

3. Alternatives Considered

3.1 Introduction

This chapter outlines the alternatives considered for this road development.

The planning and development of this road has been carried out in accordance with the National Roads Authority (NRA) National Roads Project Management Guidelines (NRPMG)⁽²⁾. These guidelines provide for a phased approach to the development of major new roads. The relevant phases to this point in the development of the design have been the Constraints Study undertaken in 2000/2001 (Report published May 2001)⁽³⁾, the Route Selection Study undertaken in 2001/2002 (Report published March 2002)⁽⁴⁾ and the Preliminary Design, which has culminated in the Preliminary Design of the road development presented in this EIS.

The consideration of alternatives at each stage of the design development is outlined below. The discussion in sections 3.2 to 3.5 inclusive follows a north to south format, consistent with the early stages of design development. Thereafter, the discussion follows the proposed road development from south to north.

3.2 Methodology for Development of Possible Route Options

3.2.1 Broad National Network Study

The NDP (paragraph 4.12) identified the need for this road development, and required further evaluation of the road type and route between Dublin and Waterford. This assessment was completed in February 2000 and published by the NRA as "Assessment of Waterford – Dublin Route and Road Type Options"⁽⁵⁾.

The assessment identified 3 main corridor options between Dublin and Waterford; the eastern corridor (N11), the central corridor (N9) and the western corridor (N8 via Durrow). It was concluded that the central N9 corridor was preferred.

3.2.2 Initial Study Area and Public Consultation No. 1

An initial study area for the proposed N9 design development was identified at the outset of the project. This area was based on the preferred 'Central N9 Corridor', outlined in section 3.2.1, and covered approximately 2,400 square kilometres crossing through Counties Kildare,

Laos, Carlow, Wicklow and Kilkenny. This Initial Study Area was presented to the public via full-page advertisements in local newspapers, which was called Public Consultation No. 1 (PC1). Comments received fed into the following stages of the design process.

3.2.3 Constraints Study Area Definition

At the outset, a preliminary study was carried out by collecting information on major constraints within the full extent of the initial study area. This information was methodically reviewed such that areas where the probability of finding a feasible route would be unlikely (areas of low routing potential) were identified. The issues that were considered included:

- Engineering constraints;
- The existing infrastructure, land use, topography and physical features;
- Planning, development and socio-economic character; and
- Identification of sites or areas of environmental significance or sensitivity.

These areas of low routing potential, and adjacent areas, which became areas of low routing potential by association, were not considered further. The areas relevant to this development (Waterford to Powerstown) excluded from further study were (listed north to south):

- High land known as the Castlecomer Plateau;
- High land to the east of the initial study area between Thomastown, Graiguenamanagh and Inistioge;
- High land south of Thomastown between Inistioge and the Arrigle River; and
- High land lying above the west side of the Arrigle River, including Tory Hill.

The preliminary study also considered any areas where the initial study area should be increased. One such area was identified to the west of Mullinavat to give more scope for developing a route option on that side.

The amended area, called the Constraints Study Area, is shown on Figure 3.1 in Volume 2, the separate volume of Figures.

3.2.4 Constraints Study

The Constraints Study was carried out at an early stage of the project with the objective of

gathering as much information in the study area as possible. This data collection is focused on determining the constraints including physical, environmental and engineering aspects that exist and could affect the location, design and progress of the road development. The constraints identified were under separate headings, as follows:

- Engineering and Topography
- Accidents
- Geology and Hydrogeology
- Socio-Economic Impact
- Flora, Fauna and Fisheries
- Archaeology and Cultural Heritage
- Land Use and Agriculture
- Landscape and Visual Aspects

3.2.5 Standards

The design standards for this road development are the National Road Authority's Design Manual for Roads and Bridges (NRA DMRB)⁽⁶⁾. At the time of the Route Selection Study the standard for the new road, in accordance with the NDP, was to be either a Grade Separated Dual 2 Lane (7.0 metres) Carriageway or a Standard Dual 2 Lane (7.0 metres) Carriageway Motorway. Both categories have the same cross-section.

The road cross-section and alignment standards used in the route selection process are those identified in Chapter 4 Description of the Proposed Road Development, of this EIS.

3.3 Alternative Route Corridor Options

3.3.1 Initial Route Corridors

Using the information from the Constraints Report, a series of possible (initial) route corridors were developed through the constraints study area.

Following this, Route Corridor Options were selected that were to form the basis for the Public Consultation No. 2 (PC2) and detailed assessment, leading to the selection of a single route corridor.

The route corridor options were prepared after the early revision of the study area and covered options between Powerstown, Leighlinbridge, Paulstown, Dungarvan, Stoneyford, Thomastown, Lukeswell, Ballymartin and

Waterford. A number of alternative concepts were also considered between Powerstown and Waterford.

One option was based on the possibility of upgrading the existing N9 (on-line option), although this could not be developed to the same standard as off-line options due to the variable alignment of the existing N9, the frequency of existing accesses on to the N9 and the amount of frontage development. An analysis was undertaken of an on-line option to a reduced standard. This was discarded because:

- Approximately 58% of the route would need to be constructed off-line (by-passes and other realignments)
- It would require the demolition of at least 90 houses
- It would be sub-standard over much of its length
- It would need to retain at grade junctions
- Safety objectives would not be met
- Separate bypasses would be needed for Paulstown, Gowran, Dungarvan, Thomastown, Ballyhale, Lukeswell and Mullinavat.

In addition to the above issues, many hundreds of properties would need to be routed onto the existing road network in order to gain access to the new road. This would involve increased travelling along unsuitable roads and in some cases for between 4 and 5 kilometres.

A number of initial options were then discarded so that the route corridors to be presented at PC2 avoided those options associated with considerable residual difficulties, where the project objectives were unlikely to be met. At the same time some options were retained even though a major impact had been identified. This applied, for example, to flora, fauna and fisheries, landscape and visual impacts where a complete route could not be developed without crossing a candidate Special Area of Conservation (cSAC) or an area of high amenity (King's River/River Nore).

Using the above process, links between Thomastown and Ballymartin (and Waterford) were discarded. Links across the valley through Knockmoylan, north of Lukeswell were also discarded because of the need to cross both the railway and the N9, although it was recognised that this type of link may need to be re-introduced at a later stage.

3.3.2 Route Corridor Options

General

As the Route Corridor Options for the N9/N10 Kilcullen to Waterford covered such a large geographical area, the study area was split into seven sections, A to G. Sections A to D covered the section between Kilcullen and Paulstown, while Sections E to G covered the remainder of the route to Waterford. Each Route Corridor Option had a width of 100m.

