NORWICH NORTHERN DISTRIBUTOR ROUTE

PRELIMINARY ASSESSMENT OF ALTERNATIVE WESTERN CORRIDOR OPTIONS

March 2005

Prepared by Technical Group

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Prepared by:-

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Norwich Northern Distributor Route

Preliminary Assessment of Alternative Western Corridor Options

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Executive Summary

The Norwich Area Transport Strategy public consultation in 2003 included four western route corridor options for a Northern Distributor Road. As a result of the consultation, various alternatives to these corridors were put forward by members of the public, local authorities and other organisations. The alternatives consisted of 5 variants of the consultation corridor options and 10 new routes further west of these. This report documents the work which took place in the spring and summer of 2004 to assess all the western alternatives at a Stage 1 level in line with 23 sub-objectives set out in the national Government's New Approach to Appraisal (NATA), asking the question 'does the alternative route provide any tangible benefits over the consultation route?'

The following route options were compared:

- the red consultation route compared with two alternative red routes;
- the blue consultation route compared an alternative blue route;
- the orange consultation route compared with two alternative orange routes;
- the routes referred to in this report as the Easton-Morton, Pylon and Frans Green routes, compared with the red consultation route;
- the routes referred to in this report as the original Pylon and Frans Green routes compared with the routes referred to in this report as the alternative Pylon and Frans Green routes;
- the routes referred to in this report as the Pylon and Frans Green routes compared with the further western routes.

The assessments concluded that the following route options should be taken forward to a second consultation in autumn 2004:

- The alternative red route 2 (as the Consultation 2004 Red Route);
- The consultation blue route (as the Consultation 2004 Blue Route);
- The alternative orange route 1 (as the Consultation 2004 Orange Route);
- The consultation green route (as the Consultation 2004 Green Route);
- The Frans Green route (as the Consultation 2004 Alternative Purple Route);
- The Pylon route (as the Consultation 2004 Alternative Brown Route);
- The alternative Frans Green route (as the Consultation 2004 Purple Route);
- The alternative Pylon route (as the Consultation 2004 Brown Route);

These route options were then subjected to a stage 2 Environmental Assessment prior to the consultation.

1.0 **INTRODUCTION**

- 1.1 A review of the Norwich Area Transport Strategy (NATS) was carried out in 2003 and a Norwich Northern Distributor Route (NDR) was included as part of the Preferred Strategy. A consultation on NATS was carried out in Autumn 2003 and this included four western route corridor options for the NDR.
- 1.2 As a result of the consultation, various alternatives to these corridors were put forward by members of the public, local authorities and other organisations. These suggestions are shown on plan R1C093-R1-298 in Appendix A. Some of the alternatives were minor variations to the original corridors. These tended to have very localised effects and could either be incorporated with the consultation routes or be given full consideration during detailed development of a preferred route, if appropriate. The remainder involved either significant deviation from the original corridors or completely new route corridors. This report assesses all the major western alternatives at a Stage 1 level in line with the Government's Guidance on the New Approach to Appraisal (NATA).

2.0 THE ALTERNATIVE ROUTE CORRIDORS

- 2.1 The western alternatives suggested as a result of the consultation have been classified into two groups for comparison purposes. These are:
 - Western Consultation Routes and Variations: This group compares the four western route corridors which were put out to consultation, with significant variations on these routes.
 - Other Western Route Options: This compares the alternatives which were suggested further west of the consultation red route. Alternatives are identified in this report by names relating to distinguishing features or places that they pass.

A list and description of all the alternatives within each group is shown in Appendix B. The two comparison groups are also shown on Plans R1C093-R1-262 and 263 in Appendix C.

- 2.2 Alternatives not discussed in this report are:
 - A minor variation moving the consultation red, blue and orange corridors to the north west of Thorpe Marriott, either side of Reepham Road. This variation can be incorporated with little adverse effect and it is intended to change these corridors accordingly.
 - Eastern Options. These are considered in a separate report.
 - Possible variations at Norwich Airport. These are considered in a separate report.

3.0 **PURPOSE OF THE REPORT**

- 3.1 The purpose of this report is to document the analysis which took place in the spring and summer of 2004 to determine whether the alternatives suggested provided any significant benefits over the original consultation options so that the best western route options were taken forward to a Stage 2 consultation in autumn 2004, pending the outcome of the Stage 2 Environmental Assessment.
- 3.2 The assessment was based on information from
 - Stage 1 Environmental Assessment
 - Stage 1 Appraisal Summary Tables
 - SATURN traffic model and TUBA economic assessment

based on a level of assessment that was appropriate at the time.

4.0 **METHODOLOGY – OBJECTIVES**

4.1 Each route corridor has been assessed according to the 5 key Government objectives and under the 23 sub-objectives set out in NATA. The methodology applied to these objectives for this assessment is as follows:

4.2 Environment

4.2.1 <u>Noise</u>:

At this stage, quantitative information on levels of noise is unavailable. However, a qualitative analysis of the number of residences lying within 300m of the corridor options gives an indication of how many properties would suffer an increase in noise. Also, a preliminary assessment of the decrease in traffic on the existing road network as a result of each option enables a comparison of noise reduction to be made between the options. The estimated changes in traffic were assessed using the SATURN (Simulation and Assignment of Traffic to Urban Road Networks) traffic model for Norwich and the results are given in Appendix D.

4.2.2 Local Air Quality:

At this stage, quantitative information on levels of PM₁₀ and NO₂ is unavailable, although initial work carried out on the Stage 2 Environmental Assessment indicates that the air quality limits and objectives for these two pollutants would not be breached. A qualitative analysis of the number of residences lying within 50m and 200m of the corridor options gives an indication of how many properties may suffer an increase in these pollutants, although this may be counterbalanced to some extent by the decrease in traffic on the existing road network.

4.2.3 <u>Greenhouse Gases</u>:

At this stage, quantitative information on levels of CO_2 is unavailable. However, CO_2 emissions can be expected to increase with both the do-minimum scenario, and with any of the corridor options as traffic will grow.

4.2.4 Landscape:

At this stage, a broad indication has been given of the impacts on landscape character and the probable levels of visual intrusion. Ringland and the River Wensum valley are the most sensitive and of the highest quality in landscape terms.

4.2.5 <u>Townscape</u>:

None of the routes affects townscape.

4.2.6 <u>Heritage of Historic Resources</u>:

At this stage, only a desk based assessment has been undertaken. A number of the corridor options significantly adversely affect the historic resource. There is the potential for unknown buried archaeological finds. These impacts remain uncertain until they can be more precisely defined with further archaeological work such as geophysical survey or trial trenching. The precise level of impact on the cultural heritage resource is therefore not fully known at this stage.

4.2.7 <u>Biodiversity</u>:

Where the corridor options cross the River Wensum significant adverse impacts are predicted. However, full ecological surveys have not yet been completed to identify the impacts absolutely. Impacts would also occur at a local level affecting biodiversity.

4.2.8 <u>Water</u>:

Where the corridor options cross through a river valley, detrimental effects would arise. However, these are not considered to be insurmountable although special measures may be required. For all routes it has been assumed that sustainable drainage methods would be implemented.

4.2.9 Physical Fitness:

A footpath/cycleway is proposed along the whole length of the road, which may encourage walking/cycling. However, the corridor options may also have some detrimental effect on the landscape and sever/curtail some Public Rights of Way, which could deter some walkers, cyclists or horseriders, although wherever possible suitable crossings will be provided.

4.2.10 Journey Ambience:

Uninterrupted travel on a modern dual carriageway through the countryside would improve journey ambience, with only the provision of at grade roundabouts along the route likely to cause stress to drivers.

4.3 Safety

4.3.1 Accidents:

Quantitative information on accident savings is unavailable at this stage. An early study identified that an NDR would save up to 60 Personal Injury Accidents per year in the Norwich area by removing traffic from congested urban areas and relocating it on a modern dual carriageway. In reality, the actual number of accidents saved would depend on how effective the NDR is at redistributing the traffic, and it is anticipated that the further the road is from Norwich, the less attractive it would be and the less it would reduce congestion in the city.

4.3.2 <u>Security</u>:

At this stage, it is assumed for all the corridor options that there would be a number of lay-bys but it is not proposed to provide emergency telephones or lighting. The proposed footpath/cycleway provided along the length of the road would not be lit and may be separated from the road by landscaping. Bridges and underpasses would be designed for pedestrian and cyclist use where appropriate.

