

# Appendix 2.12 Agriculture

### 2.12.1. Introduction

As part of the works associated with the proposed N25 Waterford to Glenmore Road Scheme, Philip Farrelly & Co. were engaged by Atkins to assess the agricultural impact of the route options. The agronomy report assesses and evaluates the potential agricultural impacts associated with the proposed route options for the N25 Waterford to Glenmore Road Scheme.

The land quality in the N25 Waterford to Glenmore Study Area is considered good with land undulation ranging in height from 13 meters to 174 meters ordnance datum.

Agriculture in this area is intensive in nature due to the relative high quality of the soil. The majority of the farmland in the Study Area is in grassland. Of the land that is in grassland, the vast majority of holdings are either dairy farms or mixed livestock, beef and or sheep farms. Fields with paddocking and grazing infrastructure and or yards observed with milking facilities are assumed to be involved in dairying. Holdings with horses or equine facilities observed are categorised as equine.

A key equestrian training enterprise 'Beacon Hill Stables' was identified within the Study Area.

### 2.12.2. Study Methodology

This report documents the assessment of the potential impact of the seven route options on agriculture and was prepared having regard to the following documents:

- Draft guidelines on the information to be contained in Environmental Impact Assessment Reports (EPA, 2017);
- Project Management Guidelines (TII, 2017).

The assessment of the agricultural impact consisted of a desktop survey of available aerial photography mapping supplied by Atkins, land folio information obtained from the Property Registration Authority, Census of Agricultural Data, a roadside survey of publicly accessible lands and local knowledge of the Study Area. Land Registry data was used to determine boundaries land holdings affected by the various route options. It should be noted that the number of land holdings identified on each route option may not reflect the total number of farms affected due to fragmentation of farms.

Consultation also took place with local Teagasc advisors to compile information on agricultural enterprises within the Study Area.

Consultation with land owners was not undertaken at this stage therefore specific information in relation to farming systems is not known. Consultation with affected landowners will take place during the Design & Environmental Phase of the project. Both qualitative and quantitative assessments of the impacts to key agricultural enterprises within the Study Area were carried out.

The agricultural enterprises considered most sensitive to a proposed scheme development consists mainly of dairy and equine enterprises. The route options assessment considered the impact each route option has on agriculture.

Land use, soil type, and key agricultural enterprises were considered in the qualitative assessment.

Land use (% of holdings), land take (approx. ha), land severance (% of holdings), route length (km), number of farmyards/facilities in close proximity to route options and the key enterprise types within the route options were considered in the quantitative assessment.

The assessment of the proposed scheme under the above categories (i.e. land use) was based on the number of land holdings falling within each sub-category.

In general, negative impacts from the development of a proposed scheme are mainly due to the level of land take and access problems to land and farmyard facilities. This assessment identified the key agricultural enterprises that would be considered most sensitive to the construction and operation of a proposed scheme. Intensive farm enterprises may be particularly affected by the loss of direct access to lands. This is particularly important in the case of dairy enterprises where daily access is required from the grazing platform to milking facilities on a twice daily basis during the grazing season.

Dairy farms are known to be particularly sensitive to the location of a major road. A dairy farm is one of the most intensive land-based farming enterprises and is entirely dependent on the land holding or grazing paddocks adjacent to the farmyard.

Equine farms also have the potential to be severely impacted as equine stock are of more a nervous disposition than other stock types and are prone to stress caused by irregular noise and moving vehicles. Beef and sheep farms are not as sensitive as horses to the noise impact of a major road. Where there is a significant impact on a grassland farm, the farming practices on these farms need to be adapted to mitigate the overall impact.

A road scheme will have a lower impact on a tillage farm or enterprise than on a livestock farm. Land take and land severance may also occur on tillage farms although the impact will largely consist of access problems for machinery to a severed area. It is preferable for the route option to pass through tillage and beef and or sheep farms rather than through dairy or equine farms.

### 2.12.3. Comparative Evaluation for Route Options

The comparative evaluation of the route options was assisted by scoring the agricultural impacts of each route option on sensitive receptors using the Stage 2 Project Appraisal Matrix similar to that shown in Stage 4 of the Project Appraisal Guidelines for National Roads Unit 7.0 - Multi Criteria Analysis<sup>1</sup>. Each route was awarded a score based on the seven-point scale as shown in Table 2-13-1 and a number was assigned according to the level of significance of the impacts. The impact of a new route will have different levels of impact on particular farms in a given area depending on a number of factors. There are seven impact ratings from Highly Positive to Major Negative. Three of these are deemed to be applicable to the assessment of agriculture.

**Table 2-13-1 Impact Scoring Key**

Score	Significance Level	Criteria
7	Major or Highly Positive	No effect on agricultural lands.
6	Moderately Positive	No effect on agricultural lands.
5	Minor or Slightly Positive	No effect on agricultural lands.
4	Neutral	No effect on agricultural lands.
3	Minor or slightly negative	Land use is grass based with medium levels of non-grassland parcels such as wetlands and forestry. Land quality is average being less suited to intensive agricultural production. Impact/land severance is Low to Medium. There are no impacts on farmyards. There are no impacts on sensitive farming enterprises e.g. horticulture, equine, dairy.
2	Moderately negative	Land use is mainly grass based with low levels of rough grazing or forestry. Land quality is average to good and is suited to intensive agricultural uses. Impact/land severance is predominately Medium. Impact on a low number of farmyards. Medium to high impacts on sensitive farming enterprises, e.g. horticulture, equine or dairy.
1	Major or Highly negative	Land use is primarily grass or arable. Land quality is good being suited to a wide range of agricultural uses. Impact/land severance is predominately Medium to High.

<sup>1</sup> TII. 2016. Project Appraisal Guidelines for National Roads Unit 7.0 - Multi Criteria Analysis. PE-PAG-02031.

Impact on a medium to high number of farmyards.  
Significant or highly significant impact on a large number of sensitive farming enterprises, e.g. horticulture, equine or dairy.

## 2.12.4. Existing Environment

The N25 Waterford to Glenmore Study Area is located entirely in County Kilkenny. The Study Area is mainly rural in nature and commences at Luffany roundabout in the townland Luffany and continues north of Ballyverneen roundabout and terminates in the townland Jamestown. The land in the Study Area is primarily in agricultural use. Long term grassland pastures account for the majority of the land within the Study Area. In addition to the grassland areas there are some areas of tillage within the Study Area. Farming practices are predominantly dairy, beef and or sheep related with some tillage enterprises located within the Study Area. A number of equine farms are located within the Study Area. One equine training facility 'Beacon Hill' is impacted by the proposed route options.

A number of dairy farms were identified within the Study Area. All of the route options impact on dairy farms; this is not unusual given the rapid expansion of the dairy sector in Ireland since the abolishment of Milk Quota in 2015.

## 2.12.5. Agriculture in Co. Kilkenny

According to the Central Statistics Office (CSO) in the Census of Agriculture (2010), the total agricultural area of Co. Kilkenny is 164,604ha excluding commonage. There are 3,737 farms with an average farm size of 44.05ha which is considerably higher than the national average of 32.7ha.

Grassland based livestock farming is very important in Co. Kilkenny. Some 1,738 farms (46.5% of total) are involved in specialised beef farming, while 766 farms (20.5%) of total are involved in specialist dairy. 232 farms (6% of total) are involved in specialist tillage, and sheep farming accounts for 129 (3.5% of total).

Tillage and arable crops are of less significance in Co. Kilkenny. The Census of Agriculture collects information on the structural characteristics of agricultural holdings such as land use, farm size, and farming enterprise type every ten years.

## 2.12.6. Agriculture within the Study Area

The data from the Central Statistics Office (CSO 2010) indicates there are eight rural districts for Co. Kilkenny. The rural district of Urlingford, Castlecomer, Kilkenny, Thomastown, Callan, Carrick-on-Suir, Ida and Waterford. The Study Area comprises of two rural districts Waterford and Ida. The total number of farms for the rural district of Waterford is 447, the total area farmed (UAA) was 18,347ha. Rough grazing accounts for 4%, tillage and other arable crops accounts for 9% while pasture, hay and silage accounts for 87% of land use.

The total number of farms for the rural district of Ida is 224, the total area farmed (UAA) is 8,971ha. Rough grazing accounts for 2%, tillage and other arable crops accounts for 14% while pasture, hay and silage accounts for 84% of land use. The low level of rough grazing confirms that land is good quality land. The high level of pasture, hay and silage demonstrates the intensive nature of farming within the Study Area.

The dominant agricultural use in the Study Area is grassland-based enterprises comprising of dairy, beef and/or sheep farming, with some equine enterprises. Dairy farms are located within the Study Area some of which are affected by some route options. Dairy farms are located in the townlands of Nicholastown, Ballinorea, Grogan, Coolnaleen, Flemingstown, Ballybrahee, Ballinclare, Ballinlammy, Robinstown, Kilcrenagh, Mullinahone, Ballyrahan, Ballyhobuck, Borrismore, Curraghmore, Ballinlaw, Ballyvarrig, Rochestown, Kearneybay, Aylwardstown and Ballyrowragh.

Equine enterprises are located within the Study Area. Equine enterprises are located in the townlands of Airmount, Treanaree, Haggard, Robinstown, Rochestown, Ballyrawragh and Milepost.

Roadside surveys were completed over two days from publicly accessible lands within the Study Area in October 2019. Surveys from publicly accessible lands confirmed the nature of farming practice within the Study Area. The surveys from publicly accessible land confirmed that dairy, beef and or sheep enterprises are the prevalent enterprises within the Study Area with some tillage and equine enterprises located within the Study Area.

## 2.12.7. Soils

Soil types influence the nature and the intensity of farming that can be carried out. In this section reference is made to the Irish Soil Information System digital data downloaded from the Irish Soils Information website in May 2020.

Clonroche is the main soil type identified within the Study Area. It is a fine loamy drift soil with siliceous stones. The soil is associated with lower slopes which reflects the rolling steep valley like topography. It is a typical brown earth soil which is best suited to improved grassland. It is a very fertile and moderately well drained soil.

Clashmore is also identified within the Study Area. It is a coarse loamy drift soil with siliceous stones. The soil is associated with lower slopes which reflects the steep rolling valley like topography. It is a humic-stagnic brown earth soil which is suited to improved grassland. It is a fertile soil and has reduced permeability compared to typical brown earth soils.

Land quality in the N25 Waterford to Glenmore Study Area is considered good with undulation ranging from 13 meters to 174 meters ordnance datum.

## 2.12.8. Agricultural Receptors

The major agricultural receptors within the Study Area comprise of key farming enterprises which are considered sensitive to road development works. The key agricultural enterprises identified consist of dairy farms, equine enterprises and intensive beef and or sheep enterprises.

Table 213-2 illustrates other key considerations for Agricultural Receptors comprising of the length of the route option, the number of holdings affected and the number of farmyards/facilities in close proximity to the route option.

**Table 2-13-2 Key Considerations for Agricultural Receptors**

Route Option	Length of Route Option (km)	Number of farms/holdings on Route Option	Approx. Land take per Route Option (ha)	Number of Farm yard/facilities in close proximity to Route Option
Purple	11.6	58	24.84	2
Navy	9.5	46	20.34	3
Magenta	9.3	48	20.08	-
Red	9.0	44	19.22	5
Teal	8.7	37	18.79	3
Lime Green	8.9	39	19.22	2

The approximate land take area (ha) of each route option is based on a 21.6-meter-wide carriageway.

The results for the assessment for each route option are shown in the following sections for land quality, land use, land severance and farmyards/ facilities in close proximity to route options.

### 2.13.8.1. Land Quality

The definitions for the assessment categories under land quality are presented in Table 2-13-3.

**Table 2-13-3 Definitions of Land Quality**

Land Quality Status	Impact
Good quality land	High agricultural value and potential. Accessibility is good and the maintenance level is very high. The drainage is very good or the soils is free draining. It is suitable for a wide range of arable and livestock enterprises at an intensive level.
Medium quality land	Medium agricultural value with a medium to high agricultural potential. There may be drainage problems in these areas. These areas may require maintenance work to increase productivity. It is suitable for a wide range of arable and livestock enterprises.
Poor quality land	Low agricultural value and potential. These areas are unsuitable for intensive grazing by livestock enterprises. They are suitable for extensive stocking, rough grazing, forestry or peat production.

The impact on agriculture is greater where the affected land is of good quality. Good quality land has a high agricultural potential and the value attached to that land is greater as a result. Table 2-13-4 details the percentage of land within each route option that is of Good, Medium or Poor Land Quality.

**Table 2-13-4 Assessment of Land Quality**

Route Option	Number of farms/ holdings on Route Option	Land Quality		
		Good	Medium	Poor
Purple	58	.91%	9%	-
Navy	46	91%	9%	-
Magenta	48	96%	4%	-
Red	44	100%	-	-
Teal	37	86%	14%	-
Lime Green	39	92%	8%	-

The majority of the land within the Study Area is good quality and suited to all farming enterprise types.

### 2.13.8.2. Land Use

The definitions for the assessment categories under land use are presented in Table 2-13-5.

**Table 2-13-5 Definitions of Land Use**

Land Use	Descriptor
Grass	This consists of areas of grassland.
Tillage	This consists of areas used for crop production.

Forestry	This consists of areas of natural woodland, commercial forestry and areas with significant levels of scrub and hazel.
Other	This consists of lands which are in other uses such as for horticultural use, or grassland areas currently unutilised.

The assessment of land use in the Study Area is important to establishing the most suitable route option. Agricultural land will be impacted differently to various extents depending on what type of agriculture the land is designated to. For example, land used for livestock production will be more impacted than land used for crop production.

Table 2-13-6 details the land use as a percentage of the land within each route option.

**Table 2-13-6 Assessment of Land Use**

Route Option	Land Parcels	Land Use (% of Land Parcels)				
		Grazing	Dairy	Forestry	Equine	Tillage
Purple	58	76%	14%	3%	-	7%
Navy	46	85%	6%	-	-	9%
Magenta	48	92%	8%	-	-	-
Red	44	75%	16%	-	2%	7%
Teal	37	76%	5%	8%	-	11%
Lime Green	39	79%	8%	3%	-	10%

The Study Area predominantly comprises of grassland and is utilised for livestock production. There are some areas of land used for tillage and forestry within the Study Area. The grassland-based activities comprise of grazing livestock such as dairy, beef and/or sheep enterprises. The impact on agriculture is greatest within the grassland category. The land parcels categorised as grassland are most affected by land take which causes a reduction in area farmed and severance to farm land and or severance to farmyards/ facilities. Intensive farm enterprises may be particularly affected by the loss of direct access to farmland this results in an inconvenience to farming operations.

### 2.13.8.3.Land Severance

The definitions for the assessment categories under land severance and used to assess the severance of land parcels are presented in 2-13-7.

**Table 2-13-7 Assessment of Land Severance**

Land Severance	Descriptor
Major	Major severance refers to land parcels that are characterised by the route splitting the parcel in two resulting in a significant area of the parcel becoming inaccessible or landlocked. It also occurs in smaller parcels where the route may occupy a significant portion of the parcel area. The route may impact on farmyard buildings or a significant agricultural facility.
Moderate	Moderate severance refers to land parcels where a significant portion is separated from the rest by the new development. The isolated portion is large enough to continue to be farmed in a productive manner. There will be operational difficulties when moving livestock or machinery.

	Alternative access and/or gateways may need to be provided. Animal handling facilities or a farmyard area may be affected.
Minor	Minor severance denotes land parcels that are characterised by having a relatively small portion of land isolated by the route or a realignment of a local road, or where the land take is along the boundary of a land parcel and impacts upon access to remaining lands. Small severed parcels of land may be too small to farm in a productive manner.
Not Significant	Not significant severance refers to land parcels that are impacted along the boundary of the parcel or where a corner of a field is removed. It generally involves a low level of land take. There is no impact on access to lands.

The level of significant land severance which is regarded as the combined levels from the major and moderate categories together with the proximity of route options to farmyard/facilities are often the most influential factors that impact on agriculture. Depending on the agricultural enterprise, the impact derived from land severance varies. Severance of livestock-based farm holdings can have a high impact due to the difficulties created in stock movement around the farm or access to and from the fields to the farmyard. Severance will have a greater impact on a dairy enterprise where twice daily access is required from land to milking facilities during the grazing season. Daily access to severed land would not be required on tillage enterprises.

In this assessment, proximity of route options to farmyard/facilities was recorded. Such facilities may comprise of animal housing or fodder storage facilities and also applies to animal-handling facilities such as yards and cattle pens.

The assessment of severance has omitted the impact of the route options on land drainage or the provision of services such as electricity and water supply. It is been assumed that the provision of land drainage will be restored and services to severed land will be restored.

**Table 2-13-8 Land Severance and Close Proximity of Route Option to Farmyard/ Facilities**

Route Option	Land Parcels	Land Severance (% of land parcels)				Close proximity of route option to farmyard/ facilities
		Major	Moderate	Minor	Not Significant	Tillage
Purple	58	26%	27%	24%	23%	3%
Navy	46	22%	28%	11%	39%	7%
Magenta	48	-	6%	13%	81%	-
Red	44	25%	14%	39%	22%	11%
Teal	37	24%	25%	32%	19%	8%
Lime Green	39	13%	31%	21%	35%	5%

## 2.12.9. Assessment of Potential Impacts

Following an assessment of each route option under the various sections of land quality, land use and farmyards/ facilities within each route option, the data gathered was combined to determine the level of impact for each route option. This is presented in Table 2-13-9 below and described further in the section.

