

Wicklow County Council

**N11/M11 Junction 4 to Junction 14  
Improvement Scheme**

**Appendix C4 - Hydrology**

265455-ARP-EWE-SWI-RP-ZX-0002

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# 1 Hydrology

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## 1.1 Introduction

This report details the environmental assessment of the Stage 1 Preliminary Options Assessment for the N11/M11 Scheme with respect to the Hydrology constraints identified in **Section 14** (Hydrology) of **Volume B**.

For the corridor assessment, the overall scheme has been split into two sections, i.e. the Northern Section and the Southern Section and the corridor options assessed are those discussed in **Section 6.1** of **Volume A**.

There are three zones associated with each corridor option referred to in this assessment:

- The potential road “footprint” which is the potential landtake required to construct or improve the road;
- The road “corridor” which is a 200m wide corridor centred around the alignment centre line for all off-line corridors. For the on-line Corridor Options 1 (North), 1 (South) and 5 (South), the width is variable, but is typically narrower than the width of the off-line corridors. The “footprint” sits inside the “corridor” boundary; and
- The road “assessment study area” which includes a 250m buffer zone from the road centre line and an overall width of 500m. This buffer zone may increase to consider attributes which extend beyond this zone e.g. along link roads.

**Section 1.2** outlines the methodology that was used to carry out the study, and **Section 1.3** outlines the assessment criteria which were used. The Stage 1 assessment is presented in **Section 1.4**, the summary in **Section 1.5** and references are listed in **Section 1.6**.

## 1.2 Methodology

This assessment was prepared taking cognisance of the requirements of the following guidance:

- Transport Infrastructure Ireland (TII) guidance, formally National Roads Authority (NRA) Guidelines on Procedures for Assessment and Treatment of Geology, Hydrology and Hydrogeology for National Road Schemes<sup>1</sup>;

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<sup>1</sup>National Roads Authority (NRA) Guidelines on Procedures for Assessment and Treatment of Geology, Hydrology and Hydrogeology for National Road Schemes, 2009. Available from: <https://www.tii.ie/technical-services/environment/planning/Guidelines-on-Procedures-for-Assessment-and-Treatment-of-Geology-Hydrology-and-Hydrogeology-for-National-Road-Schemes.pdf>

- The Environmental Protection Agency (EPA) Draft Guidelines on the Information to be Contained in Environmental Impact Assessment Reports<sup>2</sup>; and
- Transport Infrastructure Ireland (TII) guidance, formally National Roads Authority (NRA). Environmental Impact Assessment of National Road Schemes – a Practical Guide<sup>3</sup>.

In line with the TII Guidelines<sup>1</sup>, the assessment study area for this Corridor Options Assessment, which is different to the scheme study area, has been set at 250m from the centre line of each corridor. This has been extended on a conservative basis to capture the zones of influence of attributes where appropriate.

The TII Guidelines<sup>1</sup> provide useful criteria for assigning importance ratings to the identified hydrological attributes, and the criteria which are presented in **Section 14** (Hydrology) of **Volume B**. The potential impacts that may arise at each attribute are assessed on a conservative basis based on the information currently available. The nature and timeframe are considered against the criteria presented in **Box 4.4** of the Guidelines<sup>1</sup>.

An Impact Level is determined from **Table 1.2** based on the importance rating of an attribute and the degree of potential impacts. It should be noted that the criteria provided in the table only considers negative potential impacts, however the potential for positive impacts is highlighted in the text of the TII Guidelines<sup>1</sup> and also in the EPA Guidelines<sup>2</sup>. For this reason, the potential for positive impacts are also considered and incorporated where appropriate.