The Route Corridor Options for the N9/N10 Waterford to Powerstown Scheme are shown as Figures 3.2 to 3.7, and formed the basis for the PC2 exhibition and the assessment of route corridors. The options in the area between Powerstown, County Carlow and Waterford City have been shown as they were presented at the second public consultation, split into four sections D, E, F and G (Section D also being part of the N9 Kilcullen to Powerstown route selection study). Each of the sections had a range of options that either represented full options in that section (D1 for example) or represented options that could be linked to form full options (E1/E6 and part of E1 for example). Comments and representations from members of the public were made by reference to the route corridor option label (D2, E4, F3, G1 for example). The Route Corridor Options are described below.

Route Corridor D1

Route Corridor D1 emerged from Section C near Killeeshal and continued southwards between the River Barrow and the high ground to the west, passing west of Milford and between Oldleighlin and Leighlinbridge.

Route Corridor D2

Route Corridor D2 emerged from Section C near Ballybannon railway bridge and crossed the N9 National Primary Road and the River Barrow south of Milford. The route then ran nearly approximately one kilometre to the east of Route Corridor D1 passing to the west of Leighlinbridge, and ending at Tinnagarney.

Route Corridor D3

Route Corridor D3 emerged from Section C southeast of Tinryland and ran north of Clonmelsh and crossed the railway to join Route Corridor D2 north of Powerstown.

Route Corridor D4

Route Corridor D4 also emerged from Section C east of Tinryland and passed to the east of Clonmelsh and Garrybundon before swinging

westwards to cross the N9 National Primary road and the River Barrow north of Rathvinden and Leighlinbridge.

Route Corridor D5

Route Corridor D5 started on Route Corridor D4 near Nurney and passed to the east of Leighlinbridge. It crossed the River Barrow midway between Leighlinbridge and Muine Bheag (Bagenalstown) and continued in a south-westerly direction to join Route Corridor D2 at Tinnagarney.

Option E1

This option passed to the north and west of Paulstown, connecting with possible options in Section D. E1 then ran across an area of generally low-lying ground, from Paulstown to the west of Bennettsbridge. It crossed the N10 at Blanchvillespark, headed south-east to cross the railway at Rathcash and again at Maddoxtown. Option E1 crossed both the River Nore and the R700 north of Sheastown, before turning to head south at Wallslough. Further south, E1 passed in the vicinity of Pigeonpark and crossed the N10 south of Danesfort. This option then covered low-lying ground to the west of Stoneyford and included a crossing of the King's River.

Option E1/E6

This option provided the opportunity to link E1 with different options from Section D. It crossed low-lying ground in Shankhill area.

Option E2

This option ran from the north of Paulstown across generally low-lying ground. There was a crossing of the N9 immediately northeast of Paulstown and then E2 ran south west towards Gowran close to the east side of the existing N9. Further south there was a crossing of the N9 and R702 (Gowran to Kilkenny Road) north of Gowran. Passing to the west side of Clashwilliam, and to the north of Bennettsbridge, E2 had crossings of the railway and the River Nore immediately north of Bennettsbridge. It also crossed both the R700 (Bennettsbridge to Kilkenny) and local road running west from Bennettsbridge. There was also a crossing of the N10 south of Danesfort cross.

Option E3

This option ran due south from Wallslough across low lying ground towards Annamult and the confluence of the King's River and River Nore at Ballylynch.

Option E4

Beginning at Clashwilliam and passing Bishopslough South on the east side of Bennettsbridge across relatively flat ground, Option E4 headed in a south westerly direction between Bishopslough south of Rathduff to the south west of Stoneyford. Along this option there was a crossing of the King's River south of Bennettsbridge and the King's River west of Stoneyford. Again the terrain was mainly flat.

Option E5

This was a short option between options E6 and E4 to the north of Dungarvan.

Options E6

This was the most easterly of options from the north of Paulstown to the north of Dungarvan. The option ran across generally flat ground dipping towards the south and passing to the east side of Gowran, before passing between Dungarvan and Ballylynch where the River Nore and the King's River meet. The terrain is relatively flat although the ground rises to form a hill on the east side of the rivers. Along this option, there was a need to cross both the railway and the R700 (linking Thomastown with Bennettsbridge) before reaching the main river crossing. From here, option E6 ran south between Ballylynch and Oldtown, east of Stoneyford.

Option F1

Option F1 ran from Rathduff to Hugginstown, almost due south. The terrain was uneven, rising as the option proceeded south. There was a cut into the lower slopes of Knockadrina Hill identified and a crossing of the R699 was needed to the west of Knocktopher. The Option F1 continued south across high ground towards Keatingstown where it reached the top of Section G.

Option F2

This option extended between Oldtown (Option E6) and Hugginstown. A crossing of the N10 was identified in the vicinity of Floodhall and a further crossing for the R699 was needed on the west side of Knocktopher. The ground rose over this option as it approached the Hugginstown area.

Option F3

Option F3 ran to the east of Ballyhale and Knocktopher, due south from Oldtown to Kiltorcan, rising all the way and crossing the N9 and Little Arrigle River east of Knocktopher and

the railway at Kiltorcan. From Kiltorcan the option continued close to the east side of the existing N9 to Castlebanny from where the ground started to fall towards Castlegannon.

Option G1

Extending from Keatingstown to Clonassey on the west side of Mullinavat, Option G1 covered terrain featuring a succession of hills and depressions, as the land rose steeply to the north. Further south from Clonassey to Dunkitt (where the route would join the Waterford bypass), the option passed along the side of the Blackwater Valley and crossed the river in the vicinity of Kilmacow.

Option G2

Option G2 ran from Keatingstown to the Clonassey area west of Mullinavat, dropping from high ground towards the Blackwater River and a crossing of the railway may have been needed.

Option G3

Running from Castlegannon to Dunkitt, Option G3 passed close to the N9 and railway and passed Mullinavat on the east side about 300m from the existing N9. This option would continue south where the ground falls gently towards the termination with the Waterford By-pass tie-in.

3.3.3 Public Consultation No. 2

The second Public Consultation (PC2) was undertaken between May 2001 and August 2001, following the identification of the Route Corridor Options. The objectives of the consultation were to:

- present the route corridor options to the public;
- inform them of the process and programme for the project;
- invite submissions on these options; and
- to gather information, particularly local information, which may not be already known to the design team.

In addition, letters of consultation were issued to a number of statutory and non-statutory consultees notifying them of the Route Corridor Options under consideration and inviting them to comment on the options.

A total of 55,000 flyers giving details of the exhibition venues and dates were delivered to households in the study area and advertisements were placed in the local papers

and broadcast on local radio. The consultation exhibitions were held on display for a two-week period in May 2001.

The six venues for consultation and appraisal of the Waterford to Powerstown section of the road development were held in Thomastown, Mullinavat, Kilkenny City, Waterford City, Bagenalstown and Carlow Town. Mapping and brochure material was made available at these exhibitions. Each of the 1,545 attendees at the above venues was asked to sign a register, while being offered the mapping relevant to their interests. They were also asked to complete a questionnaire and a free post envelope was provided for ease of return. The venues were attended by staff from Kilkenny County Council, Carlow County Council, Tramore Regional Design Office, and the Design Consultants as appropriate. An Agricultural Consultant from Phillip Farrelly & Partners was also available.