4.4 Economics

4.4.1 <u>Public Accounts</u>:

This information is available from preliminary TUBA (Total User Benefit Analysis) assessments carried out during the spring/summer 2004 on some of the corridors. For those alternatives which have not been directly modelled, the Present Value Cost (PVC) has been estimated on a pro-rata basis to the nearest equivalent modelled option.

4.4.2 Business Users and Providers:

This information is available from preliminary TUBA assessments carried out during the spring/summer 2004 on some of the corridors. For those options which have not been modelled, it has been assumed that the Present Value Benefit (PVB) is that of the nearest equivalent corridor. The TUBA default profiles have been used for the allocation of benefits between the Business Users and the Consumer Users below.

4.4.3 <u>Consumer Users</u>:

This information is available from TUBA assessments of some of the corridors. For those options which have not been modelled, it has been assumed that the PVB is that of the nearest equivalent corridor. The TUBA default profiles have been used for the allocation of benefits between the Business Users above and the Consumer Users.

4.4.4 <u>Reliability</u>:

This information is available from a preliminary assessment of the SATURN model.

4.4.5 <u>Wider Economic Impacts</u>:

All the corridor options would enhance access to Norwich International Airport and support planned development around the Norwich Area and enhance the economic vitality of North Norfolk.

4.5 Accessibility

4.5.1 Option Values:

Option Values 'are associated with unexpected use of a transport facility which is not built into the forecasts produced by the modelling stage, and would otherwise not appear in the appraisal as a benefit'. It is assumed that no new transport options are created by the NDR.

4.5.2 <u>Severance</u>:

The corridor options have been assessed for severance to pedestrians, cyclist and equestrians.

4.5.3 <u>Access to the Transport System</u>:

It is assumed that all the corridor options may improve local public transport through reduced congestion in the northern suburbs. Also longer distance bus services may use the NDR to access the best corridor into the city.

4.6 Integration

4.6.1 <u>Transport Interchange</u>:

It has been assumed that all options would facilitate passenger and freight interchange at Norwich International Airport. Access to various Park and Ride sites would also be enhanced. However, no additional transport interchange is to be provided.

4.6.2 <u>Land-Use Policy</u>:

The various County Council and District Council policies have been grouped into 11 categories:

- (i) to protect the quality and character of the landscape, countryside and general environment;
- (ii) to protect important landscape areas;
- (iii) environmental improvements to urban areas;
- (iv) protection of areas of employment;
- (v) protection of areas of housing;
- (vi) development of Norwich Airport;
- (vii) to enhance and protect public highways for the purposes of movement of goods and people;
- (viii) to protect waste facilities;
- (ix) to protect mineral resources;
- (x) to protect the environment from pollution;
- (xi) to protect land for public use.

The policies which are either positively or negatively affected by the corridor options have been identified.

4.6.3 <u>Other Government Policies</u>:

It has been assumed that all corridor options would have the same impact on national objectives.

5.0 **METHODOLOGY – CORRIDOR OPTIONS**

5.1 The methodology on how each group of corridor options has been assessed is as follows:

5.1.1 <u>Western Consultation Routes and Variations:</u>

For the environmental, safety, accessibility and integration objectives, each of the consultation routes and alternatives were assessed between the A47 and the A140 Cromer Road. However, for the economy objective, a whole NDR has been assessed with the costs being based on the each of the consultation options combined with the eastern yellow route, that being an 'average' eastern option. Similarly, the traffic information has been determined by modelling each consultation western route combined with the eastern yellow route. The alternative routes have not been modelled as it has been assumed that these would attract similar levels of traffic to their respective consultation routes.

5.1.2 <u>Western Route Options:</u>

For the environmental, safety, accessibility and integration objectives, each of the alternative options was assessed between the A47 and the A140 Cromer Road. However, for the economy objective, a whole NDR has been assessed with the costs being based on the each of the options combined with the eastern yellow route, that being an 'average' eastern option. The traffic information has been determined by modelling the Pylon, Frans Green, Hockering to Lenwade and Hockering to Ringland Routes only combined with the eastern yellow route. Consequently the economic information for these four routes has been derived by computed modelling, whereas for the remaining six alternative western routes, it has been interpolated.

6.0 ASSESSMENTS & CONCLUSIONS – WESTERN CONSULTATION ROUTES & ALTERNATIVES

- 6.1 In this chapter, as shown on drawing R1C093-R1-262, the following route corridor options are compared using the 23 NATA sub-objectives:
 - **the red consultation route compared with two alternative red routes** to determine whether the red alternatives provide any overall benefits to the red consultation route;
 - **the blue consultation route compared with an alternative blue route** to determine whether the blue alternative provides any overall benefits to the blue consultation route;
 - the orange consultation route compared with two alternative orange routes to determine whether the orange alternatives provide any overall benefits to the orange consultation route;
- 6.2 The assessment was carried out on the following sub-objectives:
 - Noise
 - Air Quality
 - Landscape
 - Heritage
 - Biodiversity
 - Water Environment
 - Journey Ambience
 - Cost to the Public Accounts (PVC)
 - Transport Economic Efficiency Consumers and business users (PVB). These two objectives have been combined
 - Severance
- 6.3 The remaining twelve sub-objectives are:
 - Greenhouse Gases
 - Townscape
 - Physical Fitness
 - Accidents
 - Security
 - Reliability
 - Wider Economic Impacts
 - Option Values
 - Access to the Transport System
 - Transport Interchange
 - Land-use Policy
 - Other Government Policies

These are considered to be consistent across all the options at this stage and so have not been included in the assessments.

6.3 The red consultation route compared with two alternative red routes

6.3.1 The differences between the red route and its alternatives are given in Appendix B and shown on Plan R1C093-R1-262 in Appendix C.

6.3.2 <u>Noise</u>:

The **alternative routes 1 and 2** appear more favourable than the consultation route with 138 properties within 300m of the alternative route 1 and 139 properties within 300m of the alternative route 2 compared with 166 properties for the consultation route.

6.3.3 <u>Air quality</u>:

The **consultation route** appears more favourable than the alternative routes with 53 properties within 200m of the route compared with 63 and 66 properties respectively for the alternative routes 1 and 2.

6.3.4 Landscape:

All the routes have a severe impact on Ringland Hills, the River Tud valley and the River Wensum valley. However, the alternative routes follow a more northerly line past Ringland. Although these pass through woodland, they would be less visible from Ringland than the consultation route that cuts diagonally across Royal Hill On balance, **the alternative routes** appear more favourable.

6.3.5 <u>Heritage</u>:

None of the routes directly affect any ancient monuments or built conservation areas, but the consultation route passes near the site of a crop mark of a roman villa and the setting of the Church of St Peter a grade 1 listed building. On balance, the **alternative route 2** is more favourable.

6.3.6 Biodiversity:

All of the routes impact on the River Tud, River Wensum, a semi-natural ancient woodland and Ringland Hills, affecting local biodiversity and protected species such as otters, bats and water vole. Both alternative routes would sever Attlebridge Hills County Wildlife Site and woodland at Royal Hill. On balance the **consultation route** appears slightly more favourable than the alternative routes.

6.3.7 <u>Water Environment</u>:

All of the routes cross the River Tud and the River Wensum with the potential for pollution and increased siltation. All of the routes pass over a groundwater protection zone for 1km with the whole of each route passing over a major aquifer. On balance, **none of the routes** appears more favourable than any other.

6.3.8 <u>Journey Ambience</u>:

Uninterrupted travel on a modern dual carriageway with only 2 at grade roundabouts along the route provides improved journey ambience on both routes. Consequently **all of the routes** appear equally favourable.

6.3.9 <u>PVC</u>:

The **consultation route** appears more favourable than the alternative routes with a calculated PVC of \pounds 176.7M compared with an interpolated PVC of \pounds 180.8M for the alternative route 2 and \pounds 181.4M for the alternative route 1.

6.3.10 <u>PVB</u>:

As the alternative routes have not been modelled, it is assumed that the PVB of all routes would be the similar at £659.4M. Consequently **all routes** appear equally favourable.

