MERSEY CROSSING
STUDY

CONFIDENTIAL

Stage 1 Report

June 1997
# REPORT CONTROL SHEET

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OSCAR FABER
NEW MERSEY CROSSING STUDY

STAGE 1 REPORT

CONFIDENTIAL

June 1997

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1. INTRODUCTION

1.1 Background

Oscar Faber were commissioned by the Department of Transport in 1991 to undertake the Mersey Crossing Study, to examine the need for a new strategic crossing in an area extending from the M6 westwards to the coast. Though the study was completed much earlier, the Final Report was not released till 1993.

The study looked at a number and range of route options and identified five which deserved closer investigation. These were subject to preliminary traffic engineering and environmental appraisals, and the results are described in some detail in the Study Final Report.

The key findings of the study were as follows:

a) The existing Runcorn Bridge was (in 1993) already close to capacity, carrying in the order of 75,000 vehicles per day AADT, with frequent peak period congestion and queuing.

b) Forecast growth and new highway schemes programmed or already under construction at the time would increase the demand on the Runcorn-Widnes Bridge to traffic flows of 118,000 to 150,000 AADT by the year 2016, significantly above the capacity of the existing crossing or approach roads.

c) The Runcorn-Widnes Bridge carries a large amount of long distance traffic, with 50% travelling more than 15 kilometres and 30% travelling between Runcorn and Widnes.

The main conclusions from the study were as follows:

a) Existing traffic congestion on the bridge will get much worse to the extent that there would inevitably be constraint on traffic demand.
b) There are severe constraints affecting the construction of a new strategic crossing in particular:

- ecology - due to the sensitive nature of the river and its banks which include a Ramsar site, a Special Protection Area (SPA) and Sites of Special Scientific Interest (SSSI);

- urban environment - due to the location of Widnes and Runcorn on the banks at the shortest crossing point; and

- cost and engineering - due to the possible length of a crossing and the difficulty of bridging the Manchester Ship Canal, in particular the need to cross at high level to maintain shipping rights.

Three preferred options were identified for a strategic crossing. All were close to and would give relief to the existing bridge.

The Government concluded that there is insufficient strategic traffic demand across the Mersey to justify a new trunk road (or strategic) crossing. It pointed out however that there is a large local traffic demand, and subsequently accepted that the local authorities in the area may wish to consider the feasibility of a more local crossing, to resolve the increasing congestion. This acceptance reflected the Objective 1 status of Merseyside and the Objective 2 designation of areas of North Cheshire.

There is little prospect of the present Government constructing and funding a new trunk road crossing. In the meantime problems continue to increase on the existing bridge affecting particularly the sub-regional and local traffic, for which there is no nearby alternative crossing. Continuing traffic congestion on the bridge and its approaches will restrain future economic development of the counties of Merseyside and North Cheshire and the freestanding towns either side of the Mersey. It could also restrain the potential development of Liverpool Airport and associated strategic development sites in the area. At the recent
public inquiry into the expansion of Liverpool Airport, the congestion on Runcorn-Widnes Bridge was cited as a potential constraint on accessibility.

A Mersey Crossing Group has been formed by representatives of the Mersey Metropolitan Borough Councils of Liverpool, Knowsley, Wirral, Sefton and St. Helens, Cheshire County Council; the two Cheshire District Councils of Halton and Warrington, and the Chambers of Commerce of Liverpool, Warrington and Halton.

Following ministerial approval in December 1995, the Mersey Crossing Group commissioned Oscar Faber to investigate the feasibility of a new crossing of the Mersey, in the vicinity of the existing Runcorn-Widnes Bridge. The study is particularly aimed at supporting economic development initiatives in the Objective 1 and 2 areas, relieving the constraint on sub-regional and local movements, with only limited improvements to approach roads to the crossing.

Oscar Faber were assisted in the study by the following sub-consultants:

- Pieda, Economic Development;
- RPS Consultants, Environmental Assessment; and
- Cheshire Engineering Consultancy, Engineering Design.

### 1.2 Objectives of the Study

A brief for the current study was prepared by Oscar Faber and this was subsequently approved by the Mersey Crossing Group. The objectives of the study are summarised below, and the full brief is included in Appendix A:

a). To examine the feasibility of a new local crossing aimed at relieving the existing Runcorn Widnes Bridge, in order to remove constraints on accessibility across the river and to facilitate future developments in the widest area on both the north and south banks.
b) The study area should extend approximately 3 kilometres either side of the existing bridge, to encompass both possible southward extensions of the A5300 in the west, and possible crossings linking to the Runcorn Expressway near Astmoor in the east. As the nearest practical options to the existing bridge but facilitating alternative uses of the existing highway network.

The economic development opportunities arising from a new crossing, or alternatively the damage that may occur to the local economy in the absence of a new crossing, is a key issue for this study. Other key issues for the study are as follows:

- Provide an optimal solution, within the identified constraints, for the encouragement and facilitation of economic development on both sides of the Mersey in the widest possible area, including Merseyside, Runcorn and Widnes and North Cheshire;

- Minimise disruption to the rural environment, ecology and river regime, paying particular regard to the Ramsar site, SPA and SSSI;

- Separation of local and sub-regional/strategic traffic movements, particularly on crossing approaches, to ensure the new crossing capacity is used most effectively and to avoid increasing the overall amount of traffic which passes through the urban centres either side of the crossing(s);

- Minimise disruption and further disturbance and pollution to the urban environment of Runcorn and Widnes;

- Minimise construction beyond the new crossing to ensure that a cost effective solution is achieved whilst relieving congestion across the corridor;
1.3 Study Approach

The study is being conducted in two stages and this report presents the findings of the first stage. Stage 1 of the study involved the identification and assessment of a wide range of options within a 3km corridor either side of the existing bridge. The identified options were subject to a preliminary assessment of their traffic, economic development, environmental and engineering impacts. Three options have been identified for analysis in Stage 2 of the study (The original study brief stated that two options were to be taken forward to Stage 2 but this was amended to three following a presentation to the client group on 6 November 1996. A third option being included to ensure that a balanced assessment of the alternative crossing options was undertaken in Stage 2).

Stage 2 of the study will involve a thorough assessment of the three options brought forward from Stage 1. Recommendations will then be made with regard to a preferred option and the work required to progress the preferred option will be identified.

1.4 Structure of this Report

This report presents the findings of Stage 1 of the Mersey Crossing Study. It details the identification of the scheme options and describes the results and conclusions of the analysis of the options.

Following this introduction there are a further 5 chapters. Chapter 2 details the results of a review of existing data sources and the changes that have occurred since the original study undertaken on behalf of the Department of Transport.
The identification and description of the Stage 1 options are presented in Chapter 3. Chapter 4 presents the environmental, economic and traffic assessment of each of the options. Chapter 5 summarises the main findings of the study and the recommended options for Stage 2 of the study are given in Chapter 6.
2. REVIEW OF EXISTING DATA

The traffic model developed for the original study used 1991 as a base year. Since that date a number of changes have taken place to the highway network with a number of schemes now being open to traffic, and they are:

- Widnes Eastern Bypass;
- A5300; and
- St Helens Link.

The traffic patterns in the study area are therefore different to those that existed at the time of the original study.

The first stage in the review of existing data was to obtain traffic counts for the main crossing points of the River Mersey. Cheshire County Council were able to supply data for the Runcorn-Widnes Bridge and other links within Cheshire. Merseytravel were able to provide traffic count data for the Mersey Tunnels.

Traffic flows across the M6 Thelwall Viaduct have been restricted due to the roadworks and traffic management arrangements associated with the construction of a new motorway viaduct. Unfortunately as a consequence of the roadworks traffic count data has not been collected across the Viaduct during 1996. (It should be noted that the DOT study of the Mersey Crossing indicated that the improvements to Thelwall Viaduct would not significantly reduce the level of congestion across the Runcorn Bridge and this has been confirmed in this study).

Comparison of 1996 and 1991 traffic flows across Runcorn Bridge indicate that traffic flows have increased by almost 13% from 67,000 vehicles AADT in 1991 to 75,000 vehicles AADT in 1996. In comparison national vehicle traffic, excluding motorways, increased by 3% between 1991 and 1995 (the last year for which full data is available). This indicates that there has been a significant increase in traffic flow across the Runcorn Bridge which is in excess of national growth. Analysis of historical count data indicates that up to 1991 traffic growth across the bridge was in line with observed national growth.
The hourly profile of traffic flows across the bridge, for 1991 and 1996, are shown in Figures 2.1 and 2.2 for the northbound and southbound directions respectively. It can be seen that rather than traffic spreading to the off-peak periods there has been an increase in traffic across the whole day and in particular during the peak periods.

The higher than average increase in traffic flows could be caused by the new highway schemes in the area drawing additional traffic onto the bridge and by general traffic growth.

The 1991 traffic model and its technical content were approved during the DOT study of a new Mersey Crossing and a Local Model Validation Report was produced. The 1991 model has therefore been developed and validated according to the guidance given in the Department of Transport’s Traffic Appraisal Manual (TAM) and meets all the relevant technical criteria. The 1991 model therefore provides a useful tool for assessing the changes to travel patterns in the study area and the implications of providing a new crossing of the River Mersey.

In order to determine the cause of the significant growth in bridge traffic the 1991 traffic model was updated to include the new highway schemes in the area. The trip car/light goods vehicle matrices were factored to 1996 using growth rates for the North West Region extracted from the National Trip End Model. The heavy goods vehicle matrices were factored from 1991 to 1996 using national growth rates. The matrices were then assigned to the model and a comparison was made between the observed flows on the Runcorn Bridge and the figure produced by the model.

The traffic updated model produced 12 hour assigned flows on Runcorn Bridge of 67,800 (two-way) compared to an observed 12 hour flow of 64,000 (two-way). The traffic model therefore produces assigned bridge crossing flows that are within six per cent of the observed flow.

TAM states that the 95% confidence interval of an automatic traffic counter is of the order of +/- 5% of the total count. However, the traffic flows across the
Runicorn Bridge are subject to stop/start conditions, particularly during the peak
periods, and standing traffic is common. Under such conditions automatic traffic
counters will record actual traffic flows and the true 95% confidence
interval is likely to be greater than the TAM value of +/- 5%. The assigned traffic
flow across the Runicorn Bridge is within six per cent of the observed flow and,
given the nature of the traffic conditions across the bridge, this is an acceptable
result.

The 1991 base model has been fully validated according to the criteria specified
in TAM and has received approval as part of the original DOT study. The 1996
model uses the fully validated 1991 model as its starting point and as a result a
full revalidation of the model was not necessary. However, checks were
undertaken to confirm the acceptability of the model and a comparison of
modelled and observed 1996 traffic flows across the Runicorn Bridge confirmed
that the updated model is sufficiently robust for the assessment of new river
crossings.

The updated, 1996, traffic model confirms that the higher than average increase
in traffic flow across the existing Runicorn Bridge is as a result of the new
highway schemes that have opened in the study area and general traffic growth.

As part of this study the Environmental and Planning constraints map produced
during the Department of Transport investigation was updated. The major change
in this area is that the River Mersey now has official SSSI, SPA and Ramsar
status. The environmental assessment conducted in the first Mersey Crossing
Study was fairly superficial and did not address the environmental impact of
providing no additional crossing capacity. The assessment in this study will be
more detailed and will include the effects of a ‘do nothing’ scenario.

The engineering data used in the previous study has been reviewed and found to
be still valid and has therefore been utilised for the existing study.

The economic development impact issues of a new crossing were not investigated
as part of the study conducted on behalf of the Department of Transport.
Therefore data sources were not available from that study. However, existing published material has been utilised and consultations have been conducted with the Local Authorities and Chambers of Commerce in the study area.
New Mersey Crossing Study
Fig 2.2 Runcorn Bridge - Southbound

Flow

Time

Apr 1996 - Apr 1990
3. IDENTIFICATION OF OPTIONS

3.1 Introduction

Following Oscar Faber's recommendations the study area is 3 kilometres either side of the existing bridge and encompass both possible southward extensions of the A5300 in the west and possible crossings linking to the Runcorn Expressway near Astmoor in the east. Having reviewed the previous study reports and the various constraint plans, areas of search were defined.

The identification of route options took into account the engineering constraints and the topographical and geotechnical characteristics of the area. The major engineering constraint was the location of the connections of the new bridges to the existing road network as the A562 and the Runcorn Expressway have relatively closely spaced junctions for this type of road and the introduction of new junctions would be extremely difficult. However, appropriate forms of junction will be designed at the intersection of the existing highway network and new crossing options.

