Thank you for your letter of 21 December 2009, inviting the Scottish Futures Trust ("SFT") to assist the Finance Committee’s considerations in relation to the Forth Crossing Bill Financial Memorandum.

The Scottish Futures Trust is an independent company, established by the Scottish Government, with a responsibility to enhance value for money across all public infrastructure investment. SFT operates at arms’ length from the Government but works closely with the public sector to seek and deliver improved value for taxpayers.

Our wider role is: to support the challenging investment plan; to use the skills and experience of public and private sector organisations; and to apply the lessons learned from previous procurements in order to achieve the best possible value for money for the people of Scotland.

Within this wider role, SFT also has specific responsibility for undertaking the key stage review process on behalf of Scottish Government; this type of validation review, historically outsourced, will be undertaken by in-house SFT teams, allowing the knowledge of lessons learned to be retained for future project reviews.

The purpose of such a review is to provide a Project Board, at pre-defined stages of project development and procurement, with external assurance that a Project is ready to proceed and that going forward the systems and procedures are in place to increase the probability of the intended outcomes of the Project being delivered. Completing reviews of this nature is one of the key recommendations from the Audit Scotland “Review of major capital projects in Scotland, 2008”.

In relation to the Forth Replacement Crossing ("FRC"), SFT assumed responsibility for this review process in undertaking a pre Invitation to Participate in Dialogue ("pre ITPD") review during October/November 2009. The review sought to understand the deliverability and affordability implications of the project against desired outcomes and allocated human and financial resources, as well as seeking an understanding as to how value for money will be realised through the procurement process and maintained post contract award.

Following completion of the review, ITPD documentation has been provided by Transport Scotland to the two bidding consortia.

The Financial Memorandum reflects the financial parameters and assumptions that were presented to us during the review process in terms of costs estimates, sources of funding and the approach to securing value for money that Transport Scotland have adopted for this project.

A further review will be undertaken by SFT in early 2011 prior to the appointment of a preferred bidder.
SUBMISSION FROM FIFE COUNCIL

1.0 Witness Synopsis

1.1 My name is Dr Bob McLellan. I am presently employed as Head of Transportation Services, Fife Council. I graduated with a BSc (Hons) in Civil Engineering from Strathclyde University, Glasgow 1978-82. Thereafter, I worked for Lothian Regional Council in Edinburgh in 1982 as a Graduate Civil Engineer and progressed to Assistant Director of Transportation, a post I held between 1993 and 1995 when I moved to Angus Council as Director of Roads. In 2001, I moved to my current post in Fife.

I have a doctorate (PhD) in project/construction management which I undertook on a part-time basis between 1988 and 1994, again at Strathclyde University, Glasgow.

I am a Fellow of the Institution of Civil Engineers, a Fellow of the Chartered Institute of Highways and Transportation.

I have previously (2004) been Chair of the Management team of the South East of Scotland Transport Partnership (SESTRAN) which at that time comprised of 10 Local Authorities and the Forth Estuary Transport Authority (FETA) before it became the formal SEStran Regional Transport Partnership.

I have also (2000) been Chair of the Association of Municipal Engineers in Scotland (AME) and have held key roles within the Society for Chief Officers of Transportation in Scotland (SCOTS), most recently as Chair of their Engineering Committee (2003).

2.0 Evidence

2.1 Introduction

2.1.1 Fife Council continues to support the delivery of the New Forth Crossing by 2016. This project is vital for the economic well being of Fife, since it will ensure continued connectivity for business markets throughout Fife, the East of Scotland, and beyond. It will also create employment opportunities during its construction, which will be particularly important as Scotland emerges from the recession.

2.1.2 The Council is also continuing to work with the Scottish Government, Transport Scotland, SEStran, The City of Edinburgh Council and West Lothian Council to develop a Public Transport Strategy, which is appropriately funded, in parallel with the New Forth Crossing Bill.

2.1.3 For the avoidance of doubt, the Council does not intend to delay the progress of the Bill, nor the construction of the New Crossing. However, the Council is seeking appropriate funding from the Scottish Government for those elements of the Public Transport Strategy which are located within Fife, which could be implemented in parallel with the works associated with the Forth Crossing Bill.

2.1.4 On 14 January 2010 Fife Council agreed to submit a report and appendices to the Scottish Parliament as part of the Hybrid Forth Crossing Bill process, for information purposes only (refer to Appendix A).

