasive and non-native species in Sections 49 and 50. Sections 49 and 50 have not yet been legally implemented as they have implications for members of the pet and horticultural trades and consultation with these groups is ongoing. It is expected that these new regulations will come into place soon.

Since then the EU Regulation on Invasive Alien Species (EU Regulation 1143/2014) also came into force on the 3rd August 2016.

*The plant and animal species to which the Birds and Habitats Regulations (2011) apply are presented in Schedule Three. Part 1 details the plants species, while Part 3 outlines those animal or plant vector materials and are presented below. Species encountered during the site visit are highlighted in yellow.*
### Third Schedule: Part 1 Plants

Non-native species subject to restrictions under Regulations 49 and 50.

<table>
<thead>
<tr>
<th>First column</th>
<th>Second column</th>
<th>Third column</th>
</tr>
</thead>
<tbody>
<tr>
<td>Common name</td>
<td>Scientific name</td>
<td>Geographical application</td>
</tr>
<tr>
<td>American skunk-cabbage</td>
<td><em>Lysichiton americanus</em></td>
<td>Throughout the State</td>
</tr>
<tr>
<td>A red alga</td>
<td><em>Grateloupia doryphora</em></td>
<td>Throughout the State</td>
</tr>
<tr>
<td>Brazilian giant-rhubarb</td>
<td><em>Gunnera manicata</em></td>
<td>Throughout the State</td>
</tr>
<tr>
<td>Broad-leaved rush</td>
<td><em>Juncus planifolius</em></td>
<td>Throughout the State</td>
</tr>
<tr>
<td>Cape pondweed</td>
<td><em>Aponogeton distachyos</em></td>
<td>Throughout the State</td>
</tr>
<tr>
<td>Cord-grasses</td>
<td><em>Spartina</em> (all species and hybrids)</td>
<td>Throughout the State</td>
</tr>
<tr>
<td>Curly waterweed</td>
<td><em>Lagarosiphon major</em></td>
<td>Throughout the State</td>
</tr>
<tr>
<td>Dwarf eel-grass</td>
<td><em>Zostera japonica</em></td>
<td>Throughout the State</td>
</tr>
<tr>
<td>Fanwort</td>
<td><em>Cabomba caroliniana</em></td>
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</tr>
<tr>
<td>Floating pennywort</td>
<td><em>Hydrocotyle ranunculoides</em></td>
<td>Throughout the State</td>
</tr>
<tr>
<td>Fringed water-lily</td>
<td><em>Nymphoides peltata</em></td>
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</tr>
<tr>
<td>Common name</td>
<td>Scientific name</td>
<td>Geographical application</td>
</tr>
<tr>
<td>----------------------</td>
<td>--------------------------</td>
<td>--------------------------</td>
</tr>
<tr>
<td>Giant hogweed</td>
<td><em>Heracleum mantegazzianum</em></td>
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</tr>
<tr>
<td>Giant knotweed</td>
<td><em>Fallopia sachalinensis</em></td>
<td>Throughout the State</td>
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<tr>
<td>Giant-rhubarb</td>
<td><em>Gunnera tinctoria</em></td>
<td>Throughout the State</td>
</tr>
<tr>
<td>Giant salvinia</td>
<td><em>Salvinia molesta</em></td>
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<tr>
<td>Himalayan balsam</td>
<td><em>Impatiens glandulifera</em></td>
<td>Throughout the State</td>
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<tr>
<td>Himalayan knotweed</td>
<td><em>Persicaria wallichii</em></td>
<td>Throughout the State</td>
</tr>
<tr>
<td>Hottentot-fig</td>
<td><em>Carpobrotus edulis</em></td>
<td>Throughout the State</td>
</tr>
<tr>
<td>Japanese knotweed</td>
<td><em>Fallopia japonica</em></td>
<td>Throughout the State</td>
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<tr>
<td>Large-flowered waterweed</td>
<td><em>Egeria densa</em></td>
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<tr>
<td>Mile-a-minute weed</td>
<td><em>Persicaria perfoliata</em></td>
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</tr>
<tr>
<td>New Zealand pigmyweed</td>
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<tr>
<td>Parrot’s feather</td>
<td><em>Myriophyllum aquaticum</em></td>
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<tr>
<td>First column</td>
<td>Second column</td>
<td>Third column</td>
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<tr>
<td>Rhododendron</td>
<td><em>Rhododendron ponticum</em></td>
<td>Throughout the State</td>
</tr>
<tr>
<td>Salmonberry</td>
<td><em>Rubus spectabilis</em></td>
<td>Throughout the State</td>
</tr>
<tr>
<td>Sea-buckthorn</td>
<td><em>Hippophae rhamnoides</em></td>
<td>Throughout the State</td>
</tr>
<tr>
<td>Spanish bluebell</td>
<td><em>Hyacinthoides hispanica</em></td>
<td>Throughout the State</td>
</tr>
<tr>
<td>Three-cornered leek</td>
<td><em>Allium triquetrum</em></td>
<td>Throughout the State</td>
</tr>
<tr>
<td>Wakame</td>
<td><em>Undaria pinnatifida</em></td>
<td>Throughout the State</td>
</tr>
<tr>
<td>Water chestnut</td>
<td><em>Trapa natans</em></td>
<td>Throughout the State</td>
</tr>
<tr>
<td>Water fern</td>
<td><em>Azolla filiculoides</em></td>
<td>Throughout the State</td>
</tr>
<tr>
<td>Water lettuce</td>
<td><em>Pistia stratiotes</em></td>
<td>Throughout the State</td>
</tr>
<tr>
<td>Water-primrose</td>
<td><em>Ludwigia (all species)</em></td>
<td>Throughout the State</td>
</tr>
<tr>
<td>Waterweeds</td>
<td><em>Elodea (all species)</em></td>
<td>Throughout the State</td>
</tr>
<tr>
<td>Wireweed</td>
<td><em>Sargassum muticum</em></td>
<td>Throughout the State</td>
</tr>
</tbody>
</table>
Other Invasive Species
The main guidance document that has been prepared dealing with invasive species/noxious weeds on sites is the NRA ‘Guidelines on The Management of Noxious Weeds and Non-Native Invasive Plant Species on National Roads’ which was published in 2010. This document details other non-native species of note. A detailed survey for such species was conducted.

7.1.5 Fisheries
The proposed development site is located within the Loughlinstown-Coastal river catchment. According to the EPA Envision Map Viewer, there are no rivers on or immediately adjacent to the proposed development site. The nearest watercourse to the proposed development site is the Glenamuck Stream, which is located to the east of the townland of Glenamuck Road South. The Glenamuck Stream converges with the Carrickmines Stream, which flows for c. 3.2km until it reaches Shanganagh River. The Shanganagh River ultimately flows into Killiney Bay at Shankhill. The water quality of the Glenamuck Stream is currently unknown. The water quality of the Shanganagh River is classified as ‘Good’ (i.e. Q4), as recorded at the Bridge of Carns (Heron Ford Lane) monitoring station located c. 2.4km downstream of the proposed development site. The water quality of the Killiney Bay coastal waterbody is ‘Unpolluted’. As such, there have been no breaches of the EPA’s threshold values for nutrient enrichment, accelerated plant growth, or disturbance of the level of dissolved oxygen normally present under the EPA’s “Trophic Status Assessment Scheme” classification (EPA 2015).

Inland Fisheries Ireland report that the Loughlinstown system is exceptional in that it is an urban river system which supports both migratory sea trout as well as resident brown trout and note that salmonid waters constraints apply to any development works within the catchment.

7.1.6 Survey Constraints
The site surveys were conducted during the optimum time for conducting badger and other large mammal surveys, which is December–March, as the likelihood of detecting both setts and signs of badger/large mammal activity diminishes during the summer months as vegetation cover increases.

The habitat assessment and botanical surveys were completed during the early flowering period for plants. The breeding bird season had begun.

There was difficulty in accessing the lands to the rear of the hedgerow on the northern side of Glenamuck Road and the presence of invasive species within the grounds of the property in this location cannot be ruled out.
7.2 **Methodology**

7.2.1 **Project Description**

It is proposed to upgrade the Enniskerry Road / Glenamuck Road Junction generally as shown on Figure 7.2 below. This will necessitate the removal of existing trees and banks of natural vegetation on the northern and southern side of the junction.

![Figure 7.2 Extent of proposed upgrade works.](image)

7.2.2 **Desk Study**

A desk study was carried out to collate the available information on the ecological environment potentially impacted by the proposed development. The National Parks and Wildlife Service (NPWS) of the Department of Arts, Heritage, Regional, Rural and Gaeltacht Affairs (DAHRRGA) database of designated conservation areas and NPWS records of rare and protected plant species were checked with regard to the location of the proposed development.

Information on protected species of fauna and flora listed for protection under Annex II of the EU Habitats Directive (92/43/EEC), Annex I of the Birds Directive (79/409/EEC) and the Wildlife (Amendment) Act (2000) was also sought from NPWS and published sources. Recent, high resolution, colour aerial photographs were also used to identify and map potential habitats.
7.2.3 Field Surveys

The site was visited in April 2017 when the receiving habitats were surveyed and a breeding bird and mammal survey was completed.

Habitat & Botanical Survey
The habitats present were recorded and described to level 3 (Fossitt, 2000) and a check was made for the presence of any invasive species as described above.