Following the two weeks of exhibition, the exhibition materials, including the scheme brochure and the accompanying questionnaires, were displayed and made available at County Halls in Kilkenny City and Carlow Town, and at the Health Centre in Mullinavat.

Five further meetings were held with community groups, individuals and representatives. A number of the responses were received from both statutory and non-statutory consultees.

In total, 875 responses were received in relation to the Waterford to Powerstown section of the road development. These consisted of questionnaires and letters, some of which were accompanied by additional information, comments and maps. A number of submissions in the form of reports prepared by professional bodies or individuals were also received. All submissions relating to specific archaeological, ecological, or landscape features were forwarded to the relevant sub-consultant. Table 3.1 summarises the responses received to the question of what issues were considered 'very important' in the choice of the route (this table refers solely to the Consultations south of Paulstown).

The consultation process was undertaken to ensure that the views expressed by the respondents were considered, both in terms of engineering content and environmental impact, and where possible these views have influenced the design process. All responses, either received directly at the exhibitions or for a period of time following that, were analysed and given careful consideration.

The issues and concerns that appeared regularly in submissions included:

- NRA Road Needs Study 1998⁽⁷⁾ should be adhered to;
- the existing N9/N10 road should be upgraded online;
- concerns regarding effects on private dwellings and farms;
- concerns regarding compensation;
- concerns regarding access to villages, towns, local communities, schools;
- concerns regarding increase in noise and air pollution; and
- concerns regarding impact on the environment, generally.

3.4 Development of the Preferred Route Corridor

3.4.1 Introduction

The completion of the second consultation enabled the process for the selection of a Preferred Route Corridor to begin.

This process was largely based on the following procedure:

- **Step 1** Assessment of the Route Corridor Options. Links within each section of the route were compared and the least favourable links were identified. This step did not include the wider effects of traffic and socio economics.
- **Step 2** A review of the Step 1 process took place at a workshop attended by the contributors to the assessments. The aim was to discuss the assessment and the reasons why certain links attracted high impacts. Socio economics and traffic were included in the workshop review and options were discarded that could not meet the scheme objectives. The workshop then identified a number of modifications to the remaining links, and new links, that should reduce impacts in the areas of greatest concern.
- **Step 3** Assessment of the route modifications and new links and preparation of a further summary, based on the most favourable links.
- **Step 4** Preparation of a number of complete route corridor options in each

section (D, E, F and G). A further summary compared these options and an analysis of this summary matrix assisted in the decision on the preferred route corridor. This analysis included discussions on junction arrangements in any option and traffic, economics, socio economics and cost benefit factors that might affect the choice of preferred route corridor.

- **Step 5** Description of the preferred route corridor with the relevant details was then summarised.

3.4.2 Step 1

The following is a summary of Step 1 in the process, the assessment of the route corridor options.

Planning and Socio-Economics

Strategic Planning - It is considered that the road development will have a beneficial effect in terms of satisfying the National planning policy outlined in the NDP.

- *Regional Planning* - The route corridor options accord with the stated policies and objectives. In overall terms, there is a beneficial effect on the planning environment in Counties Carlow and Kilkenny.
- *Socio-Economics* - The principal socio-economic benefit of all of the routes is the enhancement of the links from the wider Kilcullen-Waterford corridor as described earlier in this section.

In overall socio-economic terms, the highest benefits would arise from Option E1 (and possibly utilising E3). These Options service Kilkenny well, promoting and consolidating development within the City boundary. There is little to differentiate in socio-economic terms, between the options in the remaining sections (D, F and G), with each of the options presenting a socio-economic benefit to the region, subject to any mitigation measures that may be necessary.

Impact on People

The route corridor options pass through the counties of Carlow and Kilkenny, which are mainly rural in character. Due to the lack of restriction on one-off housing developments in rural areas in the past, the entire study area is sprinkled with ribbon development along its existing roads network. In this respect the routing of any corridor through the area is hindered by this spread of development.

There are also many fine older houses and estates and numerous agricultural based developments.

There are a number of noteworthy community centres within each section. In Section D, the towns of Leighlinbridge and Bagenalstown, County Carlow are the most significant towns. In Section E, the towns of Paulstown, Bennettsbridge, Gowran and Stoneyford are the most significant, after the city of Kilkenny. In Section F, Knocktopher and Ballyhale (both on the National Primary Roads network) are the main population centres and in Section G, Mullinavat and Kilmacow villages are most prominent.

In addition to the above, there are numerous local communities and many rural and tourism based community facilities across the county.

In Section D, Option D1 was preferred, followed by Options D2 and D3. In overall terms it was shown that in Section E Options E1 and E6 would have the greatest impact on property and people whereas options E1/E6, E2, E3, E4 and E5 have lesser impact and are similar to each other. In Section F, F3 would have the greatest impact and F1 the least. Option G2 had the greatest overall impact in Section G with Options G1 and G3 being similar.

Community facility issues featured a range that could be considered typical for County Kilkenny including racecourses, stud farms, caravan parks, golf courses, GAA pitches and quarrying industries. The highest number of facilities was located in Section E and impacts varied with the differing options.

Flora, Fauna and Fisheries

The route options pass through a broad band of mainly flat to gently undulating land from Powerstown, Co. Carlow to Stoneyford, in the east and centre of County Kilkenny. Most of the land is used for intensive agriculture with a high proportion of improved grassland and some arable land. Further south, the route options pass through undulating to hilly land and along river valleys in south Co Kilkenny. The land is primarily agricultural and varies from intensive with large areas of improved grassland and abundant dairy farms in lowland areas, to less intensive pasture with sheep and cattle grazing in the uplands. There are numerous large conifer plantations in the uplands and scattered small conifer and broad-leaved plantations in wetland areas and along river floodplains, particularly in the south. Areas of broad-leaved woodland are widespread but generally limited in

extent on old estates and along the river valleys. Comparatively few ecological sites would be impacted by the route corridors in lowland areas.

The number of ecological sites increases in the uplands and river valleys to the south. Hedgerows are found throughout the study area and many contain mature broad-leaved trees. The route corridors would cross numerous watercourses, which are part of the Barrow, Nore and Suir catchments. This includes the main channel of the Barrow, Nore and King's rivers, and the Blackwater and Pollanassa Rivers, tributaries of the Suir. All the main watercourses are important for salmonid fish.

In Section D Options D2, D4 and D5 each cross the River Barrow and Nore cSAC. All options in Section E would cross designated conservation areas at either the River Nore or King's River, both of which are part of the River Barrow and Nore cSAC. Option E5 would affect the Red Bog at Dungarvan (pNHA) and both F1 and G2 would affect Hugginstown Fen, previously a pNHA, and now a cSAC.