A geotechnical assessment has been undertaken on the basis of a review of the geotechnical data in the previous report and for new routes by examination of the Geotechnical survey maps of Great Britain including borehole data.

A key issue is whether a new crossing should be by bridge or tunnel. Whilst a tunnel would avoid some environmental problems it would create others, for much of the estuary it would also present engineering difficulties. Ground conditions, comprising mainly superficial drift material, would make conventional tunnelling unsuitable, and the ship canal would be an obstruction which may prevent the use of the immersed tube technique. In addition immersed tubes would have a significant impact on the river bed and would be have an adverse environmental impact. There would also be difficulties in connecting a tunnel to the existing highway network and the overall cost of a crossing would be more expensive than a bridge option. A tunnel option was therefore considered to be not viable.
The area under consideration lies within the approach path of Liverpool Airport’s runway. There is a defined ‘approach surface’ above which structures cannot go. This surface is at ground level at the airport and at about 130m above that level at the existing Runcorn Bridge which is approximately 80m high.

As a result of the considerations described above, a total of nine options were produced and cost estimates were derived for each option. The costs have been derived on the basis of a multiple span crossing and include the cost of the structure and highway costs associated with connecting the crossing with the existing highway network. The figures do not include the costs of other highway works that may be necessary as a result of providing a new crossing or the costs of environmental measures that may be necessary to reduce the impact of a new crossing. These would be assessed in Stage 2 of the study.

The options are shown in Figure 3.1 and described below.

3.2 Description of Route Options

3.2.1 Option A (A5300 to A557 Weston Point Expressway)

This option links the southern terminal of the A5300 to the A557 Weston Point Expressway north of the chemical works with all movement junctions at the terminal points of the new crossing. Avoidance of works within the estuary cannot be achieved with this option, or routes to the south of this line, by a suspension bridge, as the towers would extend above the ‘approach surface’ of Liverpool Airport’s runway. A suspension bridge solution would also increase the construction costs significantly.

The new bridge and connections to the existing highway network are estimated to cost £114 million.
3.2.2 Option B (A5300 to A557 Weston Point Express)

This is a shorter variation of Option A having the same terminal arrangements but having a greater impact on residential areas to the north of the river. Costs estimates to be similar to Option A.

3.2.3 Options C1 and C2 (A562 Speke Road near Everite Road to A557 Weston Point Expressway)

Both of these options leave Speke Road in the vicinity of Everite Road climbing over Hale Road and the Railway and following Ditton Brook on viaduct to the river. It is envisaged that the new route would become the through road and that slip roads can be provided to link to the existing Speke Road eastwards. The separation of the A5300 slip roads and this proposed junction is likely to be substandard.

On approaching the river, the two routes diverge, C1 taking a more southerly route, crossing the dock area and joining the line of the Runcorn Expressway to the north of existing Picow Farm Road junction, but being some distance above it. This is a very difficult terminal point, the railway being higher than the Expressway. One option is for the new route to pass over Picow Farm Road Bridge, with the existing Expressway and slip roads being diverted sideways and lengthened southwards to form the southern junction. Picow Farm Road Bridge, if necessary, may have to be closed for approximately 9 months, though the slip roads would probably remain open for partial access. It would appear likely due to poor ground conditions north of the river that all this route would be on viaduct.

The junctions between the new crossing and the existing highway network were modelled as all movements.

The bridge for Option C1 and its connections to the existing highway network are estimated to cost £119 million.
Option C2 takes a shorter line across the river joining the Expressway north of Picow Farm Road Interchange by means of a tight curve similar in radius to the curve on Queensway as it sweeps round and up to pass over Ditton Road roundabout. The route then crosses the railway and drops down to join the Expressway with the existing road split sideways to maintain links to the east.

Route C2 and its connections to the existing highway network are estimated to cost £107 million.

3.2.4 Option D (A562 at St Michael’s Road to A557 Weston Point Expressway)

Option D leaves the A562 by means of two slip roads in the vicinity of St Michael’s Road, the southbound one sweeping in a tight curve to pass over the A562, across the golf course and Ditton Road, then joining the northbound slip to pass over the railway and the landfill site. South of the river the connection is as described for Option C2.

The estimated costs of the new crossing and its connections to the existing highway network is £88 million.

3.2.5 Option E (A562 at Queensway to A557 to Weston Point Expressway)

Option E leaves the A562 at its junction with Ditton Road, one junction option sweeping through route over the roundabout and the first railway before passing through two of the arches carrying the Runcorn to Liverpool railway adjacent to Desoto Road East. It would then regain height to follow the line of and above Desoto Road East on viaduct then across the river to terminate on the Expressway as described for Option C2.

The bridge and its connections to the existing highway network are estimated to cost £100 million.
3.2.6 Option F (A second bridge adjacent to the existing Runcorn-Widnes bridge)

A report prepared prior to the previous widening of the existing bridge concluded that widening the existing bridge would entail replacing the existing concrete bridge deck with a steel version. This would restrict the bridge to 2 lanes for approximately 2 years. This is considered unacceptable with the present traffic demand.

A second bridge could be constructed between the existing bridge and the railway bridge at the same level.

The realignment of the northern approach to tie in with the existing highway network would appear to be relatively straightforward, but would be subject to a thorough examination in Stage 2.

The connection of a new crossing to the Runcorn Expressway could be made by means of improvements to the existing slip roads to the Runcorn Bridge or by a complete re-design of the junction with revised priorities. If this option is taken forward to Stage 2 a full assessment will be made of the two alternatives. The proposals contained in the previous study indicated a likely re-design alternative.

The design of a new bridge would be constrained by the listed status of the existing rail bridge and has an estimated cost of £54 million, which includes the cost of linking into the existing highway network.

3.2.7 Option G (A557 Widnes Eastern Bypass to A533 Daresbury Expressway at Astmoor Road (West))

This option leaves the Widnes Eastern Bypass as it passes under the railway at Appleton Street. The new route would become the through route as it climbs to pass over the St Helens canal enabling the west bound slip road from the eastern bypass to pass under it. Any junction proposed on this trunk road would require Highways Agency approval.
Skirting Spike Island this option then crosses the river to terminate at an elevated roundabout above the Daresbury Expressway, where Astmoor Road currently passes under it. Full slip road connections could be provided but Astmoor Road could no longer join the Expressway at this point, and a new western connection for Astmoor Road would have to be provided possibly to Bridge Street or Heath Road.

The terminal junctions of the new crossing have been tested as all movements.

The new crossing and its links into the existing highway network are estimated to cost £79 million.

3.2.8 Option H (A557 Widnes Eastern Bypass to A533 Daresbury Expressway at the Central Expressway junction)

This option leaves the Widnes Eastern Bypass north of Appleton Street, crossing the Railway, St Helens Canal, the River Mersey and the Manchester Ship Canal. Any junction between the new crossing and the Widnes Eastern Bypass would require approval from the Highways Agency.

South of the river, this option cuts through the Astmoor Estate to join the expressway at the junction between the Daresbury and Central Expressways. Both this and the northern junction have been tested allowing for all movements.

The new crossing and its connections to the existing highway network are estimated to cost £106 million.
4. ASSESSMENT OF STAGE 1 OPTIONS

4.1 Introduction

Each of the options were assessed in terms of their traffic impacts, preliminary cost benefit analysis, economic development benefits and environmental impacts. The traffic projections for each option were derived using the updated traffic model and a design year of 2016. The assessment of the routes is detailed below.

4.2 Traffic Assessment

4.2.1 Introduction

An opening year of 2001 has been used for each of the options and therefore traffic forecasts were produced for the design year 2016, ie fifteen years after opening, using growth factors from the Merseyside Integrated Transport Study (MERITS). The MERITS study produced central growth factors for the period 1991-2011, which were extrapolated to cover the period 1996-2016. These were then applied to the 1996 base year matrices to produce low growth forecasts for 2016. The central growth forecasts from MERITS were derived from a distribution of activity to the present day. It is likely that the provision of additional highway capacity across the River Mersey will lead to an increase in economic activity either side of the river. It was therefore necessary to include high growth forecasts as a sensitivity test. High growth figures were produced by factoring the 2016 low growth matrices by the relative growth between the national low and high traffic forecasts.

The assessment methodology used is that of a fixed matrix approach, that is to say the total trip making remains the same in both the Do-Minimum and Do-Something tests. No allowance has been made for trips being induced as a result of the removal of congestion for movements across the River Mersey.

A capacity restrained assignment technique was used was to produce the forecast traffic flows. This allows speeds on the traffic network to fall as flow levels...
increase. It does not, however, impose a limiting capacity on any link in the road network. The assumption is that all the traffic demand is satisfied during the 12 hour modelling period and that no trips are suppressed, however great the cost of making the trip becomes. This approach is equivalent to assuming that peak hour congestion will result in peak hour spreading rather than trip suppression.

Using these low and high matrices, traffic was assigned to each of the test networks. Figures 4.1-4.9 show the results of these assignments in each option. The following section describes the results of the assignments to each option and compares the traffic flows with the Do-Minimum. It highlights the main increases and reductions in flows and gives an indication of the scale of improvements required to the wider study network.

4.2.2 Do-Minimum

Figure 4.1 shows the forecast Do-Minimum 2016 AADT flows. The forecast traffic flows across the Runcorn Bridge would be in the range 102000-120000 AADT. At such levels of traffic flow there would be high levels of congestion for journeys across the bridge. Indeed the queues and delays currently experienced across the bridge during peak hours are likely to exist for much of the working day at the forecast levels of flow in the Do-Minimum. This will ultimately result in disruption to trip patterns with trips being either suppressed, retimed or diverted.

A comparison between the base year and forecast Do-Minimum cross river traffic flows indicates that the flows across the Runcorn Bridge increase by a lower proportion than the overall matrix growth. All things being equal the increase in flow across each of the river crossings should be the same. The fact that the increase in flow across the Runcorn Bridge is lower than the other crossing points demonstrates that the levels of congestion across the bridge forces trips to seek alternative routes. In other words the growth in traffic flow on Runcorn Bridge is being suppressed due to the capacity constraints. The result of traffic seeking alternative routes is that the other river crossing experience a slightly larger increase in traffic flow than the overall matrix growth.
Traffic flows across the M6 Thelwall Viaduct would be in the range 153000-165000 AADT. Once again, at such levels flow breakdown will occur and the levels of delay are likely to be similar to those that were experienced prior to the provision of additional capacity across the viaduct.

Traffic flows on the A557 Runcorn Expressway would be in the range 54000-60000 AADT and at such levels traffic flow breakdown and delays may be experienced during parts of the day. In addition the traffic flows on the A561, between the A5300 and the Runcorn Bridge, would be in the range 57000-66000 AADT which could result in delays and congestion on the approaches to the Runcorn Bridge, from the northern side of the Mersey.

The traffic flows on the M56 to the west of Junction 12 would be in the range 110000-127000 AADT which, once again, may result in flow breakdown on this section of the motorway.

The capacity limitations across the Runcorn Bridge, in the Do-Minimum, would result in traffic seeking alternative crossings of the River Mersey. Traffic that remains on the Runcorn crossing are likely to experience delays and congestion both on the bridge and its approaches. Such restrictions upon movement could have an adverse impact on the economy of the region and this will be more thoroughly investigated in Stage 2 of the study.

4.2.3 Option A

The 2016 forecast traffic flows for this option are shown in Figure 4.2. The route would carry vehicle flows in the range of 49000-63000 vehicles AADT. The traffic on the new crossing would mainly be as a result of a transfer of traffic from the existing bridge, whose flow would be reduced by up to 34%, compared to the Do-Minimum, to between 67000 and 80000 AADT.

The provision of additional capacity across the Mersey would result in traffic that was diverting away from the existing Runcorn Bridge in the Do-Minimum returning to this corridor. This suppressed traffic then reverts to its preferred
route across the river. As a consequence traffic flows on the Mersey Tunnels would drop by up to 7%, with traffic on the Thelwall Viaduct falling by 3%. However, the effect of traffic returning to the corridor from other crossing points would be to increase the traffic flows on the A557 Runcorn expressway by an average of 21% to between 66000-72000 vehicles AADT. At such traffic levels on the Expressway, the peak period may be subject to flow breakdown and congestion. As a result, the expressway may require widening from a dual two lane carriageway to dual three lanes. Junction 12 of the M56 may also require improvements to accommodate traffic flows onto the expressway. To the west of Junction 12 flows on the M56 would increase by 4% to 115000-132000 AADT by 2016.