**Table 2-13-9 Assessment of Potential Impacts**

Assessment Criteria	Purple	Navy	Magenta	Red	Teal	Lime Green
Land Quality (% of holdings)						
Good	91%	91%	96%	100%	86%	92%
Medium	9%	9%	4%	-	14%	8%
Poor	-	-	-	-	-	-
Key Enterprises (% of holdings)						
Grazing	76%	85%	92%	75%	76%	79%
Dairy	14%	6%	8%	16%	5%	8%
Forestry	3%	-	-	-	8%	3%
Equine	-	-	-	2%	-	-
Tillage	7%	9%	-	7%	11%	10%
Impact of Severance (% of holding)						
Major	26%	22%	-	25%	24%	13%
Moderate	27%	28%	6%	14%	25%	31%
Minor	24%	11%	13%	39%	32%	21%
Not Significant	23%	39%	81%	22%	19%	35%
Farmyard/Facilities in close proximity to Route Options (% of holdings)	3%	7%	-	11%	8%	5%
Agricultural Impact	Major Negative	Moderate Negative	Moderate Negative	Major Negative	Moderate Negative	Moderate Negative

## 2.12.10. Comparison of Route Options

This study carried out an assessment of the agricultural impact on each of the seven route options and allocated them an agricultural impact using the criteria as presented in Table 2.13.9. The impact of the individual route option on agriculture has been assessed under several categories including agricultural land take, land quality, land use, land severance and farmyard/facilities within close proximity to each route option.

The 'Do Nothing' route option represents the retention of the existing road network without improvement. Therefore, there will be no land take, or land severance caused to the existing farm holdings along the existing route. There may be some slight disturbance to access to farm holdings during routine maintenance works.

The land quality under all route options is predominately good quality land suited to land intensive agriculture.

Farming in the Study Area appears to be of high intensity. None of the farms are identified as being of national or regional importance. The permanent loss of agricultural land in the Study Area would affect agriculture at local level only.

Based on the information contained within previous sections, the following agricultural impact and ranking order has been assigned to the seven route options. The preference level has been assigned taking land severance farm enterprise and number of holdings into account. The route options have been ranked in terms of preference with (1) being the preferred option.

**Table 2.13.10 Agronomy Assessment Summary**

Route Option	Impact	Impact Score
Purple	Major Negative	Least Preferred (7)
Navy	Moderate Negative	Intermediate (5)
Magenta	Moderate Negative	Preferred (2)
Red	Major Negative	Least Preferred (6)
Teal	Moderate Negative	Intermediate (4)
Lime Green	Moderate Negative	Intermediate (3)
'Do Nothing' (Existing Route)	Minor / Slightly Negative	Preferred (1)

### 2.13.10.1. Purple

The Purple route is 11.6km and impacts on 58 farm holdings some of which are classified as sensitive farm holdings such as dairy farms. Of the 58 farm holdings, 76% are classified as grazing, 14% are classified as dairy farms, 3% are classified as forestry and 7% are classified as tillage. The route is in close proximity to 2 farmyard/facilities.

91% of holdings are classified as good land quality while 9% of holdings are classified as medium land quality. Good land quality has a high agricultural potential and the value attached to that land is greater as a result.

26% of holdings are classified as resulting in Major Severance, 27% of holdings are classified as Moderate Severance, while 47% of holdings are classified as Minor or Not Significant Severance. It is preferable for the route to pass through tillage and grazing (Beef/Sheep) enterprises rather than through sensitive enterprises like dairy farms.

### 2.13.10.2. Navy

The Navy route is 9.5km and impacts on 46 farm holdings some of which are classified as sensitive farm holdings such as dairy farms. Of the 46 farm holdings, 85% are classified as grazing, 6% are classified as dairy farms and 9% are classified as tillage. There are no forestry holdings impacted by the route. The route is in close proximity to 3 farmyard/facilities.

91% of holdings are classified as good land quality while 9% of holdings are classified as medium land quality. Good land quality has a high agricultural potential and the value attached to that land is greater as a result.

22% of holdings are classified as resulting in Major Severance, 28% of holdings are classified as Moderate Severance, while 50% of holdings are classified as Minor or Not Significant Severance. It is preferable for the route to pass through tillage and grazing (Beef/Sheep) enterprises rather than through sensitive enterprises like dairy farms.

### 2.13.10.3. Magenta

The Magenta route is 9.3km and impacts on 48 farm holdings some of which are classified as sensitive farm holdings such as dairy farms. Of the 48 farm holdings, 92% are classified as grazing and 8% are classified as dairy farms. There are no forestry or tillage holdings impacted by the route. The route is not in close proximity to any farmyard/facilities.

96% of holdings are classified as good land quality while 4% of holdings are classified as medium land quality. Good land quality has a high agricultural potential and the value attached to that land is greater as a result.

No holdings are classified as resulting in Major Severance because the route is predominantly online, 6% of holdings are classified as Moderate Severance, while 94% of holdings are classified as Minor or Not Significant Severance. It is preferable for the route to pass through tillage and grazing (Beef/Sheep) enterprises rather than through sensitive enterprises like dairy farms.

#### 2.13.10.4. Red

The Red route is 9.0 km and impacts on 44 farm holdings some of which are classified as sensitive farm holdings such as dairy farms and equine enterprises. Of the 44 farm holdings, 75% are classified as grazing, 16% are classified as dairy farms, 7% are classified as tillage and 2% are classified as tillage. The route is in close proximity to 5 farmyard/facilities.

100% of holdings are classified as good land quality. Good land quality has a high agricultural potential and the value attached to that land is greater as a result.

25% of holdings are classified as resulting in Major Severance, 14% of holdings are classified as Moderate Severance, while 61% of holdings are classified as Minor or Not Significant Severance. It is preferable for the route to pass through tillage and grazing (Beef/Sheep) enterprises rather than through sensitive enterprises like dairy farms or equine enterprises.

#### 2.13.10.5. Teal

The Teal route is 8.7km and impacts on 37 farm holdings some of which are classified as sensitive farm holdings such as dairy farms. Of the 37 farm holdings, 76% are classified as grazing, 5% are classified as dairy farms, 8% are classified as forestry and 11% are classified as tillage. The route is in close proximity to 3 farmyard/facilities.

86% of holdings are classified as good land quality while 14% of holdings are classified as medium land quality. Good land quality has a high agricultural potential and the value attached to that land is greater as a result.

24% of holdings are classified as resulting in Major Severance, 25% of holdings are classified as Moderate Severance, while 51% of holdings are classified as Minor or Not Significant Severance. It is preferable for the route to pass through tillage and grazing (Beef/Sheep) enterprises rather than through sensitive enterprises like dairy farms.

#### 2.13.10.6. Lime Green

The Lime Green route is 8.9km and impacts on 39 farm holdings some of which are classified as sensitive farm holdings such as dairy farms. Of the 39 farm holdings, 79% are classified as grazing, 8% are classified as dairy farms, 3% are classified as forestry and 10% are classified as tillage. The route is in close proximity to 2 farmyard/facilities.

92% of holdings are classified as good land quality while 8% of holdings are classified as medium land quality. Good land quality has a high agricultural potential and the value attached to that land is greater as a result.

13% of holdings are classified as resulting in Major Severance, 31% of holdings are classified as Moderate Severance, while 56% of holdings are classified as Minor or Not Significant Severance. It is preferable for the route to pass through tillage and grazing (Beef/Sheep) enterprises rather than through sensitive enterprises like dairy farms.

### 2.12.11. Summary and Conclusions

The land quality under all route options is predominately good quality land suited to land intensive agriculture.

Farming in the Study Area appears to be of high intensity. None of the farms are identified as being of national or regional importance. The permanent loss of agricultural land in the Study Area would affect agriculture at local level only.

The study involved a comparative assessment of the impact of the route options for the N25 Waterford to Glenmore Scheme road project on agricultural holdings. The study involved a quantitative and qualitative assessment of the route options on agricultural holdings comprising of farm land and farmyards/facilities. Each route option was assessed using the criteria presented in Tables 2-13-1 to 2-13-10.

The Magenta option is the second preference because of the online nature of the route it does result in significant severance of farm holdings. It impacts on 48 holdings 8% of these are dairy farms.

The Lime Green option is the third preference it impacts on 39 holdings 8% of these are dairy farms. It results in significant severance on 44% of holdings and is in close proximity to 2 farm buildings.

The Teal option is the fourth preference it impacts on 37 holdings 5% of these are dairy farms. It results in significant severance on 49% of holdings and is in close proximity to 3 farm buildings.

The Navy option is the fifth preference it impacts on 46 holdings 6% of these are dairy farms. It results in significant severance on 50% of holdings impacted and is in close proximity to 3 farm buildings.

The Red option is the sixth preference it impacts on 44 holdings 16% of these are dairy farms and it also impacts on 1 intensive equine enterprise. It results in significant severance on 39% of holdings impacted and is in close proximity to 5 farm buildings.

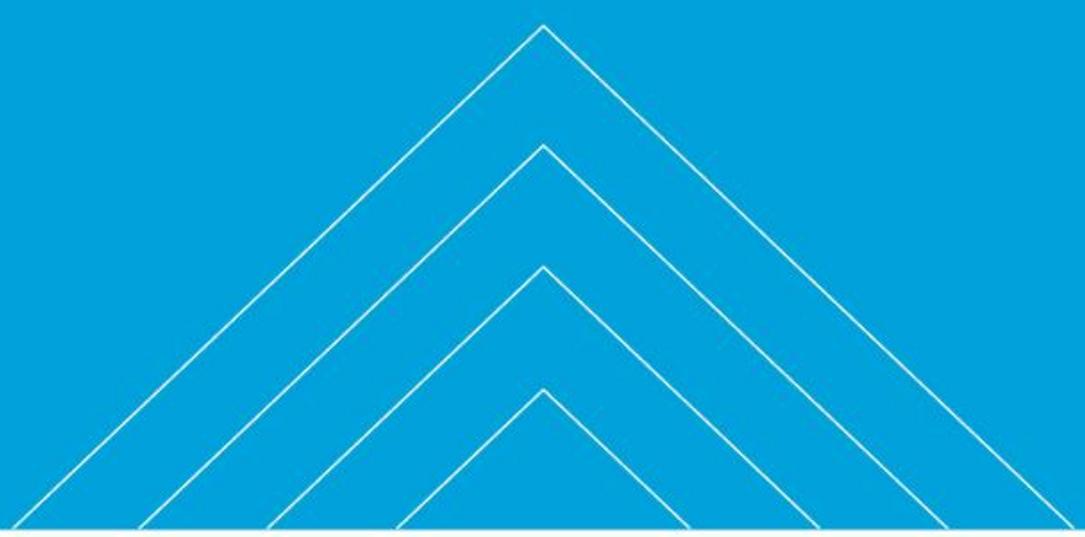
The Purple option is the least preferred because it impacts on the highest number of holdings, 58 holdings, 14% of these are dairy farms. It results in significant severance on 53% of holdings impacted and is in close proximity to 2 farm buildings.

While the proposed scheme will have an impact on the individual farm holdings which are affected; it will not have a significant effect on farming in the area as a whole. The proposed scheme is not large scale and the land take will not significantly reduce the overall supply of agricultural land in the area. There are some farmyards/ facilities in close proximity to route options in the Study Area. The 'Do Nothing' option would have the least impact on agriculture and would cause no land severance. All other route options will cause various levels of land severance to farm holdings.

The individual route or combination of route options that are decided upon for the preferred route will have a negative effect on individual farming operations. It will be important at that stage to ensure all possible mitigation measure are taken to minimise the impact to agricultural practices in the area.

## Appendix 3.1

### Phase 2: Stage 2 – Project Appraisal Matrices



N25 Waterford to Glenmore  
Stage 2 Assessment

Environmental Criteria	Preliminary Assessment of Option - Purple - 11.6km		Score
	Quantitative Assessment	Qualitative Assessment	
Air Quality	<p>The calculated Index of Overall Change in Exposure for this route has been determined: NO<sub>x</sub> Exposure Index: -18,255 PM<sub>10</sub> Exposure Index: -1,434</p> <p>There are no sensitive receptors within 50m of this route. There is a beneficial impact as traffic is diverted away from properties along the existing N25.</p> <p>All routes cross a section of the River Nore &amp; River Barrow SAC therefore no preference is considered in terms of air quality impacts on sensitive ecosystems.</p>	<p>Predicted baseline levels of NO<sub>2</sub> and PM<sub>10</sub> are based on data from representative EPA monitoring sites. A background concentration of 5 µg/m<sup>3</sup> for NO<sub>2</sub> and 10 µg/m<sup>3</sup> for PM<sub>10</sub> are predicted in the region of the proposed route options.</p> <p>The existing N25 route is the least preferred option as it impacts the greatest number of receptors and thus has the greatest NO<sub>x</sub> and PM<sub>10</sub> exposure index. Each of the revised routes will improve local air quality along the existing alignment.</p> <p>As there are no new receptors impacted by the proposed route there is an overall positive impact from the new alignment as traffic is diverted away from properties along the existing N25.</p>	5
Climate	<p>The CO<sub>2</sub> emissions associated with operational traffic along the route has been calculated: CO<sub>2</sub> Emissions: 11,554 tonnes/yr</p>	<p>CO<sub>2</sub> emissions are considered at a national scale rather than at a local level. Data from the EPA indicates that Ireland is likely to exceed its climate emissions targets in future years and therefore reduction measures are required in all areas. However, there are no sector specific GHG targets at present and a scheme in isolation will not cause a breach of the national targets.</p> <p>There is minimal difference in the route options in terms of climate impacts, all routes result in a slight negative impact to climate.</p>	3
Noise	<p>PIR = 98, with 59 NSLs within 300m of the new road (Purple). None of these properties are within 50m and 8no. residential properties are within 100m. Likely NSLs above 60dB L<sub>den</sub> is 51no. and above 70dB L<sub>den</sub> is 1no. Likely NSLs to experience a moderate negative (increase) in noise traffic levels is 39no. and a major negative impact is 53no. No positive (reduction) in noise traffic levels are likely and no noise mitigation is required.</p>	<p>Diverts west at New Ross bypass through rural areas with no alignment along the existing route.</p> <p>Expected noise climate to be a quiet in the rural area and the introduction of a 100km road would significantly change the noise environment at the small number of properties along this route. Least number of properties along this route compared to all other routes, however the 60dB L<sub>den</sub> is exceeded at 51no. NSLs. Review of traffic data indicates that this route would not divert significant traffic from the existing N25, resulting in new road traffic noise being introduced to a rural area, while the existing N25 remains the heavier trafficked route. It is the least preferable proposed route with the exception of the Do Nothing route, and is the only route that has no moderate or major positive change (reduction) in noise traffic levels.</p>	2
Landscape and Visual (including light)	<p>Visual Effects The number of receptors judged to have significant adverse effects (i.e. those categorised between the range of Moderate to Very Large) is 22.</p>	<p>Landscape Character Area E: South Eastern Uplands: The proposed route travels through greenfield land for circa. 7.1km through this character area.</p> <p>Horizontal alignment of carriageways travels in close proximity to narrow stream valleys west of Glenmore. The straight alignment at odds with the pattern of these valleys. Some field pattern severance. Vertical alignment cutting and embankment slopes would lead some disruption to existing landform. The route travels in close proximity to the lower slopes and wooded vegetation of the system of narrow stream valleys north and west of Glenmore (travels close to this intimate valley system especially at Mullennahone). Significant adverse effects on landscape character of this valley system. From south of Ardbeg towards Grogan and Nicholstown the route travels across/ sidelong on the steep side slopes of a locally prominent ridge of higher ground (a Principal Ridgeline, Refer to Figure 8.3 Landscape Sensitivities, Kilkenny County Development Plan). The side slopes are integral to the ridge and provide large scale views over the surrounding countryside. The side slopes of this ridge are visible from a wide surrounding area extending far to the west, and the route in this location may be widely visible.</p> <p>Will lead to adverse effects on the tranquillity of land and wooded stream valleys currently located to the west of the existing N25 road and other lands located far to the west of the existing N25. Loss of some areas of woodland, hedgerows and hedgerow trees and loss of agricultural land.</p> <p>Landscape Character Area C: South Western Uplands: The proposed route travels through greenfield land for circa. 4km through this character area. Long straight sections of route alignment are at odds with the curved landscape pattern. Some field pattern severance. Vertical alignment cutting and embankment slopes would lead to some limited disruption to existing landform. Immediately east of Ardbeg this route travels close to a prominent hill of high ground at Ballinclare. From south of Ardbeg towards Grogan and Nicholstown the route travels across/ sidelong on the steep side slopes of a locally prominent ridge of higher ground (a Principal Ridgeline, Refer to Figure 8.3 Landscape Sensitivities, Kilkenny County Development Plan). The side slopes are integral to the ridge and provide large scale views over the surrounding countryside. The side slopes of this ridge are visible from a wide surrounding area extending far to the west, and the route in this location may be widely visible. Significant adverse effects on side slopes of ridge of high ground from Ardbeg to Grogan and Nicholstown. Will lead to adverse effects on the tranquillity of land currently located to the west of the existing N25 road. Loss of some areas of woodland, hedgerows and hedgerow trees and loss of agricultural land.</p> <p>Landscape Character Area C2: South Hills Transition Area, South The proposed route travels through greenfield land for circa. 400m through this character area.</p> <p>Route travels across/ sidelong on the steep side slopes of a locally prominent ridge of higher ground (a Principal Ridgeline, Refer to Figure 8.3 Landscape Sensitivities, Kilkenny County Development Plan). The side slopes are integral to the ridge and provide large scale views over the surrounding countryside. The side slopes of this ridge are visible from a wide surrounding area extending far to the west, and the route in this location may be widely visible. Will lead to adverse effects on the tranquillity of land currently located to the west of the existing N25 road. Loss of some areas of woodland, hedgerows and hedgerow trees and loss of agricultural land.</p>	1
Biodiversity- Flora and Fauna	<p>The Purple route would impact upon 6 no. Ecologically Sensitive Areas (ESAs); of these 1 is of County Importance; 3 are of High Local importance and 2 are of Low Local importance. ESA 1, Ballybrahy, is of County importance and includes an area of wet woodland (WNG); the potential for equivalence with the Annex I habitat - alluvial woodland 91A0 - is a consideration. ESA 4 and 19 are of higher local importance and comprise habitats including riparian woodland, wet woodland and wet grassland, of potential local importance to bird and mammal species.</p>	<p>The Purple route is the longest route at 11.6km. It is the most westerly of all proposed routes. As with all other routes, drainage is likely either to the River Barrow &amp; River Nore SAC (002162) to the east (via the Glenmore River); or the Lower River Suir SAC (002137) to the south (via the Nicholstown/Lough Cullin/Smartcastle Stream) (drainage to be finalised at detailed design). The route would cross the Glenmore River or its tributaries at up to 3 no. locations. The Purple route differs in its interaction with the River Barrow &amp; River Nore SAC to all other routes - as it swings to the north of Glenmore. It would cross a tributary of the Glenmore River in a small river valley in the townland of Ballybrahy. The SAC is also located within the route corridor to the west in Mullennahone as well as where the route intercepts the existing N25 to the northeast of Glenmore (at the roundabout built as part of the New Ross Bypass scheme). There are no direct impacts to SPAs or to Natural Heritage Areas.</p> <p>The Purple route is the closest route to Lough Cullin pNHA located to the west. Depending upon final design, the Purple route could drain to Lough Cullin pNHA via the Nicholstown Stream. Lough Cullin is a site of importance to birds. Preliminary bird survey work suggests that there no field-feeding sites present along the Purple route that could result in indirect impacts upon bird populations of Lough Cullin. The Barrow River Estuary pNHA largely overlaps with the River Barrow &amp; River Nore SAC.</p> <p>The Purple route, being the longest, has the greatest potential for negative impacts on linear features such as hedgerows. Based on expert judgement of a contracted bat-specialist, the Purple route poses the worst risk to bats and their potential roosting and feeding sites.</p>	1
Waste	<p>Estimated Excavation &amp; Disposal of Surplus Suitable and Unacceptable Material (U1) (m3) = 312,029</p> <p>Estimated Excavation &amp; Disposal of Hazardous Unacceptable Material (U2) (m3) = 16,423</p>	N/A	2