Archaeology, Architecture and Cultural Heritage

The area is relatively rich in archaeology including fulacht fiadh sites, ring forts, souterrains, moated sites, castles and town houses, ecclesiastical remains and holy wells. Some notable sites include:

- National Movements at Tullaherin (close to E6) and at Sheepstown (close to F1);
- One site protected by a Preservation Order at Danesfort (affected by E1); and
- One site listed as a Registered site at Church Hill.

Agricultural Land Use

The land quality within the study area is generally very fertile and free draining. There is a higher percentage of tillage farming in Sections D and E as opposed to Sections F and G. Farm size tends to be larger in Section D and E as opposed to Sections F and G. There are no discernable patterns identified for the degree of severance resulting from route corridors through these sections.

There are known stud farms that would be affected by route corridors E6 (node 45 – 46), E1 (node 38 – 41), G1 (node 51 – 50), E4 (node 40 – 44), F2 (node 46 – 47) and E2 (node 33 – 42). Another key agricultural enterprise would be affected by route corridor E6 (node 45 – 46).

In Section D, Option D5 was preferred. This evaluation has shown little difference in Section E between the options under the headings of soil type, land quality and land use. Routes E1, E2, E4 and E6 all contain stud farms or key agricultural enterprises within these route corridors and therefore, have been classed as Moderate/Major impacts. Route E6 has the highest level of agricultural enterprises that would make it the least favourable of the E route options.

Option F1 contains tracts of poor quality land; option F3 contains reasonable good quality land. There is a stud farm located within the F2 corridor. This would make route F1 the most favourable option of these three routes as it takes poorer quality agricultural land and it does not contain a key agricultural enterprise.

G1 is the least favourable in Section G as it has a stud farm near Kilmacow. Land quality on the northern end of option G3 is of poorer quality than land quality on G1 and therefore option G3 would be the more favourable route corridor option.

Landscape and Visual

In Section D, Options D1 and D3 are preferred. Through the Section E study area, E2 has the least landscape and visual impact. The E2 alignment has little in the way of landscape or landscape planning impact and has less incidence of visual impact when compared to other corridors. Route Sections E1 and E1/E6 have the greatest incidence of potentially severe and major impact on properties. In terms of landscape and landscape planning, Route Sections E3 and E6 have particularly severe landscape and landscape planning impacts especially at the King's River/River Nore confluence and the respective river valleys, which are areas of designated high amenity landscape.

Through the Section F study area, F2 is the least impacting corridor followed by F1. In overall terms there is little to distinguish between the three corridors especially in terms of visual impact from properties. However, given that F2 and F3 are only possible by connecting through from either of the particularly adverse E3 or E6 Sections, F1 is considered to be the least impacting route corridor. Given that the landscape impact at Knockadrina Hill by F1 could also be avoided by a minor westward adjustment to the alignment. The F1 corridor has potential for further improvement.

Through the Section G study area, G3 is the least impacting corridor followed by G1. In overall terms there is little to distinguish between the three alignments in terms of visual impact from properties. However, both G1 and G2 have a number of landscape impacts with particularly adverse impacts on the River Blackwater and its wooded valley south of Mullinavat.

Engineering

Following the initial stage where a number of options were discarded for various reasons, the remaining route corridors were established with the following broad objectives being considered:

- *Section D:* Location in relation to Leighlinbridge and Bagenalstown. The flat topography lent itself to a wide range of possible corridors for consideration.
- *Section E:* Location in relation to Paulstown, Kilkenny, Stoneyford and Thomastown. As the topography in this section is relatively flat a wide range of possible corridors was considered.
- *Section F:* Location of route corridors to avoid high ground and their position in relation to Knocktopher and Ballyhale.
- *Section G:* Location of route corridors to avoid high ground and their position in relation to Lukeswell and Mullinavat. Proximity to the existing N9 and Waterford to Kilkenny railway corridor.

The engineering assessment considered Length, Cost, Alignment, Rivers, Railways, Roads, Services, Earthworks and construction issues.

Geology and Hydrogeology

The underlying limestone and sandstone bedrocks are major aquifers and are vulnerable to any road construction that cuts into these formations. As such the impact of options is similar and measures will need to be taken to protect any aquifers affected. Some options would pass close to public water supply wells and the possible sterilisation of gravel deposit is also a feature of a number of options in Section E close to crossings of the River Nore.

Hydrology and Drainage

A study was undertaken of the requirements for drainage structures and river/stream outfalls to cope with potential “cross drainage” and “road drainage”. The majority of the rivers and streams to be crossed carry substantial flows and will require bridge structures to enable the conveyance of flows across the proposed

carriageway. All routes are likely to require the crossing of the same river and watercourse at some stage, and there is little to distinguish between route options as a result. The water quality of the rivers and watercourses is of a high standard and pollution control measures would be required to reduce the risk of pollution to the environment. As a minimum, by-pass petrol interceptors were considered at the outfalls although, secondary pollution control measures such as containment lagoons in the event of accidental spillages, dilution lagoons and tertiary treatment in the form of reed beds were considered for specific circumstances, as necessary.

3.4.3 Step 2

It was concluded from the Step 1 assessments and workshop discussions that the least favourable options were:

- D5 between nodes 36 and 37
- E1 between nodes 38 and 41
- E3 between nodes 41 and 45
- E6 between nodes 43 and 46
- G2 between nodes 48 and 50
- G1 between nodes 50 and 51

The traffic and socio economics presentations highlighted the need to route the new N9 close to Kilkenny in Section E (Routes E1, E2, E3 and E4 should meet the objectives subject to the junction locations). It appeared that routes E5 and E6 would be least likely to meet the project objectives.

Options discarded at this step were:

- i) D5 - this route would be least likely due to the river Barrow crossing between nodes 37 and 36.
- ii) E6 - this route would be least likely to meet the project objectives in terms of traffic and economics, and it had high negative impacts between nodes 43 and 46.
- iii) E5 - because of its association with E6 in terms of its difficulty in meeting the project objectives, plus environmental implications.
- iv) E3 - this option had high negative impacts associated with the crossing of the Nore and King's River.

The analysis of the Step 1 summary and workshop discussion also identified the need for some link modifications and new links, which could help avoid areas of high, localised impact whilst retaining much of the original corridor. These modifications and new links were identified in all sections (D, E, F and G).

3.4.4 Step 3

Step 3 concluded with the identification of the favourable links and the preparation of the Step 2 summary. This recorded all the remaining links from Step 1 together with the modified links and new links introduced in Step 2. Where new nodes had been identified, small links were created as a result and these needed to be included in the summary.

3.4.5 Steps 4 and 5

At this step there was a change from assessment between nodes, to assessment of complete route options within sections D, E, F and G. As a result the following options were selected:

- D Options D3/D2 and D4
- E Options E1, E1B, E2 and E2/E1
- F Option F1A
- G Options G3/G1 and G3

These complete route options are the result of the comparison carried out in a Step 3 summary and it was concluded that the Preferred Route Corridor should be a combination of these Route Corridor Options. The Preferred Route Corridor to be presented at Public Consultation No. 3 was selected on this basis.