Mammal Surveys

Bat Survey
The bat survey consisted of several elements – a desktop review and consultation with Bat Conservation Ireland, an inspection of trees within the site for their potential to support roosting bats and an inspection of the stone walls due for demolition for their potential to support roosting bats.

The aims of the surveys were to determine the potential use of mature trees and other habitats in the site as roosting sites.

The bat surveys were carried out by Faith Wilson, a licensed bat specialist and consisted of an external inspection of the trees and stone walls present.

Trees potentially impacted by the scheme were assessed for their potential use by bats using the following standard criteria, which were created by bat specialists from Bat Conservation Ireland for use in the assessments of tree roosts on large infrastructural projects and are summarised in NRA (2006):

- Presence or absence of bat droppings (these can be hard to find amongst leaf litter or may be washed away following periods of wet weather),
- Bat droppings may also be seen as a black streak beneath holes, cracks, branches, etc.,
- Presence or absence of smooth edges with dark marks at potential entrances to roosts,
- Presence or absence of urine stains at potential entrances to roosts,
- Presence of natural cracks and rot holes in the trunk or boughs of the tree,
- Hollow trees,
- Presence or absence of creepers such as ivy or honeysuckle on trees (ivy clad trees are often used by bat species such as pipistrelles as roosts),
- Presence or absence of loose bark such as that of sycamore, or flaky bark on coniferous species such as cedars, cypress and Scot’s pine,
- Presence or absence of bracket fungi which may indicate a rotten or potentially hollow centre to the tree,
- Known bat roosts previously identified,
- Trees with storm or machinery damage or broken boughs,
- Clutter level - where the branches and trunk are easily accessible, this is considered a better tree for bat roosts,
- Adjoining habitat - if there are a variety of feeding opportunities for bats, this increases the potential of a tree as a bat roost,
- Adjoining potential roosts / known roosts. This raises the likelihood of a tree being of benefit as bats may move roosts if the roost becomes too hot or cold during roosting and a nearby alternative roost is highly desirable.
Badger Survey
A badger survey was conducted in the general environs of the working area of the site by searching for signs of badger activity. These include setts, old bedding material, feeding signs, latrines, badger tracks or paw prints, badger paths and badger hair caught on vegetation or fences. The survey was carried out by an experienced mammal specialist in accordance with best practice as described in the ‘Ecological Surveying Techniques for Protected Flora and Fauna during the Planning of National Road Schemes’ (NRA 2009) and ‘Guidelines for the treatment of badgers prior to the construction of National Road Schemes’ (NRA 2005).

Breeding Birds
The breeding bird season was well underway and birds were recorded during the course of the site visit.

7.3. Results
7.3.1 Field Surveys
The lands adjoining Glenamuck Road include a private residence and grounds to the north (Greenmount House), the DLRCC housing development at Cromlech Close and the grounds of a sports facility (derelict changing facility and playing pitch) and unmanaged lands adjoining the Kilternan Country Market property to the south.

A remnant treeline (WL2) of mature and semi-mature trees is located on the top of a steep embankment on the southern side of the road. A stone wall (BL1) forms the boundary of the Kilternan Country Market property. The treeline adjoins a small area of neutral grassland (GS1), an area of dry grassy verge vegetation (GS2), a copse of mixed broadleaved woodland (WD1) and an area of bramble scrub (WS1).

The main tree species present in the treeline which are potentially impacted by the proposed road widening include: mature and semi-mature Sycamore (Acer pseudoplatanus), Ash (Fraxinus excelsior), Elm (Ulmus sp.), Willows (Salix cinerea subsp. atrocinerea), hawthorn (Crataegus monogyna), elder (Sambucus nigra) and gorse (Ulex europaeus).

The stone wall along the Enniskerry Road and the boundary of the Kilternan Country Market is mostly covered in dense ivy (Hedera helix) and bramble (Rubus fruticosus agg.), with occasional wall rue (Asplenium ruta-muraria). At the base of the wall is a number of opportunistic ruderal species including garlic mustard (Alliaria petiolata), herb robert (Geranium robertianum), groundsel (Senecio vulgaris), spear thistle (Cirsium vulgaris), cleavers (Galium aparine), dandelion (Taraxacum agg.), and meadow grass (Poa annua).

An area of grassland best described as dry meadows and grassy verges (GS2) is found between the stone wall and the boundary of the Kilternan Country Market. This is dominated by coarse grasses including cock’s-foot (Dactylis glomerata), creeping bent (Agrostis stolonifera), Yorkshire fog (Holcus lanatus), creeping buttercup (Ranunculus repens), meadow buttercup (Ranunculus acris), creeping thistle (Cirsium arvense), docks (Rumex sp.), hogweed (Heracleum sphondylium), dandelion, ribwort plantain (Plantago lanceolata), chickweed (Stellaria media), white clover (Trifolium repens), bush vetch (Vicia sepium), lesser celandine (Ficaria verna), red clover (Trifolium pratense) and yarrow (Achillea millefolium). This area is becoming invaded by dense bramble scrub (WS1).

A pathway of hard-core chippings and tarmacad leads from a turnstile in the wall, which traverses through this area, to the derelict changing rooms and the playing grounds.
There is a height difference of c2m from the top of the bank to the Glenamuck Road which is in a cutting below. The grassland on north facing slope of the cutting (below the treeline) has a greater diversity species on account of leaching and is more species rich. Species encountered here include hairy bittercress (*Cardamine hirsuta*), creeping cinquefoil (*Potentilla reptans*), creeping buttercup, red fescue (*Festuca rubra*), yarrow, bird’s foot-trefoil (*Lotus corniculatus*), tufted vetch (*Vicia cracca*), common dog violet (*Viola riviniana*), ivy, sorrel (*Rumex acetosa*), lords and ladies (*Arum maculatum*), sycamore seedlings, hedge bedstraw (*Galium mollugo*), nipplewort (*Lapsana communis*), enchanter’s-nightshade (*Circaea lutetiana*), garlic mustard, barren strawberry (*Potentilla sterilis*) and greater stitchwort (*Stellaria holostea*). Several well worn animal tracks were noted on this slope.

Adjoining the pathway to the playing pitches is a small copse of mixed broadleaved woodland (WD1). The trees present here include oak (*Quercus* sp.), sycamore and Beech (*Fagus sylvatica*). The ground flora includes greater stitchwort, lesser celandine, ivy, hogweed, cow parsley (*Anthriscus sylvestris*), cleavers and pignut (*Conopodium majus*). The area is well used by wildlife and is criss-crossed by animal tracks. Fox was confirmed from its droppings.

A remnant hedgerow (WL1) forms the boundary of a private residence (Greenmount House) above a steep earthen bank on the northern side. This is mostly dominated by understorey species such as cherry laurel (*Prunus laurocerasus*) and wych elm (*Ulmus glabra*), and garden shrubs.

A steep earthen bank south facing bank below the hedgerow is quite shaded and is dominated in places by the non-native invasive species winter heliotrope (*Petasites fragrans*) with occasional garlic mustard, cleavers, ivy, bush vetch, dandelion, bramble and pheasantberry (*Leycesteria formosa*). A semi-mature beech tree is found at the western end near Cromlech Close. Some of the bank is faced with stone. Near the entrance to Greenmount House is a large stand of Japanese knotweed (*Fallopia japonica*).

**Invasive Species**
The presence of Japanese knotweed (*Fallopia japonica*), cherry laurel (*Prunus laurocerasus*) and winter heliotrope (*Petasites fragrans*) were all confirmed during the site visit and are in need of a dedicated eradication/control strategy particularly during the construction phase. Both Japanese knotweed and winter heliotrope can be easily spread during site works unless biosecurity measures are put in place. It is possible that other stands of Japanese knotweed are present within the grounds of Greenmount House much of which is overgrown and there were difficulties in accessing same.

**Birds**
A good variety of common bird species were recorded during the survey. These include blackbird (*Turdus merula*), wren (*Troglodytes troglodytes*), robin (*Erithacus rubecula*), dunnock (*Prunella modularis*), song thrush (*Turdus philomelos*), pied wagtail (*Motacilla alba yarrellii*) and mistle thrush (*Turdus viscivorus*).

Other species recorded include; great tit (*Parus major*), coal tit (*Parus ater*), chaffinch (*Fringilla coelebs*), rook (*Corvus frugilegus*), jackdaw (*Corvus monedula*), hooded crow (*Corvus cornix*) and magpie (*Pica pica*). Both feral pigeon (*Columba columba domest.*) and woodpigeon (*Columba palumbus*) were encountered and several flocks of starlings (*Sturnus vulgaris*) are known from the locality.

Summer visitors which had recently arrived include willow warbler (*Phylloscopus trochilus*) and chiff chaff (*Phylloscopus collybita*), while swallows (*Hirundo rustica*) have been recorded locally.
Bats
The Bat Conservation Ireland Database of bat records was searched for records of bats from the Kilternan area. The database does not hold any records of either roosts, ad hoc observations or the results of surveys such as the BATLAS 2010 project and the All Ireland Daubenton’s Monitoring Project from this immediate area but several bat species are known from the 10km square in which the road widening works are located. These include:

- Common pipistrelle (*Pipistrellus pipistrellus*),
- Soprano pipistrelle (*Pipistrellus pygmaeus*),
- Daubenton’s bat (*Myotis daubentonii*),
- Brown long-eared bat (*Plecotus auritus*),
- Leisler’s bat (*Nyctalus leisleri*),
- Whiskered bat (*Myotis mystacinus*),
- Natterer’s bat (*Myotis nattereri*).