2.2 Funding Issues

2.2.1 Paragraph 265 of the Explanatory Notes (And Other Accompanying Documents) for the Forth Crossing Bill states that the Financial Memorandum “should be read in conjunction with the Policy Memorandum and the Bill itself.” The Policy Memorandum (paragraph 106) states that “the increase in CO2 as a result of the proposed scheme will require offsetting by greater reductions elsewhere in Scotland.”

2.2.2 Paragraph 37 of the Policy Memorandum for the Bill states that current traffic flows across the Forth are about 66,000 vehicles a day. The traffic flows in 2017 are
predicted by Transport Scotland to increase to 83,300 vehicles a day without the New Crossing, as a result of underlying traffic growth and land use changes. With the New Crossing in place, the traffic flows are predicted to increase to 92,000 vehicles a day (in 2017) due to the motorway standard of the Crossing and the more efficient traffic flow predicted by the ITS control system. Transport Scotland has suggested (refer link below) that an element of the latter increase includes a reduction in traffic on other routes:


Bearing in mind the levels of congestion which were experienced in 2006, and the objectives outlined in paragraph 3.1, some reassurance is sought as to how the same level of service can be offered, and the reliability of journey times can be improved for all modes, in the context of a 39% increase in Cross Forth traffic flows by 2017.

2.2.3 With about 26% of Cross Forth travellers approaching the Bridge from Rosyth/Dunfermline and about 51% from the north and east of Halbeath, intercepting travellers at the proposed Park & Choose sites at Halbeath and Rosyth and associated bus/HOV priority measures would significantly help to counter the predicted increases in traffic flows. It is clear that these Park & Choose sites and priority measures, should form the key elements of an effective Public Transport Strategy to help mitigate such increases in traffic, and help to reduce carbon emissions. Fife Council is therefore pleased to be working with the Scottish Government / Transport Scotland, SEStran, the City of Edinburgh and West Lothian Councils to develop a Public Transport Strategy for Cross Forth travel, which will address such issues.

2.2.4 In support of Fife Council’s continued commitment to help develop an effective Public Transport Strategy for the New Forth Crossing refer to Appendices B & C, ie. the draft note of the meeting with the Minister for Transport, Infrastructure and Climate Change on 19th January 2010 and the emerging Public Transport Strategy for the Forth Replacement Crossing (FRC), dated January 2010. These documents show the ongoing partnership working with all key parties in the development of a solution to reduce the amount of traffic crossing the Forth at Queensferry.

2.2.5 The construction of the access roads onto the new bridge from Fife will require land take which would incorporate a proportion of the existing overspill car park for Ferrytoll which is accessed from the B981. Compensation under the Bill only covers the land take and not the actual infrastructure that is provided by the land. This will leave Fife Council with a significant loss of some 200 parking spaces and would cost in the region of approximately £7,500 per space to replace (for the construction of the car park only), therefore to replace the existing facility could be in the order of £1.5m. Accordingly, Fife Council would ask that appropriate provision is made as part of the New Forth Crossing project, to replace this facility which is used by Fife Council and Deep Sea World.

2.3 Liability Issues

2.3.1 The Forth Crossing Bill, Roads Part 2, Section 13 paragraph (1) gives Ministers the power to transfer roads to Local Authorities on the 1st April following the opening of this road for the purpose of through traffic. However, paragraph (3) states that the road will be transferred to the local roads authority "with liabilities vested in or incurred by the Ministers in connection with the road". This could leave Fife Council open to a financial commitment if there are any outstanding claims relating to these sections of road.

Fife Council would ask that additional provision is made in future budgetary settlements to cover this additional liability. Scottish Ministers in their procurement of the works should also ensure - by collateral warranties or otherwise - that Fife Council has appropriate rights against the contractors to ensure post-completion defects are rectified.
QUESTIONNAIRE

This questionnaire is being sent to those organisations that have an interest in, or which may be affected by, the Financial Memorandum for the Forth Crossing Bill. In addition to the questions below, please add any other comments you may have which would assist the Committee’s scrutiny.

Consultation

1. Did you take part in the consultation exercise for the Bill, if applicable, and if so did you comment on the financial assumptions made?