6.3.11 <u>PVB/PVC</u>:

Although not a sub-objective within the Appraisal Summary Tables, the ratio of PVB to PVC is a useful comparison figure for the economic information. In this case it is 3.73 for the consultation route, 3.65 for the alternative route 2 and 3.64 for the alternative route 1.

6.3.12 <u>Severance</u>:

No communities are severed by the routes but all sever PROWs and various estates and farms. The consultation route severs two more PROWs than the alternative routes. On balance, the **alternative routes** appear slightly more favourable.

6.3.13 Any other issues:

The alternative route 1 passes extremely close to an active landfill site, with a risk of the presence of contaminated land. The consultation route severs a significant area of Taverham Valley Golf Course. The alternative route 2 severs slightly less, whereas the alternative route 1 crosses only the extreme western edge. On balance, the **alternative route 2** appears the most favourable.

6.3.14 <u>Conclusion</u>:

- In environmental terms, the alternative routes appear to have an advantage for noise, landscape and heritage issues. The consultation route is slightly more favourable for air quality and biodiversity;
- In safety terms, all the routes have equal advantage;
- In economic terms, the consultation route would cost less and consequently has a more favourable PVB/PVC ratio;
- In accessibility terms, all the routes have equal advantage;
- In integration terms, all the routes have equal advantage;
- In terms of other issues, the alternative route 2 appears to be more advantageous than the alternative route 1 which crosses the disused landfill site and the consultation route which severs the golf course

6.3.15 <u>Recommendation</u>:

On balance the alternative red route 1 is preferred over the consultation route but has a significant disadvantage with respect to the landfill site. The balance is also in favour of the alternative red route 2 but without the disadvantage of the effect on the landfill site. It was therefore recommended that the **alternative red route 2** should be taken forward to the Stage 2 consultation.

6.4 **The blue consultation route compared with an alternative blue route**

6.4.1 The difference between the blue route and its alternative is given in Appendix B and shown on Plan R1C093-R1-262 in Appendix C.

6.4.2 <u>Noise</u>:

The **alternative route** appears more favourable than the consultation route with 133 properties within 300m of the route compared with 293 properties.

6.4.3 <u>Air quality</u>:

The **alternative route** appears more favourable than the consultation route with 51 properties within 200m of the route compared with 77 properties.

6.4.4 <u>Landscape</u>:

Both routes have a severe impact on Ringland Hills, the River Wensum valley landscape and on Ringland. The alternative blue route runs along the edge of the Wensum Valley for a greater distance. On balance, the **consultation route** is more favourable.

6.4.5 <u>Heritage</u>:

Neither route affects any ancient monuments or built conservation areas, but both would impact on Taverham Hall. Consequently, **neither route** appears more favourable.

6.4.6 <u>Biodiversity</u>:

Both routes impact on the River Tud, River Wensum, a semi-natural ancient woodland and Ringland Hills, affecting local biodiversity and protected species such as otters, bats and water vole. The alternative blue route runs along the flood plain for a greater distance with potential impact on habitat loss. On balance, the **consultation route** is more favourable.

6.4.7 <u>Water Environment</u>:

Both routes cross the River Tud and the River Wensum with the potential for pollution and increased siltation. Both routes pass over a ground water protection zone for 1.5km with the whole of each route passing over a major aquifer. The alternative blue route runs along the flood plain for a greater distance with potential impact on hydrology. On balance, **the consultation route** is more favourable.

6.4.8 <u>Journey Ambience</u>:

Uninterrupted travel on a modern dual carriageway with only 2 at grade roundabouts along the route provides improved journey ambience on both routes. Consequently **both routes** appear equally favourable.

6.4.9 <u>PVC</u>:

The **consultation route** is more favourable than the alternative route with a calculated PVC of \pounds 170.0M compared with an interpolated PVC of \pounds 172.8M for the alternative.

6.4.10 <u>PVB</u>:

As the alternative route has not been modelled, it is assumed that the PVB of both routes would be the same at £684.3M. Consequently **both routes** appear equally favourable.

6.4.11 <u>PVB/PVC</u>:

Although not a sub-objective within the Appraisal Summary Tables, the ratio of PVB to PVC is a useful comparison figure for the economic information. In this case it is 4.03 for the consultation route and 3.96 for the alternative route.

6.4.12 <u>Severance</u>:

No communities or PROWs are severed by either route although the consultation route is closer to Taverham and Thorpe Marriott. Both sever various estates and farms and both routes bisect the golf course although this may be more severe with the consultation route. The alternative route severs one more PROW than the consultation route. As a result, the **alternative route** appear slightly more favourable.

6.4.13 Other Issues:

The variation that distinguishes the alternative blue route was put forward by Broadland District Council and Taverham Parish Council. The consultation route passes closer to Taverham High School than the alternative.

6.4.14 <u>Conclusion</u>:

- In environmental terms, the alternative route is more favourable for noise and air quality. However, the consultation route is significantly more favourable for landscape, biodiversity and water environment;
- In safety terms, both routes have equal advantage;
- In economic terms, the consultation route appears to cost less and has a more favourable PVB/PVC ratio;
- In accessibility terms, the alternative route is slightly more favourable;
- In integration terms, both routes have equal advantage;
- In terms of other issues, the alternative route appears to be the slightly better route;.

6.4.15 <u>Recommendation</u>:

On balance whilst the alternative blue route has some advantages in relation to the built environment, the consultation route is significantly more favourable in terms of landscape, biodiversity and water environment, and is more economical compared to the alternative route. It was therefore recommended that the **consultation blue route** should be taken forward to the Stage 2 consultation.

6.5 The orange consultation route compared with two alternative orange routes

- 6.5.1 The difference between the orange route and its two alternatives is given in Appendix B and shown on Plan R1C093-R1-262 in Appendix C.
- 6.5.2 The differences between the orange alternative routes 1 and 2 are the same as the differences between the blue consultation route and blue alternative route respectively. In 6.4.15 it was recommended that the blue alternative route be rejected on the basis of its greater environmental impact and cost. Therefore the alternative orange route 2 can be rejected at this stage on the same basis.

6.5.3 <u>Noise</u>:

The **alternative route 1** appears more favourable than the consultation route with 271 properties within 300m of the route compared with 350 properties.

6.5.4 <u>Air quality</u>:

The **alternative route 1** appears more favourable than the consultation route with 87 properties within 200m of the route compared with 98 properties.

6.5.5 <u>Landscape</u>:

Both the consultation route and the alternative route 1 have a severe impact on the landscape southwards past Taverham and through the River Wensum valley landscape and on Ringland. Both routes impact on the Tud Valley, but this is more significant with the alternative route. Consequently, the **consultation route** appears more favourable.

6.5.6 <u>Heritage</u>:

None of the routes affects ancient monuments or built conservation areas, but all impact on Taverham Hall. The alternative route 1 also impacts on Beehive Lodge. Consequently, the **consultation route** is more favourable.

6.5.7 <u>Biodiversity</u>:

Both routes impact on the River Tud, River Wensum, three county wildlife sites and three smaller woodlands. The consultation route impacts on a fourth county wildlife site. Consequently, the **alternative route 1** appears slightly more favourable than the consultation route.

6.5.8 <u>Water Environment</u>:

Both routes cross the River Tud and the River Wensum with the potential for pollution and increased siltation. They also pass over a ground water protection zone for 3km with the whole of each route passing over a major aquifer. Consequently, the **consultation route** and the **alternative route 1** appear equally favourable.

6.5.9 <u>Journey Ambience</u>:

Uninterrupted travel on a modern dual carriageway with only 2 at grade roundabouts along the route provides improved journey ambience on both routes. Consequently **both the routes** appear equally favourable.

6.5.10 <u>PVC</u>:

The **consultation route** appears more favourable than the alternative route 1 with an interpolated PVC of \pounds 175.7M compared with a calculated PVC of \pounds 191.8M.

6.5.11 <u>PVB</u>:

As the consultation route has not been modelled, it is assumed that the PVB of both routes would be the same at £717.3M. Consequently **both the routes** appear equally favourable.

6.5.12 <u>PVB/PVC</u>:

The ratio of PVB to PVC is 4.08 for the consultation route and 3.74 for the alternative route 1.

6.5.13 Severance:

The consultation route severs the site of the proposed new housing at Costessey from the main village centre. Both routes severs one PROW and a cycleway. Both routes pass close to properties on Ringland Lane. Both routes sever various estates and farms. Both routes bisect the golf course. On balance **the alternative route 1** is more favourable.