There is a maternity roost of soprano pipistrelle bats in an adjoining property (Faith Wilson, pers. obs.) and a single brown long eared bat was also recorded roosting here. Leisler’s bats have been recorded hunting and foraging here. The majority of the trees that will be impacted by the road widening offer limited potential for roosting bats.

Badgers
There was no evidence of badger using the area proposed for the road widening but surveys conducted in the grounds of Rockville House to the east confirmed the presence of three badger setts in close proximity to the proposed road works (Faith Wilson, pers. obs).

Other Mammals
Other mammals known from the general area include hedgehog, fox, brown rat, rabbit, house mouse, long tailed field mouse, grey squirrel and deer.

7.4. **Assessment of Significance**

The main interest in the site is in the mature and semi-mature trees within the treeline and the flora on the bank of neutral grassland. The lands are used by a variety of fauna including badgers, deer and other mammals. These trees, the area of bramble scrub and the grassland habitats provide a locally important habitat for badgers, foxes and bats in terms of cover for hunting and foraging. There is potential for the inadvertent spread of several invasive species unless a management plan is designed and implemented by the contractor.

7.5. **Ecological Impact Assessment**

7.5.1 **Potential Impacts**

Potential impacts on flora and fauna arise during both the Construction and Operational Phases of the proposed development. The activities associated with the proposed development that has the potential to affect the ecology of the site and surrounding area include:

- Direct Habitat Loss;
- Disturbance;
- Fragmentation; and
- Potential Water Pollution.

The main faunal impacts arise as a result of the loss of mature and semi-mature trees adjoining the road which are potentially used by several species of bats for foraging and commuting purposes, foraging and nesting by birds and potential acoustic disturbance to nearby badger setts.

### 7.5.1.1 Construction Phase:

The proposed realignment of the Glenmauck Road is provided for in the Dun Laoghaire Rathdown County Development Plan 2016-2022 and the Kiltiernan – Glenamuck LAP 2013 and there are already permissions in place for a significant number of residential developments in the area as the first phase of development in the new growth node of Kiltiernan – Glenamuck. These developments will ultimately change what was a rural landscape to that of an urban one.

No habitat designated for nature conservation purposes, or plant species protected under the Floral Protection Order 2015, will be impacted by the proposed development of these lands, which would be deemed of local importance for biodiversity.

The construction of the widened road will require the direct removal of several mature and semi-mature trees. For the most part, the trees being removed are of low quality but the works could also potentially result in damage to the roots of retained trees if mitigation measures are not implemented thereby posing a risk to their long term stability and longevity. There is also the potential for damage to retained trees arising from site clearance works unless protective measures are put in place prior to the commencement of construction activities on the site. Several of these trees offer limited potential for roosting bats.

The grasslands that will be lost are generally of low ecological value but given the species diversity of the bank on the southern side of the road widening there are some mitigation measures required here.

The other main potential impacts during this phase arise from the physical disturbance of the soil at and adjacent to the site during construction. There is potential for the spread of invasive and non-native species if biosecurity measures are not implemented. There is also potential for run-off from the site during construction to enter local drains and ultimately the Loughlinstown River (with subsequent implications for water quality and salmonids).

### 7.5.1.2 Operational Phase:

Once constructed the main potential impacts arise from further developments facilitated by the road widening. This ultimately will result in the loss of what was previously a rural and relatively unlit countryside area to an urbanised one. Some species may continue to use the area such as common garden birds and mammals such as fox which adapt readily to urban environments. Some species of bat which are not as light sensitive as others (Leisler’s bat, common and soprano pipistrelle) are likely to continue to use the wider landscape although foraging habitat and quality will be diminished.
7.6. **Proposed Mitigation Measures**

A number of mitigation measures are presented below.

7.6.1 **Sediment Control**

Sediment control practices are used on building sites to prevent sand, soil, cement and other building materials from reaching waterways and water dependent habitats such as the adjoining drainage ditches, reedbeds and saltmarshes. Even a small amount of pollution from a site can cause significant environmental damage by killing aquatic life, silting up streams and blocking storm water pipes. Storm water can contain many pollutants which can enter our local drainage ditches, streams, rivers and marine systems, causing harm to native animals, plants, fish breeding habitats and recreational areas.

Soil erosion, sediment and litter from building sites can be major sources of storm water pollution, and can cause:

- significant harm to the environment e.g. loss of valuable foraging areas in adjoining mudflats for wintering birds
- weed infestation of waterways caused by sediment settling on river beds and transporting nutrients
- loss of valuable topsoil
- significant public safety problems when washed onto roads and intersections
- blocked drains creating flooding and increased maintenance costs
- damage to recreational and commercial fishing

Sediment control usually requires little effort and results in:

* Cleaner waterways and healthier aquatic life.
* Improved site conditions.
* Improved wet weather working conditions.
* Reduced wet weather construction delays.
* Reduced losses from material stockpiles.
* Fewer mud and dust problems.

Good site management in relation to sediment control during the construction phase should prevent this from occurring and possible mitigation measures for consideration are outlined below.

**Minimising site disturbance:**

Prevention is better than cure. Careful design and an efficient construction sequence will minimise disturbance to the site and this has been included in the design rationale for the project. This will both save money and reduce environmental impact.

The project has been designed to avoid excessive cut and fill, unnecessary clearing of vegetation and to preserve existing site drainage patterns. Clear only those areas necessary for building work to occur. Preserve grassed areas and vegetation where possible. This helps filter sediment from storm water run off before it reaches the drainage system and stops rain turning exposed soil into mud. Delay removing vegetation or commencing earthworks until just before building activities start. Avoid building activities that involve soil disturbance during periods of expected heavy or lengthy rainfall.
7.6.2 Protection Measures for Fisheries

Given that the Loughlinstown River which is ultimately downslope and downstream is a salmonid watercourse with the confirmed presence of a number of species listed under Annex II of the EU Habitats Directive various measures will be implemented to ensure that there is no deterioration in water quality or damage to fisheries habitat in this important river.

Although no instream works are proposed the guidelines presented in the Eastern Regional Fisheries Board ‘Requirements for the Protection of Fisheries Habitat during Construction and Development Works at River Sites’ should be reviewed and followed where applicable and the contractor informed of the sensitivity of the catchment. This and other guidance is available from:


7.6.3 Contractor Briefing

All site contractors should be briefed regarding the importance of tree protection for those retained trees adjoining the site. Contractors should also be made aware of the biosecurity risks posed by invasive species such as Japanese knotweed (*Fallopia japonica*) and winter heliotrope (*Petasites fragrans*) to ensure that there are no accidental or unintentional actions conducted during the works that could lead to the introduction or spread of same. Such matters often arise through ignorance or by accident rather than as a result of an intentional action.

7.6.4 Protection Measures for Retained Vegetation and Trees

It is proposed to retain those semi-mature and mature trees adjoining works area. Protective fencing will be erected in advance of any construction works commencing. Fencing will be erected outside the drip-line of the canopy of retained trees along the site boundaries in order to prevent damage by machinery, compaction of soil, etc. in accordance with BS 5837:2012. This will be signed off on by a qualified arborist or ecologist to ensure it has been erected properly before any machinery is allowed on site. No ground clearance, earth moving, stock-piling or machinery movement will occur within these protected areas.

7.6.5 Protection Measures for Birds

Section 40 of the Wildlife Act 1976, as amended by Section 46 of the Wildlife (Amendment) Act 2000, restricts the cutting, grubbing, burning or destruction by other means of vegetation growing on uncultivated land or in hedges or ditches during the nesting and breeding season for birds and wildlife, from 1 March to 31 August. No clearance of vegetation suitable for nesting birds within the site (shrubs, bramble tangles, etc.) will take place during this period. Should such clearance be required than the area proposed for clearance should be inspected by an ecologist to ascertain if any nesting birds are present.
7.6.6 Protection Measures for Bats

It is recommended that as much native vegetation, immature and mature trees are retained surrounding the site as possible. It is likely that these areas support large numbers of invertebrates on which both bats and birds rely for feeding and foraging and also provide cover and shelter for a variety of species.

Felling of potential bat roosts in trees

All trees will be subject to appropriate felling measures as detailed in NRA Guidelines for the Treatment of Bats during the Construction of National Road Schemes (National Roads Authority 2006) once the road widening scheme commences.

Ideally the felling/clearance of trees should be scheduled for the autumn months of September/October when bats are less likely to be using trees. This also avoids the bird breeding season.

The felling of all trees, which have been identified as potential bat roosts must be supervised by a bat specialist holding a bat handling licence issued by the National Parks and Wildlife Service, (Department of Environment, Heritage and Local Government). If bats are encountered they should be removed by the licence holder to a bat box, to be sited on a nearby tree and the NPWS notified.

Identified trees must be felled carefully. Specific advice in relation to individual trees will be given on site by a bat specialist. Gradual dismantling of some mature trees may be necessary to ensure the safety of any bats which may be roosting within significant sized boughs or in the trunk. The tree should be inspected by a bat specialist, and depending on the structure of the tree they may need to be left intact on the ground for 24 hours to allow any bats within them to escape prior to processing.