In order for the qualitative assessment to align with the TII Project Appraisal Guidelines for National Roads (PAG) Unit 7.0 - Multi-Criteria Analysis<sup>4</sup> (hereafter referred to as the TII PAG) the two scoring systems were correlated. The TII PAG<sup>4</sup> seven point scale scoring procedure is summarised below:

- 7 – Major or highly positive;
- 6 – Moderately positive;
- 5 – Minor or slightly positive;
- 4 – Not significant or neutral;
- 3 – Minor or slightly negative;
- 2 – Moderately negative; or

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<sup>2</sup> Environmental Protection Agency (EPA), Guidelines on the Information to be Contained in Environmental Impact Assessment Reports, Draft 2017. Available from: <https://www.epa.ie/publications/monitoring--assessment/assessment/draft-guidelines-on-the-information-to-be-contained-in-environmental-impact-asse.php>

<sup>3</sup> National Roads Authority (NRA) Environmental Impact Assessment of National Road Schemes – a Practical Guide, 2008. Available from: <https://www.tii.ie/technical-services/environment/planning/Environmental-Impact-Assessment-of-National-Road-Schemes-Practical-Guide.pdf>

<sup>4</sup>Transport Infrastructure Ireland (TII) Project Appraisal Guidelines for National Roads Unit 7.0 - Multi-Criteria Analysis, 2016. Available from: <https://www.tiipublications.ie/library/PE-PAG-02031-01.pdf>

- 1 – Major or highly negative.

**Table 1.1** summarises how these two Guidelines<sup>1,4</sup> were correlated for this Stage 1 Corridor Options Assessment. As outlined above, in line with EPA guidance, both positive and negative potential impacts were included.

Table 1.1: Correlation of TII Guidelines<sup>1</sup> Impact Level Rating to an equivalent TII PAG Unit 7.0 MCA<sup>4</sup> seven point scale scoring procedure

Impact Level (TII Guidelines <sup>1</sup> )	Equivalent PAG <sup>4</sup> (Description)	Equivalent PAG <sup>4</sup> (Value)
Profound (Negative)	Major or highly negative	1
Significant (Negative)	Major or highly negative	1
Moderate (Negative)	Moderately negative	2
Slight (Negative)	Minor or slightly negative	3
Imperceptible	Not significant or neutral	4
Slight (Positive)	Minor or slightly positive	5
Moderate (Positive)	Moderately positive	6
Significant (Positive)	Major or highly positive	7

In order to determine the overall TII PAG<sup>4</sup> score for the types of features identified (e.g. rivers), the impact level and equivalent TII PAG<sup>4</sup> value was first assigned to each individual attribute identified (e.g. each individual watercourse). If multiple features were identified (e.g. multiple watercourses) these were then averaged using professional judgement, to allow an overall TII PAG<sup>4</sup> score to be defined for each type of feature.

The information that was included in **Section 14** (Hydrology) of **Volume B** was used to undertake this assessment.

### 1.3 Assessment criteria

In line with TII Guidelines<sup>1</sup>, the hydrological attributes which should be considered during this Stage 1 Corridor Options Assessment are presented below:

- Watercourses crossed by each corridor and potential impacts on water quality arising from construction work or discharges during the operational stage;
- Ecological features;
- Surface water abstractions close to and downstream of crossings;

- Sites of amenity value traversed by the corridor; and
- Potential increase (or reduction) of flood risk to existing properties.

It should be noted that a number of other hydrological features were highlighted in **Section 14** (Hydrology) of **Volume B**. This information was gathered to provide the wider context of the scheme (e.g. catchment information), however this assessment has focused on the assessment study areas for the corridor options to compare the potential impacts associated with each corridor.

The TII Guidelines<sup>1</sup> note that with respect to hydrological features, most of the environmental impacts for watercourses occur close to the point where the proposed corridors cross the water channel. Potential exceptions to this relate to the potential to cause water quality impacts downstream and the potential to cause flooding upstream and downstream. Therefore, the assessment study areas were extended where a corridor option extended to within an attribute's Zone of Influence.

## 1.4 Stage 1 corridor options assessment

The Stage 1 Corridor Options Assessment for hydrological constraints considered both the potential impacts to watercourses and the potential risk of flooding.

### 1.4.1 Watercourses

The corridor options lie within the Ovoca-Vartry Catchment and a number of watercourses that were identified during the Hydrology Constraints Study are presented in **Table 14.2** of **Section 14** (Hydrology) of **Volume B**. The potential impacts of each corridor option on watercourses were assessed by considering the watercourses to be encountered or crossed, their attribute importance, the extent of the potential interaction (e.g. number of crossings) and determining the impact level on this basis. These are presented in **Table 1.2** and **Table 1.3**.