Fife Council has contributed to the consultation during the development of the Bill through various officer and member briefings, and formal submissions agreed by Fife Council’s Environment, Enterprise and Development Committee.

2. Do you believe your comments on the financial assumptions have been accurately reflected in the Financial Memorandum?

The Council has stressed to Transport Scotland since the Scottish Government’s commitment to the delivery of the New Forth Crossing that an integral Public Transport Strategy will be required for the New Bridge, to ensure that any increase in the demand for Cross Forth travel is successfully accommodated by the Public Transport Corridor on the existing Forth Road Bridge. (refer to main evidence above) The Financial Memorandum does not make any allowance for the delivery of a Public Transport Strategy.

Fife Council does not wish to delay the Bill process, or the delivery of the New Crossing, and therefore the Council is working with the Scottish Government, Transport Scotland, SEStran, and the City of Edinburgh and West Lothian Councils to develop a Public Transport Strategy (refer to Appendices B and C) in parallel with the Bill process. There is still no funding commitment to deliver that strategy, but Fife Council is developing the design of 2 key elements of the strategy (ie. the Halbeath and Rosyth Park & Choose sites) to planning application stage, in an effort to assist progress.

3. Did you have sufficient time to contribute to the consultation exercise?

The time available to contribute has been reasonable, but it is disappointing that the views expressed in relation to the funding required to deliver a Public Transport Strategy for the Forth Crossing have not been taken on board.

Costs

4. If the Bill has any financial implications for your organisation, do you believe that these have been accurately reflected in the Financial Memorandum? If not, please provide details.

The delivery of an integral Public Transport Strategy for the New Bridge, to ensure that any increase in the demand for Cross Forth travel is successfully accommodated by the Public Transport Corridor on the existing Forth Road Bridge should be a financial matter for Transport Scotland. However, it may have implications for Fife Council, other Councils and the public transport operators. (refer to main evidence above)

It is currently estimated that Halbeath and Rosyth Park & Choose sites would cost in the region of £7.1m and £6m respectively and £1.5m for the Overflow Car Park at Ferrytoll. There would also be the on-going maintenance costs.

5. Are you content that your organisation can meet the financial costs associated with the Bill? If not, how do you think these costs should be met?
No, we cannot meet the costs as these are substantial, refer to response to Q4.

6. Does the Financial Memorandum accurately reflect the margins of uncertainty associated with the estimates and the timescales over which such costs would be expected to arise?

This is a matter for Transport Scotland to comment on.

Wider Issues

7. If the Bill is part of a wider policy initiative, do you believe that these associated costs are accurately reflected in the Financial Memorandum?

From the Policy Memorandum, (ref para 106) the carbon emissions generated by the bridge will not meet the requirement of the Climate Change Act – net increase in CO2 emissions, so savings will have to be met from elsewhere in Scotland. The Policy Memorandum should explain how this increase in carbon emissions will be dealt with and at what cost.

A funding commitment for the delivery of a Public Transport Strategy within specific timescales would help to explain how the Scottish Government and Transport Scotland are going to deal with the increase in emissions as a result of the New Crossing.

8. Do you believe that there may be future costs associated with the Bill, for example through subordinate legislation or more developed guidance? If so, is it possible to quantify these costs?

Unless a financial commitment is provided by Scottish Government / Transport Scotland to the delivery of an integral Public Transport Strategy for the New Bridge within specific timescales, then the future costs of delivering it will fall to other organisations, which may include Fife Council. Local Government will continue to be under severe budgetary pressure for the foreseeable future, and hence it is difficult to see how the required Public Transport Strategy could be delivered entirely by others. It is an integral part of a national project and hence should be funded nationally. Fife Council and others would, of course, be willing to assist with the delivery of the strategy if funding is committed by national government.
Forth Crossing Bill – Financial Memorandum

Evidence to the Finance Committee

By Dr Bob McLellan

Head of Transportation Services, Fife Council

Appendix A

Environment, Enterprise and Transportation Committee
14 January 2010

Agenda Item No. 5
Response to Hybrid Forth Crossing Bill
Report by: Dr Bob McLellan, Head of Transportation Services
Wards Affected: All Wards

Purpose

The purpose of this report is to seek approval to send this report to the Scottish Parliament for information purposes only as Fife Council’s response to the Hybrid Forth Crossing Bill.