7.6.7 Protection Measures for Badgers

Although no setts have been identified within the proposed works area there is an active badger sett within close proximity to the changing rooms on the site boundary with Rockville House.

Construction works close to breeding setts can cause serious disturbance to badgers and mortality of cubs. Badgers may be killed or injured by road traffic as they attempt to access their feeding areas. Also although no setts have been identified within the proposed landtake during the present survey badgers create new setts regularly and existing setts may change in terms of breeding status or level of use by badgers. Therefore, in order to ensure that there are no significant changes to the badger territories identified in this Ecological Impact Assessment and the mitigation measures specified, a pre-construction survey should be undertaken prior to the commencement of any works.

During the construction phase of the development activities may pose a temporary threat to badgers or disturb them whilst they are in their sett. This should be mitigated against by adopting some of the following practices.

- The use of noisy plant and machinery in the vicinity of the protection zone should cease at least two hours before sunset
- Security lighting should be directed away from setts
- Chemicals should be stored as far away from the setts and badger paths as possible.
- Trenches must be covered at the end of each working day, or include a means of escape for any animal falling in. (Badgers will continue to use established paths across a site even when construction work has started).
o Any temporarily exposed open pipe system should be capped in such a way as to prevent badgers gaining access as may happen when contractors are off site
o Badger gates may need to be installed in perimeter fencing. If so, specialist advice should be sought.
o Water sources (for badgers) should always be safeguarded
o Trees should be felled away from setts and must not block badger paths

7.6.8 Soil Handling

It is recommended that the topsoil on the leached slopes on the southern side of the scheme is stored for reuse on the project as it potentially contains a rich seed bank of native species.

The soils on the northern side of the scheme are contaminated with winter heliotrope rhizomes and potentially also with Japanese knotweed. These soils should be handled and stored separately and disposed of to a licensed landfill site – they should not be reused on site.

The topsoil and subsoil layers will be stripped, stored and maintained separately. Topsoil from the southern bank will be temporarily stored upon geotextile such as Terram 1000 (www.terram.com). The contractor is to submit proposals for supplier and product, which should be a nonwoven geotextile manufactured from UV stabilised, high tenacity, virgin polypropylene fibres that have been both mechanically and thermally bonded with a minimum of 5 years lifespan in all soil conditions.

Note that soil levels within the root spread of those trees that are to be retained should not be raised.

From this temporary storage heap the species rich topsoil is to be distributed incrementally across the site on the realigned embankments. In general do not firm, consolidate or compact topsoil when laying. Tip and grade to approximate levels in one operation with minimum of trafficking by plant.

Do not mix the topsoil containing the seed bank with: Subsoil, stone, hardcore, rubbish or material from demolition work, other grades of topsoil. Handle the topsoil in the driest condition possible. Do not handle during or after heavy rainfall or when it is wetter than the plastic limit less 3%, to BS 1377-2.

Depending on how long the construction period is expected to last it might be necessary to seed the stored topsoil to prevent weed establishment. A recommended mixture is: 35% Chewings fescue, 35% Slender red fescue, 20% Smooth stalked meadow grass and 10% Brown top bent. This should be applied to the manufacturer’s recommendations (min. 15g/m2) and the following wildflower mix @ 5g/m2 added:

- Native Origin Irish Wildflower Seed Mixture: Range: Meadow Mixtures (Code MM)
- Product Name: MM12 Wild Flora for Raw Impoverished Sub Soil
- Product Code: MM12
- Supplier: Design by Nature www.wildflowers.ie
7.6.9 Invasive Species

The soils on the northern side of the scheme are contaminated with winter heliotrope rhizomes and potentially also with Japanese knotweed. The rhizomes of Japanese knotweed can potentially extend for up to 7m in all directions from where the plant is visible above ground and for up to 3m in depth.

This means the proposed works run the risk of spreading the Japanese knotweed from the gate at Greenmount House unless a detailed invasive species management plan is developed by the contractor and biosecurity measures are implemented. The preparation of same should be completed prior to the commencement of works by the contractor and approved by an ecologist. There is also the potential for further stands of Japanese knotweed to be identified elsewhere within the grounds of Greenmount House so care must be taken to ensure that vegetation is hand cleared initially until all working areas can be fully surveyed for same.

Soils contaminated with invasive species should be handled and stored separately and disposed of to a licensed landfill site – they should not be reused on site.

Soil contaminated with invasive species will be identified and handled as per Invasive Species Ireland Best Practice Management Guidelines/Environment Agency Guidelines for the relevant species.

7.6.10 Landscaping

In addition to the reuse of the stored topsoil with associated seed bank on site there is an opportunity to reinstate linear features such as hedgerows and treelines adjoin the Glenamuck Road. Native Irish species, which have been sourced locally should be used in any planting proposals and should be certified as being of Irish origin to ensure genetic diversity.

7.7 Conclusions

The proposed road widening at Glenamuck Road has been assessed from the perspective of ecology and detailed mitigation measures are presented to reduce impacts on same in the vicinity of the proposed development and surrounding lands.

This report recommends that the above mitigation measures be reflected in the Construction Management Plan/Method Statements prepared for the site and for an ecologist to be engaged to review same prior to the commencement of the development.

Ultimately the Kiltiernan-Glenamuck LAP area of the County is identified for significant commercial, residential and infrastructural development as a new growth area. The road widening at Glenamuck Road is a small element of the wider plan. Ultimately the surrounding lands will be constructed in accordance with the County Development Plan and LAP and this will result in the urbanisation of a previously rural environment with subsequent losses for biodiversity.
7.8. References


Convention on the Conservation of European Wildlife and Natural Habitats (Bern Convention) 1982.


European Commission (2001). *Assessment of plans and projects significantly affecting Natura 200 sites - methodological guidance on the provisions of Article 6(3) and 6 (4) of the Habitats Directive 92/43/EEC.*


National Parks and Wildlife Service Online Database. Available online at [www.npws.ie](http://www.npws.ie)


Natura 2000 Sites - Site Synopsis. Available online at [www.npws.ie](http://www.npws.ie)


Chapter 8: Landscape & Visual Impacts

On Enniskerry Road all works will take place within the existing carriageway cross section, and will result in a negligible visual impact as the proposed works are limited to some relatively small kerb realignments, the revision of road markings and additional controlled pedestrian crossings on the north and west arms of the junction.

The existing Glenamuck Road approach to the Enniskerry Road junction is visually restrictive due to its narrow cross section, pinch point, over-hanging vegetation and limited non-motorised user facilities. This visual aspect is illustrated in Photo 8.1 below.

As part of the proposed scheme the carriageway cross section will be widened through the provision of additional road width for vehicles and bicycles, increased footway provision and improved lighting. These measures will increase the attractiveness of the route to non-motorised road users.

Photo 8.2 below illustrates the current Glenamuck Road as viewed from the Enniskerry Road junction including the recently completed works at Cromlech Close. As part of the widening works the Glenamuck road will be widened by up to 9m on the southern side of the road (right hand side on the photo) and new boundary treatment will be provided along this side of the road (opposite Cromlech Close). A traditional metal Parkland fencing boundary will be provided from the Enniskerry Road junction for a distance of approximately 45 metres and will form the boundary to the Country Market as shown in the Kilternan Neighbourhood Framework Plan. This type of fencing will reinforce the rural character of the area. Beyond
this point a granite boundary wall will be provided for approximately 100 metres to a point opposite the end of the new stone wall to Cromlech Close. This is also in accordance with the ‘Kilternan Neighbourhood Framework Plan’ that indicates a new stone wall along this section to create a ‘Neighbourhood Edge’ to Glenamuck Road. From the end of this new proposed wall to the ‘Rockville House’ boundary the existing grassed side slope will be maintained. This land is within Development Parcel 20 A & B in the Local Area Plan (LAP), and is zoned for medium density residential development. An indicative access point to these lands from Glenamuck Road is shown in the LAP along this section of the road, and this has also been shown on the drawings. This will be further determined during the planning process for these lands in due course.

On the northern side of the road a new section of boundary treatment will be provided for a further 85m beyond the recently constructed boundary wall to Cromlech Close. The road corridor will be widened by up to 6.2m to incorporate the new cycle lanes and footpaths and to improve the road alignment. This will also remove the pinch point (See Photo 8.3 below). The land abutting this section of Glenamuck Road is within Development Parcel 6B in the LAP, and is also zoned for medium density residential development. It is proposed to erect a timber post and rail fence with green plastic coated chainlink mesh along this section of the road at the back of the footpath. The land behind this fencing will be sloped back to maintain a stable side slope and a similar timber post and rail fence will also be provided at the top of the side slope.
Photo 8.3 – area of road widening to east of Cromlech Close wall

The overall visual impact will be a notably wider road corridor with existing grassed embankments and hedgerows to be removed on both sides. This will result in a further urbanised visual appearance of the road corridor following on from the recently completed works at Cromlech Close. This impact is considered appropriate in order to incorporate the required road improvements and in the context of the ongoing development of the Kiltiernan / Glenamuck Local Area Plan lands. This development will see the existing road corridors progressing to a more urban setting as development progresses in the area to ultimately accommodate circa 2500 to 3,000 dwelling units following the construction of the Glenamuck District Distributor Road and Glenamuck Link Distributor Road.
Chapter 9: Architectural, Archaeological and Cultural Heritage

A desktop study was undertaken to identify any architectural, archaeological and cultural heritage structures or sites located proximate to the proposed scheme. Information was obtained from the Department of Arts, Heritage, Regional, Rural and Gaeltacht Affair’s Historic Environment Viewer.