6.5.14 Other Issues:

The variations that forms the alternative route 1 is mainly south of the River Wensum and was suggested by South Norfolk District Council.

6.5.15 Conclusion:

- In environmental terms there is little to choose between the both routes. The consultation route is more favourable in terms of landscape and heritage and the alternative route 1 in terms of biodiversity, noise and air quality;
- In safety terms, both routes have equal advantage;
- In economic terms the consultation route appears to cost less and has a more favourable PVB/PVC ratio than the alternative route 1;
- In accessibility terms, the alternative route 1 has the advantage over the consultation route;
- In integration terms, both routes have equal advantage;
- In terms of other issues, the alternative route 1 has an advantage over the consultation route.

6.5.16 Recommendation:

The alternative orange route 1 shows a benefit over the consultation route in terms of severance which outweighs its higher cost. It was therefore recommended that the **alternative orange route 1** should be taken forward to the Stage 2 consultation.

7.0 **ASSESSMENTS & CONCLUSIONS – FAR WESTERN ALTERNATIVES**

- 7.1 In this chapter the following route options as shown on drawing R1C093-R1-263 are compared using the 23 NATA sub-objectives:
 - The Easton-Morton, Pylon and Frans Green routes compared with the red consultation route to determine whether the three nearest far western alternatives provide any significant benefits over the red consultation route;
 - The Pylon and Frans Green routes compared with the alternative Pylon and Frans Green routes to determine whether the variants to the Frans Green and the Pylon routes provide any significant benefits over the originals;
 - The Pylon and Frans Green routes compared with the further western routes to determine whether any of the five furthest far western routes provide any significant benefits over the nearer far western routes;
- 7.2 The assessment was carried out on the following sub-objectives:
 - Noise
 - Air Quality
 - Landscape
 - Heritage
 - Biodiversity
 - Water Environment
 - Journey Ambience
 - Cost to the Public Accounts (PVC)
 - Transport Economic Efficiency Consumers and business users (PVB). These two objectives have been combined
 - Severance
- 7.3 The remaining twelve sub-objectives:
 - Greenhouse Gases
 - Townscape
 - Physical Fitness
 - Accidents
 - Security
 - Reliability
 - Wider Economic Impacts
 - Option Values
 - Access to the Transport System
 - Transport Interchange
 - Land-use Policy
 - Other Government Policies

are considered to be consistent across all the options at this stage and so have not been included in the assessments.

7.3 The Easton-Morton, Pylon and Frans Green routes compared with the red consultation route

7.3.1 The difference between the red consultation route and these three additional routes is given in Appendix B and shown on Plan R1C093-R1-263 in Appendix C.

7.3.2 <u>Noise</u>:

The **Easton-Morton route** appears more favourable than the red consultation, Pylon and Frans Green routes with 149 properties within 300m of the route compared with 166, 187 and 198 properties respectively.

7.3.3 <u>Air quality</u>:

The **red consultation route** appears more favourable than the Easton-Morton, Pylon and Frans Green routes with 53 properties within 200m of the route compared with 62, 97 and 101 properties respectively.

7.3.4 Landscape:

The red consultation route has a severe impact on Ringland Hills, the River Wensum valley landscape and on Ringland. The other three routes have a moderate adverse impact on the landscape. For the Easton-Morton route, the landscape is mostly extensive and largely featureless open arable farmland outside of the enclosed river valleys. For the Frans Green and Pylon routes the landscape is typical of a mixed farmland disbursed with hamlets such as Weston Green and can fairly easily accommodate a new road. On balance, the **Frans Green route** and **Pylon route** appear more favourable than the Easton-Morton route. The red consultation route is the least favourable.

7.3.5 <u>Heritage</u>:

In terms of archaeology, the red consultation route passes near the site of crop mark of a roman villa but none of the other routes affect any ancient monuments or known archaeology.

In terms of built heritage, the Frans Green, and Pylon routes impact on Morton Lodge. The red, Pylon and Easton-Morton routes may detract from the setting of the Church of St Peter, a grade I listed building, although it is already situated adjacent to the A47. Morton Hall's (grade II) setting would be adversely affected by the alignment of the Easton-Morton route. None of the routes affects any built conservation areas. On balance, the **Frans Green route** appears the most favourable, followed by the Pylon and the red consultation routes, which are more favourable than the Easton-Morton route.

7.3.6 <u>Biodiversity</u>:

All four routes impact on the River Wensum, although the Pylon and Frans Green routes cross in the vicinity of an existing bridge on the route of the A1067. The red consultation, Pylon and Easton-Morton routes also impact on the River Tud. The Pylon and Easton-Morton routes pass through a substantial area of woodland, part of which is listed as a county wildlife site and protected species such as bats, badgers and otters are likely to be present within these route corridors. The Frans Green route crosses through a relatively species rich woodland, and other small areas of woodland and hedgerows. Badger setts have been recorded within this route corridor and protected species such as bats are also likely to be present. The red consultation route impacts on a seminatural ancient woodland and Ringland Hills, affecting local biodiversity and possibly protected species including otters, bats and water vole. On balance, the **Frans Green route** appears to be more favourable than the Pylon route and the Easton-Morton and red consultation routes.

7.3.7 <u>Water Environment</u>:

The Pylon and the Frans Green routes cross the River Wensum in the vicinity of an existing river crossing. If engineering design is optimised and construction impacts are adequately mitigated, the proposed crossing would be marginally beneficial. The Eaton-Morton and red consultation routes also cross the Wensum but using new crossings, creating greater potential for pollution and increased siltation. This impact could also occur in the River Tud where the Pylon, Easton-Morton and red consultation routes cross – the Frans Green route does not cross the River Tud and so these issues do not arise. Approximately 1km of the Pylon and Easton-Morton and red consultation routes and 600m of the Frans Green route pass over a groundwater protection zone. On balance, the **Frans Green route** appears the most favourable followed by the Pylon route and then the Easton-Morton and red consultation routes.

7.3.8 Journey Ambience:

Uninterrupted travel on a modern dual carriageway with only 4 at grade roundabouts along the Pylon and Frans Green routes, 3 roundabouts along the Easton-Morton route routes and 2 roundabouts along the red consultation route provides improved journey ambience on all four routes. Consequently **the red consultation route** appears slightly more favourable.

7.3.9 <u>PVC</u>:

The **red consultation** appears more favourable than the Easton-Morton route, Frans Green and Pylon routes with PVC of £176.7M compared with an interpolated PVC of £181.3M, and calculated PVCs of £189.8M and £205.0M respectively.

7.3.10 <u>PVB</u>:

As the Easton-Morton route has not been modelled, it is assumed that its PVB would be the same as that for the Pylon route at £617.9M. These are more favourable than the Frans Green route which has a PVB of £585.7M, but less favourable than the **red consultation route** which has a PVB of £659.4M.

7.3.11 <u>PVB/PVC</u>:

Although not a sub-objective within the Appraisal Summary Tables, the ratio of PVB to PVC is a useful comparison figure for the economic information. In this case it is 3.73 for the red consultation route, 3.41 for the Easton-Morton route, 3.09 for the Frans Green route and 3.01 for the Pylon route.

7.3.12 Severance:

No communities are severed by the four routes but all sever various estates and farms. The Pylon and Easton-Morton routes sever 3 PROWs and 1 cycleway, while the Frans Green route severs an additional PROW. The red consultation route severs 5 PROWs and a cycleway. As a result, the **Pylon route** and the **Easton-Morton route** appear slightly more favourable.

7.3.13 Other Issues:

The main purpose of considering routes further west than the consultation routes was to negate the detrimental environmental impact of crossing two river valleys, which is a feature of all the western consultation routes, such as the red consultation route. The Easton-Morton route also crosses the Wensum and Tud and so has very little benefit over the consultation routes, except in terms of landscape. Similarly the Pylon route has an impact on the Tud.

The purple route is dependent on the dualling of the A47 by the Highways Agency.