N25 Waterford to Glenmore  
Stage 2 Assessment

Environmental Criteria	Preliminary Assessment of Option - Purple - 11.6km		Score
	Quantitative Assessment	Qualitative Assessment	
Soils and Geology	<p>3no. moderate negatives for: Moderately High Landslide Susceptibility; Well Drained soils; and Potential Soft / Compressible soils identified from historical OS maps;</p> <p>2no. minor negatives for proximity to a Potential Historic Quarry; and Potential Soft / Compressible soils identified from published Quaternary mapping (alluvial deposits);</p> <p>1no. neutral for Potential Soft / Compressible soils identified from published Quaternary mapping (lacustrine deposits).</p>	<p>The purple route corridor is underlain by quaternary sediments, predominantly till derived from Lower Palaeozoic shales, with small sections of alluvium, lacustrine sediments and, locally within the south till derived from Devonian sandstones. Bedrock is mapped outcropping throughout the route corridor.</p> <p>Bedrock below the route corridor consists of green and red-purple buff slate and siltstone of the Oaklands formation in the north and travelling south it moves through sections of green and grey slate with thin siltstone of Ballylane formation, red- brown conglomerate and sandstone of Carrigmaclea formation and yellow and red sandstone and green mudstone of the Kiltorcan Formation.</p> <p>Three isolated pockets of alluvium are intersected by the route in the north which could give rise to potential soft ground requiring excavation. The route terminates in the south within an area of Lacustrine sediments which may also contain soft, compressible sediments. Additional potential soft ground areas have also been identified from a review of historical OS maps.</p>	3
Hydrology	<p>The route will have moderate negative impact via temporary direct impact to surface water quality (on small proportion of attribute) at River Barrow and River Nore SAC.</p> <p>The route will have minor negative impacts via temporary direct impact to surface water quality (on small proportion of attribute) at Barrow River Estuary pNHA and Oakland River.</p> <p>The route will have minor negative impact via temporary indirect impacts to surface water quality (on small proportion of attribute) at Waterford Harbour Shellfish Area and Lower River Suir SAC.</p>	<p>This route corridor intersects the catchments, Nore and Suir and sub catchments Nore_SC_140 and Blackwater_SC_010.</p> <p>The purple route corridor is crossed by the Oakland River (IE_SE_140130860) to the northern extent and therefore has the potential to impact water quality due to re-alignment works and the discharge of surface water run-off. It is important to note hydrological connections as the Oaklands River flows into the River Barrow which then flows south into the River Suir.</p>	4
Hydrogeology	<p>The route will have a minor negative impact via. potential permanent impacts to 52no. private well supplies and 6no. GSI wells (on significant portion of attribute).</p> <p>The route will have a moderate negative impact via temporary indirect impact to the surface water quality (small proportion of attribute) at River Barrow and River Nore SAC &amp; Lower River Suir SAC via. groundwater pathway.</p> <p>The route will have a minor negative impact via. permanent impact to locally important aquifer along the route (small portion of attribute).</p> <p>The route will have a moderate negative impact via. permanent impact to regionally important aquifer along the route (small portion of attribute).</p> <p>The route will have a minor negative impact via. permanent impact to the groundwater quality of the bedrock aquifer in areas of cut (4.3km length of cut)</p>	<p>The purple route corridor is underlain by a locally important bedrock aquifer with sections of poorly productive bedrock aquifer and regionally important bedrock aquifer.</p> <p>Groundwater flow paths in the area of the Mullinavat Groundwater Bodies (GWB) are considered to be short because the bedrock is not considered to constitute a major aquifer. Therefore, it is likely that most groundwater flow circulates in the upper tens of meters, recharging and discharging in local zones. The groundwater flow in this area may be quite fast since the hydraulic gradient, a reflection of the mountainous topography, will be high.</p> <p>There are no Group Water Scheme Abstraction Points or Group Scheme Preliminary Source Protection Areas within the route corridor.</p> <p>A search of the GSI groundwater well database has identified 6no. registered wells within the route corridor.</p> <p>Based on a review of available GSI (2020) and historic OSI (2020) mapping there are no springs or holy wells reported within the route corridor.</p>	2
Architectural Heritage	<p>The route may have a direct impact on the designed landscape associated with Frazer's Hall demesne.</p>	<p>The Purple Route option runs to the west of the study area and is the longest and most westerly of the six route options under consideration. It is also the most elevated, traversing the hilly country that borders the western side of the study area. This route passes several vernacular features identified on historic mapping but will not impact any protected structures.</p>	4
Archaeological and Cultural Heritage	<p>This route will have a potentially slight to moderate adverse impact on the setting of two recorded archaeological monuments, a univallate ringfort in Nicholastown (KK043-039----) and another at Grogan (KK043-005----). Two possible archaeological sites identified from LIDAR/cartographic assessment also lie within the corridor. The corridor traverses 18 townland boundaries.</p>	<p>The Purple Route option runs to the west of the study area and is the longest and most westerly of the six route options under consideration. It is also the most elevated, traversing the hilly country that borders the western side of the study area. The route corridor crosses the Zone of Notification of two recorded archaeological monuments and two potential sites identified in the course of the Options Assessment; a possible enclosure (CHS_PLY_133) at Nicholastown and a possible univallate ringfort at Treanaree (CHS_PLY_116).</p>	2
Non-agricultural properties	<p>60 non-agricultural properties within 300m of route centre line.</p>	<p>Non-Agricultural properties include Residential, Commercial, Community, Health and Recreational.</p>	2
Agriculture	<p>It impacts on 58 farm holdings. There will be in Major severance on 15 holdings, and Moderate severance on 16 holdings.</p>	<p>Good quality agricultural land. Majority of land impacted by the route is in grassland. 76% grassland, 14% dairy, 7% tillage and 3% forestry. The route will result in significant severance due to the offline nature of the route.</p>	1

Environmental Criteria	Preliminary Assessment of Option - Purple - 11.6km	Score	
	Quantitative Assessment	Qualitative Assessment	
Human Beings	<p>There is 2 no. monuments included in the Record of Monuments and Places and 2 no. live planning permission along the subject route. In addition, the route traverses existing access roads to an agricultural holding and a dwelling. There are no dwellings within 50m of the route centreline, and there are 8 no. dwellings within 100m of the route centreline. The proposed route traverses the River Barrow and River Nore SAC.</p>	<p>The proposed route is located outside the area designated to be kept free from development for the provision of the realigned N25 as per Figure 11.1 of the County Development Plan 2014-2020. However, there is not a specific policy/objective outlined in the County Development Plan which states that routes will need to be within this defined corridor.</p> <p>Of note, is that there is 2 no. monuments included within the Record of Monuments and Places (Ref. KK043-039 and KK043-005) along the subject route. As per Section 8.3 of the Kilkenny County Development Plan, in terms of Development Management and recorded monuments, the Council will endeavour to preserve in situ all archaeological monuments, whether on land or underwater, listed in the Record of Monuments and Places (RMP), and any newly discovered archaeological sites, features, or objects by requiring that archaeological remains are identified and fully considered at the very earliest stages of the development process and that schemes are designed to avoid impacting on the archaeological heritage. In addition, Objective 8I of the Plan seeks to protect monuments, and is set out in full as follows;</p> <p>"Protect archaeological sites and monuments (including their setting), underwater archaeology, and archaeological objects, including those that are listed in the Record of Monuments and Places, and in the Urban Archaeological Survey of County Kilkenny or newly discovered sub-surface and underwater archaeological remains".</p> <p>In addition, and in terms of human impact, it is noted that the subject route traverses a site with live planning permission for a dwelling under Application Register Reference 18/689. This application was granted permission on 10th July 2019 and does not expire until 9th July 2024. In addition, the proposed corridor traverses a site where planning permission for a dwelling house was granted under 16/861. It is noted that the planning permission for this development does not expire until 23/03/2022. In addition, the proposed route traverses an access road serving 1 no. agricultural holding and a dwelling.</p> <p>Furthermore, there are stated to be 8 no. dwellings within 100m of the proposed route centreline. This is a relatively low number of dwellings in close proximity to the proposed route centre line in comparison to the other proposed routes. This could indicate that there would be relatively fewer impacts on human beings compared to other route options. The proposed route also traverses the River Barrow and River Nore SAC. Such sites have significant protection under both EU and National Law. (Please refer to Section 2.5 of this report to find additional information in relation to Flora/Fauna). This is outlined in Objective 8B and 8C of the Kilkenny County Development Plan, and these objectives are outlined respectively as follows;</p> <p>"To protect and, where possible, enhance the natural heritage sites designated under EU Legislation and National Legislation (Habitats Directive, Birds Directive, European Communities (Birds and Natural Habitats) Regulations 2011 and Wildlife Acts). This protection will extend to any additions or alterations to sites that may arise during the lifetime of this plan"</p> <p>"To protect and, where possible, enhance the plant and animal species and their habitats that have been identified under European legislation (Habitats and Birds Directive) and protected under national legislation (European Communities (Birds and Natural Habitats) Regulations 2011 [SI 477 of 2011], Wildlife Acts 1976-2010 and the Flora Protection Order (SI94 of 1999)."</p> <p>Having regard to the potential adverse impact of the route on the SAC which cannot be ruled out at this stage, this route is considered to be highly negative, however, this is assessed in more detail in the biodiversity section. Overall and considering the above, and notwithstanding the built and natural heritage designations which are assessed in separate sections, it is considered that this route which traverses 2 no. sites with live planning permission in place, as well as being located within 100m of 8 no. dwellings, will likely have less impacts on human beings than other routes which will impact on significantly more dwellings. In this regard, it is considered to be slightly negative from a human beings perspective.</p>	3
Human Health	<p><b>Recreational Areas</b> No recreational areas have been identified as being within the route study area.</p> <p><b>Community, Health and Educational Facilities</b> No community, health or educational facilities have been identified as being within the route study area</p> <p><b>Transport Infrastructure</b> The route study area is intersected by over 10 minor roads/lanes. No cycle routes or walking trails have been identified as within or intersecting this route study area.</p> <p><b>Road Safety</b> Collision statistics have been collated for the wider Kilkenny area however no distinction has been made between route options at this stage. No fire stations have been identified within the route study area.</p> <p><b>Air Quality, Noise and Climate</b> See respective Air Quality and Noise Assessments for consideration of these parameters. Note that with the exception of the number and nature of intersecting watercourses no distinction can be made with respect to climate impacts. Please see hydrology chapter for further information.</p>	<p>There are a number of residential properties within the route study area. These are dispersed throughout the route study area and accessed by minor roads/private lanes and may be difficult to avoid with a new route carriageway. There are also a number of commercial and agricultural premises including Glanbia Ireland Slieverue Depot and Rockett Engineering Ltd.</p> <p>A search of OSI Discovery Series mapping suggests no walking trails are within or intersect this route study area.</p> <p>No cycle routes have been identified as within or intersecting this route study area. The closest walking trail is approximately 3km west at Tory Hill. The closest cycle route is the East Kilkenny Cycle Route which is over 10km north.</p> <p>No other leisure/amenity facilities including parks and gardens, etc within or in close proximity (300m) of the route study area.</p> <p>A small section at each end of the route is intersected by the noise zone around the existing N25</p>	3

N25 Waterford to Glenmore  
Stage 2 Assessment

Environmental Criteria	Preliminary Assessment of Option : Navy - 9.5 km		Score
	Quantitative Assessment	Qualitative Assessment	
Air Quality	<p>The calculated Index of Overall Change in Exposure for this route has been determined: NO<sub>x</sub> Exposure Index: -85,138 PM<sub>10</sub> Exposure Index: -2,736</p> <p>There are 4 sensitive receptors within 50m of this route.</p> <p>All routes cross a section of the River Nore &amp; River Barrow SAC therefore no preference is considered in terms of air quality impacts on sensitive ecosystems.</p>	<p>Predicted baseline levels of NO<sub>2</sub> and PM<sub>10</sub> are based on data from representative EPA monitoring sites. A background concentration of 5 µg/m<sup>3</sup> for NO<sub>2</sub> and 10 µg/m<sup>3</sup> for PM<sub>10</sub> are predicted in the region of the proposed route options.</p> <p>The existing N25 route is the least preferred option as it impacts the greatest number of receptors and thus has the greatest NO<sub>x</sub> and PM<sub>10</sub> exposure index. Each of the revised routes will improve local air quality along the existing alignment.</p> <p>However, minor increases in background concentrations of NO<sub>x</sub> and PM<sub>10</sub> at receptors along the proposed route are likely as a result of the Navy Route. However, there is a moderately positive impact from the new alignment as traffic is diverted away from properties along the existing N25.</p>	6
Climate	<p>The CO<sub>2</sub> emissions associated with operational traffic along the route has been calculated: CO<sub>2</sub> Emissions: 12,368 tonnes/yr</p>	<p>CO<sub>2</sub> emissions are considered at a national scale rather than at a local level. Data from the EPA indicates that Ireland is likely to exceed its climate emissions targets in future years and therefore reduction measures are required in all areas. However, there are no sector specific GHG targets at present and a scheme in isolation will not cause a breach of the national targets.</p> <p>There is minimal difference in the route options in terms of climate impacts, all routes result in a slight negative impact to climate. However, this is the least preferred route option as it results in the highest CO<sub>2</sub> emissions compared with the other route options.</p>	3
Noise	<p>PIR = 247, with 134no. NSLs within 300m of the new roads (Navy). 4no. NSLs are within 50m and 13no. NSLs are within 100m. 22no. NSLs are above 60dB L<sub>den</sub> but no NSLs are above 70dB L<sub>den</sub>. Likely moderate negative (increase) in noise traffic levels at 38no. NSLs, and 1no. likely major negative (increase) in noise traffic levels. 37no. NSLs experience a moderate positive (reduction) in noise traffic levels and 25no. NSLs experience a major positive (reduction) in noise traffic levels. Noise mitigation required at 2no. NSLs.</p>	<p>Along existing route from New Ross (S.1) bypass to Kilmakevoge (S.4) then diverts west. Rural noise climate expected with potential influence from the existing road in northern sections. Extensive diversion of traffic along this proposed Navy section (S.11 = 15,322 AADT), introducing road traffic noise as dominant noise source in rural area to west of the route (although this route has the second smallest number of properties in the major negative impact category, second only to the Magenta route). Similar noise environment for properties to the east of the route, which were previously affected by N25 to front of facades, now relocated to the rear, at a greater distance with earthworks screening. Earthworks providing screening at rear of properties at Ballynarah, Grogan and between Davidstown and Luffany. Fewer likely moderate to major positive (reduction) in noise traffic levels than Teal, Red or Lime Green routes with a higher PIR than Teal and Red routes.</p>	3
Landscape and Visual (including light)	<p>Visual Effects: The number of receptors judged to have significant adverse effects (i.e. those categorised between the range of Moderate to Very Large) is 3.</p>	<p>Landscape Character Area E: South Eastern Uplands</p> <p>The proposed route travels for circa. 9.5km through this character area of which circa. 6.8km of carriageway will cross through greenfield land and circa. 2.6km online. Vertical alignment cutting and embankment slopes would lead to no significant disruption to existing landform. No significant areas of cut and fill except for one area of large fill between chainage; 5800 and 6280 (Max depth fill 14m). In general, the route follows existing contours/ levels very well. Follows the existing N25 road alignment south of Glenmore, thus avoiding effects on Glenmore and adjacent narrow stream valleys. From Ballinclare to south of Davidstown the route continues generally parallel to the existing N25 road corridor and travels along the lower side slopes of a ridge of high ground, avoiding the higher contours.</p> <p>Travels on higher contours of ridge of higher ground from Davidstown to Carriganurra, however vertical alignment follows existing contours well and cut and fill is generally not significant. Limited effects to no change on tranquillity. The route travels through areas already on/ adjacent to the existing N25 road corridor. The traffic on the existing N25 road already affects tranquillity. Loss of some areas of woodland, hedgerows and hedgerow trees and loss of agricultural land.</p>	3
Biodiversity- Flora and Fauna	<p>The Navy route would not impact upon any ESAs of County Importance. It could potentially impact on 4 ESAs of High Local importance and 6 ESAs of Low Local importance. ESAs 10, 11, 12, 15 and 17 are likely to be directly impacted by this route given their spatial distribution within the corridor; direct interaction with the remaining ESAs is likely to be avoided. ESAs 11 and 17 are of higher local importance and comprise areas of scrub, broadleaved woodland, wet woodland and wet grassland which may also be of local importance to mammal species.</p>	<p>The Navy route is one of a number of routes which run more centrally through the study area with a length of 9.5km. It approaches Glenmore from the southeast and merges back onto the alignment of the existing N25 as it approaches Glenmore. Again, drainage is likely either to the River Barrow &amp; River Nore SAC (002162) to the east (via the Glenmore River); or the Lower River Suir SAC (002137) to the south (via the Luffany Stream). There are no direct impacts to SPAs or to Natural Heritage Areas - the nearest such site is Lough Cullin pNHA located to the west and largely outside the study area. The proposed corridor would not drain to Lough Cullin pNHA. The Barrow River Estuary pNHA largely overlaps with the River Barrow &amp; River Nore SAC.</p> <p>The Navy route is 9.5km, with less potential for negative impacts on linear features such as hedgerows than the Purple route. Existing habitats provided by landscape planting along the N25 would, however, be lost. Based on expert judgement of a contracted bat-specialist, the Navy route poses the joined-second worst risk to bats and their potential roosting sites, with the Magenta route.</p>	1
Waste	<p>Estimated Excavation &amp; Disposal of Surplus Suitable and Unacceptable Material (U1) (m<sup>3</sup>) = 140,604</p> <p>Estimated Excavation &amp; Disposal of Hazardous Unacceptable Material (U2) (m<sup>3</sup>) = 7,400</p>	N/A	3
Soils and Geology	<p>1no. major negative for High Landslide Susceptibility;</p> <p>4no. moderate negatives for: proximity to a Historic Quarry; Well Drained soils; Potential Soft/ Compressible soils; and Soft / Compressible soils identified from published Quaternary mapping (alluvial deposits) and historic OS maps.</p> <p>2no. minor negatives for Moderately High Landslide Susceptibility; Soft / Compressible soils identified from published Quaternary mapping (lacustrine deposits).</p>	<p>The navy route corridor is underlain by quaternary sediments, predominantly till derived from Lower Palaeozoic shales, with small sections of alluvium, lacustrine sediments and till derived from cherts.</p> <p>Bedrock is mapped outcropping throughout the route corridor, particularly in the north and south. Bedrock below the route corridor consists of green and red-purple buff slate and siltstone of the Oaklands formation towards the north. It also intersects sections of green and grey slate with thin siltstone of Ballylane formation and red-brown conglomerate &amp; sandstone of Carrigmaclea formation.</p> <p>The route intersects a linear deposit of alluvium along the centre of the route along with 3no. localised deposits within the north and mid-section of the route which could give rise to potential soft ground requiring excavation. The route terminates in the south within an area of Lacustrine sediments which may also contain soft, compressible sediments. (GSI, 2020).</p>	2