This interactive map-based database provides access to the records of the National Monuments Service records and the National Inventory of Architectural Heritage. The Record of Protected Structures (RPS) as contained in the DLRCC County Development Plan was also referred to during the search.

The research concluded that there were no features within the proposed scheme extents identified within the records of the National Monuments Service or National Inventory of Architectural Heritage.

The Dun Laoghaire Rathdown County Development Plan lists two protected structures located adjacent to the boundary of the proposed scheme extents. These structures are denoted on the extract map from the County Development Plan, shown below, and are described as follows:

- RPS No. 1790 Rockville House, Glenamuck Road: House and Gate Lodge located adjacent Glenamuck Road behind existing boundary wall. (See Photo 9.2 below) The scheme has been specifically located to avoid disturbance to the boundary wall, and hence will result in no impact to the Gate Lodge or the House.

- RPS No. 1793 Entrance Gates to former Kiltiernan Abbey, Enniskerry Road: An entrance gate located adjacent to the Golden Ball Public House. (See Photo 9.1 below) A renewed section of tactile paving to replace the existing will be constructed adjacent to this gate. The works will have no material impact on this protected structure.

Figure 9.1 - Location of Recorded Protected Structures
Photo 9.1 - RPS No. 1793 Entrance Gates to former Kiltiernan Abbey, Enniskerry Road

Photo 9.2 – Entrance Gateway to RPS No. 1790 Rockville House, Glenamuck Road
The LAP notes the presence of the Victorian wall mounted postbox and the built-in stile in the stone boundary wall on Glenamuck Road and that this existing street furniture is to be retained (see photos 9.3 and 9.4 below). These will be incorporated in to the scheme.

Therefore in overall terms the proposed scheme is not predicted to have any negative architectural, archaeological or cultural heritage impacts.
Chapter 10: Construction Phase

10.1 Introduction
This chapter of the Environmental Report outlines the significant environmental effects that may arise during the construction phase. Furthermore the proposed ameliorative measures, which are generally considered in the previous chapters, are also outlined. This chapter deals with the issue of the timescale for construction, locations and operation of the site compounds and details temporary impacts, not previously described, on residents, road users, pedestrians and cyclists.

10.2 Time Scale for Construction
The period of time to complete the proposed road scheme is estimated at 6 months.

10.3 Site Compounds
A site compound will be required in a location to suit the construction activities. This compound will provide office and canteen facilities as well as providing a space for storage of materials and construction plant.

10.4 Impact of Construction Activities
Construction Noise: The construction of the road scheme will cause an increase in local noise levels during working hours. No particularly high noise generating activities such as blasting are anticipated. Contract conditions will limit working hours to daytime, thereby avoiding the potential for disturbance of residents at night. Normal working times will, in general, be during daytime hours 08:00 to 19:00 hrs Monday to Friday and 08.00 to 14.00 hrs on Saturday (no works on Sundays or Bank Holidays). However some operations may be required to be completed outside of normal working hours, and these will not be undertaken outside these working hours without the written permission of the Engineer.

Pollution of Watercourses: Accidental spillages into the watercourses and drainage systems could lead to pollution. The Contract will include requirements for appropriate measures to prevent an accidental spillage of pollutant materials. Measures will be adopted to prevent discharge of suspended solids into the watercourses during construction phase. The road drainage run-off will be treated before discharging to the receiving waters.

Dirt and Dust: The Contractor will be obliged by the local authority and the relevant legislation to ensure that the surrounding roads are kept free from dirt. In dry weather conditions, the Contractor will be required to minimise airborne dust from the site through spraying of exposed earthworks with water.

Construction Traffic: There will be traffic associated with the construction phase of the proposed Bracken Road Extension. The contractor will be required to submit a traffic management plan for approval to the Engineer prior to commencement of works.
Figure A:1: Development Traffic AM

Figure A:2: Development Traffic PM
Figure A:5: Opening Year 2017 + Development AM

Figure A:6: Opening 2017 + Development PM
Figure A:7: Opening Year + 5 2022 AM

Figure A:8: Opening Year +5 2022 PM
Figure A:9: Opening Year +5 + Development 2022 AM

Figure A:10: Opening Year +5 + Development 2022 PM
APPENDIX B: Scheme Drawings

RPO16-28-00 – LOCATION MAP
RPO16-28-01 – EXISTING LAYOUT
RPO16-28-02 – PROPOSED LAYOUT
RPO16-28-03 – TYPICAL SECTIONS
RPO16-28-04 – ELEVATION 1-1
RPO16-28-05 – ELEVATION 2-2

DRAWINGS ARE ATTACHED SEPERATELY
APPENDIX C:

APPROPRIATE ASSESSMENT SCREENING
PROVISION OF INFORMATION FOR APPROPRIATE ASSESSMENT SCREENING
PROPOSED ROAD IMPROVEMENTS AT THE GLENAMUCK/ENNISKERRY ROAD JUNCTION,
KILTIERNAN, CO. DUBLIN

PREPARED FOR DÚN LAOGHARIE RATHDOWN COUNTY COUNCIL

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1 Introduction

This report which contains information required for the competent authority (in this instance Dún Laoghaire-Rathdown County Council) to undertake a screening exercise for Appropriate Assessment (AA), was prepared by Scott Cawley Ltd. It provides information on and assesses the potential for the proposed development to significantly affect Natura 2000 sites (hereafter “European sites”).

It is necessary that the proposal has regard to Article 6 of the Council Directive 92/43/EEC of 21 May 1992 on the Conservation of Natural Habitats and of Wild Fauna and Flora (as amended) (hereafter “the Habitats Directive”). This is transposed in Ireland primarily by the European Communities (Birds and Natural Habitats) Regulations 2011 (S.I. No. 477/2011) (as amended) (hereafter the Birds and Habitats Regulations) and the Planning and Development (Amendment) Act, 2010 (as amended).

An AA is required if likely significant effects on European sites arising from a proposed development cannot be ruled out at the screening stage, either alone or in combination with other plans or projects.

Following the preparation of this report it was objectively concluded that there was no likelihood of any significant effects on any European sites arising from the proposed development, either alone or in combination with other plans or projects. Therefore, it is our view that an Appropriate Assessment is not required in this instance. The information in the tables below provides a summary of the information gathered for this screening exercise and the conclusions that were made.

2 Methodology

This report was prepared with regard to the following guidance documents, where relevant:

- Appropriate Assessment of Plans and Projects in Ireland - Guidance for Planning Authorities. (Department of Environment, Heritage and Local Government, 2010 revision);
- 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 (European Commission Environment Directorate-General, 2001); hereafter referred to as the EC Article 6 Guidance Document. The guidance within this document provides a non-mandatory methodology for carrying out assessments required under Article 6(3) and (4) of the Habitats Directive;
- Guidelines for Good Practice Appropriate Assessment of Plans under Article 6(3) Habitats Directive. Findings of an international workshop on Appropriate Assessment in Oxford, December 2009; and

1 Natura 2000 sites are defined under the Habitats Directive (Article 3) as a European ecological network of special areas of conservation composed of sites hosting the natural habitat types listed in Annex I and habitats of the species listed in Annex II. The aim of the network is to aid the long-term survival of Europe’s most valuable and threatened species and habitats. In Ireland these sites are defined as European sites - defined under the Planning Acts and/or Birds and Habitats Regulations as (a) a candidate site of Community importance, (b) a site of Community importance, (c) a candidate special area of conservation, (d) a special area of conservation, (e) a candidate special protection area, or (f) a special protection area. They are commonly referred to in Ireland as candidate Special Areas of Conservation (SACs) and Special Protection Areas (SPAs).
The above referenced guidance sets out a staged process for carrying out Appropriate Assessment. To determine if Appropriate Assessment is required, documented screening is required. Screening identifies the likely effects on European sites, if any, which would arise from a proposed plan or project, either alone or in combination with other plans and projects. In addition, it further considers whether these effects are likely to adversely affect the integrity of any European sites.

If the conclusions at the end of screening are that there is no likelihood of significant effects occurring on any European sites, as a result of the proposed plan or project (either alone or in combination with other plans and projects) then there would be no requirement to undertake Appropriate Assessment.

However, even if screening makes a finding of no significant effects, and therefore concludes that Appropriate Assessment is not required, these findings must be clearly documented in order to provide transparency of decision-making, and to ensure the application of the ‘precautionary principle’.

Screening for Appropriate Assessment involves the following:

- Determining whether a project or plan is directly connected with or necessary to the conservation management of any European sites (See Appendix A Figure 1 for a plan of European sites which lie within 15km of the study site);
- Describing the details of the project/plan proposals and other plans or projects that may cumulatively affect any European sites (see Table 1);
- Describing the characteristics of relevant European sites (Table 2); and
- Assessing the likelihood and significance of effects on relevant European sites (see Table 2).