It should be noted that this section of the assessment deals with the potential impacts on water quality and flows from the crossing of the watercourse – the impacts associated with the physical presence of the crossing is considered under the flooding assessment due to the interaction with the flood plain. Impacts in this assessment criterion may therefore be temporary, for example, instantaneous surface water runoff impacts during a storm event.

In line with TII Guidelines<sup>1</sup>, a 250m buffer centred around the corridor centreline was assessed (in tandem with the footprint and 200m wide corridor) for each corridor option. The number of crossings of a river were considered to be the primary measure of the potential impact: if a river was in the corridor or assessment study area but didn't interact with the potential road footprint, or there was only one crossing, there was considered to be the potential for a 'temporary impact on a small proportion of the attribute'. If a river had two or more crossings, the impact was considered to be greater and was ranked as a 'temporary impact on a significant proportion of the attribute'.

The watercourse assessments for the northern and southern corridor options are presented in **Table 1.2** and **Table 1.3**.

Table 1.2: Watercourse assessment table Northern Section

<b>Corridor Option</b>	<b>Watercourses encountered [no. of crossings]</b>	<b>Attribute Importance</b>	<b>Potential impact: Temporary Impact on 'X' proportion of attribute (from Table 1.2)</b>	<b>Box 4.4<sup>1</sup> Impact level</b>	<b>TII PAG Qualitative Assessment</b>
<b>Corridor Option 1 (North)</b>	Rathmichael [1] County Brook [3] Dargle [1] Glencullen 10 [0] Kilmacanoge [5] Rocky Valley Stream [1]	Very High Medium Very High High High Medium	Small Significant Small Small Significant Small	Slight Imperceptible Slight Imperceptible Slight Neutral	Minor or Slightly Negative
<b>Corridor Option 2 (North)</b>	Rathmichael [1] County Brook [3] Dargle [2] Glencullen 10 [0] Kilmacanoge [4] Rocky Valley Stream [1]	Very High Medium Very High High High High	Small Significant Significant Small Significant Small	Slight Imperceptible Moderate Imperceptible Slight Imperceptible	Minor or Slightly Negative
<b>Corridor Option 3 (North)</b>	Rathmichael [1] County Brook [3] Dargle [2] Glencullen 10 [0] Kilmacanoge [2]	Very High Medium Very High High High	Small Significant Significant Small Significant	Slight Imperceptible Moderate Imperceptible Slight	Minor or Slightly Negative
<b>Corridor Option 4 (North)</b>	Rathmichael [1] County Brook [3] Dargle [1] Glencullen 10 [0] Kilmacanoge [2]	Very High Medium Very High High High	Small Significant Small Small Significant	Slight Imperceptible Slight Imperceptible Slight	Minor or Slightly Negative



Table 1.3: Watercourse assessment table Southern Section

	<b>Watercourses encountered [no. of crossings]</b>	<b>Attribute Importance</b>	<b>Potential impact: Temporary Impact on 'X' proportion of attribute (from Table 1.2)</b>	<b>Box 4.4<sup>1</sup> Impact level</b>	<b>TII PAG Qualitative Assessment</b>
<b>Corridor Option 1 (South)</b>	Kilmacanoge [3] Three Trouts Stream [3] Woodlands 10 [1] Kilcoole Stream [1] Ballyronan Stream [1] Newtownmountkennedy [1] Moneycarroll [1] Newcastle River [1] Volan [0] Dunran Demense Channel [1] Cullenmore Stream [0] Courtfoyle Stream [0]	High Medium Medium High High Very high Very high Very high Very high Very high Very high Very high	Significant Significant Small Small Small Small Small Small Small Small Small Small	Slight Imperceptible Neutral Imperceptible Imperceptible Slight Slight Slight Slight Slight Slight Slight	Minor or Slightly Negative
<b>Corridor Option 2 (South)</b>	Kilmacanoge [2] Three Trouts Stream [1] Kilmurray_South [1] Woodlands 10 [1] Ballyronan Stream [1] Newtownmountkennedy [1] Moneycarroll [1] Newcastle [1] Volan [0] Dunran Demense [1] Cullenmore [0] Courtfoyle [0]	High Medium Medium Medium High very high Very high Very high Very high Very high Very high Very high	Significant Small Small Small Small Small Small Small Small Small Small Small	Slight Neutral Neutral Neutral Imperceptible Slight Slight Slight Slight Slight Slight Slight	Minor or Slightly Negative
<b>Corridor Option 3 (South)</b>	Kilmacanoge [1] Three Trouts Stream [1] Kilcoole Stream [1] Ballyronan Stream [1] Newtownmountkennedy [1] Moneycarroll [1] Newcastle River [1] Volan [0] Dunran Demense Channel [1] Cullenmore Stream [0] Courtfoyle Stream [0]	High Medium High High Very high Very high Very high Very high Very high Very high Very high	Small Small Small Small Small Small Small Small Small Small Small	Imperceptible Neutral Imperceptible Imperceptible Slight Slight Slight Slight Slight Slight Slight	Minor or Slightly Negative
<b>Corridor Option 4 (South)</b>	Kilmacanoge [1] Three Trouts Stream [1] Kilcoole Stream [1] Ballyronan Stream [1]	High Medium High High	Small Small Small Small	Slight Neutral Imperceptible Imperceptible	Minor or Slightly Negative