N25 Waterford to Glenmore  
Stage 2 Assessment

Environmental Criteria	Preliminary Assessment of Option : Navy - 9.5 km		Score
	Quantitative Assessment	Qualitative Assessment	
Hydrology	<p>The route will have moderate negative impact via temporary direct impact to surface water quality (on small proportion of attribute) at River Barrow and River Nore SAC &amp; on Lower River Suir SAC.</p> <p>The route will have minor negative impacts via temporary direct impact to surface water quality (on small proportion of attribute) at Barrow River Estuary pNHA, Oakland River and Luffany River.</p> <p>The route will have minor negative impact via temporary indirect impact to surface water quality (on small proportion of attribute) at Waterford Harbour Shellfish Area.</p>	<p>This route corridor intersects the catchments Nore and Suir and sub catchments Nore_SC_140 and Blackwater_SC_010.</p> <p>The navy route corridor is crossed by the Oakland River (IE_SE_140130860) and its tributaries in the northern extent and the Luffany River (IE_SE_16L680750) to the southern extent of this route corridor therefore having the potential to impact water quality due to re-alignment works and the discharge of surface water run-off. It is important to note hydrological connections as the Oaklands River flows into the River Barrow and the Luffany River flows into the River Suir.</p>	3
Hydrogeology	<p>The route will have a moderate negative impact via temporary indirect impact to the surface water quality (small proportion of attribute) at River Barrow and River Nore SAC &amp; Lower River Suir SAC via. groundwater pathway.</p> <p>The route will have a minor negative impact via. permanent impact to locally important aquifer along the route (small portion of attribute).</p> <p>The route will have a minor negative impact via. permanent impact to the groundwater quality of the bedrock aquifer in areas of cut (4.5km length of cut)</p> <p>The route will have a minor negative impact via. potential permanent impacts to 149no. private well supplies and 3no. GSI wells (on significant portion of attribute).</p>	<p>The navy route corridor is underlain predominately by a locally important bedrock aquifer with sections of poorly productive bedrock aquifer.</p> <p>There are a number of historic wells located within the study area and adjacent to a number of the routes which have not been monitored as part of this investigation.</p> <p>Groundwater flow paths in the area of the Mullinavat GWB are considered to be short because the bedrock is not considered to constitute a major aquifer. Therefore, it is likely that most groundwater flow circulates in the upper tens of meters, recharging and discharging in local zones. The groundwater flow in this area may be quite fast since the hydraulic gradient, a reflection of the mountainous topography, will be high.</p> <p>There are no Public Supply Source Protection Area, Group Water Scheme Abstraction Points or Group Scheme Preliminary Source Protection Areas within the route corridor.</p> <p>A search of the GSI groundwater well database has identified 3no. registered wells within the route corridor.</p> <p>Based on a review of available GSI (2020) mapping no springs were identified within the route corridor but historic OSI (2020) mapping reported a spring within the route corridor.</p>	3
Architectural Heritage	<p>The Navy Route corridor intersects with a clachan at Davidstown as well as a number of historic vernacular features which appear on 19th-century maps.</p>	<p>Settlements close to the Navy Route include Glenmore village and several farmsteads and hamlets including at Robinstown, Ballynarah, Davidstown and Carriganurra. There are no protected architectural structures or features (included in the Record of Protected Structures) within the Navy Route corridor, although it passes close to the southeast of seven structures in Glenmore village that are identified in the NIAH. The Navy Route corridor passes across the former site of/beside several vernacular features identified from historical maps, aerial photography and LIDAR survey, which are not included on any statutory listing.</p>	3
Archaeological and Cultural Heritage	<p>The Navy Route corridor intersects with six archaeological monuments identified in the Sites and Monuments Record and seven potential archaeological sites. The route would have a large adverse impact on the setting of two of a series of three inter-visible, ringforts set on a ridgeline in Davidstown and Carriganurra. This area contains several potentially significant features identified from a review of LIDAR imagery and confirmed by a geophysical survey that have variously been interpreted as two enclosure ditches and settlement activity in the form of linear and pit responses. These features lie within the corridor. The Navy Route would also impact on the setting of six additional known or suspected archaeological sites. The corridor traverses 13 townland boundaries.</p>	<p>Six archaeological monuments are either fully or partially located within the corridor. These are (from north to south) a fulacht fia in Kilmakevoge (KK041-021), a standing stone in Robinstown (KK041-055), a fulacht fia in Ballinclare (KK041-025), two ringforts (KK043-013 / KK043-014) along a ridgeline bordering the townlands of Davidstown and Carriganurra and a kiln site at Luffany (KK043-021). The corridor intersects with seven potential archaeological monuments/areas of potential: three possible enclosures and two areas of archaeological activity (CHS_PLY_130, 50, 51, 53 and 57) in the vicinity of known archaeological monuments in Davidstown and Carriganurra, an area of potential archaeological activity on a ridgeline at Treanaree (CHS_PLY_141) and a possible mound (CHS_PLY_117) at Luffany.</p>	1
Non-agricultural properties	<p>147 non-agricultural properties within 300m of route centre line.</p>	<p>Non-Agricultural properties include Residential, Commercial, Community, Health and Recreational.</p>	1
Agriculture	<p>The route will impact on 46 farm holdings. The route will pass in close proximity to 3 farm buildings. Not significant severance on 18 holdings, Minor severance on 5 holdings, Moderate severance on 13 holdings, Major severance on 10 holdings.</p>	<p>Good quality agricultural land. Majority of land impacted by the route is in grassland. 85% grassland, 6% dairy and 9% tillage. The route will result in significant severance due to the offline nature of the route.</p>	2

Environmental Criteria	Preliminary Assessment of Option : <i>Navy - 9.5 km</i>	Score	
	Quantitative Assessment	Qualitative Assessment	
Human Beings	<p>There are 6 no. monuments which are included within the Record of Monuments and Places. There is 1 no. live planning permission. The subject route also traverse the River Barrow and River Nore SAC. There are 4 no. dwellings located within 50m of the route centreline and a further 13 no. dwellings within 100m of the route centreline.</p>	<p>The proposed route is largely within the area designated to be kept from development for the provision of the realigned N25 as per Figure 11.1 of the County Development Plan 2014-2020. The proposed route also traverses 6 no. Monuments (Ref. KK 043-021, KK041-025, KK041-055, KK043-013, KK043-014 and KK043-021) which are included in the Record of Monuments and Places. As per Section 8.3 of the Kilkenny County Development Plan, in terms of Development Management and recorded monuments, the Council will endeavour to preserve in situ all archaeological monuments, whether on land or underwater, listed in the Record of Monuments and Places (RMP), and any newly discovered archaeological sites, features, or objects by requiring that archaeological remains are identified and fully considered at the very earliest stages of the development process and that schemes are designed to avoid impacting on the archaeological heritage. In addition, Objective 8l of the Plan seeks to protect national monuments, and is set out in full as follows; "Protect archaeological sites and monuments (including their setting), underwater archaeology, and archaeological objects, including those that are listed in the Record of Monuments and Places, and in the Urban Archaeological Survey of County Kilkenny or newly discovered sub-surface and underwater archaeological remains". Please refer to Section 2.11 of the Route Options report for further information in terms of monuments. It is noted that the proposed route traverses land to which there is a live planning permission in place (application register reference 18573). However, this permission relates to the upgrading of overhead cables, which may be negatively impacted by the proposed development. There are stated to be 4 no. dwellings located within 50m of the route centreline, and a further 13 no. dwellings located within 100m of the proposed route centre line. In comparison to other routes, this is a relatively low number of dwellings in close proximity to the proposed route option. In this context, the impact on human beings from this route option would be minorly negative. Please refer to Noise (Section 2.3) and Air Quality (Section 2.1) sections of this report, and the Traffic Section of Phase 2 report for further information on potential impacts to those living in close proximity to the proposed route option. The proposed route also traverses the River Barrow and River Nore SAC. Such sites have significant protection under both EU and National Law. (Please refer to Section 2.5 of this report to find additional information in relation to Flora/Fauna). This is outlined in Objective 8B and 8C of the Kilkenny County Development Plan, and these objectives are outlined respectively as follows; "To protect and, where possible, enhance the natural heritage sites designated under EU Legislation and National Legislation (Habitats Directive, Birds Directive, European Communities (Birds and Natural Habitats) Regulations 2011 and Wildlife Acts). This protection will extend to any additions or alterations to sites that may arise during the lifetime of this plan" "To protect and, where possible, enhance the plant and animal species and their habitats that have been identified under European legislation (Habitats and Birds Directive) and protected under national Legislation (European Communities (Birds and Natural Habitats) Regulations 2011 (SI 477 of 2011), Wildlife Acts 1976-2010 and the Flora Protection Order (SI94 of 1999)." Having regard to the potential adverse impact of the route on the SAC which cannot be ruled out at this stage, and on 2 no. RMPs, this route is considered to be highly negativ, however, this is assessed in more detail in the biodiversity section . Overall and considering the above, and notwithstanding the built and natural heritage designations which are been assessed in separate sections, it is considered that this route which is located within 100m of 17 no. dwellings, will likley have less impacts on human beings than other routes which will imoact on significantly more dwellings. In this regard, it is considered to be slightly negative from a human beings perspective.</p>	3
Human Health	<p><b>Recreational Areas</b> Glenmore GAA club has been identified as within the route study area. <b>Community, Health and Educational Facilities</b> Glenmore National School, Community Hall and St James Church are each within the route study area. Glenmore Garda Station is also within the study area. <b>Transport Infrastructure</b> The route study area is intersected by over 15 minor roads/lanes. No cycle routes or walking trails have been identified as within or intersecting this route study area. Route study area falls partially within proposed Kilkenny Greenway. <b>Road Safety</b> Collision statistics have been collated for the wider Kilkenny area however no distinction has been made between route options at this stage. No fire stations have been identified within the route study area. <b>Air Quality, Noise and Climate</b> See respective Air Quality and Noise Assessments for consideration of these parameters. Note that with the exception of the number and nature of intersecting watercourses no distinction can be made with respect to climate impacts. Please see hydrology assessment for futher consideration.</p>	<p>There are a number of residential properties within the route study area. These are located throughout the route study area with a slightly increased number towards the north. Properties within the route study area are accessed by a mix of minor roads/private lanes which may be difficult to avoid with a new carriageway. There are also a number of commercial and agricultural premises in close proximity including Murphys Motors, Duggan Brothers, Jacques Nurseries and Gianbia Agribusiness. A search of OSI Discovery Series mapping suggests no walking trails are within or intersect this route study area. No cycle routes have been identified as within or intersecting this route study area. The closest walking trail identified is approximately 4.5km west at Tory Hill. The closest cycle route identified is the East Kilkenny Cycle Route, situated over 10km north. Route study area falls partially within proposed Kilkenny Greenway Glenmore GAA club, Glenmore National School, Garda Station, Glenmore Community Hall and St James Church are all within close proximity (300m) of the route, towards the north. No other leisure/amenity facilities including parks and gardens have been identified as being within the route study area. Approximately three quarters of the routes length is intersected by the noise zone around the existing N25.</p>	3

N25 Waterford to Glenmore  
Stage 2 Assessment

Environmental Criteria	Preliminary Assessment of Option : <i>Magenta</i> - 9.3 km		Score
	Quantitative Assessment	Qualitative Assessment	
Air Quality	<p>The calculated Index of Overall Change in Exposure for this route has been determined: NO<sub>x</sub> Exposure Index: -1,138 PM<sub>10</sub> Exposure Index: -28</p> <p>There are 26 sensitive receptors within 50m of this route.</p> <p>All routes cross a section of the River Nore &amp; River Barrow SAC therefore no preference is considered in terms of air quality impacts on sensitive ecosystems.</p>	<p>Predicted baseline levels of NO<sub>2</sub> and PM<sub>10</sub> are based on data from representative EPA monitoring sites. A background concentration of 5 µg/m<sup>3</sup> for NO<sub>2</sub> and 10 µg/m<sup>3</sup> for PM<sub>10</sub> are predicted in the region of the proposed route options. The magenta route option is considered neutral in terms of air quality impacts. It is the most online option and therefore has the highest number of receptors within 50m of the route carriageway, however, as these receptors are already impacted by the existing traffic along the N25 the change in NO<sub>x</sub> and PM<sub>10</sub> concentrations is lessened. The resultant NO<sub>x</sub> and PM<sub>10</sub> scores are slightly positive but the overall change in emission compared with the other route options is minimal and overall results in a neutral score.</p>	4
Climate	<p>The CO<sub>2</sub> emissions associated with operational traffic along the route has been calculated: CO<sub>2</sub> Emissions: 12,124 tonnes/yr</p>	<p>CO<sub>2</sub> emissions are considered at a national scale rather than at a local level. Data from the EPA indicates that Ireland is likely to exceed its climate emissions targets in future years and therefore reduction measures are required in all areas. However, there are no sector specific GHG targets at present and a scheme in isolation will not cause a breach of the national targets.</p> <p>There is minimal difference in the route options in terms of climate impacts, all routes result in a slight negative impact to climate.</p>	3
Noise	<p>PIR = 360, with 154no. NSLs within 300m of the new roads (Magenta). 26no. NSLs are within 50m and 31no. NSLs are within 50-100m. 59 NSLs are above 60dB L<sub>den</sub> and 5no. NSLs are above 70dB L<sub>den</sub>. There are no negative (increase) in noise traffic levels at NSLs, and there are 11no. NSLs experiencing a moderate positive (reduction) in noise traffic levels and 2no. NSLs experiencing a major positive (reduction) in noise traffic levels. Noise mitigation required at 13no. NSLs.</p>	<p>Closest alignment to the existing route (S.1-S.10). Heavily trafficked route (S.8 = 16,815 AADT), comparable to Do Nothing route AADT. While the PIR is high with a number of properties affected, the existing noise environment will be improved due to realignment of the existing route i.e. Magenta route (S.7) at a greater distance to properties along existing route at Gaulstown. Towards southern end of the route (S.9 Curraghmore and S.10 Luffany) Magenta route moves to rear of NSLs affected by existing route (comparable distance). Magenta route is the only route with no negative (increase) in noise traffic levels. Reduction in current noise environment at 13no. NSLs as route moves further from properties, with earthworks providing physical screening at properties. Similar to Navy route, the PIR is higher than Teal, Red and Lime Green routes. The number of properties likely to experience a moderate to major positive change (reduction) in traffic noise levels is, however, lower compared to the above mentioned routes (which is also true for the Purple route). Ranked higher than Navy route due to the improvement in existing noise environment for those along the existing route, in comparison to the Navy route that introduces road traffic noise as dominant source to some rural areas along S.11 of the Navy route.</p>	3
Landscape and Visual (including light)	<p>Visual Effects: The number of receptors judged to have significant adverse effects (i.e. those categorised between the range of Moderate to Very Large) is 27.</p>	<p>Landscape Character Area E: South Eastern Uplands: The proposed route travels for circa. 9.3km through this character area of which circa. 4.1km of carriageway will cross through greenfield land and circa. 5.2km online. Generally, the route follows the existing N25 alignment towards Ballyrowanagh. Thus, avoiding effects on; Glenmore, narrow stream valleys and ridges of surrounding higher ground either side of the existing N25 Road. The route diverts west from the existing N25 towards Carriganurra. At Carriganurra the route travels close to a local rock outcrop (with cross on top) which is a prominent local landmark. With mitigation this landmark may be successfully integrated. Limited effects to no change on tranquillity. The route travels through areas already on/ adjacent to the existing N25 road corridor. The traffic on the existing N25 road already affects tranquillity. Loss of some areas of woodland, hedgerows and hedgerow trees and loss of agricultural land.</p>	3
Biodiversity- Flora and Fauna	<p>The Magenta route would not impact upon any ESAs of County Importance. It could potentially impact on 5 ESAs of High Local importance and 6 ESAs of Low Local importance. The only ESA where direct impacts would be unavoidable is ESA 11, which is of higher local importance and comprises scrub, broadleaved woodland, wet woodland and wet grassland which could be of local importance to mammal and field-feeding bird species. The Magenta Route impacts 3 of the same sites of high local importance to the Navy route; as well as 5 of the same sites of local importance.</p>	<p>The Magenta route is one of a number of routes which run more centrally through the study area with a length of 9.3km. As with the Navy route, it approaches Glenmore from the southeast and merges back onto the alignment of the existing N25. Again, drainage is likely either to the River Barrow &amp; River Nore SAC (002162) to the east (via the Glenmore River); or the Lower River Suir SAC (002137) to the south (the Luffany Stream). There are no direct impacts to SPAs or to Natural Heritage Areas - the nearest such site is Lough Cullin pNHA located to the west and largely outside the study area. The proposed corridor would not drain to Lough Cullin pNHA. The Barrow River Estuary pNHA largely overlaps with the River Barrow &amp; River Nore SAC.</p> <p>The Magenta route is 9.3km, with less potential for negative impacts on linear features such as hedgerows than the Purple route; similar to the Navy route. Existing habitats provided by landscape planting along the N25 would, however, be lost. Based on expert judgement of a contracted bat-specialist, the Magenta route poses the joined-second worst risk to bats and their potential roosting sites, with the Navy route.</p>	1
Waste	<p>Estimated Excavation &amp; Disposal of Surplus Suitable and Unacceptable Material (U1) (m<sup>3</sup>) = 95,077</p> <p>Estimated Excavation &amp; Disposal of Hazardous Unacceptable Material (U2) (m<sup>3</sup>) = 5,004</p>	N/A	3
Soils and Geology	<p>1no. major negative for High Landslide Susceptibility;</p> <p>5no. moderate negatives for: proximity to a Historic Quarry; Moderately High Landslide Susceptibility; Well Drained soils; and Soft / Compressible soils identified from published Quaternary mapping (alluvial deposits) and historic OS maps.</p> <p>2no. minor negatives for proximity to a Potential Historic Quarry; Soft / Compressible soils identified from published Quaternary mapping (lacustrine deposits).</p>	<p>The magenta route corridor is predominantly underlain by quaternary sediments, predominantly till derived from Lower Palaeozoic shales, with small sections of alluvium, lacustrine sediments and till derived from cherts. Bedrock is mapped outcropping throughout the route corridor.</p> <p>Bedrock below the route corridor consists of green and red-purple buff slate and siltstone of the Oaklands formation within the north and mid-section of the route, and green and grey slate with thin siltstone of Ballylane formation along the centre and southern section. The route locally intersects the red- brown conglomerate &amp; sandstone of the Carrigmaclea formation in the south.</p> <p>The route intersects a linear deposit of alluvium in the central Glenmore region along with 3no. localised deposits in the north and south which could give rise to potential soft ground requiring excavation. The route terminates in the south within an area of Lacustrine sediments which may also contain soft, compressible sediments. Additional potential soft ground areas have also been identified from a review of historical OS maps.</p>	1