This screening exercise was based on a desk study conducted on the 9th December 2016. Information relied upon included the following information sources, which included maps, ecological and water quality data:

- Ordnance Survey of Ireland mapping and aerial photography available from www.osi.ie;
- Online data available on European sites as held by the National Parks and Wildlife Service (NPWS) from www.npws.ie;
- Online data available from the National Biodiversity Data Centre mapping service (http://maps.biodiversityireland.ie/#/Map);
- Information on land-use zoning from the online mapping of the Department of the Environment, Community and Local Government http://www.myplan.ie/en/index.html;
- Information on water quality in the area available from www.epa.ie;
- Information on the Eastern River Basin District from www.wfdireland.ie;
- Information on soils, geology and hydrogeology in the area available from www.gsi.ie;
- Information on the location, nature and design of the proposed development supplied by the applicant’s design team;
- Information on the status of EU protected habitats in Ireland (National Parks & Wildlife Service, 2013); and
- Information on the conservation status of birds in Ireland (Colhoun & Cummins, 2014).

The following planning and policy documents were relevant to the subject lands, in particular with regard to the assessment of other plans and projects with potential for cumulative effects:

- National Biodiversity Plan 2011 – 2016 (Department of Arts, Heritage and the Gaeltacht, 2011);

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2 One of the primary foundations of the precautionary principle, and globally accepted definitions, results from the work of the Rio Declaration. Principle #15 declaration notes:

“In order to protect the environment, the precautionary approach shall be widely applied by States according to their capabilities. Where there are threats of serious or irreversible damage, lack of full scientific certainty shall not be used as a reason for postponing cost-effective measures to prevent environmental degradation.”

3 In this instance the proposed development is not directly connected with or necessary to the conservation management of any European sites.
- County Development Plan 2016-2022 (Dún Laoghaire-Rathdown County Council, 2016);
- Eastern River Basin District, River Basin Management Plan 2009 – 2015; and,
- Kiltiernan Glenamuck Local Area Plan 2013 (Dún Laoghaire-Rathdown County Council, 2013)
Proposed Road Improvements

Provision of Information for Glenamuck Rd/Enniskerry Rd Junction, Co. Dublin

Appropriate Assessment Screening

Table 1 Overview of the Proposed Development and its Receiving Environment

| Site Description | The proposed development site is located at the Enniskerry Road and Glenamuck Road junction and along both the Glenamuck Road and Enniskerry Road in Kilternan Co. Dublin (approximate centroid grid reference: O20442 22515). The site itself is comprised of the existing hardstanding (i.e. the existing road surface, wall and footpath). The site’s immediate environs include residential properties with associated gardens, improved agricultural fields, hedgerows and treelines. The M50 Motorway is located c. 1.4km north-east of the proposed development site. According to Dun Laoghaire and Rathdown County Development Plan 2016-2022 (Dún Laoghaire-Rathdown County Council, 2016), lands immediately adjacent to the proposed development are zoned as ‘R2 – Existing Residential’. Other land zonings in the surrounding area include: ‘P1 - Agriculture’, ‘C2.1 – Industrial, enterprise, employment’, ‘G1 – Open space, park’ and ‘G3 – Conservation, amenity or buffer space, corridor/belt, landscape’. |
| Features of the surrounding environment | The desk study found no records of any species for which European Sites (listed in Table 2) are designated within the proposed site. Only one species (for which the European Site Wicklow SAC [002122] listed in Table 2 is designated) was recorded within 2km of the proposed development site4, i.e. Otter (Lutra lutra), which was recorded c. 465m south of the proposed development site in 2010. The proposed development site is located within the Ovoca-Vartry WFD river catchment. According to the EPA Envision Map Viewer, there are no rivers within or immediately adjacent to the proposed development site. The nearest watercourse to the proposed development site is the Glenamuck North Stream, which is located c. 390m north of the existing Glenamuck road. It appears to flow for c. 1km until it reaches the Glenamuck North River, which then flows for c. 3.2km until it converges with the Carrickmines Stream, which in turn flows for c. 800m until it reaches Shanganagh River, which flows for c. 1.6km until it reaches Killiney Bay. The Shanganagh River ultimately flows into Killiney Bay. The water quality of both the Glenamuck Stream and River is currently unknown. The water quality of the Carrickmines Stream is classified as ‘Moderate’ (i.e. Q3-4), as recorded at the upstream overpass monitoring station of the R118. The water quality of the Shanganagh River is classified as ‘Good’ (i.e. Q4), as recorded at the Bridge of Carns (Heron Ford Lane) monitoring station. The water quality of the Killiney Bay coastal waterbody is ‘Unpolluted’. As such, there have been no breaches of the EPA’s threshold values for nutrient enrichment, accelerated plant growth, or disturbance of the level of dissolved oxygen normally present under the EPA’s “Trophic Status Assessment Scheme” classification (EPA 2015). According to the GSI Map Viewer, the bedrock of the proposed site location is ‘Granite with muscovite phenocrysts’ and is classified as a ‘Poor Aquifer – Bedrock which is Generally Unproductive except for Local Zones’. The site is located within the catchment of the ‘Ovoca-Vartry’ groundwater body. The level of groundwater vulnerability within the proposed site is ‘High’5. |

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4 According to NBDC online data [www.biodiversity.ie](http://www.biodiversity.ie) accessed 9th December 2016. This excludes NBDC records with a precision of over 1km².

**Description of the Proposed Development**

In brief, the proposal will involve the upgrading of the Glenamuck Road/Enniskerry Road Junction in order to improve traffic flow. Improvement works will specifically include:

- Widening of Glenamuck Road Arm (*i.e.* 60m long left turn lane) and provision of a new retaining wall;
- Tying road improvements into the kerbline of the Enniskerry Road (*i.e.* R117, Southern approach): 40m long right turn lane and Enniskerry Road (*i.e.* R117, Northern approach) 12m long right turn lane;
- Revised staging plan to the traffic lights;
- Improved pedestrian crossing incorporated within signalised junction including new crossing on northern arm of Enniskerry Road (*i.e.* R117);
- Cycle lanes / cycle tracks on Glenamuck Road; and,
- Improved junction geometry.

This upgrade work will ultimately be extended to tie into the Glenamuck District Distributor Road (GDDR) network. It is envisaged that this will be constructed within the next five years.

Existing surface water runoff discharges to road gullies located on both the Glenamuck Road and Enniskerry Road. There will be minimal change to the existing road width of the Enniskerry Road and as such, the existing road surface drainage will be maintained. The gullies on the Glenamuck Road currently drain to existing ditches located along the side of the road. As part of these works, it is proposed that the new gullies will be connected up to the existing drainage system. SUDS measures (*i.e.* the use of oversized pipes or infiltration trenches) will be utilised on site. In the future, as part of a separate consent process, this drainage system will connect to the GDDR drainage scheme, which will include attenuation/settlement ponds and petrol interceptors.

There will be no foul effluent generated from the proposed development.

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**Defining the Zone of Influence of the Proposed Development**

The Zone of Influence (ZoI) is a distance within which the proposed development could potentially affect the conservation condition of QI habitats or species. There is no set recommended distance for which European sites are considered as being relevant (*i.e.* within the ZoI of proposed works) for AA. Available guidance (NPWS, 2010) recommends that ‘the distance should be evaluated on a case-by-case basis with reference to the nature, size and location of the project, and the sensitivities of the ecological receptors, and the potential for in combination effects’. As a general rule of thumb, it is often considered appropriate to examine all European sites within 15km as a starting point. In some instances, where there are far reaching hydrological/hydrogeological connections, a whole river catchment or a groundwater aquifer may need to be included in determining the ZoI. All European sites within 15km of the proposed development are listed in Table 2 below and shown on Figure 1. In this case the distance of 15km exceeds the potential zone of influence of the proposed development and any likelihood of significant effects in relation to European Sites beyond 15km can be ruled out.

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**Other existing or proposed plans or projects nearby which may lead to Existing Habitat Loss Pressures**

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**Proposed Road Improvements**

Glenamuck Rd/Enniskerry Rd Junction, Co. Dublin

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**Provision of Information for Appropriate Assessment Screening**
The proposed site does not overlap with any European Sites. The main habitat identified within the proposed site is hard standing (i.e. the road surface and adjacent footpaths). None of these are habitats listed under Annex 1 of the Habitats Directive. This habitat is not directly or indirectly connected with any habitats within European sites (e.g. by groundwater). No mobile fauna species for which European sites are designated are known to use the habitats within the subject lands. There is therefore no potential for cumulative effects relating to habitat loss.

**Existing pressures on water quality within European sites in proximity to the site**

*Pressures on European sites in Killiney Bay from surface waters*

The section entitled “Features of the Surrounding Environment” of this table describes the baseline environment of receiving coastal waters for the proposed development.

There is potential for “in-combination” effects of proposed plans and projects within the Dún Laoghaire-Rathdown County Development Plan 2016-2022 which would influence conditions in Killiney Bay via rivers and other surface water features. However Killiney Bay is of ‘Unpolluted’ water quality status (EPA 2015) and the pollutant content of future surface water discharges to Killiney Bay are considered likely to be decreased in the long-term. This is because it is an objective of the Greater Dublin Strategic Drainage Study, and development plans within the catchments of Shanganagh WWTP to include Sustainable Urban Drainage Systems in new developments. Together these objectives are considered likely to reduce pressures on designated marine and intertidal species and habitats in Killiney Bay.