Recommendation(s)

It is recommended that the Committee agrees:

i) to confirm the Council’s continuing support for the delivery of the New Forth Crossing by 2016;

ii) that this report and the appendices be submitted to the Scottish Parliament as part of the Hybrid Forth Crossing Bill process for information purposes only;

iii) to note the opinion provided by Douglas Armstrong, QC to SEStran on the issues relative to them and Fife Council, the City of Edinburgh Council, and West Lothian Council with regard to the Parliamentary Bill process for the New Forth Crossing;

iv) to delegate to the Head of Transportation Services and the Executive Director (Performance & Organisational Support), in consultation with the Chair and Vice Chair of the Environment, Enterprise and Transportation Committee, to provide any necessary input for the Council’s benefit, with regard to the Parliamentary Bill process for the New Forth Crossing; and,

v) to note that Fife Council is continuing to work with the Scottish Government, Transport Scotland, SEStran, the City of Edinburgh Council and West Lothian Council to develop a Public Transport Strategy, which is appropriately funded, in parallel with the New Forth Crossing Bill.

Resource Implications

It is considered that the work required to support any input could be provided from existing resources.

Legal & Risk Implications

As discussed herein, SEStran has obtained Counsel’s Opinion on the issues relative to Fife Council, the City of Edinburgh Council, West Lothian Council and SEStran with regard to the Parliamentary Bill process for the replacement crossing.
There is a risk of the implementation of the New Forth Crossing being delayed if the Parliamentary Bill process is delayed.

Policy & Impact Assessment

This new crossing is vital for the economic well being of Fife, as it will ensure sustainable connectivity for business markets throughout Fife, the East of Scotland, and beyond, as well as offering employment opportunities during the five years of its construction.

There are, however, consequential local issues, which are discussed in Appendix 1 hereto.

The development of a Public Transport Strategy for the New Forth Crossing will support the BIG 8 Objectives, particularly:

- Making Fife the leading green Council in Scotland;
- Improving local conditions for economic development; and
- Becoming a top performing Council.

It will also support the 3 strategic outcomes of the National Transport Strategy and will be consistent with the Local Transport Strategy and the Regional Transport Strategy.

Consultation

This report has been prepared with input from the Council’s Performance and Organisational Support Directorate (Standards and Governance) and Environmental, and Development Services.

SEStran and the Councils of West Lothian, the City of Edinburgh and Fife continue to seek agreement with Scottish Government’s executive agency, Transport Scotland, to develop and fund a public transport strategy in parallel to the new Forth Crossing.

1.0 Background

1.1 The Hybrid Forth Crossing Bill was introduced to Scottish Ministers in the Scottish Parliament on the 16 November 2009 by John Swinney MSP. The objection period for this Bill runs from the 17 November 2009 till the 26 January 2010.

1.2 The purpose of the Bill is to give Scottish Ministers powers to construct a new bridge over the Firth of Forth and to construct and improve associated roads and structures; to authorise the acquisition, or temporary possession and use, of land for construction and improvements works; and for connected purposes.

1.3 The Bill and supporting documents have been made available for inspection by the public at Fife House as well as other key locations throughout Fife and in the surrounding Local Authorities during the objection period. There have also been public exhibitions held at Queensferry Hotel, North Queensferry 27th and 30th November and the 1st December as well as at other locations between 18th November and the 4th December giving details of the scheme. A public meeting at North Queensferry Hotel, North Queensferry was held on the 10th December by staff from the Scottish Parliament to outline the parliamentary procedure for consideration of the Scottish Government’s Forth Crossing Bill.

1.4 A Hybrid Bill Committee of three to five MSPs is to be established to consider the Bill. Members will need to show they have no links to the areas affected by the Bill. The Bill is subject to a three-Stage parliamentary process during which some MSPs take part as members of the committee and all MSPs can take part in proceedings on the Bill in the Debating Chamber.
Stage 1: Spring 2010
Committee consideration of the general principles of the Bill and a Parliamentary decision whether to agree to those general principles; consideration of whether the Bill should proceed as a Hybrid Bill; and preliminary consideration of objections.

Stage 2: Autumn 2010
Committee consideration of the details of the Bill and any objections to it along with all remaining objections. MSPs will have the opportunity to table amendments to the Bill (eg for associated Public Transport measures) at this stage.

Stage 3: Winter 2010
Parliament’s final consideration of the Bill and a decision whether to pass, amend, or reject it.