	<b>Watercourses encountered [no. of crossings]</b>	<b>Attribute Importance</b>	<b>Potential impact: Temporary Impact on 'X' proportion of attribute (from Table 1.2)</b>	<b>Box 4.4<sup>1</sup> Impact level</b>	<b>TII PAG Qualitative Assessment</b>
	Newtownmountkennedy [1] Moneycarroll [1] Newcastle River [1] Volan [0] Dunran Demense Channel [1] Cullenmore Stream [0] Courtfoyle Stream [0]	Very high Very high Very high Very high Very high Very high Very high	Small Small Small Small Small Small Small	Slight Slight Slight Slight Slight Slight Slight	
<b>Corridor Option 5 (South)</b>	Kilmacanoge [3] Three Trouts Stream [4] Woodlands 10 [1] Kilcoole Stream [1] Ballyronan Stream [1] Newtownmountkennedy [1] Moneycarroll [1] Newcastle River [1] Volan [0] Dunran Demense Channel [1] Cullenmore Stream [0] Courtfoyle Stream [0]	High Medium Medium High High Very high Very high Very high Very high Very high Very high Very high	Significant Significant Small Small Small Small Small Small Small Small Small Small	Slight Neutral Imperceptible Slight Slight Slight Slight Slight Slight Slight Slight Slight	Minor or Slightly Negative

It should be noted that the existing road represents the current baseline environment. Corridor Options 1 (North), 1 (South) and 5 (South) are located on-line. If these options proceed, the runoff and treatment of discharges to watercourses will be improved to current standards and it is likely a positive impact will arise. On a conservative basis, this has not been incorporated at this stage of the assessment.

### 1.4.2 Surface water dependent habitats

A conservative approach was taken regarding water dependent habitats. In advance of a detailed survey at environmental impact assessment stage, some features have been included and given an importance rating as if they are dependent on both surface water and groundwater, refer to **Appendix C3** (Hydrogeology) of **Volume C**.

The ecological features that are considered to be dependent on surface water flow, level or quality to maintain their integrity are presented in **Section 14.3.6** of **Section 14** (Hydrology) of **Volume B**. These are:

- Kilmacanoge Marsh pNHA (including the priority Annex I habitat, Alluvial woodland [91E0\*] that was identified there);

- The Murrough pNHA SAC and SPA which are likely dependent on the water quality and flows from local rivers; and
- Priority Annex 1 habitat Alluvial woodlands [91E0\*] identified in Glen of the Downs SAC; and
- Potential site identified in Ballywaltrim Lane Ecological Site as Priority Annex 1 habitat Alluvial woodland [91E0]\* (numbered EC45 in **Section 12** (Biodiversity) of **Volume B**).

Kilmacanoge Marsh pNHA was assigned an ecological value of international importance due to the presence of priority Annex I habitat, in the form of Alluvial woodland [91E0\*]. Refer to **Appendix C1** (Biodiversity) of **Volume C** for the biodiversity assessment of this feature. This constraint is therefore of extremely high importance in this assessment.

Priority Annex I habitat Alluvial woodland [91E0\*] located in the Glen of the Downs SAC is assigned an ecological value of international importance and is therefore of extremely high importance in this assessment. The potential site identified at Ballywaltrim Lane (EC45) would also be considered of extremely high importance in this assessment.