On the A5300 traffic flows would increase, on average, by 5% to between 57000 and 60000 AADT. Such growth is within the present capacity of the road. East of the A5300, traffic flows on the Widnes Eastern By-Pass would increase by 4%, when compared with the Do-Minimum, to reach flow levels of between 34000-38000.

4.2.4 Option B

The route followed by Option B is similar to Option A but forms a slightly more direct route to the A5300. The 2016 forecast traffic flows are shown in Figure 4.3. This option would attract flows in the range 48000-55000 vehicles AADT, mainly drawn from the existing Runcorn-Widnes bridge. The flow levels on the existing bridge would be reduced by up to 33% when compared with the Do-Minimum, to between the range 68000-81000 AADT.

As in option A, traffic would no longer be diverted to other crossings due to the constraints on capacity between Runcorn and Widnes. Therefore the other river crossings would experience reduction in traffic as movements return to the corridor. The Mersey Tunnels flows would reduce by up to 6% and the Thelwall Viaduct by 3%, compared to the Do-Minimum.
Once again traffic flows on the A557 would be increased by 12% to 62000-66000 vehicles AADT by the year 2016. Once more, the expressway may require widening from dual two lanes to dual three. Junction 12 of the M56 may also require improvements to accommodate the additional traffic attracted to this junction. West of Junction 12 traffic flows would increase by 4%, to between 115000 and 132000 vehicles AADT by 2016.

Traffic flows on the A5300 would increase by up to 5% to between 57000-60000 AADT, a similar increase to Option A, such that no road improvements are necessary. Following on, east of the A5300 traffic flows would be similar to those experienced in the previous option, where flows increase by 3%.

4.2.5 Option C1

This option is similar to Option B in that it originates at Westpoint but rather than following a direct route to the A5300 it connects into the A561 adjacent to A533. The 2016 forecast traffic flows are shown in Figure 4.4. The new crossing would carry between 49000-57000 vehicles AADT by the year 2016. The main source of this traffic is from the existing Runcorn-Widnes bridge, which would experience traffic flow reductions from the Do-Minimum levels of 102000-120000 to 66000-78000. Traffic flows through the Mersey Tunnels would reduce by an average of 4% due to traffic returning to the Runcorn-Widnes corridor, and the flow across Thelwall Viaduct would reduce by an average of 3%. These reductions take place as traffic that is suppressed from using the Mersey Crossing in the Do-Minimum, and as a result is forced to use alternative crossing points, returns to its preferred route as a consequence of the additional highway capacity across the Mersey.

Traffic flows on the A557 Runcorn Expressway would increase by an average of 24%, to 69000-72000 vehicles AADT by the year 2016 - compared to 54000-60000 in the Do-Minimum. Once again the expressway may require widening to dual three lanes from Junction 12 of the M56 to the junction with the new crossing. In addition Junction 12 of the M56 may need upgrading.
On the A5300 traffic flows would increase by an average 5% from Do-Minimum flows of 54000-57000, to 58000-59000 AADT. Traffic flows on the A561, between the A5300 and the new crossing, would increase by an average of 17% to 67000-77000 vehicles AADT by the year 2016. This section of the A561 may therefore require widening from dual two lanes to dual three lanes in order to prevent a breakdown of traffic flows.

4.2.6 Options C2 and D

Both Option C2 and Option D would commence at Westfield on the A557 Runcorn expressway and would link into the A561 north of the river, albeit at slightly different locations. In traffic modelling terms the routes are very similar and therefore a single run of the model has been undertaken and the resulting traffic flows apply to both options. The resulting forecast traffic flows at 2016 are shown in Figure 4.5.

The new river crossing would carry traffic flows between 54000-63000 vehicles AADT by the year 2016. Once again the flows are mainly drawn from the existing Runcorn-Widnes bridge, which would carry traffic flows of between 59000 and 69000 AADT, an average reduction of 42% compared to the Do-Minimum.

Once again the additional capacity in the corridor means that traffic no longer diverts to other crossings. Hence the Mersey Tunnels experience an average reduction in flows of 4%, and the M6 Theilwall Viaduct of 2%, compared to the Do-Minimum. However, as in previous options, on the A557 Runcorn Expressway, traffic flows would increase by an average of 11% to 60000-65000 vehicles AADT by the year 2016. Under low growth these flow levels are close to the acceptable limits for a dual two lane carriageway, and the expressway may require widening to three lanes. It is possible that the A557 may require widening to dual three lanes from Junction 12 of the M56 to the junction with the A533. Once again Junction 12 of the M56 may require improvements.
Traffic flows between the A5300 and the diverge for the new crossing would increase on the A561 by an average of 14% to 63000-77000 vehicles AADT by the year 2016. This section of the A561 would therefore require widening from dual two lanes to dual three lanes.

On the A5300 traffic flows would increase by 4% to 56000-59000 vehicles AADT by the year 2016. On the Eastern Widnes By-Pass, traffic flows increase by an average of 7% to 35000-39000.

4.2.7 Option E

This option extends from a new junction at Westfield on the A557 Runcorn expressway, to the A561 at Lower House. The resulting forecast traffic flows at 2016 are shown in Figure 4.6.

Option E results in traffic flows similar to those produced by Option C2/D. The new crossing would carry flows of between 55000 and 63000 vehicles AADT by the year 2016. The flows on the new crossing would be mainly due to traffic transferring from the existing Runcorn Widnes bridge. Under this option the traffic flows on the existing bridge would be 56000-69000 AADT, an average reduction of 44% compared to the Do-Minimum.

The traffic flows on the A557 Runcorn Expressway would increase by 8% from the Do-Minimum, to between 58000 and 65000 vehicles AADT. Should high growth materialise the flow levels on the A557 Runcorn Expressway are such that widening to three lanes may be required. The A557 may require widening to dual three lanes from Junction 12 of the M56 to the junction with the A533. Once again Junction 12 of the M56 may require improvements.

Traffic flows on the section of the A561, between the A5300 and the new crossing, would increase by 8% to between 62000 and 71000 vehicles AADT by the year 2016. This section of the A561 may therefore suffer a breakdown in traffic flow and require remedial measures.
4.2.8 Option F

Figure 4.7 shows the forecast 2016 traffic flows for this option. The improved crossing would attract between 112000 and 130000 vehicles AADT by the year 2016. This represents an increase in vehicle flow of 10% compared to the Do-Minimum. As in previous options, the provision of additional capacity in this corridor results in traffic no longer diverting to other river crossings. As a result the flows through the Mersey Tunnels and on the M6 Thelwall viaduct would be respectively 5% and 2% lower than in the Do-Minimum.

Traffic flows on the A557 Runcorn Expressway would be similar to those in the Do-Minimum and, should high growth materialise, may require widening in order to accommodate the forecast traffic flows. Traffic flows on the A533 Central expressway would increase by an average of 16% to 23000-28000 vehicles AADT by 2016. These flows are within acceptable limits for a dual two lane carriageway. However, the A557 may require widening to dual three lanes from Junction 12 of the M56 to the junction with the A533. As in previous options, Junction 12 of the M56 may also require improvements.

On the A561 north of the bridge, traffic flows would increase by 9% to 62000-72000 vehicles AADT by the year 2016. The A561 may require widening to a dual three lane carriageway from the A533 roundabout to the A5300 in order to prevent a breakdown in traffic flows.

4.2.9 Option G

The forecast 2016 traffic flows for this option are shown in Figure 4.8. The new crossing would carry forecast traffic flows of between 56000 and 65000 vehicles AADT, by the year 2016. These flows would mainly be as a result of a transfer from the existing bridge. Flows on the existing bridge would therefore reduce by 38%, compared to the Do-Minimum, to between 63000-74000 AADT.

Due to the fact that the new crossing is located to the east of the existing bridge traffic from the south, eg M56 Junction 12, would route via the A533 Central
Expressway, rather than travelling round the western side of Runcorn on the A557. The flows on the A557 would therefore reduce by an average of 26%, compared to the Do-Minimum, to 39000-45000 vehicles AADT. In comparison to the Do-Minimum traffic levels the flows on the A533 Central Expressway would more than double to between 47000 and 52000 vehicles AADT by the year 2016. Both flow levels could be accommodated within the existing highway capacity.

Junction 12 of the M56 may require improvements, and the A557 may require widening from Junction 12 of the M56 to the A533 junction. In addition the A533 Northern Expressway may also require widening to dual three lanes, between the new crossing and the junction with the A558.

This option would result in an average reduction in flow on the A5300 of 7000 vehicles AADT to 45000-52000 vehicles AADT, as sub-regional traffic transfers to the Widnes Eastern Bypass. The Widnes Eastern bypass is forecast to experience an average increase in flows of 23000 vehicles AADT. The model predicts that this would represent a 67% increase, taking the flow to 55000-60000, however, there is some uncertainty about the 'base' flow because of the possible exclusion of some local traffic on this section of the road in the model. The traffic information has been extracted from a strategic traffic model of the area. As a result the model will not include all of the local reassignment effects that take place in the area as a result of the Widnes Eastern bypass. Therefore whilst the absolute flow increase is reliable the percentage increase in flow on this link could be misleading and should be treated with caution. However, it does indicate that the Widnes Eastern bypass will experience significant increases in flow as a consequence of this option. The additional traffic on the bypass would put further pressure on Junction 7 of the M62 which is currently overloaded and subject to congestion and delays during the peak periods.

4.2.10 Option H

The forecast 2016 traffic flows for this option are shown in Figure 4.9. The new crossing would carry flows between 52000-60000 vehicles AADT by the year
2016. As before, these would mainly be as a result of a transfer from the existing bridge. The traffic flows on the existing Runcorn Bridge would reduce by 34%, compared to the Do-Minimum, to between 67000-79000 AADT.

Overall the scheme results in traffic patterns similar to those produced by Option G. Option H also results in bridge traffic routeing via the A533 Central Expressway rather than the A557 Runcorn Expressway. Consequently flows on the A557 would reduce by 18% to between 45000 and 49000 vehicles AADT. Flows on the A533 would more than double, compared to the Do-Minimum, to between 48000 and 50000 vehicles AADT by the year 2016. Both flows levels could be accommodated within the existing highway capacity.

In line with previous observations, Junction 12 of the M56 may require improvements and the A557 may require widening from Junction 12 of the M56 to the A533 junction.

This option would result in an average reduction in flow on the A5300 of 9000 vehicles AADT to 43000-50000 vehicles AADT, as sub-regional traffic transfers to the Widnes Eastern Bypass. The Widnes Eastern bypass is forecast to experience an average increase in flow of 25000 vehicles AADT. The model predicts that this would represent a 72% increase, taking the flow to 56000-63000, however, there is some uncertainty about the ‘base’ flow because of the possible exclusion of some local traffic on this section of the road in the model. The traffic information has been extracted from a strategic traffic model of the area. As a result the model will not include all of the local realignment effects that take place in the area as a result of the Widnes Eastern bypass. Therefore whilst the absolute flow increase is reliable the percentage increase in flow on this link could be misleading and should be treated with caution. However, it does indicate that the Widnes Eastern bypass will experience significant increases in flow as a consequence of this option. The additional traffic on the bypass would put further pressure on Junction 7 of the M62 which is currently overloaded and subject to congestion and delays during the peak periods.
4.3 Cost Benefit Analysis (Highways)

4.3.1 Introduction

A simplified cost benefit analysis has been undertaken based on the changes in vehicle-hours and vehicle kilometres predicted by the traffic model used to assess the schemes. The assessment only includes the benefits to road users and excludes any benefit derived by non-users of the highway system, for example increased economic activity generated by businesses locating to the area due to improved access.

Standard values of time and vehicle operating costs, as used in the Highway Agency’s economic evaluation program COBA10, have been used. The monetary value of the user benefits for each option have been calculated over a 30 period from the assumed opening year of 2001, and then discounted at 8% per annum to 1994 prices. The central growth factors from MERITS have been used in this Stage 1 cost benefit analysis.

The results of the economic evaluation are a useful and important means of comparing the ‘value’ of the alternative options. In particular the benefits are calculated from average daily traffic flows with no special account being taken of the peak periods when the benefits of improvements in terms of travel cost savings are likely to be greatest. In addition no accident or junction delay benefits have been included in the analysis.

The simplified approach only assesses changes in travel time and distance and excludes delays at junctions and accident savings. It is therefore possible that the benefits will be underestimated with the approach used. However, the procedure used does provide a useful indicator of the travel time benefits of each option and the ranking of the options provides a reliable indicator of their relative performance, in terms of traffic economics.
4.3.2 Cost Benefit Assessment

The cost of each option has been input to the assessment and they are shown in Table 4.2. The costs have been derived in 1995 prices and include the cost of a new crossing and any roadworks associated with connecting the new crossing to the existing highway network.