N25 Waterford to Glenmore  
Stage 2 Assessment

Environmental Criteria	Preliminary Assessment of Option : <i>Magenta</i> - 9.3 km		Score
	Quantitative Assessment	Qualitative Assessment	
Hydrology	The route will have moderate negative impact via temporary direct impact to surface water quality (on small proportion of attribute) at River Barrow and River Nore SAC & Lower River Suir SAC. The route will have minor negative impacts via temporary direct impact to surface water quality (on small proportion of attribute) at Barrow River Estuary pNHA, Oakland River and Luffany River. The route will have minor negative impact via temporary indirect impact to surface water quality (on small proportion of attribute) at Waterford Harbour Shellfish Area.	This route corridor intersects the catchments Nore and Suir and sub catchments Nore_SC_140 and Blackwater_SC_010. The magenta route corridor is crossed by the Oakland River (IE_SE_140130860) to its northern extent and the Luffany River (IE_SE_16L680750) at the mid-section of this proposed route corridor therefore having the potential to impact water quality due to re-alignment works and the discharge of surface water run-off. It is important to note hydrological connections as the Oaklands River flows into the River Barrow and the Luffany River flows into the River Suir.	3
Hydrogeology	The route will have a moderate negative impact via temporary indirect impact to the surface water quality (small proportion of attribute) at River Barrow and River Nore SAC & Lower River Suir SAC via groundwater pathway. The route will have a minor negative impact via permanent impact to locally important aquifer along the route (small portion of attribute). The route will have a minor negative impact via permanent impact to the groundwater quality of the bedrock aquifer in areas of cut (4.3km length of cut) The route will have a minor negative impact via potential permanent impacts to 185no. private well supplies and 5no. GSI wells (on significant portion of attribute).	The magenta route corridor is underlain by locally important bedrock aquifer with sections of poorly productive bedrock aquifer. Groundwater flow paths in the area of the Mullinavat GWB are considered to be short because the bedrock is not considered to constitute a major aquifer. Therefore, it is likely that most groundwater flow circulates in the upper tens of meters, recharging and discharging in local zones. The groundwater flow in this area may be quite fast since the hydraulic gradient, a reflection of the mountainous topography, will be high. There are no Public Supply Source Protection Area, Group Water Scheme Abstraction Points or Group Scheme Preliminary Source Protection Areas within the route corridor. A search of the GSI groundwater well database has identified 5no. registered wells within the route corridor. Based on a review of available GSI (2020) mapping no springs were identified within the route corridor but historic OSI (2020) mapping reported a spring within the route corridor.	3
Architectural Heritage	This route will have a large adverse impact on the setting of O'Donovan's Mill, a protected structure in Ballyrowragh.	There are no designated architectural sites within the Magenta Route corridor, although it passes close to the southeast of seven structures in Glenmore village that are identified in the NIAH and also passes close to two protected structures: O'Donovan's Corn Mill (C845) at Ballyrowragh and a wayside cross in Luffany (KK044-022 and C846) . The corridor intersects with/runs adjacent to several vernacular features identified from historical maps, aerial photography and LiDAR survey that are not included on any statutory listing. These include a lime kiln in Ballyrahan (CH5_PNT_061), numerous structures/industrial features depicted on historical maps in Jamestown and Graiguenakill, such as a cornmill (no longer extant) and millrace, a lime kiln, several buildings and benchmarks; and settlement features midway along the route within Gaulstown and Ballynaraha.	3
Archaeological and Cultural Heritage	The Magenta Route corridor intersects with ten archaeological monuments identified in the Sites and Monuments Record. The route will have a potentially moderate adverse impact on the setting of a standing stone in Robinstown (KK041-055) and on the setting of a Holy Year cross erected on Carriganurra Rock (prominent rock outcrop). The corridor crosses 20 townland boundaries.	The Magenta Route option runs through the centre of the study area and is the option that most closely follows the existing N25 alignment. Ten archaeological monuments are located either fully or partially within the corridor. These are (from north to south) a fulacht fia in Kilmakevoge (KK041-021), a standing stone in Robinstown (KK041-055), a fulacht fia in Ballynaraha (KK041-023), a fulacht fia in Ballinclare (KK041-025), a fulacht fia in Ballyrahan (KK044-005001) and the site of a kiln (KK043-021) and a fulacht fia in Luffany (KK044-023). In addition, the route corridor intersects with the Zone of Notification for three other recorded monuments: a fulacht fia in Ballynaraha (KK041-024) and an earthwork (KK044-004) and a second fulacht fia (KK044-005002) in Ballyrahan. The route extends along the eastern extents of Carriganurra Rock and associated Holy Year cross. While not a recorded archaeological site, this is a prominent landmark with local cultural importance.	2
Non-agricultural properties	145 non-agricultural properties within 300m of route centre line.	Non-Agricultural properties include Residential, Commercial, Community, Health and Recreational.	1
Agriculture	The route will impact on 48 farm holdings. The route will not pass in close proximity to any farm buildings. Not significant severance on 39 holdings, Minor severance on 6 holdings and Moderate severance on 3 holdings.	Good quality agricultural land. Majority of land impacted by the route is in grassland. 92% grassland and 8% dairy. The route will not result in a high level of significant severance due to the online nature of the route.	2

N25 Waterford to Glenmore  
Stage 2 Assessment

Environmental Criteria	Preliminary Assessment of Option : <i>Magenta</i> - 9.3 km		Score
	Quantitative Assessment	Qualitative Assessment	
Human Beings	<p>There are 10 no. monuments included in the Record of Monuments and Places located along the proposed route corridor. The route also traverses the River Barrow and River Nore SAC. There are 26 no. dwellings located within 50m of the route centre line, with a further 31 dwellings located within 100m of the route centreline.</p>	<p>The proposed route is largely within the area designated to be kept from development for the provision of the realigned N25 as per Figure 11.1 of the County Development Plan 2014-2020. However, there is not a specific policy/objective outlined in the County Development Plan which states that routes will need to be within this defined corridor. The proposed route corridor intersects with 10 no. monuments which are included in the Record of Monuments and Places. As per Section 8.3 of the Kilkenny County Development Plan, in terms of Development Management and recorded monuments, the Council will endeavour to preserve in situ all archaeological monuments, whether on land or underwater, listed in the Record of Monuments and Places (RMP), and any newly discovered archaeological sites, features, or objects by requiring that archaeological remains are identified and fully considered at the very earliest stages of the development process and that schemes are designed to avoid impacting on the archaeological heritage. In addition, Objective 8l of the Plan seeks to protect national monuments, and is set out in full as follows;</p> <p>"Protect archaeological sites and monuments (including their setting), underwater archaeology, and archaeological objects, including those that are listed in the Record of Monuments and Places, and in the Urban Archaeological Survey of County Kilkenny or newly discovered sub-surface and underwater archaeological remains". Please refer to Section 2.11 of the Route Options report for further information in terms of monuments.</p> <p>It is noted that the proposed route traverses land on which there is a live planning permission in place (Application Register Reference 18573). This permission relates to the upgrading of overhead cables, which may be negatively impacted by the proposed development. In addition, the proposed route traverses the a site with planning permission granted for a dwelling house under Application Register Reference 18191, which does not expire until 03/12/2023. In terms of dwellings in the vicinity, it is stated that there are 26 no. dwellings within 50m of the route centre line, with a further 31 no. dwellings within c. 100m of the route centreline. However, this route is close to the existing N25 alignment, so any impacts would, in general, be similar to the current situation. It is considered that having regrad to the high number of dwellings comparatively on this route, that the potential impact on human beings could be highly negative. Please refer to Noise (Section 2.3) and Air Quality (Section 2.1) sections of this report, and the Traffic Section of Phase 2 report for further information on potential impacts to those living in close proximity to the proposed route option.</p> <p>The proposed route also traverses the River Barrow and River Nore SAC. (Please refer to Section 2.5 of this report to find additional information in relation to Flora/Fauna). Such sites have significant protection under both EU and National Law. This is outlined in Objective 8B and 8C of the Kilkenny County Development Plan, and these objectives are outlined respectively as follows;</p> <p>"To protect and, where possible, enhance the natural heritage sites designated under EU Legislation and National Legislation (Habitats Directive, Birds Directive, European Communities (Birds and Natural Habitats) Regulations 2011 and Wildlife Acts). This protection will extend to any additions or alterations to sites that may arise during the lifetime of this plan"</p> <p>"To protect and, where possible, enhance the plant and animal species and their habitats that have been identified under European legislation (Habitats and Birds Directive) and protected under national Legislation (European Communities (Birds and Natural Habitats) Regulations 2011 (SI 477 of 2011), Wildlife Acts 1976-2010 and the Flora Protection Order (SI94 of 1999)."</p> <p>Notwithstanding the potential impacts in terms of built and natural heritage which are assessed in detail in the biodiversity and heritage sections, having regard to the high number of dwellings within 100m of the subject site, this route is considered to be highly negative from a human being perspective</p>	1
Human Health	<p><b>Recreational Areas</b> No recreational areas have been identified as being within the route study area.</p> <p><b>Community, Health and Educational Facilities</b> Glenmore National School, Community Hall, Garda Station and St James Church are each within the route study area</p> <p><b>Transport Infrastructure</b> The route study area is intersected by over 15 minor roads/lanes. No cycle routes or walking trails have been identified as within or intersecting this route study area. Route study area falls partially within proposed South-east Greenway</p> <p><b>Road Safety</b> Collision statistics have been collated for the wider Kilkenny area however no distinction has been made between route options at this stage. No fire stations have been identified within the route study area.</p> <p><b>Air Quality, Noise and Climate</b> See respective Air Quality and Noise Assessments for consideration of these parameters. Note that with the exception of the number and nature of intersecting watercourses no distinction can be made with respect to climate impacts. Please see hydrology assessment for further consideration.</p>	<p>There are a number of residential properties within the route study area. These are dispersed throughout the route study area and accessed by a mix of minor roads/private lanes which may be difficult to avoid with a new carriageway.</p> <p>There are also a number of commercial and agricultural premises in close proximity including Murphys Motors, Duggan Brothers, Jacques Nurseries and Gianbia Agribusiness</p> <p>A search of OSI Discovery Series mapping suggests no walking trails are within or intersect this route study area.</p> <p>No cycle routes have been identified as within or intersecting this route study area. The closest walking trail identified is approximately 4.6km west at Tory Hill. The closest cycle route identified is the East Kilkenny Cycle Route, situated over 10km north. Route study area falls partially within proposed South-east Greenway</p> <p>Glenmore National School, Glenmore Community Hall, Garda Station and St James Church are all within close proximity (within 300m) of the route, towards the north.</p> <p>No other leisure/amenity facilities including parks and gardens have been identified as being within or in close proximity (200m) of the route study area.</p> <p>The entirety of the routes length is intersected by the noise zone around the existing N25 .</p>	3

N25 Waterford to Glenmore  
Stage 2 Assessment

Environmental Criteria	Preliminary Assessment of Option : Red 9.0 km Quantitative Assessment	Qualitative Assessment	Score
Air Quality	<p>The calculated Index of Overall Change in Exposure for this route has been determined: NO<sub>x</sub> Exposure Index: -78,047 PM<sub>10</sub> Exposure Index: -2,497</p> <p>There are 3 sensitive receptors within 50m of this route.</p> <p>All routes cross a section of the River Nore &amp; River Barrow SAC therefore no preference is considered in terms of air quality impacts on sensitive ecosystems.</p>	<p>Predicted baseline levels of NO<sub>2</sub> and PM<sub>10</sub> are based on data from representative EPA monitoring sites. A background concentration of 5 µg/m<sup>3</sup> for NO<sub>2</sub> and 10 µg/m<sup>3</sup> for PM<sub>10</sub> are predicted in the region of the proposed route options.</p> <p>The existing N25 route is the least preferred option as it impacts the greatest number of receptors and thus has the greatest NO<sub>x</sub> and PM<sub>10</sub> exposure index. Each of the revised routes will improve local air quality along the existing alignment.</p> <p>However, minor increases in background concentrations of NO<sub>x</sub> and PM<sub>10</sub> at receptors along the proposed route are likely as a result of the Red Route. However, there is an overall positive impact from the new alignment as traffic is diverted away from properties along the existing N25.</p>	6
Climate	<p>The CO<sub>2</sub> emissions associated with operational traffic along the route has been calculated: CO<sub>2</sub> Emissions: 11,694 tonnes/yr</p>	<p>CO<sub>2</sub> emissions are considered at a national scale rather than at a local level. Data from the EPA indicates that Ireland is likely to exceed its climate emissions targets in future years and therefore reduction measures are required in all areas.</p> <p>However, there are no sector specific GHG targets at present and a scheme in isolation will not cause a breach of the national targets.</p> <p>There is minimal difference in the route options in terms of climate impacts, all routes result in a slight negative impact to climate.</p>	3
Noise	<p>PIR = 155, with 76no. NSLs within 300m of the new roads (Red). 3no. NSLs are within 50m and 20no. NSLs are within 100m. 29no. NSLs are above 60dB L<sub>den</sub>, none exceed 70dB L<sub>den</sub>. There are 13no. NSLs that experience a moderate negative (increase) in noise traffic levels and 33no. NSLs calculated with a likely major negative (increase) in noise traffic levels. There are 38no. NSLs that experience a moderate positive (reduction) in noise traffic levels and 172no. NSLs experience a major positive (reduction) in noise traffic levels. Noise mitigation required at 18no. NSLs.</p>	<p>Route starts along the existing route from New Ross bypass to Graiuenakill (S.1) then diverts furthest east through clusters of properties between Carrickloney and Redgap (S.11), with screening due to earthworks. Minimal screening towards southern section of route from Curraghmore to Luffany. Rural noise environment with route passing close to many small clusters of properties in the 0-100m bands (23no.), a greater number of properties in comparison to Teal route, also located to east of the Do Nothing route. Comparable traffic to Teal route, with S.11 at 14,575 AADT, lower AADT diversion from existing route compared to Navy and Lime Green routes. Twice the AADT than Purple route. Route with the highest number of NSLs requiring mitigation. However it also is the route that provides the highest number of Major positive (reduction) in noise traffic levels (172no.) with Teal route second highest at 141no. NSLs. Ranked below Navy due to the number of mitigation clusters required. The Teal route has lower PIR with less mitigation and comparable positive (reduction) in noise traffic levels calculated overall.</p>	3
Landscape and Visual (including light)	<p>Visual Effects: The number of receptors judged to have significant adverse effects (i.e. those categorised between the range of Moderate to Very Large) is 29.</p>	<p>Landscape Character Area E: South Eastern Uplands</p> <p>The proposed route travels for circa. 9km through this character area of which circa. 8.65km of carriageway will cross through greenfield land. Most of the route within this character area travels in lands to the east of the existing N25 Road (up to 2.8km distance to the east of the existing N25 Road in places). Horizontal alignment of carriageways would be in keeping with existing route patterns. However vertical alignment cutting, and embankment slopes would disrupt existing landform. In particular; where the route travels up a steep hillside and over a stream valley from Craiuenakill to Carrickloney, there would be significant adverse effects on the landscape character from fill embankments within this sloping land which also connects visually with the River Barrow valley.</p> <p>Where the route cuts through the side of a ridge of high ground at Aylwardstown and south to Rathinure, there would be significant adverse effects on this ridge of high ground and to the character of the wider River Barrow valley landscape.</p> <p>Where the route travels through a local valley on embankments between Rathinure and Redgap and sidelong of a hill in a cutting at Redgap there is likely to be significant adverse effects on the hill at Redgap and also on views through this local valley and on landscape character of the wider river Barrow valley.</p> <p>There would be adverse effects rural tranquillity as the route travels in existing tranquil land to the east of the existing N25 road and close to the River Barrow.</p> <p>Loss of some areas of woodland, hedgerows and hedgerow trees and loss of agricultural land.</p>	1
Biodiversity- Flora and Fauna	<p>The Red route would not impact upon any ESAs of County Importance. It would impact on 2 ESAs of High Local importance and 4 ESAs of Low Local importance. ESA 3 comprises a tributary of the Glenmore River, and associated bankside scrub, over which a water crossing would be required. This ESA may be of local importance to mammal and aquatic species, while also being hydrologically connected to the SAC.</p>	<p>The Red route is the most easterly of the proposed routes; located closest to the valley of the River Barrow. Drainage is likely either to the River Barrow &amp; River Nore SAC (002162) to the east (via the Glenmore River); or the Lower River Suir SAC (002137) to the south (via the Luffany Stream). The corridor intersects the SAC at two points. The Red route merges onto the alignment of the existing N25 as it approaches the northern terminus from the south through Graiuenakill. At this point the route may utilise structures already built as part of the New Ross Bypass, avoiding additional impact to the SAC at the northern intersection. There are no direct impacts to SPAs or to Natural Heritage Areas - the nearest such site is Lough Cullin pNHA located to the west and largely outside the study area. The proposed corridor would not drain to Lough Cullin pNHA. Any impact to the Barrow River Estuary pNHA will be dependent upon the final design and the level of interaction with wetland habitats along the river at Graiuenakill following detailed design.</p> <p>The Red route is 9km, with less potential for negative impacts on linear features such as hedgerows than longer routes, such as Purple. Based on expert judgement of a contracted bat-specialist, the Red route poses least risk to bats and their potential roosting sites. The Red route is located closest to the Barrow Estuary which supports important populations of roosting and feeding birds. Further surveys of the route would be required to determine if there is habitat that would be impacted that may be of importance to field-feeding birds associated with the Barrow Estuary.</p>	1
Waste	<p>Estimated Excavation &amp; Disposal of Surplus Suitable and Unacceptable Material (U1) (m<sup>3</sup>) = 488,362</p> <p>Estimated Excavation &amp; Disposal of Hazardous Unacceptable Material (U2) (m<sup>3</sup>) = 25,703</p>	N/A	1
Soils and Geology	<p>2no. moderate negatives for Moderately High Landslide Susceptibility, and Well Drained Soils;</p> <p>3no. minor negatives for Potential Soft / Compressible soils).</p>	<p>The red route corridor is predominately underlain by quaternary sediments, predominantly till derived from Lower Palaeozoic shales, with small sections of alluvium, and lacustrine sediments.</p> <p>Bedrock is also mapped to be outcropping regularly throughout sections of route corridor. Bedrock below the route corridor consists of green and red-purple buff slate and siltstone of the Oaklands formation within the north, and predominantly green and grey slate with thin siltstone of Ballylane formation along the north, centre and south of the route. The route locally intersects the red-brown conglomerate &amp; sandstone of the Carrigmaclea formation in the south.</p> <p>Four isolated pockets of alluvium are intersected by this route. 2no in the central region and 2no. in the north which could give rise to potential soft ground requiring excavation. The route terminates in the south within an area of Lacustrine sediments which may also contain soft, compressible sediments. Additional potential soft ground areas have also been identified from a review of historical OS maps.</p>	3