An assessment of the potential for impacts to the hydrological characteristics of these attributes is presented in **Table 1.4** and **Table 1.5** and these were ranked in line with the methodology presented in **Section 1.2**. It should be noted that these did not rank the potential impacts on the attributes themselves, but only the potential changes in water quality, levels or flow at the attribute. The assessment of the impacts on the attribute as a biodiversity feature is included in **Appendix C1** (Biodiversity) of **Volume C**.

In order to undertake a conservative assessment, the TII PAG<sup>4</sup> qualitative assessment was assigned to each corridor option based on the highest impacts likely to be observed on any of the features.

Table 1.4: Water dependent biodiversity assessment table Northern Section

	Surface water dependent biodiversity features	Attribute Importance	Potential impact: <i>Temporary Impact on 'X' proportion of attribute (from Table 1.2) Box 4.4<sup>1</sup></i>	Box 4.4 <sup>1</sup> Impact level	TII PAG qualitative ranking
<b>Corridor Option 1 (North)</b>	Kilmacanoge Marsh pNHA	Extremely High	Significant	Significant	Major or highly negative
	Priority habitat in Ballywaltrim Lane	Extremely High	Significant	Significant	Major or highly negative
<b>Corridor Option 2 (North)</b>	Kilmacanoge Marsh pNHA	Extremely High	Significant	Significant	Major or highly negative

	Surface water dependent biodiversity features	Attribute Importance	Potential impact: <i>Temporary Impact on 'X' proportion of attribute (from Table 1.2) Box 4.4<sup>1</sup></i>	Box 4.4 <sup>1</sup> Impact level	TII PAG qualitative ranking
<b>Corridor Option 3 (North)</b>	Kilmacanoge Marsh pNHA	Extremely High	Small	Slight	Minor or slightly negative
<b>Corridor Option 4 (North)</b>	Kilmacanoge Marsh pNHA	Extremely High	Small	Slight	Minor or slightly negative
	Priority habitat in Ballywaltrim Lane	Extremely High	Small	Slight	Minor or slightly negative

Corridor Option 1 (North) and Corridor Option 2 (North) are within the boundary of the pNHA and are likely to have higher potential impacts than Corridor Options 3 (North) and 4 (North), where the pNHA is within the buffer zone but not within the corridor itself.

Considering the distance from the Murrough SAC to the rivers within the corridor options that interact with it, it is likely that all potential impacts will be 'Temporary impacts on a small proportion of the attribute'.

The priority Annex I habitat within the Glen of the Downs SAC will be impacted by both temporary and permanent impacts.

Table 1.5: Water dependent biodiversity assessment table Southern Section

	Surface water dependent biodiversity features	Attribute Importance	Potential impact: <i>Temporary / Permanent Impact on 'X' proportion of attribute (from Table 1.2) Box 4.4<sup>1</sup></i>	Box 4.4 <sup>1</sup> Impact level	TII PAG Qualitative Assessment
<b>Corridor Option 1 (South)</b>	Murrough pNHA SAC & SPA	Extremely High	Small (Temporary)	Moderate	Major or highly negative
	Priority habitat in Glen of the Downs	Extremely High	Significant (Permanent)	Profound	
<b>Corridor Option 2 (South)</b>	Murrough pNHA SAC & SPA	Extremely High	Small (Temporary)	Moderate	Moderately negative
	Priority habitat in Glen of the Downs	Extremely High	Small (Temporary)	Moderate	
	Murrough pNHA SAC & SPA	Extremely High	Small (Temporary)	Moderate	Moderately negative

	Surface water dependent biodiversity features	Attribute Importance	Potential impact: <i>Temporary / Permanent Impact on 'X' proportion of attribute (from Table 1.2) Box 4.4<sup>1</sup></i>	Box 4.4 <sup>1</sup> Impact level	TII PAG Qualitative Assessment
<b>Corridor Option 3 (South)</b>	Priority habitat in Glen of the Downs	Extremely High	Small (Temporary)	Moderate	
<b>Corridor Option 4 (South)</b>	Murrough pNHA SAC & SPA	Extremely High	Small (Temporary)	Moderate	Moderately negative
	Priority habitat in Glen of the Downs	Extremely High	Small (Temporary)	Moderate	
<b>Corridor Option 5 (South)</b>	Murrough pNHA SAC & SPA	Extremely High	Small (Temporary)	Moderate	Major or highly negative
	Priority habitat in Glen of the Downs	Extremely High	Significant (Permanent)	Profound	

### 1.4.3 Surface water abstractions

Four surface water abstractions (A1, A2, A11 and A12<sup>5</sup>) were identified in **Table 14.9** of **Section 14** (Hydrology) of **Volume B**. These are all upstream of the potential corridor options and will not be impacted by any of the proposed corridors. For this reason, they are not included in the assessment.