7.3.14 Conclusion:

- In environmental terms, the Frans Green route appears to be a better route than the red consultation and Pylon routes which appear to be better than the Easton-Morton route. The red consultation route is most favourable for air quality and ambience and least for landscape, biodiversity and water. The Easton-Morton route is most favourable for noise and least for heritage, biodiversity and water. The Pylon route is least favourable for ambience. Frans Green is most favourable for landscape, heritage, biodiversity and water and least for noise and air quality;
- In safety terms, all three routes have equal advantage;
- In economic terms, the red consultation route appears to cost less and has a more favourable PVB/PVC ratio, followed by the Easton-Morton route, Frans Green route then the Pylon route;
- In accessibility terms, all three routes have equal advantage;
- In integration terms, all three routes have equal advantage;
- In terms of other issues, the Frans Green route has the slight advantage but is dependent on the highways Agency dualling the A47.

7.3.15 Recommendation:

The Easton-Morton route has no significant environmental or economic benefits over the consultation red route. However, the Pylon and Frans Green routes have significant environmental advantages over the consultation red route, despite their higher costs. It was therefore recommended that the **Frans Green route** and the **Pylon route** should be taken forward to the Stage 2 consultation.

7.4 The Pylon and Frans Green routes compared with the alternative Pylon and Frans Green routes

7.4.1 The difference between the Pylon and Frans Green routes and the variation on these routes is given in Appendix B and shown on Plan R1C093-R1-263 in Appendix C.

7.4.2 <u>Noise</u>:

The **alternative Pylon and Frans Green routes** appear very slightly more favourable than the original Pylon and Frans Green routes with 186 and 197 properties within 300m of the route compared with 187 and 198 properties respectively.

7.4.3 <u>Air quality</u>:

The **original Frans Green and Pylon routes** appear slightly more favourable than the alternative Frans Green and Pylon routes with 94 and 97 properties within 200m of the route compared with 96 and 99 properties respectively.

7.4.4 Landscape:

All four routes pass through a landscape of mixed farmland disbursed with hamlets. All four routes pass close to a small number of isolated properties and to the north of Thorpe Marriott. Consequently, **neither the original routes nor the alternative routes** appear more favourable.

7.4.5 <u>Heritage</u>:

None of the routes affects ancient monuments or built conservation areas. All four routes impact on the grade II listed Morton Lodge. Both Pylon routes may detract from the setting of St. Peter's Church. Consequently, the **original routes and the alternative routes** appear equally favourable.

7.4.6 <u>Biodiversity</u>:

All the routes crosses through relatively species rich woodland and would cause other small areas of woodland and hedgerows, which are important in terms of biodiversity, to be lost. The Pylon and Frans Green routes pass through a Roadside Nature Reserve which is located alongside the A1067. Badger setts have be recorded within both route corridors and protected species such as bats and otters are also likely to be present. All the routes would cross the river Wensum cSAC in the vicinity of an existing bridge crossing. The alternative routes also cross Triumph and Foxburrow Plantations county wildlife site, composed of a mixed broadleaved woodland. On balance the **original Frans Green and Pylon routes** appear slightly more favourable than their respective alternatives.

7.4.7 <u>Water Environment</u>:

All four routes cross the River Wensum in the vicinity of an existing river crossing. If engineering design is optimised and construction impacts are adequately mitigated, the proposed crossing would be marginally beneficial. All four routes pass over a ground water protection zone. Consequently, **neither the original routes nor the alternative routes** appear more favourable.

7.4.8 Journey Ambience:

Uninterrupted travel on a modern dual carriageway with only 4 at grade roundabouts along the both the original and the alternative routes provides improved journey ambience on both routes. Consequently, the **original routes and the alternative routes** appear equally favourable.

7.4.9 <u>PVC</u>:

The **original Frans Green and Pylon routes** appear slightly more favourable than the alternative routes with calculated PVCs of £198.8M and £205.0M respectively compared with interpolated PVCs of £190.9M and £206.1M.

7.4.10 <u>PVB</u>:

As the alternative routes have not been modelled, it is assumed that the PVB of both the original and alternative routes would be the same at £617.9M for the Pylon routes and £585.7M for the Frans Green routes. Consequently, the **original routes and the alternative routes** appear equally favourable.

7.4.11 <u>PVB/PVC</u>:

Although not a sub-objective within the Appraisal Summary Tables, the ratio of PVB to PVC is a useful comparison figure for the economic information. In this case it is 3.07 and 3.00 for the alternative Frans Green and Pylon routes and 3.09 and 3.01 for the original Frans Green and Pylon routes.

7.4.12 <u>Severance</u>:

No communities are severed by any of the routes but all 1 cycleway and various estates and farms. The original Pylon and Frans Green routes sever 2 and 3 PROWs respectively and the alternatives each sever an additional PROW. As a result, the **original routes** appear more favourable.

7.4.13 Other issues:

All four routes require dualling the A1067 over the length that each route runs along it. The original routes will have an impact on the Wensum Valley Golf Course.

7.4.14 <u>Conclusion</u>:

- In environmental terms, the original routes appear to be slightly better than the alternatives. The original routes are more favourable in terms of air quality and biodiversity. The alternative routes are more favourable in terms of noise;
- In safety terms, both routes have equal advantage;
- In economic terms, the alternative routes appear to cost slightly less and have a more favourable PVB/PVC ratio;
- In accessibility terms, the original routes appear to be marginally better than the alternatives.;
- In integration terms, both routes have equal advantage;
- In terms of other issues, the alternative routes have a slight advantage.

7.4.15 <u>Recommendation</u>:

The original Pylon and Frans Green routes have slight environmental and accessibility benefits over the alternative Pylon and Frans Green routes. However, the alternative routes have slight economic advantages over the original routes and do not impact on the golf course. It was therefore recommended that both the **alternative Frans Green route** and the **alternative Pylon route** should be taken forward to the Stage 2 consultation.

7.5 The Frans Green and Pylon routes compared with the further western routes

7.5.1 The differences between these routes to the west of Norwich are given in Appendix B and shown on Plan R1C093-R1-263 in Appendix C.

7.5.2 <u>Noise</u>:

The **Hockering-Ringland route** appears more favourable than the other routes with 136 properties within 300m of the route compared with the Pylon (186), Frans Green (198), Wood Lane (251), Hockering-Attlebridge (284), Sandy Lane (324) and Hockering-Lenwade (375) routes.

7.5.3 <u>Air quality</u>:

The **Hockering-Ringland route** appears more favourable than the other routes with 58 properties within 200m of the route compared with Frans Green (94), Pylon (97), Hockering-Attlebridge (115), Wood Lane (127), Sandy Lane (140) and Hockering-Lenwade (175) routes.

7.5.4 Landscape:

The Hockering-Ringland route has a severe impact on Ringland Hills, the Wensum Valley landscape and Ringland. The other six routes pass through mixed farmland disbursed with hamlets and the landscape can fairly easily accommodate an improved standard of road. However, the Sandy Lane and Hockering-Lenwade routes would impact on the high quality Wensum valley landscape at Lenwade. All seven routes pass close to a small number of isolated properties which would experience visual intrusion. This is most severe where the Wood Lane and Hockering-Attlebridge routes pass Weston Longville. Consequently, the **Frans Green route** and **Pylon route** appears the most favourable route.

7.5.5 <u>Heritage</u>:

None of the routes affects any ancient monuments or built conservation areas. All of the routes, with the exception of the Hockering-Ringland route, impact on Morton Lodge. The Sandy Lane route impacts on Weston Hall. The Wood Lane route impacts on listed buildings in Weston Longville. The Hockering-Attlebridge route impacts on Overgate Hall and listed buildings in Weston Longville. The Hockering-Lenwade route impacts on Overgate Hall and Weston Hall. The Pylon route may detract from the setting of the Church of St Peter, a grade I listed building. The Hockering-Ringland route does not impact on any listed buildings, but passes near the site of a roman villa. On balance, **all the routes** appear equally unfavourable.

7.5.6 <u>Biodiversity</u>:

The Hockering-Ringland route would have a severe impact on the River Wensum cSAC, with protected species such as otters and water voles are likely to be present. This route also impacts on a semi-natural ancient woodland, a county wildlife site and Ringland Hills, affecting local biodiversity. The Pylon routes pass through a substantial area of woodland, part of which is listed as a county wildlife site and protected species such as bats, badgers and otters are likely to be present within these route corridors. The five remaining routes would impact on small amounts of woodland and hedgerows also affecting local biodiversity. All these five routes cross the River Wensum cSAC in the vicinity of an existing bridge crossing but the Sandy Lane and Hockering-Lenwade routes cross at Lenwade, an area rich in flora and fauna and where otters and may be present. In summary, the **Frans Green route** and the **Wood Lane route** appear equally more favourable than the remaining routes.