The results of the evaluation are presented in Table 4.3 and have been ranked in order of performance. The costs and benefits are expressed in 1994 prices and have been discounted to 1994 using the procedures recommended in COBA10. The difference between the costs and benefits are presented as a Net Present Value (NPV), the higher the NPV the more economically robust an option is.

With the exception of Options E and F all the schemes produce benefits of a similar magnitude (£150 Million). Options E and F result in benefits of the order of £100 Million. However, there is a wide range of discounted costs which affects the resulting NPV. The three highest ranking options are:

- Option B  West of existing crossing;
- Option F  On line; and
- Option G  East of existing crossing.

It should be remembered that the assessment has been undertaken using a simplified approach and therefore the results should be considered as indicative at this stage.

4.4 Economic Development Benefits

4.4.1 Introduction

The economic development analysis of the options has been undertaken by Pieda, as sub-consultants to Oscar Faber. A detailed and comprehensive analysis of the economic development potential of each of the identified nine options was not
carried out in Stage 1. This will be undertaken in Stage 2 of the study for the most promising routes selected for more detailed examination.

The analysis carried out in Stage 1 was based on consultation interviews with local authorities and a review of key documents. No detailed analysis of traffic data or the local economy was carried out - these will be considered in Stage 2. The issues considered were: first, the need in terms of economic development potential for benefits of a crossing, wherever it is located; and, second, the actual location of a crossing viz:

- On-line, next to the current bridge ie. central (Option F).
- West of the existing crossing, at any point up to 3km to the west of the current Runcorn/Widnes bridge (Options A, B, C1,C2, D and E), or
- East of the existing crossing, at any point up to 3km to the east of the current Runcorn/Widnes bridge (Options G and H).

The arguments relating to the options are discussed below in terms of (a) the general nature of economic benefits arising from a new Mersey Crossing (wherever it is positioned within the agreed scope of the crossing locations in the study); and (b) the extent to which these benefits would be achieved by the three groups of crossing options (ie. easterly, westerly and central).

4.4.2 The General Nature of Economic Benefits Arising from a New Mersey Crossing

The four main potential types of economic benefits arising from a new crossing are:

- Business cost savings relating to easing congestion for existing firms (that can then help expansion of firms in situ or avoid contraction)
- Reducing travel time to the national motorway network so increasing the likelihood of inward investment or new business start-ups;
• The specific benefit of improving access to Liverpool Airport to aid its expansion; and
• Easing congestion for commuters.

Most benefits are likely to arise from business cost savings relating to easing congestion for existing firms. Business cost savings are made by time savings in the movement of goods and people which lead to reduced business costs, improved efficiency and ultimately to higher profits.

Cost savings also arise from increasing reliability of transport routes. People not arriving at work on time means businesses must pay staff for work not done or pay overtime to shift workers until relief arrives. 'Just in time' delivery methods for manufacturing firms mean reliability is of key importance for deliveries.

Congestion increases transport costs for manufacturing and retail/distribution firms in particular because:

• fewer trips can be planned, reducing productivity of drivers and fleet;
• late deliveries have a knock on effect on delivery appointments later in the day;
• early arrivals means vehicles have to wait for delivery slots creating as much inefficiency as late deliveries; and
• the ability to make back hauls is adversely affected.

For service sector firms congestion means increased costs to businesses in terms of:

• fuel costs; and
• executive costs in terms of unproductive time.

Lower transport costs means an additional crossing will increase strategic access between the M56 and M62. It will also improve routes into and out of Merseyside - an Objective 1 area in recognition of its considerable economic difficulties - and the Objective 2 area of Halton.
Many surveys of business location decision-making have stressed the importance of access to markets and good access to the strategic road network.² From an economic development practitioners' point of view, it has also been Pieda's experience over many years that good road access for new sites (especially access to the motorway network) is an important factor in attracting investment. Such access is best seen as a necessary but not sufficient condition for much investment. Improving access to the national motorway network therefore increases the likelihood of but does not guarantee inward investment.

The literature surveyed¹ also suggests that transport costs and accessibility play an important role in drawing up first an initial short list of locations and then in the choice of final site. Generally, the final location decision on a site will take account of relative local accessibility and congestion in relation to the motorway network.

The market areas of firms in the study area will be spread but are likely to be concentrated (a) within the region (i.e., the North West) and then (b) eastward to Transpennine routes (to Yorkshire, the North East and the Humber ports) and southward (to Midlands, South East and South Coast parts).

The existing Runcorn Widnes Bridge carries a large volume of cross river traffic and is subject to delays and congestion through much of the working day. Whilst there are alternative routes across the river via the Mersey Tunnels and the M6 The wall Viaduct these involve a significant diversion, compared to the Runcorn Bridge route, and an increase in overall journey length. As a consequence of providing additional cross river capacity in the vicinity of the existing Runcorn Bridge (which would have the effect of removing the constraint to north south movements in the area); access to Runcorn, Widnes, Merseyside and North Cheshire would be greatly improved. Without a new crossing congestion is likely


to increase and the lack of cross river capacity would severely constrain the movement of people and goods into and out of the area, which may affect the economic competitiveness of companies.

A new Mersey Crossing will improve the southern access transport links to/from Liverpool airport. There are plans to redevelop Liverpool’s airport so that it is capable of handling 12 million passengers per year as well as the major Speke/Garston redevelopment project. Any major expansion at the airport would add significantly to the volume of passengers accessing the airport from/to the south via the Runcorn/Widnes bridge. Congestion affecting the current bridge could well have a negative effect on the perception of the airport as accessible to passengers and reduce its attractiveness to new airlines. If the Secretary of State’s decision, from the recent public inquiry, into the expansion of Liverpool Airport is that the airport’s expansion should not take place, the land in question will be available for alternative development opportunities.

Economic benefits will arise from easing congestion across the Runcorn/Widnes bridge for commuters. Consultees indicated that the bridge is perceived by many local residents as a physical and psychological barrier to accessing employment on the opposite side of the river. Improving access across the bridge for commuters would allow firms to access a larger effective “labour pool” so lessening the likelihood of skills shortages and increase in choice in the selection of staff.

4.4.3 Economic Assessment of Crossing Options

The traffic assessment, concerning the use made of a new crossing in terms of the flow of local and sub-regional traffic, showed:

- A westerly crossing point would carry a significant volume of sub-regional north/south traffic between the M56 and M62 and traffic travelling in and out of North Cheshire and Merseyside. Access to the area for strategic traffic would therefore be enhanced. The current Runcorn/Widnes bridge would mainly carry local traffic, i.e. business and
commuter traffic between Widnes and Runcorn and locally generated traffic travelling onto the M62 or M56.

- A crossing point next to the current Runcorn/Widnes bridge would need to have some traffic management measures so that local traffic (ie, commuters and business traffic between Runcorn and Widnes), and sub-regional traffic is separated.

- The traffic assessment indicated that an easterly crossing would not result in the natural segregation of local and sub-regional traffic and therefore traffic management measures would be required in order to separate these two types of traffic.

4.3.4 Reducing Business Costs Through Shorter Journey Times

A detailed analysis of relative journey time savings between different options, which would be indicative of business travel costs savings, has not been carried in Stage 1 of the study but will be addressed in Stage 2. However, consultations were undertaken with representatives of the Local Authorities in the study area and the local Chambers of Commerce. The issue of travel time savings were discussed and the key points are detailed below:

- In Pidda's view the key benefits are those obtained from having any additional crossing (in any location considered by the current study) to ease the acute congestion problems of the current bridge.

- The relative advantage of each option would vary depending on where a business was located and where its main markets were located. [Consultees believed that the relative travel time savings between options between points in the study area to the north and south of the Mersey are likely to vary largely in the range of 6-10 minutes]). These will be tested further during Stage 2.
There were some concerns amongst consultees however that the perception of time savings might vary more significantly between options. A westerly crossing point linking with the A5300 was seen as being more likely to be perceived by strategic traffic (moving between the M62 and M56) as a faster crossing option because it would involve passing more directly across the Mersey. This view will need to be tested in Stage 2.

4.4.5 Increasing the Likelihood of Inward Investment

Key points relating to the relative impact on the likelihood of inward investment between options are:

- A number of strategic employment sites (ie. those designated for expansion and development) were discussed with local authorities to establish the likely impacts of the three possible groups of crossing options on inward investment.

- All options would benefit all sites to some extent as in all cases the existing, central bridge location would be relieved eg, a westerly crossing would therefore also benefit sites in the east side of Runcorn or Widnes and an eastern crossing would benefit sites to the west of the existing crossing.

- The further sites are from the existing bridge, the less difference does the precise option make. In Pieda's view for sites north of the M62 or south of the M56 the precise option chosen would make little difference to the benefits.

- As would be expected, however, sites located nearer the existing crossing would benefit more directly from specific crossing options. The actual benefits would depend on precise road alignments as the improvement in accessibility at the level of individual sites can depend on the local access to the crossing alignment.
At this stage we have not carried out a detailed review of site accessibility improvement of different options but in strategic terms the westerly options would tend to provide greatest benefit to sites in south Liverpool (eg. Speke/Garston) and south Knowsley. The easterly options would tend to be of greatest benefit to sites in eastern Widnes and Runcorn (eg. Manor Park and Shell Green).

There are 168 hectares of land allocated for development in south Liverpool in the Speke/Garston area\(^3\). Of this total, 143 hectares (85\%) is in three key sites: Liverpool Northern Airfield, Speke Hall Road and the former Bryant and May site. The sites are in the Speke Garston SRB Partnership area and the Merseyside Objective 1 area. Very significant investment is intended in the sites using a mix of English Partnerships, Objective 1 ERDF and private sector resources. These sites would potentially benefit most from a westerly crossing. By improving links to the area the case for further inward investment is strengthened.

There are 159 hectares of land allocated for development in North East Runcorn (95 hectares) and East Widnes (65 hectares)\(^4\). There are three larger sites Manor Park East (53 hectares), Manor Park III (22 hectares) and Shell Green (22 hectares). These sites would tend to benefit more from an easterly crossing by improving access to Warrington and the M62 or M56 eastward. All these sites would benefit from a central crossing, although a westerly or easterly crossing would also benefit them by relieving traffic on the existing bridge and segregating local and sub-regional traffic.

4.4.6 The main point concerning access to Liverpool Airport is that a westerly crossing point would be most likely to help airport expansion as this would provide the

\(^3\) Liverpool UDP, Draft Report April 1996

\(^4\) Halton Local Plan, Adopted April 1996
best southern access to the airport to passengers travelling from North Wales, North Cheshire and (to a lesser extent) southern Greater Manchester.

4.4.7  Key points concerning the advantages to commuters of easing congestion on the Runcorn/Widnes bridge are:

• The main benefits will be achieved by easing congestion on the current bridge crossing, which can be achieved by any of the crossing options.

• An easterly crossing would also provide a new, more direct link between residential areas north and south of the Mersey in East Widnes and East Runcorn and employment sites in Widnes, Ruicorin and Warrington.

4.4.8  Summary of key points:

• Any new crossing which eased congestion (current and future) would provide economic development advantages to the study area in terms of helping retain employment in existing firms and aiding the attraction of inward investment. The degree of these benefits will be assessed in Stage 2, for the different crossing options.

• In Pidea's view, the difference between crossing options in economic development terms is far less important than whether or not there is a new crossing at all;

• However, the spatial economic development impact within the study area will depend, to a certain degree, on the crossing option chosen. This will be assessed during Stage 2 of the study.

• The travel time savings differences for most businesses and employment sites (and so attractiveness of the latter to new firms and developers) between different options are likely to be modest; a westerly route would be a more direct north/south sub-regional route linking Merseyside to the M56 and would offer greater travel time savings to traffic to and from
Merseyside; an easterly route would be of greater relative benefit to firms in the east of Runcorn and Widnes (as well as possibly Warrington);

- Most of the savings to existing businesses are likely to accrue to local firms on local trips (i.e. Runcorn to Widnes and visa versa);

- All options would relieve congestion on the existing bridge and so cater for the needs of local commuters wishing to move across the river with, potentially, a slight balance of advantage for more easterly crossings;

- A western route is likely to offer most benefits to the further development of Liverpool Airport and other strategic sites in the area;

- There are a multitude of factors influencing location decisions, of which the economic development benefits of a new crossing are one. Most sites and businesses already have access into the strategic highway network without needing to use the existing bridge, especially with recent new roads to the north of the bridge and the M6 Thelwall Viaduct widening;

- However, in the future travel times on these routes are likely to increase due to the effects of traffic growth and congestion so the negative economic development impacts of not providing a new crossing will rise.