### 1.4.4 Amenity value

Two sites of amenity value (A2 and A13) were identified in **Table 14.9** of **Section 14** (Hydrology) of **Volume B**. These are both upstream of the corridor options and will not be impacted. For this reason, they are not included in the assessment.

### 1.4.5 Flood risk

The potential increase (or reduction) of flood risk to existing properties is also considered as part of the assessment based on the property number bands outlined in **Table 14.1** of **Section 14** (Hydrology) of **Volume B**. The length of the mapped floodplain within the assessment study area of each corridor option and the presence of downstream flood relief schemes are the primary factors considered.

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<sup>5</sup> Reference numbers were assigned to each attribute identified in the Hydrology Constraints Study, Section 14 of Volume B – Constraints Study and these reference numbers are used in the assessment for consistency.

There are several areas of existing flood risk along the current alignment in the Northern Section.

The on-line corridor options have the potential to alleviate some of these existing issues e.g. through upgrading the drainage system to current standards. This could potentially be considered as a positive impact, however taking a conservative approach and to ensure parity between corridor options, it will be considered as neutral.

It should be noted that there is an existing flood relief scheme downstream of the corridor options in the Northern Section on the River Dargle. The current scheme represents the baseline environment and would have been incorporated into the design of the flood defences. However, any additional crossings of the River Dargle or its tributaries have the potential to reduce the floodplain capacity and therefore contribute to a marginal increase in peak flood flows. The impacts of this have been incorporated into the assessment by considering the additional number of crossings that may be required that may impact the designed flood storage of the existing scheme.

The assessments are presented in **Table 1.6** and **Table 1.7** for the northern and southern corridor options respectively.

Table 1.6: Flooding assessment table Northern Section

Assessment Criteria	Corridor Option 1 (North)	Corridor Option 2 (North)	Corridor Option 3 (North)	Corridor Option 4 (North)
Length of mapped floodplain along corridor (km)	1.715	1.715	1.715	1.715
Attribute Importance	Very High (protects more than 50 properties as per Table 1.1)	Very High (protects more than 50 properties as per Table 1.1)	Very High (protects more than 50 properties as per Table 1.1)	Very High (protects more than 50 properties as per Table 1.1)
Flood Risk Upstream Quantitative Assessment	Not significant or neutral	Estimated 2 additional crossings of the of the River Dargle or its tributaries will be required (1 of the River Dargle and 1 of the Kilmacanoge)	Estimated 3 additional crossings of the River Dargle or its tributaries will be required (1 of the River Dargle and 2 of the Kilmacanoge)	Estimated 1 additional crossing of the Kilmacanoge, a tributary of the River Dargle will be required
Qualitative Assessment	Neutral	Permanent negative impact on small proportion of attribute	Permanent negative impact on small proportion of attribute	Permanent negative impact on small proportion of attribute
Impact Level	Neutral	Significant negative	Significant negative	Significant negative

Assessment Criteria	Corridor Option 1 (North)	Corridor Option 2 (North)	Corridor Option 3 (North)	Corridor Option 4 (North)
TII PAG <sup>4</sup>	Not significant or neutral	Major or highly negative	Major or highly negative	Major or highly negative