7.5.7 <u>Water Environment</u>:

The Hockering-Ringland route crosses the River Wensum with the potential for pollution and increased siltation. The remaining six routes cross the Wensum in the vicinity of an existing crossing. If engineering design is optimised and construction impacts are adequately mitigated the proposed crossing would be marginally beneficial. All the routes pass over a ground water protection zone. The Hockering-Ringland, Hockering-Attlebridge, Hockering-Lenwade and Sandy Lane routes run over the major aquifer supplying Norwich with its source of water. Consequently, the **Frans Green route** and the **Wood Lane route** appear equally more favourable than the remaining routes.

7.5.8 <u>Journey Ambience</u>:

Uninterrupted travel on a modern dual carriageway provides improved journey ambience on all the routes. There are two roundabouts on the Hockering-Ringland route, four on the Pylon, Frans Green, Wood Lane and Hockering-Attlebridge routes and five on the Sandy Lane and Hockering-Lenwade routes. Consequently the **Hockering-Ringland route** appears slightly more favourable.

7.5.9 <u>PVC</u>:

The **Hockering-Ringland route** appears more favourable than the other routes, with a calculated PVC of £180.2M compared with the PVCs of Frans Green (£189.8M calculated), Wood Lane (£191.1M interpolated), Hockering-Attlebridge (£194.7M interpolated), Pylon (205.0M calculated), Hockering-Lenwade (£210.7M calculated) and Sandy Lane routes (£212.8M interpolated).

7.5.10 <u>PVB</u>:

As they have not been modelled, the PVB of the Sandy Lane and Hockering-Attlebridge routes is assumed to be the average of the PVB for the Hockering-Lenwade and Frans Green routes. The Wood Lane PVB is assumed to be the PVB for the Frans Green Route. Consequently, **PyIon route** appears more favourable than the other routes with a PVB of £617.9M, compared with the Hockering-Ringland route (596.6M), the Frans Green and Wood Lane routes (£585.7M), the Sandy Lane and Hockering-Attlebridge routes (£569.5M) and the Hockering-Lenwade route (£553.2M).

7.5.11 <u>PVB/PVC</u>:

The ratio of PVB to PVC is 3.31 for the Hockering-Ringland route, 3.09 for the Frans Green route, and 3.07, 3.01, 2.92, 2.67 and 2.63 for the Wood Lane, Pylon, Hockering-Attlebridge, Sandy Lane and Hockering-Lenwade routes respectively.

7.5.12 Severance:

All the routes sever a cycleway and various estates and farms. The Wood Lane and Hockering-Attlebridge routes bisect Weston Longville but none of the other routes severs any communities. The Pylon, Wood Lane and Sandy Lane routes sever two PROWs, the Frans Green route three, the Hockering-Lenwade and Hockering-Attlebridge routes four and the Hockering-Ringland route eight. As a result, the **Pylon and Sandy Lane routes** appear slightly more favourable.

7.5.13 Other Issues:

By nature of its alignment, the Hockering-Ringland route is likely to act more as a bypass than as a distributor route.

The Wood Lane and Hockering-Lenwade routes follow the existing road network.

All the routes, with the exception of the Pylon route, are dependent on the dualling of the A47 by the Highways Agency.

7.5.14 Conclusion:

- In environmental terms, the Frans Green route appears to be the best route; The Frans Green and Wood Lane routes are most favourable in terms of biodiversity and water. The Frans Green and Pylon routes are most favourable in terms of landscape. The Hockering-Ringland route is most favourable in terms of noise, air quality, and journey ambience and least favourable in terms of landscape, heritage, biodiversity and water.
- In safety terms, all six routes have equal advantage;
- In economic terms, the Hockering-Ringland route appears to cost least and has a more favourable PVB/PVC ratio, followed by the Frans Green Route;
- In accessibility terms, all six routes have equal advantage;
- In integration terms, the Sandy Lane and Pylon routes have a slight advantage;
- In terms of other issues, the Hockering-Ringland route has the least advantage.

7.5.15 <u>Recommendation</u>:

None of the western routes, except the Hockering-Ringland route, has any environmental or economic advantage over the Frans Green route. However, by nature of its alignment, the Hockering-Ringland route is likely to act more as a bypass than as a distributor route. The Sandy Lane route has a slight accessibility advantage over the Frans Green Route but is equal to the Pylon route. It was therefore recommended that **none of the western routes,** other than the Frans Green route, the Pylon route and their alternatives, should be taken forward to the Stage 2 consultation.

8.0 **RECOMMENDATIONS**

- 8.1 It was recommended that the following western options be taken forward for the 2004 consultation:
 - The alternative red route 2 (as the Consultation 2004 Red Route);
 - The consultation blue route (as the Consultation 2004 Blue Route);
 - The alternative orange route 1 (as the Consultation 2004 Orange Route);
 - The consultation green route (as the Consultation 2004 Green Route);
 - The Frans Green route (as the Consultation 2004 Alternative Purple Route);
 - The Pylon route (as the Consultation 2004 Alternative Brown Route);
 - The alternative Frans Green route (as the Consultation 2004 Purple Route);
 - The alternative Pylon route (as the Consultation 2004 Brown Route);

These route options were then subjected to a stage 2 Environmental Assessment prior to the consultation.

Appendix A

Appendix B

ROUTE NAME	DIFFERENCE TO CONSULTATION ROUTE
Western Consultation Routes a	ind Alternatives
Consultation Western Red	N/A
Alternative Western Red 1	At Ringland, the route continues north-westwards and joins Reepham Road at the Fir Covert Road junction.
Alternative Western Red 2	At Ringland, the route continues north-westwards and after crossing the Wensum it swings eastwards to the A1067. It then skirts Deighton Hills, joining the red route west of Thorpe Marriott.
Consultation Western Blue	N/A
Alternative Western Blue	After crossing Ringland Lane, the route travels northwards between the river and golf course and rejoins the blue route north of Taverham.
Consultation Western Orange	N/A
Alternative Western Orange 1	From William Frost Way, the route curves westwards round the proposed housing and joins the orange route north of the Wensum.
Alternative Western Orange 2	As alternative 1 but after crossing Ringland Lane, the route travels northwards between the river and golf course and rejoins the orange route north of Taverham.
Consultation Western Green	N/A
Far Western Alternatives	
Pylon Route	Western section of the route runs from the A47 immediately west of the Easton roundabout to the A1067 at Attlebridge and along the A1067 to rejoin the red route.
Alternative Pylon Route	Western section of the route runs from the A47 immediately west of the Easton roundabout to the A1067 at Attlebridge, then eastwards to and along Reepham Road to rejoin the red route.
Frans Green Route	Western section of the route runs from the A47 at Wood Lane to the A1067 at Attlebridge and along the A1067 to rejoin the red route.
Alternative Frans Green Route	Western section of the route runs from the A47 at wood Lane to the A1067 at Attlebridge, then eastwards to and along Reepham Road to rejoin the red route.
Easton to Morton Route	Western section of the route runs from the A47 immediately west of the Easton roundabout to the A1067 at Morton and along the A1067 to rejoin the red route.
Wood Lane Route	Western section of the route runs from the A47 at Wood Lane along existing roads to the A1067 at Attlebridge and along the A1067 to rejoin the red route.
Sandy Lane Route	Western section of the route runs from the A47 at Sandy Lane along existing roads to the A1067 at Lenwade and along the A1067 to rejoin the red route.
Hockering to Lenwade Route	Western section of the route runs from the A47 at Hockering along existing roads to the A1067 at Lenwade and along the A1067 to rejoin the red route.
Hockering to Attlebridge Route	Western section of the route runs from the A47 at Hockering to the A1067 at Attlebridge and along the A1067 to rejoin the red route.
Hockering to Ringland Route	Western section of the route runs from the A47 at Hockering to rejoin the red route at Ringland Lane