3.4.6 Junction Strategy

A road traffic model was built, which covered both the northern and southern sections of the route corridor as discussed in Chapter 6 of this EIS. The conclusion reached from the junction strategy study was that the route should be to the east of Carlow Town so that traffic could more readily be distributed with junctions on the N9 to the north and south. Movements to and from Kilkenny were shown to be crucial in the traffic assignments and there was clearly a benefit in route options that passed close to Kilkenny. Access to Kilkenny was also an important factor in the location of proposed junctions. It had been concluded from the traffic analysis that junctions should be provided to the east and south of Kilkenny (in both cases close to the N10) and that a new single carriageway

link should be added between the new junction on the east side of Kilkenny and Kilkenny City (linking to the Ring Road Extension). Thomastown would best be served by a new junction in the vicinity of Knocktopher and an additional junction was planned at Mullinavat to serve the local community rather than for overall strategic reasons.

3.4.7 Kilkenny Link Road

The junction strategy (Section 3.4.6) identified the need for a new link to Kilkenny, which was to be a single carriageway standard. Having concluded that there was sufficient capacity for a new link to the Ring Road Extension at Hebron Road, four options (A to D) were identified linking between the Ring Road Extension and junction 7 (Dunbell) of the proposed new route. The assessment process resulted in Option D being selected as having the best alignment standard and reduced severance.

3.5 Development of the Recommended Route Corridor

3.5.1 Introduction

The Recommended Route Corridor was selected following further public consultation, individual meetings with landowners directly affected by the development and consideration of local modifications to the Preferred Route Corridor. This process is outlined below.

3.5.2 Public Consultation No. 3

The Preferred Route Corridor and the proposed Kilkenny Link Road were the subject of Public Consultation No. 3 (PC3), held in the autumn of 2001. As part of the consultation, exhibitions were held in October 2001 over a 2-week period. The week before the exhibition a series of landowner meetings were arranged in Kilkenny City, Carlow Town and Mullinavat to meet landowners within the preferred route corridor. The objectives of the consultation were to:

- Present the route corridor options to the public.
- Inform them of the process and programme for the project.
- Invite submissions on these options.
- To gather information, particularly local information, which may not be already known to the design team.

In addition, letters of consultation were issued to a number of statutory and non-statutory consultees notifying them of the route corridor options under consideration and inviting them to comment on the options.

PC3 began on the 15 October 2001 in Carlow Town with a presentation to members of each of the Local Authorities involved (Carlow, Kilkenny, Kildare and Laois) and other elected members. A number of journalists were also present.

The public consultation took place at six venues throughout the study area over seven days beginning on 22 October 2001. The dates and venues were as follows:

- Springhill Hotel, Kilkenny – Monday 22 and Tuesday 23 October
- Carmelite Hall, Knocktopher – Wednesday 24 October
- The Dolmen Hotel, Carlow – Wednesday 24 and Thursday 25 October
- Rising Sun, Mullinavat – Thursday 25 October
- Teagasc Offices, Muine Bheag – Friday 26 October
- Scouts Den, Thomastown – Tuesday 30 October
- Community Hall, Kilmacow – Wednesday 31 October

The displays consisted of background information on the road development, project programme, cross section of a typical dual carriageway/motorway, a summary of the route selection information and the Preferred Route Corridor on Discovery Series mapping at a scale of 1:50,000 and on aerial photography at a scale of 1:10,000. The venues attended by staff from the Design Consultants and Carlow and Kilkenny County Councils, as appropriate. The displays remained open to the public from Monday 5 November to Monday 3 December 2001 at County Halls in Carlow and Kilkenny, and in the Health Centre, Mullinavat. The displays were not manned during this time.

A total of 355 people attended the consultation south of Powerstown over the six days, while certain members of the public also attended the exhibition in Carlow Town. All visitors were asked to sign a register and were handed the information brochure, map insert, questionnaire and freepost envelope on entry. All submissions received prior to the publication of the Route Selection Report were taken into consideration.

A total of 47 responses were received in the southern route selection study area. These consisted of comments sheets, some of which were accompanied by additional information, comments and maps.

All submissions were reviewed and logged on a specially designed database. All submissions relating to specific archaeological, ecological, landscape features were forward to the relevant specialist. Specific Information on agriculture was forwarded to the agricultural consultants and other submissions with useful information were circulated among the design team. The notable issues identified in the submissions can be summarised as follows:

- Depreciation of property value/compensation/ willingness to sell house to NRA
- Environmental effects/impacts
- NRA process
- Government Policy
- General satisfaction with the project

The 47 submissions received in the south were generally from people who feel that they would be affected in some way by the proposal. The low number of submissions may reflect the fact that all landowners directly affected were invited to individual meeting and their comments were recorded on separate feedback sheets.

3.5.3 Modifications and Assessment

Following the meetings with landowners and the representations made throughout PC3, the possible modifications that could be made to the preferred route corridor to reduce impacts were summarised.

The requested modifications indicated that consideration could be given to changes in a number of areas. The following list of issues highlights the range of objectives identified during this process:

- further reduction of farming severance
- further reduction of effects on water wells and supply.
- the avoidance of a woodland area.
- further reduction of the effects on dairy units where the preferred route corridor isolates the milking parlour from adjacent lands.
- further reduction of land severance.

- the avoidance of a landfill site and reduce the impact on quarrying and future mining.
- further reduction of the impact on property.
- further reduction of the impact on a building with architectural merit, reduce impact on property and reduce community severance.
- tie-in closely with the line of the Waterford Bypass.

Further constraints information was gathered for these areas and modified alignments were prepared to try to meet the objectives summarised above.

The modified alignments were assessed and compared to the Preferred Route Corridor and where it was considered that the modification would not be worse, an additional assessment was made by the local liaison team in Kilkenny County Council to establish the effect on landowners. This was generally done by further discussion with the relevant landowner.

3.5.4 Recommended Route Corridor

Following an assessment of all the issues raised it was recommended that the Preferred Route Corridor be modified as described below. The list of modifications adopted is shown in Table 3.2.

It was also recommended that the Kilkenny Link Road be locally modified to allow for a grade separated type junction with the proposed mainline to be engineered.

The Recommended Route Corridor and the Kilkenny Link Road were then published (March 2002)⁽⁴⁾ and formed the basis for the preliminary design of the road development, outlined in Section 3.6 of this EIS.

3.6 Development of the Road Preliminary Design

3.6.1 Design Development Methodology

On completion of the Recommended Route Corridor, a feasibility alignment was generated on the centreline of the corridor. This feasibility alignment was then reviewed in the field, where a site walkover of the areas crossed by the alignment was undertaken by staff from Kilkenny County Council, Tramore Regional Design Office, Carlow County Council, and the Design Consultants, as appropriate. The feedback from this walkover fed into the production of Alignment Stage 1/First Freeze Drawings.