4.5 Environmental Assessment

The environmental assessment has been undertaken by RPS Consultants as sub-consultants to Oscar Faber.

4.5.1 Extent of the Study Area

The study area extends approximately 3 km east and west of the existing Runcorn-Widnes bridge and covers the southern fringes of the town of Widnes and the northern fringes of Runcorn. At this point, the Mersey is at its narrowest for some distance and links the towns of Widnes on the north bank and Runcorn on the south bank. Ditton lies 1.5 km to the west of Widnes and smaller
settlements include Hale Bank, 3km to the south west, and Hale 5km to the south west of Widnes. Runcorn occupies much of the southern bank of the river within the study area.

The area experienced rapid growth from the 19th Century onwards based on the area's developing chemical industry and is therefore highly developed in parts, particularly the areas immediately north and south of the existing crossing. Further to the west on the north bank beyond Ditton, Ditton Marsh and Hale Bank, development gives way to open countryside. Similarly, though to a lesser extent, there is open land to the east, including Widnes Marsh, Astmoor Salt Marsh and beyond this Cuerdley Marsh. These areas however, extend for no more than 0.5 km north and south of the Mersey Estuary.

4.5.2 Topography and Land Use

The local topography is dominated by the River Mersey estuary, the dominant feature within the landscape, which varies in width from 300m at Runcorn Gap, below the existing bridge, to over 1km wide at points 1km upstream and downstream of the bridge. The banks of the river rise gradually on the north side to approximately 20m at Ditton and Widnes whilst the south bank climbs more steeply to approximately 70m at Higher Runcorn. Although the developed areas are in a mix of uses, business and industry predominates.

Throughout the length of the study area the river is estuarine and is approximately 27 km (18 miles) from Liverpool Bay.

At low water mudflats and banks within the estuary are exposed and upstream, 2km east of the bridge at Runcorn, Astmoor salt marsh occupies the southern bank of the river. Other salt marshes exist at points along the river's course and are restricted to within 0.5km of the estuary.

Several canals occupy land adjacent to the estuary on both the north and south banks. East of the existing bridge at Widnes is the St. Helens Canal linking the town to Warrington some 9km to the east. The southern bank is dominated by the
Manchester Ship Canal, a major feature of the area, which hugs the southern bank of the estuary as far as Astmoor to the east of the existing crossing. At this point it is separated from the estuary by Astmoor Salt Marsh. It is contained by heavily engineered walls, sometimes within the estuary itself. Further to the south and at a height of approximately 25m is the smaller scale Bridgewater canal, the course of which is more influenced by the surrounding rising topography.

Other significant drainage features include the River Weaver to the south of Runcorn and Ditton Brook 2km west of Widnes. Mixed farmland occurs in the west of the study area around Ditton and Hale.

Deciduous tree cover is low being generally confined to field boundaries, domestic grounds and occasional small plantations. Natural cover is greatest on land which has been invaded by scrub on the north bank. On the south bank, to the east of Runcorn, mature deciduous woodland exists around Norton Priory. In addition, semi-mature structure planting occupies land around road improvement schemes and the more recent industrial park developments at Astmoor.

The generally flat to undulating nature of the local topography and the historic importance of the river and the bridge both as important means of communication and transport have resulted in a varied and intensively used landscape, the existing character of which is determined by land use. A range of landscape character areas can be identified along the river banks.

4.5.3 Cultural Heritage

Several features of cultural heritage interest exist within the study area including four of the five Ancient Monuments which are recorded in the Halton Local Plan adopted in April 1996. These include: Hale Duck Decoy 1km north east of Hale; Lovel’s Hall moated site and fishpond 1.5km south west of Ditton; the remains of Halton Castle 2.5km east of Higher Runcorn; and Norton Priory 3.5km east of Higher Runcorn.
Halton Castle and Norton Priory Woods are also designated as areas of Local Landscape Value. Other areas within the study area include: the municipal golf course south of Ditton; Clinton Wood west of Ditton; several small wooded sites around Hale village; Runcorn Town Park; Spike Island at Widnes; Haddocks Wood to the north of Norton Priory; and Windmill Hill Wood south of the Priory.

Six locations within the study area have been designated as Conservation Areas; the southern part of Hale Village; Victoria Square in Widnes; West Bank at Widnes; Higher Runcorn; and Halton Village.

4.5.4 Ecology and Nature Conservation

The Mersey Estuary is of considerable importance in nature conservation terms and in parts is heavily protected, by national, international and local nature and other conservation designations.

The Mersey Estuary Site of Special Scientific Interest (SSSI) covers 702 ha extending from the railway bridge in the east to below the settlement of Bebington in the west. The site boundary also extends on the north shore to encompass the Hale Duck Decoy. It is notified under the provisions of the Wildlife and Countryside Act 1981 (as amended).

As described in the SSSI Notification Schedule, the Mersey Estuary is an internationally important site for wildfowl and consists of large areas of intertidal sand and mudflats. The site also includes an area of reclaimed marshland, saltmarshes, brackish marshes and boulder clay cliffs with fresh water seepages. The Manchester Ship Canal lies between the main estuary, and a series of pools which form important roosting areas for wildfowl and waders at high tide.

Much of the nature conservation value of the Mersey estuary is as a consequence of the dynamic hydraulic regime which causes the re-suspension of invertebrate rich intertidal sediment which provides an important food resource for populations of wading birds during the winter. The river channel within the estuary is prone to silting and continually deposits the intertidal sand and mudbanks. The chargeable nature of the River’s main channel is known, through
modelling studies, to be very sensitive to impacts which could disturb or interrupt this regime.

During the winter the SSSI regularly supports large bird populations. Species listed on the citation document include pintail (Anas acuta), wigeon (Anas penelope), dunlin (Calidris alpina), curlew (Numenius arquata), redshank (Tringa totanus) and golden plover (Pluvialis apricaria). The estuary also serves as a staging post for migratory birds in Spring and Autumn.

As a result of the bird populations that visit the estuary over the winter, the area has attracted European and International nature conservation designations. Accordingly, in December 1995 the Mersey Estuary SSSI was designated as a Wetland of International Importance as a Waterfowl Habitat under the Ramsar Convention of 1971 (Ramsar Site), and as a Special Protection Area (SPA) for wild birds within the context of the EC Directive (79/409) on the Conservation of Wild Birds.

Although the areas east and west of the existing crossing are of nature conservation value, the principal designations, namely, SSSI, SPA and Ramsar Site, do not extend to the east of the railway bridge. This is because the river channel to the east is fixed and does not enjoy the same dynamic hydraulic regime as the western section. Accordingly, it is of less interest and value to bird populations visiting the area due to extensive historical contamination caused by the area's chemical and related contaminating industries.

Although the area to the east of the existing bridges is less attractive to wildlife and not as protected, it remains sensitive to bridge development. If supports are required in the river for a new bridge, any disturbance of the estuary bed here is likely to result in contaminants, in certain tidal conditions, being washed downstream into the SSSI etc., with the potential to impact on this important area's overall value.

Pickering's Pasture LNR lies on the north shore of the Mersey at Halewood. Originally an area of pasture land, it covers 12 km and is owned by Halton Borough Council. The Council have declared it a Local Nature Reserve (LNR)
under the National Parks and Access to the Countryside Act 1949. Formerly a chemical waste tip in the 1960's - 1970's, reclamation work began in the 1980's and the site is now managed for nature conservation and public amenity. It consists of areas of grassland and has a wildfowl scrape with viewing facilities for visitors.

Various other conservation orientated designations affect parts of the study area. These include sites of local landscape value and sites of biological importance as set out in the Cheshire Replacement Structure Plan and Halton Local Plan.

4.5.5 Planning Policy Guidance

Current government planning policy guidance is found in Planning Policy Guidance Notes (PPGs). The following are relevant:


PPG9 was published in October 1994 and provides comprehensive advice on the relationship between planning control and nature conservation, and in particular the implications of EC Directives on wild birds and habitats and conservation.

The Government's general policy on nature conservation is that nature conservation objectives and obligations should be taken into account in all activities which affect rural and coastal land use.

Nature conservation and the various designations which relate to it can be a significant material consideration in determining the suitability of a wide range of infrastructure and development proposals, especially in or near SSSIs and other statutory sites where there is a requirement to consult English Nature whose role is to advise local and central government on all aspects of nature conservation.

The guidance confirms that planning permission for developments can be granted if conditions can be imposed which prevent damaging impacts on wildlife.
habitats or important physical features, or if other material factors are sufficient to over ride nature conservation considerations.

In SSSI, the PPG confirms that proposals should be subject to special scrutiny, including consultation with English Nature. Some SSSI have additional designations like SPAs and Ramsar Site status as in the case of the Mersey Estuary. The PPG (Annex C) sets out procedures for considering a development proposal in such areas.

(ii) Planning Policy Guidance Note 13 - Transport - (PPG13), March 1994

The aim of this guidance is to advise local authorities how to integrate transport and land-use planning. Its aims are to reduce the need to travel; influence the rate of traffic growth; and reduce the overall environmental impacts of transport.

The government recognises that forecast levels of traffic growth, especially in urban areas, cannot be met in full and that new road building or the upgrading of existing roads will in some cases be environmentally unacceptable. The intention is to produce policies to manage demand.

Regional Planning Guidance, structure plans and local plans should provide the means for examining the relationships between transport and land-use planning at the different levels; promote their integration and co-ordination; and promote strategies to reduce the need to travel. Regional Guidance provides advice on the regional transport strategy and priorities. Structure plans are the principal means of integrating strategic transport and planning policies.

Paragraphs 5.9-5.14 cover ‘road planning’, indicating that structure plans should include all firm proposals for new roads and major improvements to the primary road network. Trunk road schemes have an important influence on development patterns. Paragraph 5.11 indicates that the Government will consider any new proposals for addressing the traffic pressures faced within a plan area that may emerge in preparing the framework of the development strategy established by regional planning guidance.
Paragraphs 5.15-5.22 deal with mitigating the impact of new road schemes. Wherever possible new routes must be kept away from protected areas, such as AONBs and SSSIs. Road schemes which are likely to significantly affect both potential and designated Special Protection Areas (SPAs) under the EC Birds Directive and Special Areas of Conservation (SPACs), under the EC Habitats Directive will be allowed to proceed only in strictly defined circumstances. Further advice on these issues are contained in PPG9.

Transport proposals are subject to the same constraints as other major development proposals in areas of protection. They must be demonstrated to be in the public interest before being allowed to proceed.

Any local road proposal which is a departure from the development plan must be notified to the Secretary of State. Local Planning Authorities are also required to consult the Secretary of State about any planning application for a road proposal, which is not a departure, but whose route is not proposed in the relevant local plan. The Secretary of State has powers to call-in such proposals for his own determination.

(iii) Coastal Planning - PPG20

Issued in September 1992 this PPG gives guidance on policy in relation to coastal planning, coastal zone planning and policies for specific coast-related developments.

Key Policy issues are: conservation of the natural environment; development requiring a coastal location; and improving the environment, especially of urbanised or despoiled coastlines. The PPG gives advice on conservation policies. Coastal areas are particularly vulnerable to visual intrusion because of the high visibility of development on the foreshore, on the skyline, and affecting views along stretches of undeveloped coast.

Particular care needs to be taken to assess the impact of proposals affecting estuaries, not only on the immediate site and surroundings, but also of the cumulative effects on the estuary itself. In estuaries, the effect of development
on other interests, such as fisheries and shell fisheries, can be acute and widespread.

Proposed developments of national or regional importance that require a coastal location will normally be included in structure plans.

The PPG includes a list of those issues planning authorities need to take into account in preparing development plans for coastal developments.

(iv) Regional Planning Guidance for the North West - RPG13

The guidance aims to preserve the Region's environmental assets and indicates that it has a high concentration of internationally important areas for nature conservation including the estuaries notified as Sites of Special Scientific Interest, Ramsar Wetlands and Special Protection Areas. The priority for the future is to maximise the competitiveness, prosperity and quality of life in the Region through sustainable development.

The Development framework over the past 20 years has focused on the Mersey Belt, but scope for further expansion here is limited by the Mersey flood plain, mosslands, and the need to preserve a sense of separation between existing settlements and the two conurbations of Merseyside and Greater Manchester.