Table B1 – List of the Western Alternative Routes

Appendix C

Appendix D

	Western Consultation				Far Western Alternatives				
	Red-Yellow	Blue-Yellow	Orange-	Green-Yellow	Pylon-Yellow	Frans Green-	Hock-	Hock-	
			Yellow			Yellow	Lenwade-	Ringland-	
							Yellow	Yellow	
Northern Radial Routes									
A1074 Dereham Rd	-12%	-14%	-10%	-33%	-5%	-11%	-10%	-17%	
A1067 Drayton Rd	-14%	-14%	-17%	20%	-11%	-9%	-8%	-6%	
A140 Cromer Rd	11%	12%	11%	3%	10%	10%	10%	11%	
B1150 N Walsham Rd	-16%	-16%	-18%	-21%	-19%	-16%	-16%	-14%	
A1151 Wroxham Rd	-24%	-25%	-24%	-27%	-24%	-24%	-24%	-24%	
A1042 Yarmouth Rd	-11%	-11%	-11%	-12%	-12%	-12%	-12%	-12%	
Average	-11%	-11%	-11%	-13%	-10%	-10%	-10%	-11%	
Southern Radial Routes									
A146 Trowse Bypass	3%	3%	3%	2%	2%	2%	2%	2%	
A140 Ipswich Rd	5%	5%	5%	1%	5%	4%	4%	4%	
A11 Newmarket Rd	1%	0%	2%	0%	0%	0%	1%	-1%	
B1108 Watton Rd	4%	5%	6%	6%	4%	0%	-1%	0%	
Average	3%	3%	4%	2%	2%	2%	2%	1%	
Inner Ring Road									
Grapes Hill	-1%	-1%	-2%	-2%	-1%	0%	0%	-1%	
Queen's Road	1%	1%	1%	0%	2%	1%	1%	2%	
Riverside Road	1%	0%	3%	6%	-1%	0%	0%	0%	
Average	0%	0%	0%	0%	0%	0%	1%	0%	
Outer Ring Road									
Boundary Rd	-12%	-13%	-13%	-22%	-9%	-11%	-10%	-10%	
Martineau Lane	4%	4%	4%	3%	4%	4%	4%	4%	
Mousehold Lane	-5%	-4%	-4%	-1%	-5%	-6%	-7%	-6%	
Colman Rd	-3%	-3%	-3%	1%	-2%	-2%	-1%	-1%	
Average	-4%	-4%	-5%	-6%	-3%	-4%	-4%	-3%	
Northern Suburbs									
Hellesdon Rd	-18%	-19%	-22%	-53%	-14%	-8%	-10%	-10%	
Middleton's Lane	-36%	-41%	-43%	-52%	-40%	-37%	-36%	-35%	
White Woman Lane	16%	16%	19%	12%	20%	19%	18%	14%	
Church Lane	-67%	-67%	-69%	-71%	-64%	-65%	-63%	-63%	
Fifers Lane	-31%	-31%	-31%	-27%	-32%	-30%	-30%	-31%	
Woodside Rd	-59%	-60%	-62%	-60%	-59%	-59%	-60%	-59%	
Average	-35%	-36%	-37%	-43%	-35%	-33%	-33%	-33%	

Table D1 Changes in traffic on various existing roads with the modelled western NDR options (2025)

	Western Consultation				Far Western Alternatives				
	Red-Yellow	Blue-Yellow	Orange- Yellow	Green-Yellow	Pylon-Yellow	Frans Green- Yellow	Hock- Lenwade Yellow	Hock- Ringland- Yellow	
Northern Rural									
Ringland Road	-90%	-90%	-88%	-77%	-92%	-88%	-86%	-87%	
Spixworth Road	-54%	-54%	-56%	-44%	-56%	-55%	-57%	-52%	
Church Rd	-80%	-80%	-86%	-89%	-80%	-80%	-80%	-80%	
Average	-72%	-71%	-73%	-66%	-73%	-71%	-72%	-70%	
Inside Outer Ring Road S	outh								
Bracondale	-4%	-4%	-5%	-3%	-3%	-3%	-3%	-3%	
Hall Rd	1%	2%	2%	3%	1%	1%	1%	0%	
Ipswich Rd	0%	0%	0%	1%	0%	0%	-1%	0%	
Newmarket Rd	0%	0%	0%	1%	0%	0%	0%	0%	
Unthank Rd	1%	3%	3%	3%	1%	1%	1%	1%	
Earlham Rd	2%	0%	3%	7%	2%	1%	1%	1%	
Average	-1%	-1%	0%	1%	0%	-1%	-1%	-1%	
Inside Outer Ring Road N	lorth								
Dereham Rd	3%	5%	8%	6%	4%	3%	1%	4%	
Drayton Rd	-3%	-4%	-5%	-9%	-5%	-4%	-5%	-4%	
Aylsham Rd	-2%	-2%	-3%	2%	0%	1%	1%	1%	
Catton Grove Rd	2%	2%	1%	0%	2%	6%	7%	5%	
Constitution Hill	13%	11%	11%	7%	11%	12%	12%	11%	
Sprowston Rd	4%	4%	4%	-2%	4%	4%	4%	4%	
Gurney Rd	-3%	-3%	-4%	-6%	-2%	-2%	-2%	-1%	
Plumstead Rd	-8%	-9%	-8%	-10%	-10%	-10%	-10%	-7%	
Carrow Rd	-3%	-3%	-3%	-4%	-2%	-2%	-2%	-3%	
Average	0%	0%	0%	-2%	0%	0%	0%	1%	
A47 NSB									
West of Longwater	11%	15%	-12%	-3%	7%	-6%	-11%	-15%	
Longwater - B1108	1%	3%	11%	-1%	-2%	-10%	-12%	-14%	
B1108 - A11	-5%	-5%	0%	-10%	-6%	-11%	-11%	-15%	
A11 - A140	-7%	-8%	-7%	-12%	-6%	-7%	-6%	-9%	
A140 – A146	0%	-1%	-4%	-9%	3%	4%	4%	1%	
A146 – Postwick	7%	5%	2%	-1%	10%	11%	12%	8%	
East of Postwick	4%	4%	3%	2%	4%	4%	4%	4%	
Average	1%	1%	-1%	-5%	1%	-2%	-3%	-5%	

		Western Co	onsultation		Far Western Alternatives				
	Red-Yellow	Blue-Yellow	Orange-	Green-Yellow	Pylon-Yellow	Frans Green-	Hock-Len-	Hock-Ring-	
			Yellow			Yellow	Yellow	Yellow	
Additional - Northern Sub	ourbs								
Hall Lane	-29%	-33%	-25%	-13%	-19%	-36%	-36%	-42%	
Drayton Rd	-98%	-97%	-100%	-84%	-99%	-85%	-85%	-82%	
Blue Boar Lane	-89%	-89%	-89%	-89%	-89%	-89%	-90%	-90%	
Average	-75%	-76%	-75%	-69%	-73%	-75%	-75%	-76%	
Additional Sites ²									
Ringland Rd, Taverham	-100%	-	-100%	-100%	-96%	-98%	-100%	-100%	
Taverham Ln, Costessey	-97%	-100%	-100%	-89%	-92%	-71%	-56%	-55%	
Costessey Ln, Drayton	-68%	-82%	-84%	-100%	-46%	-28%	-15%	-29%	
Reepham Rd, Horsford	-33%	-32%	-39%	-1%	-39%	-28%	-28%	-23%	
Holt Rd, Horsford	1%	2%	2%	23%	0%	-2%	-5%	-3%	
Crostwick Ln, Spixworth	102%	102%	105%	105%	102%	100%	98%	93%	
Lodge Ln, Old Catton	-32%	-33%	-31%	-29%	-31%	-31%	-31%	-31%	
Salhouse Rd, Sprowston	-2%	-2%	0%	-5%	1%	0%	1%	1%	
Plumstead Rd E, Thorpe	6%	7%	7%	4%	6%	5%	5%	5%	
St Andrew									
Green Ln E, Rackheath	-14%	-16%	-16%	-17%	-10%	-10%	-9%	-11%	
Average	-12%	-9%	-13%	-7%	-11%	-9%	-8%	-8%	

Table D2 Predicted Annual Average Daily Traffic using the modelled western NDR options (2025)

	Western Consultation				Far Western Alternatives				
	Red-Yellow Blue-Yellow		Orange- Green-Yellow		Pylon-Yellow	Frans Green-	Hock-Len-	Hock-Ring-	
			Yellow			Yellow	Yellow	Yellow	
A47 – Ringland Lane	30202	33074	36517	30431	20941	21897	10498	19854	
Ringland Lane - A1067	30203	33074	36516	43132	20941	21897	10498	19854	
A1067 - Reepham Rd	28049	31302	32276	42491	21558	21425	19629	24764	
Reepham Rd - A140	25528	27546	28205	42488	22466	22984	21496	25177	
A140 – Buxton Rd	32222	32897	32783	35955	31133	31568	31630	32586	
Buxton Rd - B1150	32221	32896	32782	35957	31133	31568	31630	32586	
B1150 - A1151	35438	35175	34074	34795	35558	36034	35971	36366	
A1151 - Salhouse Rd	40220	39817	38325	38794	40731	41418	41796	42401	
Salhouse Rd - B1140	28790	28105	26826	27657	29723	30479	30961	31468	
B1140 - A47	31793	30926	29578	30662	33463	34136	34619	34766	
Average	31467	32481	32788	36236	28765	29341	26873	29982	

Appendix E

Appendix F

Appendix G

Table F1: Summary of Assessments for Western Consultation Routes and Alternatives.