In the Dún Laoghaire-Rathdown County Development Plan 2016 – 2022, lands adjacent to the proposed development are zoned as ‘R2 – Existing Residential’, ‘P1 - Agriculture’, ‘C2.1 – Industrial, enterprise, employment’, ‘G1 – Open space, park’ and ‘G3 – Conservation, amenity or buffer space, corridor/belt, landscape’. However, due to the distance of the proposed development site from Killiney Bay and the temporary and small scale nature of the proposed development, there will be no likelihood of significant impacts arising from this development. There will be no predicted change in the amount of surface water runoff generated during the operational stage of the proposed development and the existing surface water drainage network will be maintained and utilised. SUDS measures (i.e. use of oversized pipes or infiltration trenches) will be utilised on site. In the future, as part of a separate planning application, this drainage system will connect to the GDDR drainage scheme, which will include attenuation/settlement ponds and petrol interceptors.

There is a risk that construction related contamination (e.g. through surface run off) could flow overland into the local drainage network. However, such overflows are deemed unlikely to result in significant effects upon water quality in Killiney Bay. This is due to the following circumstances: the small scale of the proposed development; any pollution events will only occur during a short period of time (i.e. four to six months during construction), and are likely to be infrequent (i.e. limited to storm flows) where standard good practice for construction sites have been adhered to; and, due to the distance of the proposed development from Killiney Bay which would mean that any escaped contaminants would be subject to dilution, adsorption and mixing in the local drainage network prior to reaching Killiney Bay. As such there will be no risk of significant adverse impacts upon European sites occurring.
### Conclusion for potential in-combination effects from surface waters

It is our professional opinion that there will be no likelihood of significant effects on any European Sites during the construction or operation of the proposed development, in combination with other plans or projects. This judgement was reached on the basis that:

- The proposed development site does not overlap with any European Sites, appears to contain only habitats which would not correspond to habitats listed under Annex 1 of the Habitats Directive, and there are no records for qualifying interest species of any European sites either on the site or immediately adjacent to it.

- The coastal waters in Killiney Bay are classed as ‘Unpolluted’ by the EPA;

- It is an objective of all development plans within the catchment of Shanganagh WWTP to include Sustainable Urban Drainage Systems for all new development and same will be included in the proposed development;

- The recent upgrade at Shanganagh WWTP has ensured that the ‘Unpolluted’ water quality status of coastal waters at Killiney Bay are maintained, despite potential pressures from future development; and,

- Due to the distance of the proposed development site from Killiney Bay, the small scale of the proposed development, the short-term nature of the construction works (i.e. approximately four to six months), the likely low frequency of any escape of contaminants/silt during construction and the adherence to standard good practice for construction sites there will be no risk of significant adverse impacts upon European sites occurring.
European sites within 15km of the proposed development site are shown in Figure 1 in Appendix A.

### Table 2  Analysis of European sites within 15km.

<table>
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<tr>
<th>Site name and code</th>
<th>Distance from Proposed Development (approximate)</th>
<th>Reasons for designation(^6) ((^*=) Priority Habitat) (Sourced from NPWS online Conservation Objectives Generic Version 5.0 (15/08/16), unless otherwise stated).</th>
<th>Relevant source-pathway-receptor links between proposed development and European site?</th>
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</table>
| Knocksink Wood SAC (000725) | Located c. 3.7km south of the proposed development site. | Conservation Objectives Generic Version 4.0 (15/08/16) Annex I Habitats:  
- Petrifying springs with tufa formation (Cratoneurion [7220])  
- Alluvial forests with *Alnus glutinosa* and *Fraxinus excelsior* (Alno-Padion, Alnion incanae, Salicion albae) [91E0] | No. Due to the substantial terrestrial land buffer that exists between the proposed development site and the European site and the absence of any potential hydrological or other impact pathway between the two. |
| Ballyman Glen SAC (000713) | Located c. 4.3km south of the proposed development site. | Conservation Objectives Generic Version 4.0 (15/08/16) Annex I Habitats:  
- Petrifying springs with tufa formation (Cratoneurion [7220])  
- Alkaline fens [7230] | No. Due to the substantial terrestrial land buffer that exists between the proposed development site and the European site and the absence of any potential hydrological or other impact pathway between the two. |
| Wicklow Mountains SAC (002122) | Located c. 5.5km south-west of the proposed development site | Conservation Objectives Generic Version 4.0 (15/08/16) Annex I Habitats:  
- Oligotrophic to mesotrophic standing waters with | No. Due to the substantial terrestrial land buffer that exists between the proposed development site and the European site and the absence of any potential hydrological or other impact pathway between the two. |

\(^6\)“Qualifying Interests” for SACs and “Special Conservation Interests” for SPAs based on relevant Statutory Instruments for each SPA, and NPWS Conservation Objectives for SACs downloaded from www.npws.ie in February 2015.

\(^7\) For significant effects to arise, there must be a risk enabled by having a ‘source’ (e.g. construction works at a proposed development site), a ‘receptor’ (e.g. a SAC), and a pathway between the source and the receptor (e.g. a watercourse connecting a proposed development site to a SAC). The identification of a pathway does not automatically mean significant effects will arise. The likelihood for significant effects will depend upon the characteristics of the source (e.g. duration of construction works), the characteristics of the pathway (e.g. water quality status of watercourse receiving run-off from construction) and the characteristics of the receptor (e.g. the ecology including conservation status of the SAC reason for designation). When expert judgment determines, that significant effects are likely to arise, both the pathway, and the European site are considered “Relevant”, and an Appropriate Assessment is triggered.
<table>
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<th>Site name and code</th>
<th>Distance from Proposed Development (approximate)</th>
<th>Reasons for designation[^6] (*= Priority Habitat) (Sourced from NPWS online Conservation Objectives Generic Version 5.0 (15/08/16), unless otherwise stated).</th>
<th>Relevant source-pathway-receptor links between proposed development and European site?</th>
</tr>
</thead>
</table>
| South Dublin Bay SAC (000210) | Located c. 6.3km north-east of the proposed development site | vegetation of the Littorelletea uniflorae and/or Isoeto-Nanojuncetea [3130]  
• Natural dystrophic lakes and ponds [3160]  
• Northern Atlantic wet heaths with *Erica tetralix* [4010]  
• European dry heaths [4030]  
• Alpine and Boreal heaths [4060]  
• Species-rich *Nardus* grasslands, on siliceous substrates in mountain areas (and submountain areas, in Continental Europe) [6230]  
• Blanket bogs (* if active bog) [7130]  
• Siliceous scree of the montane to snow levels (Androsaceta alpinae and Galeopsietalia ladani) [8110]  
• Calcareous rocky slopes with chasmophytic vegetation [8210]  
• Siliceous rocky slopes with chasmophytic vegetation [8220]  
• Old sessile oak woods with *Ilex* and *Blechnum* in the British Isles [91A0]  
**Annex II Species:**  
• *Lutra lutra* (Otter) [1355]  

**Conservation Objectives Version 1.0 (22/08/13)**  
**Annex I Habitats:**  
• Mudflats and sandflats not covered by seawater at low tide [1140]  
• Annual vegetation of drift lines [1210]  

No. Due to the substantial terrestrial and marine buffers that exist between the proposed development site and the European site.
### Table 2  Analysis of European sites within 15km.

<table>
<thead>
<tr>
<th>Site name and code</th>
<th>Distance from Proposed Development (approximate)</th>
<th>Reasons for designation (Sourced from NPWS online Conservation Objectives Generic Version 5.0 (15/08/16), unless otherwise stated).</th>
<th>Relevant source-pathway-receptor links between proposed development and European site?</th>
</tr>
</thead>
</table>
| Rockabill to Dalkey Island SAC (003000) | Located c. 6.6km east of the proposed development site | - *Salicornia* and other annuals colonising mud and sand [1310]  
- Embryonic shifting dunes [2110] | Whilst there is a possible linkage between the proposed development site and the European site, no significant effects are predicted.  
It is our professional opinion that there will be no likelihood of significant effects on this European site during the construction or operation of the proposed development, in combination with other plans or projects. This judgement was reached on the basis that:  
- Surface water runoff generated from the proposed development site during operation will be attenuated prior to discharge into the existing system;  
- The small scale and temporary nature of any discharges related to construction of the site;  
- Any unlikely pollution event during construction would not be of such a magnitude that it would have significant adverse effects on the Qualifying Interest/Special Conservation Interests of the European sites; and,  
The significant distance of the proposed development site from the European site and significant dilution and mixing within the receiving waters. |
**Table 2**  Analysis of European sites within 15km.