The Region is noted for its large estuaries most of which are covered by special policy considerations. Five of the region's estuaries are amongst the top 10 most important sites for wading birds in the UK. Short lengths of development exist along the Mersey/North Wirral coasts. These developed areas may offer opportunities for renewal and sustainable development in line with the development framework. Development plans are expected to protect and enhance the nature conservation, archaeological, landscape and recreation value of the open areas of the coast. They should identify and make provision for other necessary development within the existing developed area of the coast giving priority to coast-dependent development. The RPG acknowledges that the chemical industry has left a range of contaminated as well as derelict sites.
The Mersey Basin is the subject of a 25 year drive to improve water and environmental quality and stimulate waterside improvements. Major schemes to clean up the Mersey Estuary are currently being implemented by North West Water.

The development framework is designed to contribute to reducing emissions from motor vehicles by proposing broad land use distributions to help reduce the need to travel.

There is nothing contained within the RPG, in terms of Transport and Traffic, relating to a proposed Mersey Crossing.

(v) Mersey Strategy - Mersey Estuary Management Plan

The Mersey Estuary Management Plan (February 1996), is an advisory document which aims to set out a framework to assist the decisions of the agencies which regulate the use of the Mersey. Such an advisory framework is designed to enable existing interests to be safeguarded, new development proposals to be evaluated, and the full potential of the Estuary as a natural resource to be realised.

The Management Plan confirms that the Mersey Estuary is one of Britain's largest estuaries; has one of the highest tidal ranges in the world, and is of international importance for wildlife and a major trade route.

The Management Plan sets out a number of objectives dealing with: Estuary Dynamics; Water Quality and Pollution Control; Biodiversity; Land Use and Development; Commercial Navigation and Port Development; Urban Regeneration and Tourism.

The plan highlights the key estuary dynamics relating to new development and other human activities and calls for the highest possible degree of protection to be given to sites of international, national and local nature conservation importance, and also encourages the adoption of creative nature conservation policies. With regard to Land Use and Development, the plan reflects current government advice concerning coastal development and encourages the
concentration of new development within existing built-up areas. The plan also advocates the protection and enhancement of the built environment adjoining the estuary, and the retention of its waterfront heritage.

The study area is shown on the Key Map of the Management Plan lying between the 'Inner Estuary' to the west, and 'Upper Estuary' to the east. The 'Inner Estuary' covers the area of the Mersey Estuary RAMSAR site and SPA. It is noted for its estuarine landscape and extensive views, and the following features are noted:

- almost continuous access along the northern side of the river;
- water-based recreation is limited by aspects of public safety and nature conservation interests;
- barrier to access to the southern shores of the estuary;
- opportunities for quiet recreation; and
- opportunities for new interpretative facilities.

The 'Upper Estuary' is industrial in character with some limitations to recreation. The following characteristics are noted:

- there are opportunities for riverside walks;
- there are land-based opportunities for recreation;
- canal moorings exist; and
- wildlife interest.


The Deposit Draft plan sets out proposed changes to the Cheshire Structure Plan approved in 1992. Its underlying approach to sustainable development in the context of Heritage Conservation is that as a minimum, there should be 'no net loss' of environmental assets arising from any development. This requires distinguishing between irreplaceable assets, which because of their antiquity, complexity, rarity or vulnerability cannot be replaced; other significant assets which are renewable or abundant but the loss of which can be compensated for
by habitats or features elsewhere, or by adding to and improving the stock of protected sites; and, the beauty, amenity and interest of the natural and man-made landscape as a whole, which should be maintained.

Irreplaceable assets are given as SSSIs, listed buildings (statutory protection) and those which should be protected such as Ancient Woodlands, habitats, rare species and canals. Significant assets are considered to be sites of biological importance, historic landscapes, conservation areas, parks and gardens. Exceptional circumstances may exist where the overriding need for a development means the unavoidable damage to or loss of this type of asset. In such situations mitigation measures will be required to ensure the creation or replacement of such an asset.

Management plans for the Mersey and Dee Estuaries currently being prepared point to an increasing appreciation of the value of estuaries and cover areas of Wales and Merseyside as well as parts of Cheshire, and will help reconcile competing claims on the estuaries' resources. Any development on the estuaries should wherever possible be located within areas already developed, and should provide public access to the shore.

The draft plan shows the environmental areas affecting the study area, with both banks of the Mersey being within the defined coastal zone and within the Mersey Forest.

A document - 'New Thoughts for the Next Century' - accompanying the deposit draft plan lists, among the major schemes in the Transport section to be implemented by 2011, a new road crossing of the River Mersey between Runcorn and Widnes. The draft plan indicates that the Transport Policies and Programme (TPP) will decide the year when construction will start and that it will be subject to Environmental Assessment. Proposed Policy T10 in the Deposit Draft Plan, shown on the Key Diagram, is meant to refer to this proposal but does not yet appear in the text of the document.
(vii) Halton Local Plan

This local plan was recently adopted in April 1996 and is the first up to date statutory local plan to cover the study area since 1974. The plan is short term only looking to 2001 as Halton Borough will become a unitary authority in 1998 and will prepare a unitary development plan for the borough looking beyond 2001. The proposals map of the local plan indicates in detail, the various statutory designations affecting the study area such as: the SSSI, Ramsar site and SPA, west of the present crossing.

Section 1 of the local plan contains the general strategy and major objective 7 - 'Increasing Accessibility' - has, as a policy objective, the promotion of new road schemes, particularly a second road crossing of the Mersey.

4.5.6 Impact Upon Cultural Heritage

Three of the nine proposed route options would directly affect features with an identified cultural heritage value. The route of Option A is located approximately 150m to the west of Lovel's Hall moat, presenting potential physical and visual disturbance to the setting of the feature. The route of Option B lies directly over the site of the same feature which would be destroyed by the proposals. Option F, utilising the route of the existing river crossing, presents a potential physical disruption to the area of West Bank Conservation Area.

There are no direct effects upon features of cultural heritage value from the remaining six options.

4.5.7 Impact upon Ecology and Nature Conservation

Any option to cross the Estuary, whether it be to the west or east of the existing crossing, will have some environmental impact. The issue is whether the impacts are likely to be greater if a central, east or west option is chosen and whether they are likely to be permanent, temporary or regarded as acceptable.
Although the central option appears attractive, in environmental terms, the impact on people, homes, businesses and existing development would be greater than either an east or western option. The impact of the central option will be experienced in terms of noise, visual intrusion, air pollution, vibration and by an impact on land use and the built environment. These factors will be assessed for the options taken forward to Stage 2 of the study.

Both eastern and western sections of the study area are known to contain contaminants and any option involving piers could cause contaminants to potentially affect the more sensitive and heavily protected western area. Such effects would need to be considered and assessed in detail before the risk of contamination can be fully quantified.

Construction of piers in the western section could affect the dynamic hydraulic regime of the estuary and thus have an effect on its value as a habitat. These effects, on the other hand may only be temporary, allowing the western section to regain its value, in habitat terms once construction is completed.

Whichever of the route options are chosen, those which do not require piers are likely to have the least impact on the designated areas. However, options without piers, but with large spans across the river, which minimise impact on the River Mersey would clearly be more expensive. Some additional costs may be deemed worthwhile to protect the river environment.

A central option involves a crossing at the narrowest point of the estuary. Although piers may be necessary, the central section is not within the SSSI, SPA and Ramsar Site, and the least number of piers (of either an east or west option) are likely to be required by virtue of the length of the crossing. It is possible that no piers will be required.

4.5.8 Summary

Each potential new crossing option would have its own environmental 'cost'. Option A would result in moderate disturbance to existing land uses, but would significantly affect nearby housing at Beacon Hill. Option B would affect
agricultural land and would impinge upon the site of an ancient monument. Neither of the two variations for Option C would greatly affect the landscape character of the area. Option C2 however, would impact slightly more than C1 as it is nearer to residential areas. Option D affects areas currently designated as green space and would cross land regarded as having local landscape value. Option E is considered to involve significant disturbance to existing land uses but only slight disturbance to landscape character.

Option F appears to pose the greatest physical disturbance and landscape character degradation to surrounding residential areas at both ends of the existing bridge. Option G has the potential to significantly affect Astbury Salt Marshes and the industrial park at Astmoor. Option H appears to represent similar potential disturbances.

Option A, B and F impact upon aspects of the Area’s Cultural Heritage whilst the remaining options C, D, E, G and H have no direct effects.

Any option to the west of the existing bridge would pass through the SSSI, SPA and Ramsar site and is likely to require a high cost solution in order to mitigate the environmental impact of a new crossing in this area, and would have to be supported by a strong economic development and traffic case. An eastern option would also have an adverse impact on the SSSI, SPA and Ramsar site if the river bed is disturbed during the construction of a new crossing. A crossing on the line of the existing bridge would have an impact on the people who live and work in the area through which it passes.

Regional Planning Guidance makes no reference to the possibility of a new Mersey Crossing. However, there are references to such a crossing in the deposit draft Replacement Cheshire Structure Plan, proposed Policy T10, and is a future major objective of the recently adopted Halton Local Plan. Any proposal for a further crossing will have to be the subject of additional policy development within the development plan for the area, which in turn will be subject to the relevant criteria contained within PPGs 9, 13, 20 and the Mersey Estuary Management Plan.
A balance needs to be struck between the environmental costs of a new crossing and the broader economic development potential and traffic benefits that would accrue as a consequence of a new crossing. The different environmental costs and benefits for each of the selected options, including the "do nothing" option will be investigated further in Stage 2 of the study.

Environmental issues would include the need for mitigation measures. Both eastern and western options are likely to have an impact on the River Mersey and measures may need to be taken to minimise the disturbance to the river and surrounding area. A central option is likely to have an impact on the people living and working in the immediate area of the crossing. Measures may therefore be required to reduce the impact of the crossing in terms of noise, air pollution and visual intrusion, for example.
## TABLE 4.1 COSTS OF NEW BRIDGE CROSSING AND CONNECTIONS TO EXISTING NETWORK

<table>
<thead>
<tr>
<th>Option</th>
<th>Bridge Cost (£m)</th>
<th>Connections (£m)</th>
<th>Total Cost (£m)</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>72</td>
<td>42</td>
<td>114</td>
</tr>
<tr>
<td>B</td>
<td>75</td>
<td>39</td>
<td>114</td>
</tr>
<tr>
<td>C1</td>
<td>100</td>
<td>19</td>
<td>119</td>
</tr>
<tr>
<td>C2</td>
<td>88</td>
<td>19</td>
<td>107</td>
</tr>
<tr>
<td>D</td>
<td>72</td>
<td>16</td>
<td>88</td>
</tr>
<tr>
<td>E</td>
<td>82</td>
<td>18</td>
<td>100</td>
</tr>
<tr>
<td>F</td>
<td>30</td>
<td>24</td>
<td>54</td>
</tr>
<tr>
<td>G</td>
<td>65</td>
<td>14</td>
<td>79</td>
</tr>
<tr>
<td>H</td>
<td>75</td>
<td>31</td>
<td>106</td>
</tr>
</tbody>
</table>

(Cost of structures based on a multi-span layout and rates per unit length)
<table>
<thead>
<tr>
<th>Option</th>
<th>Benefits</th>
<th>Cost</th>
<th>Net Present Value (NPV)</th>
</tr>
</thead>
<tbody>
<tr>
<td>G</td>
<td>157</td>
<td>66</td>
<td>91</td>
</tr>
<tr>
<td>B</td>
<td>166</td>
<td>96</td>
<td>70</td>
</tr>
<tr>
<td>F</td>
<td>106</td>
<td>45</td>
<td>61</td>
</tr>
<tr>
<td>H</td>
<td>149</td>
<td>89</td>
<td>60</td>
</tr>
<tr>
<td>A</td>
<td>155</td>
<td>96</td>
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</tr>
<tr>
<td>C1</td>
<td>147</td>
<td>100</td>
<td>47</td>
</tr>
<tr>
<td>D</td>
<td>120</td>
<td>74</td>
<td>46</td>
</tr>
<tr>
<td>C2</td>
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<td>30</td>
</tr>
<tr>
<td>E</td>
<td>95</td>
<td>84</td>
<td>11</td>
</tr>
</tbody>
</table>

Note: 1994 Costs and benefits discounted to 1994
Accidents and junctions excluded
COBA10 parameters
Simplified Methodology
Do Minimum 2016 AADT
New Mersey Crossing Study

Figure 4.1
Option A  2016 AADT
New Mersey Crossing Study

Figure 4.2
Option B: 2016 AADT
New Mersey Crossing Study

Figure 4.3
Option C2/D : 2016 AADT
New Mersey Crossing Study

Figure 4.5
Option E: 2016 AADT
New Mersey Crossing Study

Figure 4.6
Option F: 2016 AADT
New Mersey Crossing Study

Figure 4.7
Option G: 2016 AADT
New Mersey Crossing Study

Figure 4.8
Option H: 2016 AADT
New Mersey Crossing Study

Figure 4.9
5. MAIN FINDINGS

5.1 Summary

In deriving the recommended options for Stage 2 of the study there are a number of issues that need to be taken into consideration and they are:

- Economic Development;
- Environmental Impact;
- Traffic Impacts;
- Cost Benefit Analysis; and
- Engineering Costs.