Table 1.7: Flooding assessment table Southern Section

Assessment Criteria	Corridor Option 1 (South)	Corridor Option 2 (South)	Corridor Option 3 (South)	Corridor Option 4 (South)	Option 5 (South)
Length of mapped floodplain along corridor (km)	1.4	0.28	0.95	0.177	1.4
Attribute Importance	High (protecting 5-50 properties as per Table 1.1)	High (protecting 5-50 properties as per Table 1.1)	High (protecting 5-50 properties as per Table 1.1)	High (protecting 5-50 properties as per Table 1.1)	High (protecting 5-50 properties as per Table 1.1)
Qualitative Assessment	Neutral	Permanent impact on small proportion of attribute	Permanent impact on small proportion of attribute	Permanent impact on small proportion of attribute	Permanent positive impact on small proportion of attribute
Impact Level	Neutral	Moderate negative	Moderate negative	Moderate negative	Neutral
TII PAG <sup>4</sup>	Not significant or neutral	Moderately negative	Moderately negative	Moderately negative	Not significant or neutral

It should be noted that further detailed studies will be undertaken to determine the potential flooding impacts.

## 1.5 Summary

The Stage 1 Corridor Options Assessment for the Northern and Southern Sections are summarised in **Table 1.8** and **Table 1.9**.

Table 1.8: Summary assessment table Northern Section

Assessment Criteria	Corridor Option 1 (North)	Corridor Option 2 (North)	Corridor Option 3 (North)	Corridor Option 4 (North)
Watercourses	Minor or slightly negative	Minor or slightly negative	Minor or slightly negative	Minor or slightly negative
Flood Risk	Not significant or neutral	Major or Highly Negative	Major or Highly Negative	Major or Highly Negative

Assessment Criteria	Corridor Option 1 (North)	Corridor Option 2 (North)	Corridor Option 3 (North)	Corridor Option 4 (North)
Surface water dependent biodiversity features	Major or Highly negative	Major or Highly negative	Minor or slightly negative	Minor or slightly negative
Qualitative Assessment	Minor or slightly negative	Moderately negative	Moderately negative	Moderately negative
Score / Impact Level	3	2	2	2
Preference	Preferred	Least Preferred	Least Preferred	Intermediate

The preference for Corridor Option 1 (North) has been determined based on the neutral impact it will have on floodplain storage in the north. The preference order of Corridor Options 2 (North) – 4 (North) is based on the number of potential additional crossings that may be required for the River Dargle and its tributaries and the lesser interaction with the Kilmacanoge Marsh pNHA.

Table 1.9: Summary assessment table Southern Section

Assessment Criteria	Corridor Option 1 (South)	Corridor Option 2 (South)	Corridor Option 3 (South)	Corridor Option 4 (South)	Corridor Option 5 (South)
Watercourses	Minor or slightly negative	Minor or slightly negative	Minor or slightly negative	Minor or slightly negative	Minor or slightly negative
Flood risk	Not significant or neutral	Moderately negative	Moderately negative	Moderately negative	Not significant or neutral
Surface water dependent biodiversity features	Major or Highly Negative	Moderately negative	Moderately negative	Moderately negative	Major or highly negative
Qualitative Assessment	Major or highly negative	Moderately negative	Moderately negative	Minor or slightly negative	Major or highly negative
Score / Impact Level	1	2	2	2	1
Preference	Least Preferred	Preferred	Intermediate	Intermediate	Least Preferred

The preference for Corridor Option 2 (South) is based on the least potential impact on ecological sites and having a shorter length of flood plain than Corridor Option 3 (South) or Corridor Option 4 (South). Corridor Options 1 (South) and 5 (South) are least preferred based on their potential impact on the identified priority Annex I habitat in Glen of the Downs SAC.



## 1.6 References

Environmental Protection Agency (EPA), Guidelines on the Information to be Contained in Environmental Impact Assessment Reports, Draft 2017. Available from: <https://www.epa.ie/publications/monitoring--assessment/assessment/draft-guidelines-on-the-information-to-be-contained-in-environmental-impact-asse.php>

National Roads Authority (NRA) Guidelines on Procedures for Assessment and Treatment of Geology, Hydrology and Hydrogeology for National Road Schemes, 2009. Available from: <https://www.tii.ie/technical-services/environment/planning/Guidelines-on-Procedures-for-Assessment-and-Treatment-of-Geology-Hydrology-and-Hydrogeology-for-National-Road-Schemes.pdf>

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Transport Infrastructure Ireland (TII) Project Appraisal Guidelines for National Roads Unit 7.0 - Multi-Criteria Analysis, 2016. Available from: <https://www.tiipublications.ie/library/PE-PAG-02031-01.pdf>