N25 Waterford to Glenmore  
Stage 2 Assessment

Environmental Criteria	Preliminary Assessment of Option : Red 9.0 km Quantitative Assessment	Qualitative Assessment	Score
Hydrology	The route will have moderate negative impact via temporary direct impact to surface water quality (on small proportion of attribute) at River Barrow and River Nore SAC & Lower River Suir SAC. The route will have minor negative impacts via temporary direct impact to surface water quality (on small proportion of attribute) at Barrow River Estuary pNHA, Oakland River and Luffany River. The route will have a minor negative impact via temporary indirect impact to surface water quality (on small proportion of attribute) at Waterford Harbour Shellfish Area.	This route corridor intersects the catchments Nore and Suir and sub catchments Nore_SC_140 and Blackwater_SC_010. The red route corridor is crossed by the Oakland River (IE_SE_140130860) to its northern extent and the Luffany River (IE_SE_16L680750) to the southern extent of this route corridor therefore having the potential to impact water quality due to re-alignment works and the discharge of surface water run-off. It is important to note hydrological connections as the Oaklands River flows into the River Barrow and the Luffany River flows into the River Suir.	3
Hydrogeology	The route will have a moderate negative impact via temporary indirect impact to the surface water quality (small proportion of attribute) at River Barrow and River Nore SAC & Lower River Suir SAC via groundwater pathway. The route will have a minor negative impact via permanent impact to locally important aquifer along the route (small portion of attribute). The route will have a minor negative impact via permanent impact to the groundwater quality of the bedrock aquifer in areas of cut (3.2km length of cut) The route will have a minor negative impact via potential permanent impacts to 83no. private well supplies and 3no. GSI wells (on significant portion of attribute).	The red route corridor is underlain by a poorly productive bedrock aquifer with sections of locally important bedrock aquifer generally towards the north and south and a very small area of regionally important bedrock aquifer in the south. Groundwater flow paths in the area of the Mullinavat GWB are considered to be short because the bedrock is not considered to constitute a major aquifer. Therefore, it is likely that most groundwater flow circulates in the upper tens of meters, recharging and discharging in local zones. The groundwater flow in this area may be quite fast since the hydraulic gradient, a reflection of the mountainous topography, will be high. There are no Public Supply Source Protection Area, Group Water Scheme Abstraction Points or Group Scheme Preliminary Source Protection Areas within the route corridor. A search of the GSI groundwater well database has identified 3no. registered wells within the route corridor. Based on a review of available GSI (2020) mapping no springs were identified within the route corridor but historic OSI (2020) mapping reported a spring within the route corridor.	4
Architectural Heritage	The route will have a direct impact on the eastern extents of the demesne associated with Aylwardstown House (RPS C472). This route option will have a potential moderate direct impact on a clachan in Luffany and a road bridge over the Bearstown Stream in Graiguenakill. The potential impact of the route on the setting of Aylwardstown House with its unimpeded easterly aspect will be very large adverse with a potential moderate adverse impact on the setting of the designed landscape associated with Aylwardstown House.	Two protected structures, a skew arch railway bridge at Rathinure (RPS D126) and a wayside cross at Luffany (RPS C846), lie within the corridor, while the designed landscape surrounding a third protected structure (Aylwardstown House) will be impacted by the route. The cross at Luffany was re-sited to its present location in recent years. The now disused Waterford to New Ross railway, constructed in 1904, which runs through the subject area features embankments and cuttings with associated bridges, level crossings, gate houses. The Red Route corridor intersects with the railway line at two points at Rathinure and Luffany (CHS_PNT_94 & 97). Other features of note within the corridor include a clachan (CHS_PLY_068) and a roadbridge (CHS_PNT_009), which are not included on any statutory listing.	3
Archaeological and Cultural Heritage	The Red Route corridor intersects with four recorded archaeological monuments. This route would have a potential moderate direct impact on a possible enclosure in Rochestown. A second potential enclosure lies partly within the corridor at Carrickloney. The corridor crosses 16 townland boundaries.	The Red option, is along with the Lime Green option, the second shortest of the routes submitted for consideration and runs along the eastern edge of the subject area with Baile an Aighleartaigh hill to its west and the River Barrow to its east. Four recorded monuments are located either within or partially within this route corridor. One, a wayside cross in Luffany (KK044-022, RPS C846), is also classified as a Protected Structure. This cross, carved by Darby O' Brien in 1736 in memory of his ancestors, was re-sited to its present location in recent years. In the same townland to the west of the N25 is an excavated Fulacht Fia (KK044-023). This site is not scheduled for inclusion in the next revision of the RMP. A Castle - tower house (KK041-032) is located within the route corridor in Carrickloney townland and there is a fulacht fia in Rathpatrick townland (KK044-024-----). A curvilinear feature, possibly the remains of an enclosure (CHS_PLY_143), was identified in Rochestown in the course of cartographic analysis, while a second possible enclosure (CHS_PLY_121) identified through LIDAR analysis lies partially within the corridor in Carrickloney.	2
Non-agricultural properties	60 non-agricultural properties within 300m of route centre line.	Non-Agricultural properties include Residential, Commercial, Community, Health and Recreational.	2
Agriculture	The route will impact on 44 farm holdings. The route will pass in close proximity to 5 farm buildings. Not significant severance on 10 holdings, Minor severance on 17 holdings, Moderate severance on 6 holdings, Major severance on 11 holdings.	Good quality agricultural land. Majority of land impacted by the route is in grassland. 75% grassland, 16% dairy, 7% tillage and 2% equine. The route will result in significant severance due to the offline nature of the route. The route will impact on an intensive equine enterprise.	1

N25 Waterford to Glenmore  
Stage 2 Assessment

Environmental Criteria	Preliminary Assessment of Option : Red 9.0 km	Score	
	Quantitative Assessment	Qualitative Assessment	
Human Beings	<p>There are 4 no. monuments included in the Record of Monuments and Places along the subject route corridor. The route also traverses the access road to Beacon Hill Equine Centre, as well as the River Barrow and River Nore SAC. The route centreline is within 50m of 3 no. dwellings, with a further 20 no. dwellings within 100m. The route crosses the disused railway line (south-east Greenway).</p>	<p>The proposed route is located outside the area designated to be kept free from development for the provision of the realigned N25 as per Figure 11.1 of the County Development Plan 2014-2020. However, there is not a specific policy/objective outlined in the County Development Plan which states that routes will need to be within this defined corridor. The proposed route corridor also traverses the site of 4 no. monuments (Ref. KK041-032, KK044-022, KK044-023 and KK044-024) which are included within the Record of Monuments and Places. As per Section 8.3 of the Kilkenny County Development Plan, in terms of Development Management and recorded monuments, the Council will endeavour to preserve in situ all archaeological monuments, whether on land or underwater, listed in the Record of Monuments and Places (RMP), and any newly discovered archaeological sites, features, or objects by requiring that archaeological remains are identified and fully considered at the very earliest stages of the development process and that schemes are designed to avoid impacting on the archaeological heritage. In addition, Objective 8l of the Plan seeks to protect national monuments, and is set out in full as follows;</p> <p>"Protect archaeological sites and monuments (including their setting), underwater archaeology, and archaeological objects, including those that are listed in the Record of Monuments and Places, and in the Urban Archaeological Survey of County Kilkenny or newly discovered sub-surface and underwater archaeological remains". Please refer to Section 2.11 of the Route Options report for further information in terms of monuments.</p> <p>It is noted that the proposed route traverses land on which there is a live planning permission in place (application register reference 18573). However, this permission relates to the upgrading of overhead cables and which may be negatively impacted by the proposed development. In addition, the proposed route traverse a site where planning permission for a dwelling house has been granted under Application Register Reference 18577, which does not expire until 11/11/2023. It is considered that the proposed development could negatively impact the dwelling. Of note in relation to this route is that it traverses the access road to Beacon Hill Equine centre. On this basis, it is considered that there is a high likelihood of an objection to the development on the grounds of adverse impact to horses and to the operation of the equine centre from an economic perspective. There are 3 no. dwellings located within 50m of the route centreline, with a further 20 no. within 100m of the route centreline. This is a high volume of dwellings in close proximity of route centre line relative to the other route options, and therefore it is considered that there may be moderately negative impact in terms of human beings.</p> <p>Please refer to Noise (Section 2.3) and Air Quality (Section 2.1) sections of this report, and the Traffic Section of Phase 2 report for further information on potential impacts to those living in close proximity to the proposed route option. The route crosses a disused railway line (South-east Greenway) and therefore the impacted councils will need to be consulted. The proposed route also traverses the River Barrow and River Nore SAC. Such sites have significant protection under both EU and National Law. (Please refer to Section 2.5 of this report to find additional information in relation to Flora/Fauna) This is outlined in Objective 8B and 8C of the Kilkenny County Development Plan, and these objectives are outlined respectively as follows; "To protect and, where possible, enhance the natural heritage sites designated under EU Legislation and National Legislation (Habitats Directive, Birds Directive, European Communities (Birds and Natural Habitats) Regulations 2011 and Wildlife Acts). This protection will extend to any additions or alterations to sites that may arise during the lifetime of this plan" "To protect and, where possible, enhance the plant and animal species and their habitats that have been identified under European legislation (Habitats and Birds Directive) and protected under national Legislation (European Communities (Birds and Natural Habitats) Regulations 2011 (SI 477 of 2011), Wildlife Acts 1976-2010 and the Flora Protection Order (SI94 of 1999)."</p> <p>Having regard to the potential negative impact on the Beacon Hill Equine Centre, the presence of a high number of dwellings within 100m of the route, the impact on the existing railway line and the potential impact on an RMP, this route is considered to be negative from a planning perspective. Having regard to the potential adverse impact of the route on the SAC which cannot be ruled out at this stage, this route is considered to be highly negative, however this is assessed in detail under the biodiversity section. Therefore, and having regard to the comparative number of dwellings within 100m of the subject site, this route is considered to be moderately negative from a human being perspective.</p>	2
Human Health	<p><b>Recreational Areas</b> Beacon Hill Equine Centre has been identified as being within the route study area.</p> <p><b>Community, Health and Educational Facilities</b> No community, health or educational facilities have been identified as being within the route study area</p> <p><b>Transport Infrastructure</b> The route study area is intersected by over 15 minor roads/lanes. No cycle routes or walking trails have been identified as within or intersecting this route study area. Route crosses the proposed South-east Greenway at two locations.</p> <p><b>Road Safety</b> Collision statistics have been collated for the wider Kilkenny area however no distinction has been made between route options at this stage. No fire stations have been identified within the route study area.</p> <p><b>Air Quality, Noise and Climate</b> See respective Air Quality and Noise Assessments for consideration of these parameters. Note that with the exception of the number and nature of intersecting watercourses no distinction can be made with respect to climate impacts. Please see hydrology assessment for further consideration.</p>	<p>There are a number of residential properties within the route study area. These are dispersed throughout the route corridor and accessed by a mix of minor roads/private lanes which may be difficult to avoid with a new carriageway.</p> <p>There are also a number of commercial and agricultural premises including the Surehaul and Rhu Glen Hotel.</p> <p>A search of OSI Discovery Series mapping suggests no walking trails are within or intersect this route study area.</p> <p>No cycle routes have been identified as within or intersecting this route study area. The closest walking trail is the Waterford Greenway which is approximately 5km south west. The closest cycle route is the East Kilkenny Cycle Route which is over 10km north. Route crosses proposed South-east Greenway at two locations.</p> <p>Beacon Hill Equine Centre is within close proximity (within 50m) of the route, towards the east.</p> <p>No other leisure/amenity facilities including parks and gardens have been identified as being within this route study area.</p> <p>Approximately one quarter of the route length is intersected by the noise zone around the existing N25</p>	3