Any scheme that decreases the delays and congestion experienced in crossing the river will have a positive development impact. However, the spatial economic development impact within the study area will depend, to a certain degree, on the crossing option chosen, and this will be addressed in Stage 2 of the study.

In terms of environmental impacts of the options the main constraint is the fact that the Mersey Estuary is designated as a SSSI over an area extending from the railway bridge in the east to below the settlement of Bebington in the west. The SSSI received formal designation as a Ramsar Site and a SPA in December 1995. Due to the national and international nature conservation interest associated with part of the Mersey Estuary, any route options, east or west of the existing bridge, that could impact on the estuary would be subject to rigorous examination of their full ecological impacts.

Given the sensitivities associated with the estuary any construction within the estuary on the west side of the railway bridge is likely to have a significant effect on the hydraulic regime and consequently potentially damaging impact on the estuary. In addition if pier supports are required in the estuary for a eastern crossing any disturbance of the estuary bed is likely to result in the mobilisation of contaminants which may be washed downstream in certain tidal conditions into the SSSI, SPA and Ramsar site.
The on-line option is unlikely to require piers in the estuary and will therefore have minimal impact on the SSSI, SPA and Ramsar site and would therefore appear attractive in environmental terms. It would, however, impact on people, homes, businesses and existing development to a greater degree than either a western or eastern option.

In terms of traffic impact all of the options would provide additional capacity across the River Mersey and would relieve the existing bridge. The traffic impacts of the options can be grouped together in terms of those new crossings that are:

- On-line (Option F);
- West of the existing bridge (Options A, B, C1, C2, D and E); and
- East of the existing bridge (Options G and H).

The additional capacity provided by the on-line option would result in traffic returning to the Runcorn-Widnes corridor from the other crossings of the Mersey. This would result in increased flows on the Runcorn Expressways and on the A561 through Widnes.

The options to the west of the existing bridge would provide significant relief to the existing bridge and would result in traffic that is forced to divert away from corridor in the Do-Minimum, due to congestion, transferring back into the Runcorn-Widnes corridor. As the connections of these options to the existing highway network are to the west additional traffic would be drawn onto the A557 Runcorn Expressway.

The options to the east of the existing bridge would also provide significant relief to the existing bridge and would result in a transfer of traffic from the other crossings of the Mersey back into the Runcorn-Widnes corridor. Due to the location of the connections with the existing highway network these options would result in increases in flow on the A533 Central Expressway.

The traffic flows on the new and existing bridge crossing have been analysed in order to ascertain what level of local and sub-regional/long distance traffic each
of the bridge crossings is carrying (the segregation of sub-regional and local traffic being one of the key requirements of the brief).

The analysis of traffic distribution is presented in Figure 5.1, and indicates that the existing crossing, in the Do-Minimum scenario, would be catering mainly for local and sub-regional traffic.

If a western crossing were provided the existing crossing would carry mainly local traffic (70%) whilst the new crossing would cater for only a small element of local traffic (6%), the main proportion of the traffic on the new crossing being sub-regional and longer distance. A western option would therefore result in the natural segregation of strategic and longer distance traffic, which is a key aim of the study.

As would be expected an on-line option would cater for the same type of movements as the Do-Minimum and it would require complex traffic management arrangements in order to segregate local and longer distance traffic movements.

If a new crossing to the east of the existing bridge were provided the existing crossing and the new bridge would cater for similar traffic movements with just under half of the traffic on each crossing consisting of local traffic. Such an option would therefore not segregate local and longer distance movements and traffic management proposals would be required in order to achieve this.

The costs of the options range from £54 million to £119 million and whilst all the options provide relief to the existing crossing they all perform differently. Stage 2 of the study will include a full appraisal of each of the options taken forward.

5.2 Benefits

5.2.1 Western Crossings (Options A,B,C1/C2,D,E)

On the positive side a western option would provide a direct high speed crossing linking strategic employment sites in Merseyside, North Wales and Cheshire.
which is one of the key objectives of the study. It would also improve accessibility to Liverpool Airport and provide relief to the existing bridge. The alignment of the route would result in the natural segregation of strategic and sub-regional traffic; indeed at this stage it appears that this is the best route for sub-regional traffic, thus fulfilling another of the studies objectives. Furthermore a good Net Present Value results.

Negative aspects of such an option are that the bridge crossing and associated roadworks are very expensive. The route itself would pass through an environmentally sensitive area and would require a difficult environmental solution which may increase costs significantly. Subject to further investigation in Stage 2 of the study such an options may not meet the objectives of minimising disruption to the rural environment, ecology and river regime.

5.2.2 On Line Crossing (Option F)

Beneficial aspects of this crossing are that it spans the shortest crossing point across the river and therefore has the cheapest bridge cost. It would therefore have minimal impact on the rural environment, ecology and river regime thus meeting one of the studies key objectives. It has a good Net Present Value and would assist development over the study area by reducing delays in crossing the River Mersey. Subject to investigation in Stage 2 of the study, such a crossing would also meet the objective of encouraging economic development.

On the negative side the crossing would not naturally segregate sub-regional and local traffic, which is one of the key objectives of the study, and this would require complex traffic management to achieve. Sub-regional traffic will also have longer journey times than would be achieved with a western crossing. The option also concentrates crossing traffic close to the urban area and would have a detrimental impact on people, homes and existing development adjacent to the crossing. Therefore failing to meet the objective of minimising disruption and further disturbance and pollution to the urban environment of Runcorn and Widnes. In addition the crossing would be close to the existing listed structures and would require a sympathetic design which may have cost implications.
5.2.3 Eastern Crossing (Option G or H)

This scheme has a very good Net Present Value and would assist development opportunities in Knowsley, St Helens and particularly Halton. The new crossing could also provide significant local development opportunities by providing access to developable land. The crossing would therefore meet the objective of facilitating economic development in the area. The crossing would also provide relief to the existing bridge crossing.

The crossing would, however, require trunk road works and it offers little advantages over the On Line option. The scheme also fails to segregate local and strategic traffic, a key objective of the study, and could require extensive additional costs on road works. If piers are required in the estuary contaminates in the river bed could be released which may then impact on the SSSI, SPA and Ramsar site. The option could therefore fail to meet the objective of minimising disruption to the river regime. The bridge cost is also expensive.
New Mersey Crossing Study
Figure 5.1 - Traffic Distribution 2016

Existing Crossing
- Local
- Sub-Regional
- Strategic

New Crossing
- Local
- Sub-Regional
- Strategic
6. **RECOMMENDATIONS**

Stage 1 of the study involved an initial assessment of all the options in terms of their cost, economic development, environmental and traffic impacts. Given the nature of the work to date and the environmental sensitivity associated with some of the options it is important to ensure that the widest range of options and solutions are carried forward to Stage 2 of the study. An on-line, western and eastern option would provide such a range.

The on-line option is the cheapest bridging crossing option, and provides an achievable solution. In terms of a cost benefit analysis it produces a good economic return and it would result in minimal environmental disruption over SSSI and Ramsar. Due to its proximity to the urban areas of Widnes and Runcorn it would, however, have a detrimental impact on people, homes and existing development in the immediate area of the crossing.

The western option provides the best solution in terms of segregating sub-regional and local traffic and would provide significant relief to the existing bridge crossing. It also has a positive economic return but on the negative side the bridge crossing is expensive. A western crossing would pass through an environmentally sensitive area and it may prove to be difficult and expensive to establish an environmentally sensitive solution.

It would therefore be beneficial to include a third eastern option in Stage 2 of the study to provide a balanced assessment of all the possible crossing options. This matter was discussed at the presentation to the Steering Group on 6 November 1996 it was agreed that a third option should be included in Stage 2 of the study.

The Consultants therefore recommend that Options A/B, F and G should be taken forward to Stage 2. Stage 2 will examine each of the options in more detail and will result in a preferred route along with the identification of further work required to develop the final option.

During Stage 2 the alignments of the three routes will be developed and refined and the form of structure, multiple and single span, will be assessed in more
detail as will the environmental impacts of the options. Each option will also be subject to a full appraisal of economic development, traffic and environmental issues.
APPENDIX A

Study Brief
1. **INTRODUCTION**

In 1991 the Department of Transport, DOT commissioned Oscar Faber to undertake a strategic study of the need for a new crossing of the River Mersey. The consultants investigated the feasibility of a number of river crossing options. A limited assessment of the environmental effects of the options was undertaken leading to the conclusion that it was feasible to construct a new strategic crossing, but there would be significant costs partly relating to approach roads, and serious environmental issues to be resolved.

The Government subsequently decided not to promote a new strategic crossing of the River Mersey. Affected local Authorities of Cheshire and Merseyside were unhappy with this decision because of the constraints this decision imposes on future road capacity across the Mersey, for both local and longer distance traffic, and the potential impact this could have on the economic prosperity of the region at a time when EU investment programmes were likely to be bearing fruit.

The Mersey Crossing Group (comprising Cheshire County Council, Halton Borough Council, Knowsley Metropolitan Borough Council, Liverpool City Council, Warrington Borough Council and the Local Chambers of Commerce), was formed and following a successful lobby, of the Minister, John Watts have decided to commission a feasibility study of a new river crossing. The study would examine crossings close the the existing bridge (and therefore conform to Ministerial guidance) so that together the new and existing crossing would provide capacity for forecast local and longer distance traffic, into the next century.

Oscar Faber subsequently made a presentation to the Mersey Crossing Group in June 1996 and outlined their approach to the study. This is summarised in this report which constitutes the brief for the study. The brief comprises the following sections:
Section 2 outlines the general approach to the DOT Study Section 3 describes the three preferred options from the earlier study. Section 4 summarises the present position of the DOT and the concern of the local authority. Section 5 comprises the brief the New Study to be commissioned by the Mersey Crossing Group and Section 6 outlines the study costs and programme.

2. BACKGROUND - THE ORIGINAL STUDY

2.1 The Commission

Oscar Faber were commissioned by the Department of Transport in 1991 to undertake the Mersey Crossing Study, to examine the need for a new strategic crossing in an area extending from the M6 westwards to the coast. Though the study was completed much earlier, the Final Report was not released until 1993.

2.2 Main Findings

The study looked at a number and range of route options (see Figure 1) and identified five which deserved closer investigation. These were subject to preliminary traffic engineering and environmental appraisals, and the results are described in some detail in the Confidential Study Final Report.

The key findings of the study were as follows:

A) The existing Runcorn Bridge is already close to capacity, carrying in the order of 75,000 vehicles per day AADT, with frequent peak period congestion and queuing.

B) Traffic growth and new highway schemes programmed or already under construction at the time would increase the demand on the Runcorn-Widnes Bridge to traffic flows of 118,000 to 150,000 AADT by the year 2016. It is questionable whether such a demand could be handled.
The new highway schemes contributing to this high demand are:

- Widnes Eastern Bypass finally completed in 1996;
- A5300 opened 1996; and
- St Helens Link completed in 1994

The Runcorn-Widnes Bridge carries 50% local traffic (with local destinations) and 50% longer distance traffic, travelling more than 15 kilometres. Of that traffic with local destinations (ie. less than 15 kilometres) 30% is travelling between Runcorn and Widnes with the remaining 20% travelling to more distant destinations. These two types of traffic are essentially different in character and must be considered separately in respect of provision. Any proposal for a new crossing must however make adequate provision for both local and longer distance trip making.

The original Mersey Crossing Study also investigated the potential for bus and rail improvements to cater for strategic movements across the Runcorn-Widnes bridge. It was concluded that there would be little scope for significantly reducing demand through public transport improvements. However, the new study provides the opportunity for public transport options to be re-appraised and there may be the scope for such improvements to reduce the demand for local and sub-regional movements across the bridge. These issues need to be addressed in the new study.

2.3 Approach

The original study comprised four key stages:

- Traffic Modelling and Forecasting, involving the development and use of a highway traffic model, and an investigation into the scope for transfer of traffic from road to public transport.

  - An Engineering/Route Location Study to identify the engineering
constraints of the area which includes dense urban and industrial development and many oil and gas pipelines.