This set of drawings was then issued to each of the design team members for consideration and initial assessment. The conclusions of this initial assessment were considered at an Environmental Workshop, where all parties discussed implications and recommendations for amendments and variations on the Alignment Stage 1 (or First Freeze) drawings. With these modifications agreed, a revised set of drawings was produced and issued to all members of the design teams for more detailed reporting. The minor amendments and mitigation measures recommended at that stage were then compiled into a comprehensive set of design drawings entitled Alignment Stage 2/Second Freeze Drawings.

Checks and clarifications of the Alignment Stage 2/Second Freeze drawings resulted in some slight modifications to these drawings.

The final stage in the design development is the production of the Preliminary Design for the road development, which is that presented and assessed in this EIS.

While it was the intention of the design teams to develop the design within the Recommended Route Corridor throughout, in some areas new information came to light that when considered resulted in a recommendation to move outside the corridor (i.e. mitigation by avoidance). This occurred at each stage of the design development outlined above. The key areas developed outside the corridor are outlined and discussed in Section 3.6.2 below.

3.6.2 Mitigation by Avoidance

Townlands of Dunbell and Kilree

As a result of a disused landfill site and the existence of active and future quarries in the vicinity of the corridor, a significant modification was made over a circa 5.5km section of the development through the townlands of Dunbell and Kilree, Co Kilkenny. As these implications were acknowledged to be significant, an additional route selection study was carried out to identify the best option for passing through this area. The results of this exercise were put on public display in Bennettsbridge, County Kilkenny, in a one-day session attended by staff from Kilkenny County Council, Tramore RDO and the Design Consultants in October 2003. Significant concern was raised on a number of issues by local residents including the Bennettsbridge Community Action Group (BCAG), most notably on the impacts caused to the town of Bennettsbridge. These concerns have been considered by the design team, and

the modification, which is circa 200m distant from the corridor as it's farthest point, now forms part of the road development presented and assessed in the EIS.

Townlands of Clifden and Rathgarven

Following the results of an archeo-geophysical survey carried out in key areas of archaeological interest, a variation was introduced over a circa 2 km section to the eastern end of the proposed Kilkenny Link Road, through the townlands of Clifden and Rathgarven. This amendment, which was circa 50m distant from the corridor at it's farthest point, took into account the design of the proposed junction with the mainline at Dunbell Big. Further survey work has indicated a significant improvement in environmental terms, with the realigned section in place. This amendment forms part of the proposals presented and assessed in this EIS.

Townland of Danganbeg

The opportunity for specialists to access all lands crossed by the route following the route selection stage resulted in an area of wetland in the townland of Danganbeg, Co Kilkenny taking on greater significance. A recommendation to vary the route over a circa 2km section on nature conservation grounds was reviewed and accepted. The amended alignment is marginally outside the corridor and also forms part of the proposal presented and assessed in this EIS.

Townland of Archersrath

A further deviation from the corridor was recommended on the Kilkenny Link Road, as a result of ecological and landscape concerns over the removal of a section of mature tree lines on the boundary of Lyrath Estate. A recommendation to vary the route over a circa 2 km section was adopted and the proposals presented and assessed in this EIS include this section, which is circa 75m distant from the corridor at its most distant point.

Other Minor Areas

There are a number of other areas where the design development resulted in the proposed road being outside to corridor. These deviations were as a result of landowner issues, minor environmental improvements or design optimisation. In addition, a 1.5 km Link Road connecting Junction 6 at Jordanstown to the N9 southeast of Paulstown was included in the road development to keep strategic traffic out of the centre of the village.

3.7 Development of the Major Structures Preliminary Design

3.7.1 Introduction

Three new bridges are required by this proposed road development that exceed 100m in length. (the relevant threshold for a road bridge to require an EIS). These major structures are located as follows:

- Townland of Rathduff/Kellsboro at chainage 31+550 approx where the proposed N9 road crosses over King's River;
- Townlands of Dunbell Big and Kilree at chainage 39+950 approx where the proposed N9 road crosses over the River Nore; and
- Townland of Tomard Lower and Cloghrystick at chainage 75+590 approx where the proposed N9 road crosses over the River Barrow.

Consideration was given to all relevant constraints acting on these crossing locations, as part of the preliminary design development. Each crossing location has particular issues that have influenced the design, and these constraints have ensured that certain bridge design alternatives have not been proposed as part of the road development.

The sections below review these constraints and how they influenced the design in each of the three locations.

3.7.2 King's River Crossing

Introduction

The river valley at the proposed bridge crossing point (at Ch 31+550) is circa 180m in length and the structure is required to carry the proposed road over the King's River and its associated floodplains in the townlands of Rathduff and Kellsboro. The crossing location is situated approx 1.5km upstream from the town of Stoneyford. The route passes at approximately 18m height above river level. The proposed N9 road forms a 20 degree skew with the main river channel.

Constraints

An assessment of various bridge options was carried out, resulting in a proposed bridge preliminary design solution. The proposed design is based on the optimum balance of preliminary design level constraints in the

bridge's area of influence. The constraints considered are summarized below:

Hydrology – At the proposed N9 crossing location the river is situated at the base of a wide shallow valley with relatively flat slopes on either side forming level floodplains. The flow channel is approximately 20m wide and the floodplains are 100m wide approximately in total, although these have unequal widths on either side of the river. Support piers have been placed outside the main river channel to meet the requirements of the Southern Regional Fisheries Board (SRFB) in relation to fisheries issues, in addition to National Parks and Wildlife Service (NPWS) (formerly part of Dúchas now part of the Department of Environment, Heritage and Local Government. This also satisfies the requirements of the Office of Public Works (OPW) in relation to the avoidance of normal flow obstructions within the main river channel. Three river support piers have been positioned within the floodplain area, following consultations with the OPW in relation to anticipated river flood flow. The piers however are widely spaced, and are designed to optimise and streamline any localised flood flow hydraulic effects.

Flora, Fauna and Fisheries – The full width of the King's Valley at this location has been designated a candidate Special Area of Conservation (cSAC) by the NPWS. The cSAC extends from the southern to the northern crest of the King's River Valley. In consultation with NPWS, efforts have been made within the preliminary design to minimise permanent impacts on, and habitat loss of, the woodlands and vegetation adjacent to the structure. Piers and the end abutments have been positioned in relation to terrestrial habitats so as to meet the requirements of NPWS in this regard. Consultation with the SRFB in relation to salmonid fish stocks has reinforced the need to avoid the main river channel with piers. Set backs for these piers from the King's River have been considered to ensure there are no works in the main river channel and to minimise the risk of contamination of the watercourse by the materials and equipment used in the construction.

Aesthetic Evaluation – The King's River Valley is of especially high visual importance due to its designation as a Special Amenity Area (SAA) in the Kilkenny County Development Plan. Therefore, visual considerations were considered as important here.