N25 Waterford to Glenmore  
Stage 2 Assessment

Environmental Criteria	Preliminary Assessment of Option : Teal 8.7 km		Score
	Quantitative Assessment	Qualitative Assessment	
Air Quality	<p>The calculated Index of Overall Change in Exposure for this route has been determined: NO<sub>x</sub> Exposure Index: -90,891 PM<sub>10</sub> Exposure Index: -2,898</p> <p>There are no sensitive receptors within 50m of this route.</p> <p>All routes cross a section of the River Nore &amp; River Barrow SAC therefore no preference is considered in terms of air quality impacts on sensitive ecosystems.</p>	<p>Predicted baseline levels of NO<sub>2</sub> and PM<sub>10</sub> are based on data from representative EPA monitoring sites. A background concentration of 5 µg/m<sup>3</sup> for NO<sub>2</sub> and 10 µg/m<sup>3</sup> for PM<sub>10</sub> are predicted in the region of the proposed route options.</p> <p>The existing N25 route is the least preferred option as it impacts the greatest number of receptors and thus has the greatest NO<sub>x</sub> and PM<sub>10</sub> exposure index. Each of the revised routes will improve local air quality along the existing alignment.</p> <p>As there are no new receptors impacted by the proposed route there is an overall positive impact from the new alignment as traffic is diverted away from properties along the existing N25. This is the preferred route in terms of air quality.</p>	7
Climate	<p>The CO<sub>2</sub> emissions associated with operational traffic along the route has been calculated: CO<sub>2</sub> Emissions: 11,323 tonnes/yr</p>	<p>CO<sub>2</sub> emissions are considered at a national scale rather than at a local level. Data from the EPA indicates that Ireland is likely to exceed its climate emissions targets in future years and therefore reduction measures are required in all areas. However, there are no sector specific GHG targets at present and a scheme in isolation will not cause a breach of the national targets.</p> <p>There is minimal difference in the route options in terms of climate impacts, all routes result in a slight negative impact to climate.</p>	3
Noise	<p>PIR = 107, with 61no. NSLs within 300m of the new roads (Teal). No NSLs are within 50m and 12no. NSLs are within 100m. 13 no. NSLs are above 60dB L<sub>den</sub>. None exceed 70dB L<sub>den</sub>. There are 39no. NSLs that experience a moderate negative (increase) in noise traffic levels and 29no. NSLs calculated with a likely major negative (increase) in noise traffic levels. There are 55no. NSLs that experience a moderate positive (reduction) in noise traffic levels and 141no. NSLs experience a major positive (reduction) in noise traffic levels. Noise mitigation required at 6no. NSLs.</p>	<p>Along existing route from New Ross bypass to Graiguenakill (S.1) then diverts east, closer to existing route than Red route. Expected noise climate to be quiet rural area but route is a reasonable distance from many clusters of properties (second lowest PIR) until it passes to the rear of properties at Curraghmore, which are currently influenced to front facade by existing Do Nothing route. Follows similar line to Red route at Luffany, passing closer than Red route to properties currently influenced by existing route. Earthworks provide beneficial screening at northern section of the route near cluster of properties. Fewer property clusters than the Red route (12no.) in the 0-100m band. Comparable traffic to Red route, with S.11 at 14,575 AADT, lower AADT diversion from existing route compared to Navy and Lime Green routes. Twice the AADT than Purple route. Preferred route as it has the second highest number of likely Major positive (reduction) in noise traffic levels when compared to all other routes (Red highest) with at least 100+ more NSLs experiencing a positive (reduction) in noise traffic levels compared to other routes. Mitigation is at a low number of properties (6no.) to southern section of route.</p>	3
Landscape and Visual (including light)	<p>Visual Effects: The number of receptors judged to have significant adverse effects (i.e. those categorised between the range of Moderate to Very Large) is 10.</p>	<p>Landscape Character Area E: South Eastern Uplands</p> <p>The proposed route travels for circa. 8.7km through this character area of which circa. 8.3km of carriageway will cross through greenfield land. Most of the route within this character area travels in lands to the east of the existing N25 Road (up to 1.8km distance to the east of the existing N25 Road in places). Horizontal alignment of carriageways would be in keeping with existing route patterns. However vertical alignment cutting, and embankment slopes would significantly disrupt existing landform. In particular; where the route travels up a steep hillside and over a stream valley from Craiguenakill to Carrickcloney (in a combination of fill embankments and cutting) there would significant adverse effects on landscape character of this sloping land which connects with the River Barrow valley.</p> <p>The route forms a large cutting though some the highest contours of a ridge of high ground at Aylwardstown and south to Rathinure: A Principal Ridgeline (Refer to Figure 8.3 Landscape Sensitivities, Kilkenny County Development Plan). There would be significant adverse effects on this ridge of high ground.</p> <p>Travels through a local valley (mostly on fill embankments) between Rathinure and Redgap, which is visually connected with the River Barrow valley corridor and views from along this corridor. Thus, potential significant adverse effects on views through this valley and on the landscape character of the wider River Barrow valley.</p> <p>From Ballyrownagh to Slieveroe roundabout the route (mostly on fill embankments) follows a local stream valley parallel to the existing N25. Following these areas of lower ground will help reduce potential wider visibility of this section of the route. However, it will affect the setting of this stream valley itself and associated wetland vegetation.</p> <p>There would be adverse effects rural tranquillity as the route travels in existing tranquil land to the east of the existing N25 road.</p> <p>Loss of some areas of woodland, hedgerows and hedgerow trees and loss of agricultural land.</p>	1
Biodiversity- Flora and Fauna	<p>The Teal route would not impact upon any ESAs of County Importance. It would impact on 2 ESAs of High Local importance (same two as the Red option) and 4 ESAs of Low Local importance (same four as the Red option); though the Teal route is likely to intersect more of these than the Red route. ESA 3 comprises a tributary of the Glenmore River, and associated bankside scrub, over which a water crossing would be required. This ESA may be of local importance to mammal and aquatic species, while also being hydrologically connected to the SAC. ESA 16 comprises broadleaved and wet woodland, wet grassland and scrub, which may be of local importance to mammals and field-feeding birds.</p>	<p>The Teal route is one of a number of routes which run more centrally through the study area with a length of 8.7km. Drainage is likely either to the River Barrow &amp; River Nore SAC (002162) to the east (via the Glenmore River); or the Lower River Suir SAC (002137) to the south (via the Luffany Stream). The Teal route approaches Glenmore from the southeast (between the Navy / Magenta / Lime Green and the Red Route) crossing a tributary of the Glenmore River before re-joining the existing N25. There are no direct impacts to SPAs or to Natural Heritage Areas - the nearest such site is Lough Cullin pNHA located to the west and largely outside the study area. The proposed corridor would not drain to Lough Cullin pNHA. Any impact to the Barrow River Estuary pNHA will be dependent upon further design and the level of interaction with wetland habitats along the river at Graiguenakill. The Teal route is 8.7km, with less potential for negative impacts on linear features such as hedgerows than longer routes, such as Purple. As noted, the Teal route merges back onto the alignment of the existing N25 as it approaches the northern terminus. Thus, existing habitats provided by landscape planting along the N25 would be lost. Based on expert judgement of a contracted bat-specialist, the Teal route poses the second least risk to bats and their potential roosting sites.</p>	1
Waste	<p>Estimated Excavation &amp; Disposal of Surplus Suitable and Unacceptable Material (U1) (m3) = 712,095</p> <p>Estimated Excavation &amp; Disposal of Hazardous Unacceptable Material (U2) (m3) = 37,479</p>	N/A	1

N25 Waterford to Glenmore  
Stage 2 Assessment

Environmental Criteria	Preliminary Assessment of Option : Teal 8.7 km		Score
	Quantitative Assessment	Qualitative Assessment	
Soils and Geology	<p>2no. moderate negatives for: Well Drained soils, and for Potential Soft / Compressible soils identified from historical OS maps;</p> <p>4no. minor negatives for proximity to a Potential Historic Quarry, Moderately High Landslide Susceptibility, and Soft / Compressible soils (published Quaternary mapping).</p>	<p>The teal route corridor is predominately underlain by quaternary sediments, predominantly till derived from Lower Palaeozoic shales, with small sections of alluvium, lacustrine sediments and till derived from cherts. Bedrock is mapped outcropping throughout the route corridor.</p> <p>Bedrock below the route corridor consists of green and red-purple buff slate and siltstone of the Oaklands formation at 2no. locations in the north, and predominantly green and grey slate with thin siltstone of Ballylane formation along the north, centre and south of the route. The route locally intersects the red- brown conglomerate &amp; sandstone of the Carrigmaclea formation in the south.</p> <p>Four isolated pockets of alluvium are intersected by the route, 1no. in the southern region, 2no. in the central region and 1no. in the north which could give rise to potential soft ground requiring excavation. The route terminates in the south within an area of Lacustrine sediments which may also contain soft, compressible sediments.</p>	3
Hydrology	<p>The route will have moderate negative impact via temporary direct impact to surface water quality (on small proportion of attribute) at River Barrow and River Nore SAC &amp; Lower River Suir SAC.</p> <p>The route will have minor negative impacts via temporary direct impact to surface water quality (on small proportion of attribute) at Barrow River Estuary pNHA, Oakland River and Luffany River.</p> <p>The route will have minor negative impact via temporary indirect impact to surface water quality (on small proportion of attribute) at Waterford Harbour Shellfish Area.</p>	<p>This route corridor intersects the catchments Nore and Suir and sub catchments Nore_SC_140 and Blackwater_SC_010.</p> <p>The teal route corridor is crossed by the Oakland River (IE_SE_140130860) to its northern extent and the Luffany River (IE_SE_16L680750) to the southern extent of this route corridor therefore having the potential to impact water quality due to re-alignment works and the discharge of surface water run-off. It is important to note hydrological connections as the Oaklands River flows into the River Barrow and the Luffany River flows into the River Suir.</p>	3
Hydrogeology	<p>The route will have a moderate negative impact via temporary indirect impact to the surface water quality (small proportion of attribute) at River Barrow and River Nore SAC &amp; Lower River Suir SAC via groundwater pathway.</p> <p>The route will have a minor negative impact via permanent impact to locally important aquifer along the route (small portion of attribute).</p> <p>The route will have a minor negative impact via permanent impact to the groundwater quality of the bedrock aquifer in areas of cut (3.5km length of cut)</p> <p>The route will have a minor negative impact via potential permanent impacts to 63no. private well supplies and 5no. GSI wells (on significant portion of attribute).</p>	<p>The teal route corridor is underlain by locally important bedrock aquifer with sections of poorly productive bedrock aquifer and regionally important bedrock aquifer.</p> <p>Groundwater flow paths in the area of the Mullinavat GWB are considered to be short because the bedrock is not considered to constitute a major aquifer. Therefore, it is likely that most groundwater flow circulates in the upper tens of meters, recharging and discharging in local zones. The groundwater flow in this area may be quite fast since the hydraulic gradient, a reflection of the mountainous topography, will be high.</p> <p>There are no Public Supply Source Protection Area, Group Water Scheme Abstraction Points or Group Scheme Preliminary Source Protection Areas within the route corridor.</p> <p>A search of the GSI groundwater well database has identified 5no. registered wells within the route corridor.</p> <p>Based on a review of available GSI (2020) mapping no springs were identified within the route corridor but historic OSI (2020) mapping reported two springs within the route corridor.</p>	4
Architectural Heritage	<p>One protected structure lies within the route corridor; a wayside cross (RPS C846). The route would have a direct impact on the western extents of the demesne associated with Aylwardstown House (RPS C472). It would have a moderate adverse impact on the setting of the house as well as a potentially moderate adverse impact on the designed landscape associated with the demesne. The route would have a potentially direct moderate impact on a clachan in Luffany townland.</p>	<p>One protected structure, a wayside cross at Luffany (RPS C846), lies within the corridor, while the designed landscape surrounding a second protected structure (Aylwardstown House) will be impacted by the route. The cross at Luffany was re-sited to its present location in recent years. Along the length of the corridor are occasional remnants of features depicted on historic mapping including old farmsteads, buildings, wells, and relict field systems, none of which are included on any statutory listing. Some upstanding elements of a clachan at Luffany (CHS_PLY_068) may still survive. South from Rathinure the route runs to the east of the now disused Waterford to New Ross railway. This railway line ceased to operate in the mid-nineties. The Teal Route intersects with the railway line at two points at Rathinure and Luffany (CHS_PNT_95 &amp; 96).</p>	2
Archaeological and Cultural Heritage	<p>Four archaeological monuments lie within the Teal Route corridor. In addition, the route passes within close proximity of a cluster of features associated with Kilcolumb Church (including a graveyard, a bullaun stone, a well and a rath (KK044-007001-3, KK044-008 and KK044-009 respectively). While not directly impacting on this church site, the impact on its setting would be large adverse. There will be a potentially direct significant impact on a circular feature in Ballyrowragh identified on LiDAR visualisations and a moderate adverse impact on its setting. The corridor crosses 10 townlands.</p>	<p>The Teal Route is the shortest of the options under consideration. Towards the south, the corridor passes within the Zone of Notification (ZoN) of three recorded monuments; an ex situ wayside cross in Luffany dated 1736 (KK044-022), which is also a protected structure (RPS C846), an excavated fulacht fia (KK044-023) that is not scheduled for inclusion in the next revision of the RMP, and a fulacht fia in Rathpatrick (KK044-024). To the north, the corridor clips the eastern extents of the ZoN surrounding a ringfort – rath (KK041-030----) in Carrickcloney. A potential enclosure, identified in the course of LiDAR assessment (CHS_PLY_138), lies within the corridor at Ballyrowragh.</p>	2
Non-agricultural properties	<p>41 non-agricultural properties within 300m of route centre line.</p>	<p>Non-Agricultural properties include Residential, Commercial, Community, Health and Recreational.</p>	3
Agriculture	<p>The route will impact on 37 farm holdings. The route will pass in close proximity to 3 farm buildings. Not significant severance on 7 holdings, Minor severance on 12 holdings, Moderate severance on 9 holdings, Major severance on 9 holdings.</p>	<p>Good quality agricultural land. Majority of land impacted by the route is in grassland. 76% grassland, 5% dairy, 11% tillage and 8% forestry. The route will result in significant severance due to the offline nature of the route.</p>	2

N25 Waterford to Glenmore  
Stage 2 Assessment

Environmental Criteria	Preliminary Assessment of Option : Teal 8.7 km		Score
	Quantitative Assessment	Qualitative Assessment	
Human Beings	<p>Route Corridor traverses the Zone of Notification of 4 no. monuments included in the Record of Monuments and Places. The route crosses the disused railway line (South-east Greenway). The proposed route crosses the River Barrow and River Nore SAC. There are no dwellings within 50m and 12 no. dwellings within 100m of the route centre line.</p>	<p>The proposed route is located outside the area designated to be kept free from development for the provision of the realigned N25 as per Figure 11.1 of the County Development Plan 2014-2020. However, there is not a specific policy/objective outlined in the County Development Plan which states that routes will need to be within this defined corridor. The proposed route corridor passes through the Zone of Notification of 4 no. monuments included in the Record of Monuments and Places (Ref. KK044-022, KK044-023, KK044-024, KK041-030). As per Section 8.3 of the Kilkenny County Development Plan, in terms of Development Management and recorded monuments, the Council will endeavour to preserve in situ all archaeological monuments, whether on land or underwater, listed in the Record of Monuments and Places (RMP), and any newly discovered archaeological sites, features, or objects by requiring that archaeological remains are identified and fully considered at the very earliest stages of the development process and that schemes are designed to avoid impacting on the archaeological heritage. In addition, Objective 8I of the Plan seeks to protect national monuments, and is set out in full as follows;            "Protect archaeological sites and monuments (including their setting), underwater archaeology, and archaeological objects, including those that are listed in the Record of Monuments and Places, and in the Urban Archaeological Survey of County Kilkenny or newly discovered sub-surface and underwater archaeological remains". Please refer to Section 2.11 of the Route Options report for further information in terms of monuments.            It is noted that the proposed route traverses land on which there is a live planning permission in place (application register reference 18573). However, this permission relates to the upgrading of overhead cables, which may be negatively impacted by the proposed development. This route has the least number of dwellings in close proximity to the route centre line. There are not any dwellings within 50m of the route centre line, and there are 12 no. dwellings located within 100m of the route centreline. This is a comparatively low number of dwellings in close proximity to the route centre line and therefore is considered to be slightly positive in terms of impact on human beings relative to the other route options. Please refer to Noise (Section 2.3) and Air Quality (Section 2.1) sections of this report, and the Traffic Section of Phase 2 report for further information on potential impacts to those living in close proximity to the proposed route option. The route crosses a disused railway line (south-east Greenway) and impacted councils will need to be consulted.            The proposed route also traverses the River Barrow and River Nore SAC. (Please refer to Section 2.5 of this report to find additional information in relation to Flora/Fauna). Such sites have significant protection under both EU and National Law. This is outlined in Objective 8B and 8C of the Kilkenny County Development Plan, and these objectives are outlined respectively as follows;            "To protect and, where possible, enhance the natural heritage sites designated under EU Legislation and National Legislation (Habitats Directive, Birds Directive, European Communities (Birds and Natural Habitats) Regulations 2011 and Wildlife Acts). This protection will extend to any additions or alterations to sites that may arise during the lifetime of this plan"            "To protect and, where possible, enhance the plant and animal species and their habitats that have been identified under European legislation (Habitats and Birds Directive) and protected under national Legislation (European Communities (Birds and Natural Habitats) Regulations 2011 (SI 477 of 2011), Wildlife Acts 1976-2010 and the Flora Protection Order (SI94 of 1999)."            Notwithstanding the fact this route impacts the least number of dwellings within 100m of its centre line, having regard to the potential adverse impact of the route on the SAC which cannot be ruled out at this stage, this route is considered to be highly negative, however, it is noted that this is assessed in detail in the biodiversity section. Having regard to the relatively low number of dwellings within 100m of this route in comparison to other proposed routes, this route is considered to be slightly negative from a human being perspective.</p>	3
Human Health	<p><b>Recreational Areas</b>            No recreational areas have been identified as being within the route study area.</p> <p><b>Community, Health and Educational Facilities</b>            With the exception of Rathinure Old Graveyard, no community, health or educational facilities have been identified as being within the route study area</p> <p><b>Transport Infrastructure</b>            The route study area is intersected by over 10 minor roads/lanes. No cycle routes or walking trails have been identified as within or the route study area. Route crosses the proposed South-east Greenway at two locations.</p> <p><b>Road Safety</b>            Collision statistics have been collated for the wider Kilkenny area however no distinction has been made between route options at this stage. No fire stations have been identified within the route study area.</p> <p><b>Air Quality, Noise and Climate</b>            See respective Air Quality and Noise Assessments for consideration of these parameters. Note that with the exception of the number and nature of intersecting watercourses no distinction can be made with respect to climate impacts. Please see hydrology assessment for further consideration.</p>	<p>There are a number of residential properties within the route study area. These are located throughout the route study area with a slightly increased number towards the south. These are accessed by a mix of minor roads/private lanes which may be difficult to avoid with a new carriageway. There are also a number of commercial and agricultural premises including the Rhu Glenn Hotel, Maguire Haulage and Surehaul. A search of OSI Discovery Series mapping suggests no walking trails are within or intersect this route study area. No cycle routes have been identified as within or intersecting this route study area. The closest walking trail is the Waterford Greenway which is approximately 5km south west. The closest cycle route is the East Kilkenny Cycle Route which is over 10km north. Rathinure Old Graveyard is within the route study area. No other leisure/amenity facilities including parks and gardens have been identified as being within the route study area. Route crosses proposed South-east Greenway at two locations. Approximately one quarter of the routes length is intersected by the noise zone around the existing N25.</p>	3