- **A Landscape Study** to appraise the landscape quality of the areas on either side of the estuary.

- **An Ecology Study** to identify the constraints and possible impacts of a new bridge on the wildlife in the estuary. Information from the Landscape and Ecology Studies was combined into a Constraints Map which identified the planning and environmental constraints in the area.

### 2.4 Conclusions

The main conclusions from the study were as follows:

i) There is a need for additional highway capacity across the river, primarily to relieve congestion at the Runcorn-Widnes Bridge, but also to provide a strategic connection between M62 and M56. Traffic forecasts predict congestion which by the year 2016 is likely to be particularly severe at the Runcorn-Widnes Bridge.

ii) There are severe constraints affecting the construction of a new strategic crossing in particular.

- Ecology - due to the sensitive nature of the river and its banks which include a Ramsar site, a Special Protection Area (SPA) and Sites of Special Scientific Interest (SSSI).

- Urban environment - due to the location of Widnes and Runcorn on the banks at the shortest crossing point.

- Cost and engineering - due to the possible length of a crossing and
the difficulty of getting over the Manchester Ship Canal.

iii) Three preferred options were identified for a strategic crossing. Option 2 was preferred, with Option 3 as a second choice, Option 5 would be only appropriate choice if environmental difficulties prove insurmountable.

3. THE PREFERRED OPTIONS FROM THE ORIGINAL STUDY

3.1 Option 2 - A5300 to Frodsham

This would be essentially an extension of the A5300 across the Mersey estuary to the M56 at Frodsham Marshes. It would provide a good strategic link and carry 90,000-110,000 AADT (2016) and reduce the flows on the existing bridge to 68,000-87,000 AADT. This would represent a total reduction of 42% from the Do-Minimum, but would still be 24% more than today’s levels.

The option would have major environmental implications for the river, its banks and the Frodsham Marshes. It would severely affect a Ramsar site, SSSI and SPA.

The costs of the option would be approximately £280 million of which the bridge would cost £116 million.

3.2 Option 3 - A5300 to Runcorn

This would be essentially a southwards extension of the A5300 across the river to join the A557 Runcorn Expressway at Weston Point. This option would attract 58,000-71,000 AADT (2016) and reduce the traffic flows on the existing bridge to 77,000-96,000 AADT. This would be a reduction of 35% from the Do-Minimum, but would still be up to 37% more than today’s level.

This option would also have significant environmental implications for the river and its banks, though not the same scale as Option 2. SSSI and SPA sites together
with the recently designated Ramsar site would be affected.

The cost of this option would be £310 million, of which the bridge would cost an estimated £78 million.

3.3 Option 5 - Additional Capacity At Existing Bridge Location

This would compromise the provision of a new bridge between the existing road and rail bridges, effectively ‘widening’ the existing carriageway and upgrading the approach roads on both banks. Traffic demand on the two road bridges would be 142,000-168,000 AADT (2016), i.e. more than twice today’s levels.

This option would have the least impact on the ecology and the environment of the river estuary, but being adjacent to the existing alignment would draw all the additional traffic resulting from expected growth into and through the affected urban areas (primarily Runcorn but also to a lesser extent Widnes). The cost of this option would be £240 million of which the bridge would be £25 million.

3.4 Costs of Options

Each of the options would be very expensive. The original study required significant improvement of the approach roads to the new crossings, as well as the bridge itself.

3.5 A comparison of the costs of the options set out, recognising that any consequential motorway construction would be the responsibility of the Department of Transport, is as follows:

<table>
<thead>
<tr>
<th></th>
<th>Option 2</th>
<th>Option 3</th>
<th>Option 5</th>
</tr>
</thead>
<tbody>
<tr>
<td>Bridge Cost</td>
<td>116</td>
<td>78</td>
<td>25</td>
</tr>
<tr>
<td>Infrastructure Costs (excluding Trunk Roads)</td>
<td>75</td>
<td>75</td>
<td>80</td>
</tr>
<tr>
<td></td>
<td>Option 2</td>
<td>Option 3</td>
<td>Option 5</td>
</tr>
<tr>
<td>----------------------</td>
<td>----------</td>
<td>----------</td>
<td>----------</td>
</tr>
<tr>
<td>Total Cost (excluding Trunk Roads)</td>
<td>191</td>
<td>153</td>
<td>105</td>
</tr>
<tr>
<td>Trunk Road Costs</td>
<td>89</td>
<td>162</td>
<td>135</td>
</tr>
<tr>
<td>Total Cost</td>
<td>280</td>
<td>315</td>
<td>240</td>
</tr>
</tbody>
</table>

4. THE PRESENT SITUATION

The Government has concluded that, according to the DOT’s definition, there is insufficient strategic traffic demand across the Mersey to justify a new crossing, funded as part of the national roads programme. However, there is now agreement at both Government and local level that there is an essential need to provide for sub-regional traffic and truly local traffic, as the existing bridge is at or very near its capacity. The sub region is defined primarily as Merseyside and Cheshire. The great majority of traffic using the bridge is considered to be of strategic importance to the economy of the sub region.

Continuing traffic congestion on the bridge and its approaches may restrain the further economic development potential of Merseyside, and North Cheshire (both benefiting from EU structural fund support), as well as the towns of Runcorn and Widnes. Additional capacity would relieve congestion, and assist in promoting the future development potential of Liverpool Airport and other major development sites in the sub-region.

It is in this context that the local authorities in Merseyside and Cheshire, supported by the Local Chambers of Commerce, have agreed to commission a study to investigate fully the feasibility of a crossing of the Mersey close to the existing Runcorn-Widnes road bridge. The “area of interest” defined by the Minister is “close to the existing crossings”. However, based on the results of earlier work and the need to consider options that provide explicitly for traffic of
regional importance, options as far as 3 kilometres to the east and west of the present crossing should properly be considered at this feasibility level.

5. A PROPOSAL FOR A NEW FEASIBILITY STUDY

5.1 Objectives

The study should examine the feasibility of a new crossing aimed at relieving the existing Runcorn-Widnes Bridge, in order to remove constraints on accessibility across the river and to facilitate future developments in the broadest possible area on both the north and south banks.

The study area should extend approximately 3 kilometres either side of the existing bridge to encompass possible southward extensions of the A5300 in the west and possible crossings linking to the Runcorn Expressway near Astmoor in the east.

5.2 Key Issues for the Study

Key issues that the study will need to address are as follows:-

- The provision of adequate capacity for sub-regional traffic and local movements between Runcorn and Widnes.

- Separation of sub-regional traffic from the local traffic requirement for Runcorn/Widnes and where practicable, avoid increasing the overall amount of all traffic which passes through the urban centres either side of the crossing(s).

- Provide a crossing solution either by location or by mitigation measures which should be, as far as practicable, environmentally and ecologically neutral, given the particular sensitivity of the Mersey estuary and its protected status.
• Minimise disruption to the urban environment of Runcorn and Widnes in respect of the location of any crossing.

• Provide an optimal solution, within the identified constraints, for the encouragement and facilitation of economic development throughout the sub-region, including Merseyside, Runcorn and Widnes and North Cheshire.

• Maintain operation of the Ship Canal.

• Minimise construction and disruption associated with the provision of any new crossing, consistent with the achievement of the economic, environmental and ecological objectives of a scheme.

• Achieve a deliverable solution which is practical, acceptable and fundable.

• Investigate the scope for methods of funding including private financing, and the broad scope for integration with other development opportunities.

5.3 Possible Options for Consideration

The study should examine a range of option up to 3 kms from the existing bridge in each direction. In order to concentrate the study resources on the most practical option, a preliminary, broad review of options would be undertaken leading to the identification of two practical options for most detailed appraisal.

A principle objective of the crossing would be to provide continuous, uninterrupted movement across the River Mersey. Thus a low level crossing is unlikely to be feasible, given the continuing operation and potential for expansion in use of the Manchester Ship Canal.
The minimum amount of additional road building should be considered, consistent with the objective of separating local and longer distance or sub regional traffic movements. Any additional road building should be provided only where it is considered necessary to ensure this objective is met. Traffic management solutions should be investigated to minimise major new road works on the approach roads.

5.4 Data

A considerable amount of data already exists and is available from the original study, consequently data collection for the new study would be minimised.

Traffic data exists from the original traffic model which was based on a 1991 trips database and extensive count information. We are aware that there has been continuous traffic counting undertaken by Cheshire since then and this data would be valuable for the new study.

The original study generated a number of route location plans which identified engineering constraints. These together with the preliminary cost information for the original options would be available for the new study.

The original study included the preparation of a landscape appraisal database which described the visual quality of the landscape. This database would be a valuable data source for the new study, although there would need to be some selective updating, within the narrower area of search for a new crossing. As landscape value will form a part of the framework assessment of options output from the study, the selective updating of the previous study would be linked to crossing options requiring further investigation.

The original constraints map, which identified planning and environmental constraints in the area would be a valuable source but would require updating on
a similar selective basis.

5.5 Key Requirements of the Study

The study would be undertaken in two stages. Stage I would identify a range of options and undertake a broad assessment of them leading to recommendations on the perhaps two most practical options for more detailed study in the second stage.

Stage 2 would lead to the development of an appraisal framework identifying the cost and benefits of the new crossing taking particular account of engineering, traffic, environment and economic development issues.

The main elements of the new study would comprise the following:

- Engineering study. This would examine a range of options for a new crossing and the engineering issues relating to the options and provide a broad range of costs for the two most practical options.

- Traffic Study. This would selectively update the existing traffic model and traffic forecasts. The principle task would however be to concentrate on establishing the feasibility of providing for the separation of strategic and local traffic and the highway network changes that would be required to achieve this, for any proposed crossing options considered. Proposals to provide for the requirements of strategic and local traffic will be developed.

- Environmental/Planning Study. This would selectively review and update the original study findings and identify specifically and for the framework analysis, the environmental impacts of possible options. This study would also identify and attempt to quantify the negative impacts associated with a failure to provide increased road crossing capacity into the future.
Economic Study. The original study did not include an economic study. The Minister has also ruled out a detailed economic impact assessment. However an assessment of the economic impact of the two most practical options will be carried out to provide commentary of the effects at both regional and local level. Both assessments will be included as part of the financial framework analysis of options.

If there are substantially differing effects identified, the study will attempt to quantify the relative value of each options to sub-regional economic regeneration.

Local effect of economic development within Halton will include a consideration of the physical construction impact. The local authorities will be expected to provide any necessary data, free of charge, to meet in this respect. Detailed requirements for data will be advised to client authorities.

Evaluate Options. This would comprise an evaluation and appraisal of the options, including a COBA type evaluation and commentary. The final comparison would be in the form of an appraisal framework, very similar to that entitled "Comparison Framework" in the original study report. Detailed guidance will be sought from the study steering group on data to be included and the form of presentation, drafts will be approved by the study steering group prior to finalisation.

5.6 Study Output

The study would deliver the following:

1) A description of the options considered in Stage 1 and a commentary on their major impact and costs. Recommendation would be made for more detailed study of the two most practical options.
2) An appraisal framework of the two selected options for more detailed study in stage 2 options with identification of preferred options or a singular preferred option. The framework will summarise, inter alia:

- Engineering constraints and issues

- Environmental considerations and impacts (this will also consider each option against a developed “do-nothing” environmental impact assessment)

- Economic development considerations (at a sub-regional and local level).

- Traffic volumes, traffic segregation and any essential supporting Traffic Management requirements.

- Costs and benefits, in broad terms.

- Funding issues/opportunities including scope for private finance, and the broad scope for interaction with other development opportunities.

3) Recommendations to the Mersey Crossing Group on:

- The preferred option

- Proposals for project development beyond the study.

- Further investigative work associated with project development.

- Timescales to the submission of a proposal.

- Form of funding bid proposed.
Consultation on the proposals with partners.

Public consultation, its timing in relation to development of a proposal and bid, coverage and proposed organisation.

Outline estimates of the costs involved in developing a full proposal and submission of a bid if these were to be carried out by Oscar Faber.

6. STUDY COSTS AND TIMESCALE

This initial feasibility is to be undertaken for a budget of £50000 plus VAT. The study should be completed within 5 months of being commissioned.

It should be noted that this is a preliminary feasibility study. If an acceptable and potentially fundable option is identified and the Mersey Crossing Group decide to pursue it further, much more detailed studies would be required. These would include engineering, environmental/ecological and perhaps economic development aspects of the preferred crossing(s). These studies will cost considerably more than this initial feasibility study, reflecting the greater detail and diverse professional specialisms involved. The costs of this additional work will be estimated as part of this initial feasibility study.