The crossing location has a visual amenity, and as such, two deck options were considered (i.e. A - a post-tensioned concrete bridge deck and B

- painted structural steel box girders). Option A, with its associated parapet edge beam would produce a simple, elegant and reasonably slender solution. The large side cantilevers would help to create a more slender looking deck by casting shadow on the sides of the deck. Option B and its associated parapet edge beam would have an acceptable appearance. The substructure supports for both deck options would be the same, with the reinforced concrete abutments positioned up the side slopes to minimise their impact. Any abutment location would be away from the river, which will also help to mitigate the visual impacts of the approach embankments within the floodplain areas. The intermediate support piers would be formed in reinforced concrete and would be shaped to reduce their visual impact in oblique views from the surrounding areas.

Structural Arrangements – Further to the aesthetic evaluation, two alternative structural arrangements were considered: In-situ Post-Tensioned Concrete Box Girder and Composite Steel Box Girder. Lighting inside the voided box girders is recommended in order to facilitate long-term inspection and maintenance. Standard aluminium or steel vehicle containment parapets were considered for the full bridge length. The estimated construction costs and estimated whole life costs, including the projected future maintenance requirements, of the two forms of construction marginally favour the concrete box girder solution with aluminium parapets.

Construction – Consideration of the constraints during the construction phase is of added importance at this crossing point due to the cSAC designation. Minimising, as much as is practicable, the disturbance in the valley floor has been an objective.

To help limit any potential disruption to flood flows across the floodplains, and to minimise adverse ecological effects on habitats and potential buried archaeology, limitations on the method of temporary support of the deck were considered. Supporting deck formwork directly off the piers, launched or balanced cantilever methods, and placement of pre-fabricated structural elements are among the construction methods considered suitable for this site. Adoption of any one of these methods of construction would avoid impact on the river channel, the flood plains, and the adjacent habitats, which would otherwise occur if the deck were to be continuously supported from the ground during construction.

Construction Materials – Consideration was given to different materials for this structure, with an imperative to minimise any effect on the visual amenity.

Conclusions

Following consideration of all of the aforementioned constraints, a recommendation is proposed in Section 4.3.4 comprising a 5-span bridge supported on four intermediate piers and end abutment supports. The river bridge has been combined with the required adjacent underbridge carrying the Kellsboro local road (LS5067). The approximate length of the combined structure is circa 234.5m between the ends of wing walls.

3.7.3 River Nore Crossing

Introduction

The river valley at the proposed bridge crossing point (at Ch 40+150) is circa 260m in length and the structure is required to carry the proposed road over the River Nore and its associated floodplains through the townlands of Kilree and Dunbell. The crossing location is situated approx 900m upstream from the town of Bennettsbridge. The route passes at approximately 15m height above river level. The proposed N9 road forms a 37-degree approximately skew with the main river channel.

Constraints

An assessment of various bridge options was carried out, resulting in a proposed bridge preliminary design solution. The proposed design is based on the optimum balance of preliminary design level constraints in the bridge's area of influence. The constraints considered are summarized below;

Hydrology – At the proposed N9 crossing location the river is situated at the base of a wide shallow valley with relatively flat slopes on either side forming level floodplains. The flow channel is approximately 35m wide and the floodplains are 135m wide approximately in total, although these have unequal widths on either side of the river. Support piers have been placed outside the main river channel to meet the requirements of the SRFB in relation to fisheries issues, in addition to the NPWS. This also satisfies the requirements of OPW in relation to the avoidance of normal flow obstructions within the main river channel. Three river support piers have been positioned within the floodplain area, following consultations with OPW in relation to anticipated river flood flow. The piers however are widely spaced, and are designed to optimise

and streamline any localised flood flow hydraulic effects.

Flora, Fauna and Fisheries - The full width of the Nore Valley at this location has been designated cSAC by the NPWS. The cSAC extends from the southern to the northern crest of the River Nore Valley. In consultation with NPWS, efforts have been made within the preliminary design to minimise permanent impacts on, and habitat loss of, the woodlands and vegetation adjacent to the structure. Piers and the end abutments have been positioned in relation to trees so as to meet the requirements of NPWS in this regard. Consultation with the SRFB in relation to salmonid fish stocks has reinforced the need to avoid the main river channel with piers. Set backs for these piers from the River Nore have been considered to ensure there are no works in the main river channel and to minimise the risk of contamination of the watercourse by the materials and equipment used in the construction.

Aesthetic Evaluation – While the River Nore Valley is not designated from a visual perspective north of the town of Bennettsbridge, consideration similar to that for the King's River was given to the aesthetics.

The crossing location has a visual amenity, and as such, two deck options were considered (i.e. A - a post-tensioned concrete bridge deck and B - painted structural steel box girders). Option A, with its associated parapet edge beam would produce a simple, elegant and reasonably slender solution. The large side cantilevers would help to create a more slender looking deck by casting shadow on the sides of the deck. Option B and its associated parapet edge beam would have an acceptable appearance. The substructure supports for both deck options would be the same, with the reinforced concrete abutments positioned up the side slopes to minimise their impact. Any abutment location would be away from the river, which will also help to mitigate the visual impacts of the approach embankments within the floodplain areas. The intermediate support piers would be formed in reinforced concrete and would be shaped to reduce their visual impact in oblique views from the surrounding areas.

Construction - Consideration of the constraints during the construction phase is of added importance at this crossing point due to the cSAC designation. Minimising, as much as is practicable, the disturbance in the valley floor has been an objective.

To help limit any potential disruption to flood flows across the floodplains, and to minimise adverse ecological effects on habitats and potential buried archaeology, limitations on the method of temporary support of the deck were considered. Supporting deck formwork directly off the piers, launched or balanced cantilever methods, and placement of pre-fabricated structural elements are among the construction methods considered suitable for this site. Adoption of any one of these methods of construction would avoid impact on the river channel, the flood plains, and the adjacent habitats, which would otherwise occur if the deck were to be continuously supported from the ground during construction.

Consideration has been given to the presence of an existing buried weir adjacent to the crossing point on the west bank. The weir has been breached and is not operative. The locations and methods of construction of the adjacent piers within the floodplain have been given careful consideration to help minimise any potential impacts on the defunct weir.

Construction Materials - Consideration was given to different materials for this structure, with an imperative to minimize any effect on the visual amenity.

Conclusions

Following consideration of all of the aforementioned constraints, a recommendation is proposed in Section 4.3.4 comprising a 4-span bridge supported on three intermediate piers and end abutment supports. The approximate length of the structure is circa 260m between ends of wing walls.

3.7.4 River Barrow Crossing

Introduction

The river valley at the proposed bridge crossing point (at Ch 75+590) is circa 400m wide. At this location, the road alignment is required to carry the proposed N9/N10 road over the River Barrow and its associated floodplains through the townlands of Tomard Lower and Cloghrystick. The crossing location is situated approximately 7km downstream of Carlow Town, opposite the landfill site at Powerstown. The route passes at approximately 5.5m above river level, and the proposed N0/N10 road forms a right angle crossing with the main river channel.