	Red	Alt Red 1	Alt Red 2	Blue	Alt Blue	Orange	Alt Orange 1	Alt Orange 2	Green
Noise	166	138	139	293	133	350	271	151	536
Properties with 300m of r	oute								
Air Quality	53	63	66	77	51	98	87	66	245
Properties with 200m of r	oute								
Greenhouse Gases	Adverse	Adverse	Adverse						
Landscape	Severe	Severe	Severe						
	adverse	adverse	adverse						
Townscape	Neutral	Neutral	Neutral						
Historic Resources	Moderate	Slight	Slight	Moderate	Moderate	Moderate	Moderate	Moderate	Slight
	adverse	adverse	Adverse						
Biodiversity	Severe	Severe	Severe						
	adverse	adverse	adverse						
Water Environment	Severe	Severe	Severe						
	adverse	adverse	adverse						
Physical Fitness	Slight	Slight	Slight						
	beneficial	beneficial	beneficial						
Journey Ambience	Large	Large	Large						
	beneficial	beneficial	beneficial						
Accidents	Large	Large	Large						
	beneficial	beneficial	beneficial						
Security	Neutral	Neutral	Neutral						
Public Accounts	£176.7M	£181.4M*	£180.8M*	£170.0M	£172.8M*	£175.7M*	£191.8M	£196.9M*	£179.7M
Business Users	£369.3M	£369.3M*	£369.3M*	£383.2M	£383.2M*	£401.6M*	£401.6M	£401.6M*	£400.1M
Consumers	£290.1M	£290.1M*	£290.1M*	£301.1M	£301.1M*	£315.6M*	£315.6M	£315.6M*	£314.4M
Reliability	Large	Large	Large						
	beneficial	beneficial	beneficial						
Wider Impacts	Slight	Slight	Slight						
	beneficial	beneficial	beneficial						
Option Values	Neutral	Neutral	Neutral						
Severance	Slight	Slight	Slight	Slight	Slight	Moderate	Slight	Slight	Severe
	adverse	adverse	adverse						
Access	Slight	Slight	Slight						
	beneficial	beneficial	beneficial						
Transport interchange	Slight	Slight	Slight						
	beneficial	beneficial	beneficial						
Land-use Policy	Neutral	Neutral	Neutral						
Other Policies	Slight	Slight	Slight						
	beneficial	beneficial	beneficial						

* Estimate

Impact is common to all 9 route options

Table F2: Summary of Assessments for the Far Western Alternatives.

	Pylon	Alt Pylon	Frans Green	Alt Frans Green	Easton- Morton	Wood Lane	Sandy Lane	Hockering- Lenwade	Hockering- Attlebridge	Hockering- Ringland
Noise	187	186	198	197	149	251	324	375	284	136
properties within 300m of route										
Air Quality	97	99	101	103	62	127	140	175	115	58
properties within 200m of route										
Greenhouse Gases	Adverse	Adverse	Adverse	Adverse	Adverse	Adverse	Adverse	Adverse	Adverse	Adverse
Landscape	Moderate	Moderate	Moderate	Moderate	Moderate	Moderate	Moderate	Moderate	Moderate	Severe
	adverse	adverse	adverse	adverse	adverse	adverse	adverse	adverse	adverse	adverse
Townscape	Neutral	Neutral	Neutral	Neutral	Neutral	Neutral	Neutral	Neutral	Neutral	Neutral
Historic Resources	Moderate	Moderate	Moderate	Moderate	Moderate	Moderate	Moderate	Moderate	Moderate	Severe
	adverse	adverse	adverse	adverse	adverse	adverse	adverse	adverse	adverse	adverse
Biodiversity	Moderate	Moderate	Moderate	Moderate	Severe	Moderate	Severe	Severe	Moderate	Severe
	adverse	adverse	adverse	adverse	adverse	adverse	adverse	adverse	adverse	adverse
Water Environment	Moderate	Moderate	Moderate	Moderate	Severe	Moderate	Moderate	Moderate	Moderate	Severe
	adverse	adverse	adverse	adverse	adverse	adverse	adverse	adverse	adverse	adverse
Physical Fitness	Slight	Slight	Slight	Slight	Slight	Slight	Slight	Slight	Slight	Slight
	beneficial	beneficial	beneficial	beneficial	beneficial	beneficial	beneficial	beneficial	beneficial	beneficial
Journey Ambience	Large	Large	Large	Large	Large	Large	Moderate	Moderate	Large	Large
	beneficial	beneficial	beneficial	beneficial	beneficial	beneficial	beneficial	beneficial	beneficial	beneficial
Accidents	Large	Large	Large	Large	Large	Large	Large	Large	Large	Large
	beneficial	beneficial	beneficial	beneficial	beneficial	beneficial	beneficial	beneficial	beneficial	beneficial
Security	Neutral	Neutral	Neutral	Neutral	Neutral	Neutral	Neutral	Neutral	Neutral	Neutral
Public Accounts	£205.0M	£203.5M*	£189.8M	£188.3M*	£174.6M*	£191.0M*	£212.4M*	£210.7M	£194.9M*	£180.2M
Business Users	£346.0M	£346.0M*	£328.0M	£328.0M*	£346.0M*	£328.0M*	£318.9M*	£309.8M	£318.9M*	£334.1M
Consumers	£271.9M	£271.9M*	£257.7M	£257.7M*	£271.9M*	£257.7M*	£250.6M*	£243.4M	£250.6M*	£262.5M
Reliability	Large	Large	Large	Large	Large	Large	Large	Large	Large	Large
	beneficial	beneficial	beneficial	beneficial	beneficial	beneficial	beneficial	beneficial	beneficial	beneficial
Wider Impacts	Slight	Slight	Slight	Slight	Slight	Slight	Slight	Slight	Slight	Slight
	beneficial	beneficial	beneficial	beneficial	beneficial	beneficial	beneficial	beneficial	beneficial	beneficial
Option Values	Neutral	Neutral	Neutral	Neutral	Neutral	Neutral	Neutral	Neutral	Neutral	Neutral
Severance	Slight	Slight	Slight	Slight	Slight	Severe	Slight	Slight	Severe	Slight
	adverse	adverse	adverse	adverse	adverse	Adverse	Adverse	Adverse	Adverse	Adverse
Access	Slight	Slight	Slight	Slight	Slight	Slight	Slight	Slight	Slight	Slight
	beneficial	beneficial	beneficial	beneficial	beneficial	beneficial	beneficial	beneficial	beneficial	beneficial
Transport interchange	Slight	Slight	Slight	Slight	Slight	Slight	Slight	Slight	Slight	Slight
	beneficial	beneficial	beneficial	beneficial	beneficial	beneficial	beneficial	beneficial	beneficial	beneficial
Land-use Policy	Neutral	Neutral	Neutral	Neutral	Neutral	Neutral	Neutral	Neutral	Neutral	Neutral
Other Policies	Slight	Slight	Slight	Slight	Slight	Slight	Slight	Slight	Slight	Slight
	beneficial	beneficial	beneficial	beneficial	beneficial	beneficial	beneficial	beneficial	beneficial	beneficial

* Estimate

Impact is common to all 10 route options