<table>
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<tr>
<th>Site name and code</th>
<th>Distance from Proposed Development (approximate)</th>
<th>Reasons for designation (Sourced from NPWS online Conservation Objectives Generic Version 5.0 (15/08/16), unless otherwise stated)</th>
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</tr>
</thead>
</table>
| Bray Head SAC (000713)   | Located c. 8.5km south-east of the proposed development site | **Generic Conservation Objectives Version 4.0 (15/08/16)**  
**Annex I Habitats:**  
- Vegetated sea cliffs of the Atlantic and Baltic coasts [1230]  
- European dry heaths [4030] | No. Due to the substantial terrestrial land buffer that exists between the proposed development site and the European site and the absence of any potential hydrological or other impact pathway between the two. |
| Glenasmole Valley SAC (001209) | Located c. 11.4km west of the proposed development site | **Conservation Objectives Generic Version 4.0 (15/08/16)**  
**Annex I Habitats:**  
- Semi-natural dry grasslands and scrubland facies on calcareous substrates (Festuco-Brometalia) (* important orchid sites) [6210]  
- *Molinia* meadows on calcareous, peaty or clayey-silt-laden soils (Molinion caeruleae) [6410]  
- Petrifying springs with tufa formation (Cratoneurion) [7220] | No. Due to the substantial terrestrial land buffer that exists between the proposed development site and the European site and the absence of any potential hydrological or other impact pathway between the two. |
| North Dublin Bay SAC (000206) | Located c. 11.6km north of the proposed development site | **Source: Conservation Objectives Version 1.0 (06/11/13)**  
**Annex I Habitats:**  
- Mudflats and sandflats not covered by seawater at low tide [1140]  
- Annual vegetation of drift lines [1210]  
- *Salicornia* and other annuals colonizing mud and sand [1310]  
- Atlantic salt meadows (*Glauco-Puccinellietalia maritima*ae) [1330]  
- Mediterranean salt meadows (*Juncetalia maritimi*) [1410] | No. Due to the substantial terrestrial and marine buffers that exist between the proposed development site and the European site. |
### Table 2  Analysis of European sites within 15km.

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<tr>
<th>Site name and code</th>
<th>Distance from Proposed Development (approximate)</th>
<th>Reasons for designation* (Sourced from NPWS online Conservation Objectives Generic Version 5.0 (15/08/16), unless otherwise stated).</th>
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</thead>
</table>
| Glen of the Downs SAC (000719) | Located c. 12km south of the proposed development site | - Embryonic shifting dunes [2110]  
- Shifting dunes along the shoreline with *Ammophila arenaria* ("white dunes") [2120]  
- *Fixed coastal dunes with herbaceous vegetation ("grey dunes")* [2130]  
- Humid dune slacks [2190]  
**Annex II Species:**  
- *Petalophyllum ralfsii* (Petalwort) [1395]  
**Generic Conservation Objectives Version 4.0 (15/08/16)**  
**Annex I Habitats:**  
- Old sessile oak woods with *Ilex* and *Blechnum* in the British Isles [91A0] | No, due to the distance between the proposed development site and the European site and the absence of a hydrological linkage between the two. |
| Wicklow Mountains SPA (004040) | Located c. 5.2km south-west of the proposed development site | **Conservation Objectives Generic Version 4.0 (15/08/16)**  
- Merlin *Falco columbarius* [A098]  
- Peregrine *Falco peregrinus* [A103] | No, due to the distance between the proposed development site and the European site and the absence of a hydrological or any other linkage between the two.  
There is no risk of disturbance to Special Conservation Interest bird species given the relatively small scale and temporary nature of construction works associated with the proposed development and the substantial distance between the proposed development and the European site. |
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<th>Site name and code</th>
<th>Distance from Proposed Development (approximate)</th>
<th>Reasons for designation(^6) (*= Priority Habitat) (Sourced from NPWS online Conservation Objectives Generic Version 5.0 (15/08/16), unless otherwise stated.)</th>
<th>Relevant source-pathway-receptor links between proposed development and European site?</th>
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</table>
| South Dublin Bay and River Tolka Estuary (004024) | Located c. 6.3km north of the proposed development site | **Conservation Objectives Version 1.0 (09/03/15)**  
- Light-bellied Brent Goose (*Branta bernicla hrota*) [A046] [wintering]  
- Oystercatcher (*Haematopus ostralegus*) [A130] [wintering]  
- Ringed Plover (*Charadrius hiaticula*) [A137] [wintering]  
- Grey Plover (*Pluvialis squatarola*) [A140] [wintering]  
- Knot (*Calidris canutus*) [A143] [wintering]  
- Sanderling (*Calidris alba*) [A144] [wintering]  
- Dunlin (*Calidris alpina*) [A149] [wintering]  
- Bar-tailed Godwit (*Limosa lapponica*) [A157] [wintering]  
- Redshank (*Tringa totanus*) [A162] [wintering]  
- Black-headed Gull (*Croicocephalus ridibundus*) [A179] [wintering]  
- Roseate Tern (*Sterna dougallii*) [A192] [passage]  
- Common Tern (*Sterna hirundo*) [A193] [breeding]  
- Arctic Tern (*Sterna paradisaea*) [A194] [passage]  
- Wetlands & Waterbirds [A999] | No. Due to the substantial terrestrial and marine buffers that exist between the proposed development site and the European site.  
There is no risk of disturbance to Special Conservation Interest bird species given the relatively small scale and temporary nature of construction works associated with the proposed development and the substantial distance between the proposed development and the European site. |
| Dalkey Islands SPA (004172) | Located c. 7.3km north-east of the proposed development site | **Generic Conservation Objectives Version 4.0. (15/08/16)**  
- Roseate Tern (*Sterna dougallii*) [A192]  
- Common Tern (*Sterna hirundo*)[A193]  
- Arctic Tern (*Sterna paradisaea*) [A194] | No. Due to the substantial terrestrial and marine buffers that exist between the proposed development site and the European site.  
There is no risk of disturbance to Special Conservation Interest bird species given the relatively small scale and temporary nature of construction works associated with the proposed development and the substantial distance between the proposed development and the European site. |
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</tr>
</thead>
</table>
| North Bull Island SPA (004006) | Located c. 11.4km north of the proposed development site | **Conservation Objectives Version 1.0 (09/03/15)**  
- Light-bellied Brent Goose (*Branta bernicla hrota*) [A046] [wintering]  
- Shelduck (*Tadorna tadorna*) [A048] [wintering]  
- Teal (*Anas crecca*) [A052] [wintering]  
- Pintail (*Anas acuta*) [A054] [wintering]  
- Shoveler (*Anas clypeata*) [A056] [wintering]  
- Oystercatcher (*Haematopus ostralegus*) [A130] [wintering]  
- Golden Plover (*Pluvialis apricaria*) [A140] [wintering]  
- Grey Plover (*Pluvialis squatarola*) [A141][wintering]  
- Knot (*Calidris canutus*) [A143] [wintering]  
- Sanderling (*Calidris alba*) [A144] [wintering]  
- Dunlin (*Calidris alpina*) [A149] [wintering]  
- Black-tailed Godwit (*Limosa limosa*) [A156] [wintering]  
- Bar-tailed Godwit (*Limosa lapponica*) [A157] [wintering]  
- Curlew (*Numenius arquata*) [A160] [wintering]  
- Redshank (*Tringa totanus*) [A162] [wintering]  
- Turnstone (*Arenaria interpres*) [A169] [wintering] | No. Due to the substantial terrestrial and marine buffers that exist between the proposed development site and the European site. There is no risk of disturbance to Special Conservation Interest bird species given the relatively small scale and temporary nature of construction works associated with the proposed development and the substantial distance between the proposed development and the European site. |
### Table 2  Analysis of European sites within 15km.

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</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>• Black-headed Gull (\textit{Croicocephalus ridibundus}) [A179] [wintering]</td>
<td>No sites are “Relevant” to the Proposed Development. (European sites are “Relevant” where a relevant source-pathway-receptor link(^7) exists).</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Wetlands &amp; Waterbirds [A999]</td>
<td></td>
</tr>
</tbody>
</table>

\(^6\) (*= Priority Habitat)  
\(^7\) Relevant source-pathway-receptor link exists.
3 Conclusions

Following an examination, analysis and evaluation of the relevant information, including in particular, the nature of the proposed works and their potential relationship with European sites, as well as considering other plans and projects, and applying the precautionary principle, it is the professional opinion of the authors of this report that it is possible to rule out likely significant effects on all European sites arising from the potential hydrological linkages that exist via surface water run-off. This judgement has been reached for the reasons outlined below.

1) The distance of 15km exceeds the potential zone of influence of the proposed works and any likelihood of significant effects in relation to European Sites beyond 15km can be ruled out.

2) It has been identified that there are seven European Site lies within the potential zone of influence of surface water discharges from the proposed development. However for the reasons outlined below it is not deemed to be at risk of likely significant effects from construction or operation of the proposed development.

No significant adverse effects are predicted due to the following:

- Surface water runoff generated from the proposed development site during operation will be attenuated prior to discharge from the proposed development site;
- The small scale and temporary nature of any discharges related to construction of the site;
- Any unlikely pollution event during construction would not be of such a magnitude that it would have significant adverse effects on the Qualifying Interest/Special Conservation Interests of the European sites; and,
- The significant terrestrial and marine buffer that exists between the proposed development site and European sites and significant dilution and mixing within the receiving waters.

The authors of this report acknowledge that it is for Dún Laoghaire-Rathdown County Council, as the competent authority, to carry out a screening for AA and to reach one of the following determinations:

a) AA of the proposed development is required if it cannot be excluded, on the basis of objective information, that the proposed development, individually or in combination with other plans or projects, will not have a significant effect on any European sites;

b) AA of the proposed development is not required if it can be excluded, on the basis of objective information, that the proposed development, individually or in combination with other plans or projects, will have a significant effect on any European sites.
Appendix A

Figure 1. All European sites within 15km of the site
References