Constraints

The work undertaken at Constraints Study and Route Selection Stages identified possible sites

for the river crossing. An assessment of various bridge options was carried out as part of the Preliminary Design, resulting in a proposed bridge solution contained in the Preliminary Design. The proposed design takes into account the constraints identified in the bridge's area of influence. The constraints considered are summarised below;

Hydrology – The river channel is 38m wide approximately and follows the west side of the river valley at the crossing site. On the southwest of the river there is an existing towpath and backwater channel with the ground rising to form a bank over a distance of approximately 40m. On the northeast side there is a flood plain, which extends approximately 260m.

A Hydrological Assessment was made of the river characteristics upstream of the bridge crossing to identify the type of structure that would minimise the impact on the flow of the River Barrow. This study determined that a three span bridge with a main span of 53m with side spans, each of 30m would be appropriate. This layout satisfies the requirements of the OPW in relation to the avoidance of normal flow obstructions within the main river channel.

The proposed cross section is designed to accommodate a 100-year flood flow of 285 cumecs through the structure. This figure was provided by the Hydrometric Section of the OPW.

The support piers are located outside the main river channel to meet the requirements of the SRFB and the NPWS.

Flora, Fauna and Fisheries - The full width of the River Barrow Valley at this location has been designated cSAC by the NPWS. In consultation with NPWS, efforts have been made within the preliminary design to minimise permanent impacts on the cSAC, and habitat loss of the woodlands adjacent to the alignment. Set backs for the main piers from the river banks have been considered to ensure there are no works in the main river channel and to minimise the risk of contamination of the watercourse by the materials and equipment used in the construction.

Aesthetic Evaluation – While the River Barrow Valley is not designated from a visual perspective; consideration has been given to the aesthetics of the river crossing in determining the general arrangement of the structure.

Navigation Requirements - The River Barrow is a navigable waterway and Waterways Ireland requires a minimum clearance of 4.5m above towpath level on the southwest bank.

Construction Materials – Materials for construction of this river crossing will largely be determined during the detailed design of the structure, which will be required to minimise the visual impact on the valley.

Construction – Consideration of the constraints during the construction phase is of added importance at this crossing point due to the cSAC designation. Minimising, as much as is practicable, the disturbance in the valley floor has been an objective. However, the floodplain comprises agricultural grassland, and has little ecological value.

The risk of introduction of soil and debris into the river during construction will be minimised by providing necessary temporary works at the bridge foundations and suitable construction techniques for the deck superstructure.

Conclusions

Following consideration of all of the aforementioned constraints, a recommendation is proposed in Section 4.3.4 for a 3-span bridge supported on two main intermediate piers and end abutment supports. The approximate length of the structure is 113m between ends of wing walls.

3.8 Rest Areas

3.8.1 Introduction

The Design Consultants were requested to assess the alignment for suitable locations for siting rest areas, with a view to including two such rest areas, one in each direction, in the Preliminary Design. These rest areas will provide parking, toilet and picnic facilities, thereby providing an opportunity for drivers to break their journeys. The rest areas also include Garda Enforcement lay-bys.

Three locations in each direction were identified as complying with the geometric requirements of the DMRB. These are located as follows:

Northbound Carriageway:

- Site N1: Ch. 60+000 to Ch. 60+740 at Ballyquirke;

- Site N2: Ch. 69,975 to Ch. 70,815 at Bannagagole;

- Site N3: Ch. 71,450 to Ch. 72,290 at Seskin;

Southbound Carriageway:

- Site S1: Ch. 72,400 to Ch. 71,560 at Seskin;
- Site S2: Ch. 67,700 to Ch. 66,860 at Moanmore;
- Site S3: Ch. 60,740 to 59,900 at Ballyquirke;

The alternative locations are indicated on Figure 3.8 in Volume 2.

3.8.2 Assessment of Alternatives

The principle impacts that were likely to arise from siting a service area at each of the six provisional locations were assessed in terms their visual impact on the landscape, loss of agricultural land, impact on fauna, flora and aquatic life, as well as their impact on archaeological and cultural heritage sites.

This exercise resulted in the sites at Ballyquirke being selected (sites N1 and S3) in view of there being no impact on rivers and streams and a relatively limited loss of trees. The sites at Ballyquirke would also have minimal visual impact.

3.9 References

- (1) Statutory Instrument, SI No. 93 of 1999 Section 14 (b). European Communities (Environmental Impact Assessment) (Amendment) Regulations.
- (2) National Roads Authority. (2000) National Roads Project Management Guidelines. National Roads Authority, Dublin.
- (3) Arup Consulting Engineers & Roughan and O'Donovan-FaberMaunsell Alliance (2001) Constraints Study. Arup Consulting Engineers, Dublin.
- (4) Arup Consulting Engineers & Roughan and O'Donovan- FaberMaunsell Alliance. (2002) Route Selection Study. Arup Consulting Engineers, Dublin.
- (5) National Roads Authority. (2000) Assessment of Waterford – Dublin Route and Road Type Options National Roads Authority, Dublin.
- (6) National Roads Authority. (2000) National Roads Authority's Design Manual for Roads and Bridges (DMRB). National Roads Authority, Dublin.
- (7) National Roads Authority (1998) National Road Needs Study (NRNS). National Roads Authority, Dublin.

Table 3.1 Public Consultation No. 2 Responses South of Paulstown, Co. Kilkenny

Issue	Responses Rating Most Important
Least impact on people living near the route corridor	260
Least effect on landscape	246
Least effect on agriculture	246
Least effect on archaeological sites and historic buildings	236
Least demolition of property	236
Least effect on flora and fauna	214
Improving road safety	191
Improving air quality	171
Reducing traffic noise	167
Improving the environment of towns and villages along the existing N9/N10	161
Improving traffic conditions	138
Value for money	117
Improving regional access	94

Table 3.2 Modifications Recommended to the Preferred Route Corridor

Area Considered	Proposed Change
Area 1 (Paulstown)	Shift the corridor 200m to the east to avoid an historic tree.
Area 2A (Dunbell)	Shift the corridor 100m north-west to reduce the impact on the woodland.
Area 3 (Dunbell)	Adjustment of the Kilkenny Link Road at the junction to allow consideration of all possible junction layouts.
Area 4 (Dunbell Big)	Adjust the corridor 300m south to reduce the impact on future reserves of dolomitic limestone.
Area 5 (Danesfort and King's River)	Shift the corridor 100m east.
Area 6 (Stonecarty)	Shift the corridor 200m to the east on the north side of Knockadrina.
Area 9 (Lukeswell/Mullinavat)	Shift the corridor 300m to the north east.
Area 11 (Dunkitt)	Shift the corridor 150m to the east.