N25 Waterford to Glenmore  
Stage 2 Assessment

Environmental Criteria	Preliminary Assessment of Option : Lime Green 8.9 km		Score
	Quantitative Assessment	Qualitative Assessment	
Air Quality	<p>The calculated Index of Overall Change in Exposure for this route has been determined: NO<sub>x</sub> Exposure Index: -80,937 PM<sub>10</sub> Exposure Index: -2,604</p> <p>There are 4 sensitive receptors within 50m of this route.</p> <p>All routes cross a section of the River Nore &amp; River Barrow SAC therefore no preference is considered in terms of air quality impacts on sensitive ecosystems.</p>	<p>Predicted baseline levels of NO<sub>2</sub> and PM<sub>10</sub> are based on data from representative EPA monitoring sites. A background concentration of 5 µg/m<sup>3</sup> for NO<sub>2</sub> and 10 µg/m<sup>3</sup> for PM<sub>10</sub> are predicted in the region of the proposed route options.</p> <p>The existing N25 route is the least preferred option as it impacts the greatest number of receptors and thus has the greatest NO<sub>x</sub> and PM<sub>10</sub> exposure index. Each of the revised routes will improve local air quality along the existing alignment.</p> <p>However, minor increases in background concentrations of NO<sub>x</sub> and PM<sub>10</sub> at receptors along the proposed route are likely as a result of the Lime Green Route. However, there is an overall positive impact from the new alignment as traffic is diverted away from properties along the existing N25.</p>	6
Climate	<p>The CO<sub>2</sub> emissions associated with operational traffic along the route has been calculated: CO<sub>2</sub> Emissions: 10,166 tonnes/yr</p>	<p>CO<sub>2</sub> emissions are considered at a national scale rather than at a local level. Data from the EPA indicates that Ireland is likely to exceed its climate emissions targets in future years and therefore reduction measures are required in all areas. However, there are no sector specific GHG targets at present and a scheme in isolation will not cause a breach of the national targets.</p> <p>There is minimal difference in the route options in terms of climate impacts, all routes result in a slight negative impact to climate. However, this is the preferred route in terms of climate as it results in slightly lower CO<sub>2</sub> emissions compared with the other route options.</p>	3
Noise	<p>PIR = 299, with 150no. NSLs within 300m of the new roads (Lime Green). 4no. NSLs are within 50m and 25no. NSLs are within 100m. There are 24 no. NSLs are above 60dB L<sub>den</sub>, none exceed 70dB L<sub>den</sub>. There are 30no. NSLs that experience a moderate negative (increase) in noise traffic levels and 13no. NSLs calculated with a likely major negative (increase) in noise traffic levels. 51no. NSLs experience a moderate positive (reduction) in noise traffic levels and 24no. NSLs experience a major positive (reduction) in noise traffic levels. Noise mitigation required at 8no. NSLs.</p>	<p>Along existing route from New Ross bypass (S.1) to Kilmakevoge (S.3), then diverts east at a closer distance to existing route than Teal and Red routes. Close to a cluster of properties at Kilmakevoge and Ballyrahan (side facades), Scartnamo (rear facades) (S.11), earthworks provide screening at these properties to the north. Intersects existing route at Ballyrowragh (S.12) and heads west close to rear of properties along existing route at Curraghmore but at a further distance to Magenta route. Rural noise environment with a higher PIR than all other proposed routes with the exception of the Magenta route. Comparable combined number of properties with moderate to major positive (reduction) in noise traffic levels in comparison to the Navy route. Extensive diversion of traffic along this proposed Lime Green section (S.12 = 15,442 AADT), comparable to Navy and Magenta routes. Increase in noise environment in this rural environment but due to earthworks screening many clusters of properties experiencing a likely lower moderate to major negative (increase) in noise traffic levels than Teal route. Overall higher number of properties requiring mitigation in comparison to Teal and Navy routes.</p>	3
Landscape and Visual (including light)	<p>Visual Effects: The number of receptors judged to have significant adverse effects (i.e. those categorised between the range of Moderate to Very Large) is 32.</p>	<p>Landscape Character Area E: South Eastern Uplands</p> <p>The proposed route travels for circa. 8.9km through this character area of which circa. 6.8km of carriageway will cross through greenfield land and circa. 2km online. Most of the route within this character area travels in lands to the east of the existing N25 Road (up to 0.7km distance to the east of the existing N25 Road in places). 2.3km of the route travels to the west of the existing N25.</p> <p>Horizontal alignment of carriageways would be in keeping with existing route patterns. Some field pattern severance. Vertical alignment cutting and embankment slopes would disrupt existing landform. The route follows the existing N25 alignment to south of Glenmore, thus, avoiding effects on Glenmore and adjacent narrow stream valleys.</p> <p>From south of Glenmore, the route will cut through some of the highest contours of a ridge of high ground between Ballynamona and Aylwardstown and south to Gaustown. Significant adverse effects on this ridge of high ground and the landscape character of this elevated area.</p> <p>Descends into local stream valley at Ballyrahan including an ecological sensitive area of land cover. Significant adverse effects on local stream valley at Ballyrahan.</p> <p>Crosses over the existing N25 towards Carriganurra. At Carriganurra the route goes through a local rock outcrop (with cross on top) which is a prominent local landmark. Significant adverse effects on this feature.</p> <p>Limited effects on tranquillity. The route travels through areas on/ near the existing N25 road corridor. The traffic on the existing N25 road already affects tranquillity. The most adverse effects will be experienced in the elevated lands furthest to the east from the existing N25 road (including Aylwardstown and Ballyhobuck).</p> <p>Loss of some areas of woodland, hedgerows and hedgerow trees and loss of agricultural land.</p>	1
Biodiversity- Flora and Fauna	<p>The Lime Green route would not impact upon any ESAs of County Importance. It would impact on 5 ESAs of High Local importance and 2 ESAs of Low Local importance, all of which are shared with the Magenta Route.</p>	<p>The Lime Green route runs centrally through the study area with a length of 8.9km. Again, drainage is likely either to the River Barrow &amp; River Nore SAC (002162) to the east (via the Glenmore River); or the Lower River Suir SAC (002137) to the south (via the Luffany Stream). As with the Navy and Magenta routes, the Lime Green route approaches Glenmore from the southeast, merging with the alignment of the existing N25. There are no direct impacts to SPAs or Natural Heritage Areas - the nearest such site is Lough Cullin pNHA located to the west and largely outside the study area. The proposed corridor would not drain to Lough Cullin pNHA. Any impact to the Barrow River Estuary pNHA will be dependent upon further design and the level of interaction with wetland habitats along the river at Graiguenakill.</p> <p>The Lime Green route is 8.9km, with less potential for negative impacts on linear features such as hedgerows than longer routes, such as Purple. As noted, the Lime Green route merges back onto the alignment of the existing N25 as it approaches the northern terminus. Thus, existing habitats provided by landscape planting along the N25 would be lost. Based on expert judgement of a contracted bat-specialist, the Lime Green route ranked in the middle in terms of risk to bats and their potential roosting sites.</p>	1
Waste	<p>Estimated Excavation &amp; Disposal of Surplus Suitable and Unacceptable Material (U1) (m3) = 227,502</p> <p>Estimated Excavation &amp; Disposal of Hazardous Unacceptable Material (U2) (m3) = 11,974</p>	N/A	2

N25 Waterford to Glenmore  
Stage 2 Assessment

Environmental Criteria	Preliminary Assessment of Option : <i>Lime Green 8.9 km</i>		Score
	Quantitative Assessment	Qualitative Assessment	
Soils and Geology	<p>1no. major negative for High Landslide Susceptibility;</p> <p>3no. moderate negatives for: proximity to a Historic Quarry, Moderately High Landslide Susceptibility; Well Drained soils;</p> <p>3no. minor negatives for Soft / Compressible soils identified from published Quaternary and historic OS maps.</p>	<p>The lime green route corridor is predominately underlain by quaternary sediments, predominately till derived from Lower Palaeozoic shales, with small sections of alluvium and lacustrine sediments. Bedrock is mapped outcropping regularly particularly in the north and south of the route corridor.</p> <p>Bedrock below the route corridor consists of green and red-purple buff slate and siltstone of the Oaklands formation in the north, and predominantly green and grey slate with thin siltstone of Ballylane formation along the north, centre and south of the route. The route also intersects the red- brown conglomerate &amp; sandstone of the Carrigmaclea formation at 2no. locations in the south.</p> <p>Two isolated pockets of alluvium are intersected by the route in the north which could give rise to potential soft ground requiring excavation. The route terminates in the south within an area of Lacustrine sediments which may also contain soft, compressible sediments. Additional potential soft ground areas have also been identified from a review of historical OS maps.</p>	2
Hydrology	<p>The route will have moderate negative impact via temporary direct impact to surface water quality (on small proportion of attribute) at River Barrow and River Nore SAC &amp; Lower River Suir SAC.</p> <p>The route will have minor negative impacts via temporary direct impact to surface water quality (on small proportion of attribute) at Barrow River Estuary pNHA, Oakland River and Luffany River.</p> <p>The route will have minor negative impact via temporary indirect impact to surface water quality (on small proportion of attribute) at Waterford Harbour Shellfish Area.</p>	<p>This route corridor intersects the catchments Nore and Suir and sub catchments Nore_SC_140 and Blackwater_SC_010.</p> <p>The lime green route corridor is crossed by the Oakland River (IE_SE_140130860) to its northern extent and the Luffany River (IE_SE_16L680750) to the southern extent of this route corridor therefore having the potential to impact water quality due to re-alignment works and the discharge of surface water run-off. It is important to note hydrological connections as the Oaklands River flows into the River Barrow and the Luffany River flows into the River Suir.</p>	3
Hydrogeology	<p>The route will have a moderate negative impact via temporary indirect impact to the surface water quality (small proportion of attribute) at River Barrow and River Nore SAC &amp; Lower River Suir SAC via groundwater pathway.</p> <p>The route will have a minor negative impact via permanent impact to locally important aquifer along the route (small portion of attribute).</p> <p>The route will have a minor negative impact via permanent impact to the groundwater quality of the bedrock aquifer in areas of cut (5.9km length of cut)</p> <p>The route will have a minor negative impact via potential permanent impacts to 163no. private well supplies and 2no. GSI wells (on significant portion of attribute).</p>	<p>The lime green route corridor is underlain by a poorly productive bedrock aquifer with sections of locally important bedrock aquifer located to the north central and south of the proposed route. Groundwater flow paths in the area of the Mullinavat GWB are considered to be short because the bedrock is not considered to constitute a major aquifer. Therefore, it is likely that most groundwater flow circulates in the upper tens of meters, recharging and discharging in local zones. The groundwater flow in this area may be quite fast since the hydraulic gradient, a reflection of the mountainous topography, will be high.</p> <p>There are no Public Supply Source Protection Area, Group Water Scheme Abstraction Points or Group Scheme Preliminary Source Protection Areas within the route corridor.</p> <p>A search of the GSI groundwater well database has identified 2no. registered wells within the route corridor.</p> <p>Based on a review of available GSI (2020) mapping no springs were identified within the route corridor but historic OSI (2020) mapping reported one spring within the route corridor.</p>	3
Architectural Heritage	<p>While no protected structures lie within the Lime Route corridor, there will be a large adverse impact on the setting of O'Donovan's Mill (C845), which lies outside the corridor at Ballyrowragh. There will also be a slight to moderate direct physical impact on the mill race associated with O'Donovans Mill.</p>	<p>Along the length of the corridor are occasional remnants of features depicted on historic mapping including old farmsteads and relict field systems, none of which are included in any statutory listing. Settlement is dispersed, found mostly along roads, the housing stock varying from vernacular farmhouses to more modern dwellings. The route extends to the west of a mill complex at Ballyrowragh (the mill itself is a protected structure - RPS C845), and will potentially directly impact on a section of the associated mill race.</p>	1
Archaeological and Cultural Heritage	<p>The Lime Route corridor intersects with four archaeological monuments; ringforts/raths at Ballyhobuck (KK044-002) and Ballyrahan (KK044-003), a fulacht fia (KK041-021) at Kilmakevoge and a kiln site (KK043-021) at Luffany. The ringfort sites would experience a moderate adverse impact on their setting, while that at Ballyrahan may experience a direct physical impact. A mound in Luffany (CHS_PLY_117) may experience a direct moderate impact and a slight adverse impact on its setting. There will be a potentially direct profound impact on a Holy Year cross at Carriganurra. The corridor traverses 24 townland boundaries.</p>	<p>The Lime Green Route, at 8.9km, is together with the Teal Route one of the shortest submitted for consideration. The area through which this route extends is rural in character with a mix of pasture and arable fields bounded by mature hedgerows on earthen banks and ditches. The route will intersect with the Zone of Notification (ZoN) surrounding three known archaeological monuments and may have a direct significant impact on a fourth at Ballyrahan. The corridor passes over a rock outcrop at Carriganurra, with a cross on its summit erected by the local community to mark the Holy Year in 1950. This site has no official designation but is a well-known landmark and has cultural value. A distinctive mound measuring 15 m in diameter, identified in the course of LIDAR analysis, may be directly impacted in Luffany.</p>	1
Non-agricultural properties	<p>139 non-agricultural properties within 300m of route centre line.</p>	<p>Non-Agricultural properties include Residential, Commercial, Community, Health and Recreational.</p>	1

N25 Waterford to Glenmore  
Stage 2 Assessment

Environmental Criteria	Preliminary Assessment of Option : <i>Lime Green 8.9 km</i>		Score
	Quantitative Assessment	Qualitative Assessment	
Agriculture	The route will impact on 39 farm holdings. The route will pass in close proximity to 2 farm buildings. Not significant severance on 14 holdings, Minor severance on 8 holdings, Moderate severance on 12 holdings, Major severance on 5 holdings.	Good quality agricultural land. Majority of land impacted by the route is in grassland. 79% grassland, 8% dairy, 10% tillage and 3% forestry. The route will result in significant severance due to the offline nature of the route.	2
Human Beings	There are 4 no. dwellings within 50m of the centre line of the subject route, with a further 25 no. dwellings within 50-100m of the centre line. The proposed route also traverses the SAC and four archaeological monuments	The proposed route is located outside the area designated to be kept free from development for the provision of the realigned N25 as per Figure 11.1 of the County Development Plan 2014-2020. However, there is not a specific policy/objective outlined in the County Development Plan which states that routes will need to be within this defined corridor. It is noted that the proposed route traverses land on which there is a live planning permission in place (application register reference 18573). However, this permission relates to the upgrading of overhead cables which may be negatively impacted by the proposed development. The proposed route traverses the site with planning permission granted for a dwelling house under Application Register Reference 18191, which does not expire until 03/12/2023. In addition, the proposed development traverses the site for another dwelling house under Application Register Reference 17/553, which does not expire until 17.01.23. The proposed route is likely to have a negative impact on these permitted dwellings. It is noted that there are 4 no. dwelling located within 50m of the centreline of the proposed route, with a further 25 no. dwellings located within 50-100m of the centre line. This is a comparatively high volume of dwellings in close proximity to the route centre line and therefore, it is considered that there will be a moderately negative impact on human beings relative to the other route options. Please refer to Noise (Section 2.3) and Air Quality (Section 2.1) sections of this report, and the Traffic Section of Phase 2 report for further information on potential impacts to those living in close proximity to the proposed route option. The proposed route also traverses the River Barrow and River Nore SAC (Please refer to Section 2.5 of this report to find additional information in relation to Flora/Fauna). Such sites have significant protection under both EU and National Law. This is outlined in Objective 8B and 8C of the Kilkenny County Development Plan, and these objectives are outlined respectively as follows; "To protect and, where possible, enhance the natural heritage sites designated under EU Legislation and National Legislation (Habitats Directive, Birds Directive, European Communities (Birds and Natural Habitats) Regulations 2011 and Wildlife Acts). This protection will extend to any additions or alterations to sites that may arise during the lifetime of this plan" "To protect and, where possible, enhance the plant and animal species and their habitats that have been identified under European legislation (Habitats and Birds Directive) and protected under national Legislation (European Communities (Birds and Natural Habitats) Regulations 2011 (SI 477 of 2011), Wildlife Acts 1976-2010 and the Flora Protection Order (SI94 of 1999)." Notwithstanding the fact this route does not traverse an RMP, and that there are only 5no. dwellings within 50m of the centreline of the proposed route, having regard to the potential adverse impact of the route on the SAC which cannot be ruled out at this stage, this route is considered to be highly negative, however, this is assessed in detail in the biodiversity section. Notwithstanding the built and natural heritage designations which are dealt with under separate assessments, having regard to the number of dwellings within 100m of the route centreline, this route is considered to be moderately negative from a human being perspective.	2
Human Health	<p><b>Recreational Areas</b> No recreational areas have been identified as being within the route study area.</p> <p><b>Community, Health and Educational Facilities</b> Glenmore National School, Glenmore Community Hall, Garda Station and St James Church are all within close proximity (300m) of the route, towards the north</p> <p><b>Transport Infrastructure</b> The route study area is intersected by over 20 minor roads/lanes. No cycle routes or walking trails have been identified as within or the route study area. Route study area falls partially within proposed South-east Greenway</p> <p><b>Road Safety</b> Collision statistics have been collated for the wider Kilkenny area however no distinction has been made between route options at this stage. No fire stations have been identified within the route study area.</p> <p><b>Air Quality, Noise and Climate</b> See respective Air Quality and Noise Assessments for consideration of these parameters. Note that with the exception of the number and nature of intersecting watercourses no distinction can be made with respect to climate impacts. Please see hydrology assessment for further consideration.</p>	<p>There are a number of residential properties within the route study area. These are dispersed throughout the route study area and accessed by a mix of minor roads/private lanes which may be difficult to avoid with a new carriageway.</p> <p>There are also a number of commercial and agricultural premises including Glanbia Agribusiness, Jacques Nurseries, Surehaul and Duggan Brothers Ltd.</p> <p>A search of OSI Discovery Series mapping suggests no walking trails are within or intersect this route study area.</p> <p>No cycle routes have been identified as within or intersecting this route study area. The closest walking trail is the Waterford Greenway which is approximately 4.9km south west. The closest cycle route is the East Kilkenny Cycle Route which is over 10km north. Route study area falls partially within proposed South-east Greenway</p> <p>Glenmore National School, Glenmore Community Hall, Garda Station and St James Church are all within close proximity (300m) of the route, towards the north.</p> <p>No other leisure/amenity facilities including parks and gardens have been identified as being within the route study area.</p> <p>Approximately two thirds of the routes length is intersected by the noise zone around the existing N25.</p>	3

N25 Waterford to Glenmore  
Stage 2 Assessment

Environmental Sub-criteria	Purple	Navy	Magenta	Red	Teal	Lime Green
Air Quality	5	6	4	6	7	6
Climate	3	3	3	3	3	3
Noise	2	3	3	3	3	3
Landscape and Visual (including light)	1	3	3	1	1	1
Biodiversity- Flora and Fauna	1	1	1	1	1	1
Waste	2	3	3	1	1	2
Soils and Geology	3	2	1	3	3	2
Hydrology	4	3	3	3	3	3
Hydrogeology	2	3	3	4	4	3
Architectural Heritage	4	3	3	3	2	1
Archaeological and Cultural Heritage	2	1	2	2	2	1
Non-agricultural properties	2	1	1	2	3	1
Agriculture	1	2	2	1	2	2
Human Beings	3	3	1	2	3	2
Human Health	3	3	3	3	3	3
<b>Total</b>	<b>38</b>	<b>40</b>	<b>36</b>	<b>38</b>	<b>41</b>	<b>34</b>