Commencement of project early Spring 2011
All dates are indicative and it will be up to Parliament to determine the progress of the Bill.

1.5 On 29 October 2009, the Minister for Transport, Infrastructure and Climate Change gave an assurance to Senior Members from SEStran and the 3 Councils that the Scottish Government would develop a focused Public Transport Strategy, in partnership with SEStran and the Councils. Meetings in this regard are ongoing.

2.0 Issues and Options

2.1 The three key strategic outcomes of the National Transport Strategy (NTS), which support the Purpose of Government, are
- **Improve journey times and connections** between Scotland’s cities and towns and their global markets, to tackle congestion and to provide access to key markets
- **Reduce emissions** to tackle climate change
- **Improve quality, accessibility and affordability** of transport and to give people the choice of public transport and real alternatives to the car

2.2 SEStran has obtained Counsel’s Opinion on its ability, and the ability of the three Councils most affected by the proposals (Fife, West Lothian and Edinburgh) to participate in the Bill process. Douglas Armstrong QC, an experienced planning and transportation advocate, has given his opinion on the following matters:

- SEStran itself does not have clear statutory powers to lodge an objection to the Bill, but could do so on behalf of the Councils;
- The three Councils do have powers to object;
- The basis of such an objection would have to be related to each Council’s specific, identifiable interests, for example the increased traffic (and associated effect on the road network) which may result from a new crossing delivered without proper public transport measures;
- As well as making a formal objection, Fife Council as a statutory consultee has other ways of getting its views before the Parliament. These include writing to the Committee and asking to give evidence and Members asking MSPs to propose amendments on the Council’s behalf.
- Fife Council could also formally enter the process by lodging a statement on the pre-Bill consultation.

3.0 Conclusions

3.1 The Council should not object to the Bill, but should take every opportunity to underline its concern relative to consequential local issues.

3.2 The Committee should agree to the report’s recommendations.

List of Appendices
Appendix 1: Local issues arising from the Bill
Appendix 2: Carbon Emissions
Response to Hybrid Forth Crossing Bill
Appendix 1

Fife Council in welcoming the Scottish Government’s decision to proceed with the procurement process for the delivery of the New Forth Crossing offers the following comments:

- **Deep Sea World** – The overflow car park to the west of the A90, which is owned by Fife Council and leased to Deep Sea World, will be removed to allow room for new northbound slip from the existing bridge. There are no proposals to replace this car park, which was previously successfully used by Fife Council during the works to provide the multi storey car park at Ferrytoll. The demand for parking at Ferrytoll is currently in the order of 800 vehicles a day, and the capacity of the site is 1040. The details of the traffic management required during the reconstruction of the Ferrytoll Interchange and area at the entrance to the Park & Ride site will be developed by the successful consortium for the project. Until the details are known, it would be prudent to ensure that sufficient parking capacity is retained to enable more travellers to take the bus or car share instead of suffering, and adding to, the congestion associated with the roadworks.
  
  **Fife Council therefore recommends that the works are phased to ensure the overflow car park is available for use for as long as possible.**

- **Road Designation**
  
  The Bill states that the circulating carriageway of the new Ferrytoll Interchange will become a trunk road. Hope Street (from Inverkeithing) and western approach to the Ferrytoll Interchange will remain as local roads. The new interchange will include linked traffic signals which will be controlled and maintained by Transport Scotland.
  
  Traffic signals in the control of Transport Scotland and maintained by them should be part of the trunk road network.
  
  **Fife Council therefore recommends that the trunk road network should extend as far as the linked traffic signals on Hope Street, Inverkeithing and westwards to include the linked traffic signal junctions at Castlandhill Road and the new access to North Queensferry.**

- **Adverse effect of traffic on the local road network following construction**

  The proposed traffic flows over the estuary are forecast by Transport Scotland to increase from 83300 veh/day to 92000 veh/day (about 10%) due to the improved journey times with the proposed motorway standard of route in place. The increased traffic flows are understood to include a reduction in traffic on the Clackmannanshire and Kincardine crossings and on the M9.
The recent exhibition material shows that the corresponding impact on local traffic flows will include an increase of 400 veh/day in Inverkeithing and 1800 vehs/day through Rosyth. It is clear that the delivery of an effective Public Transport Strategy would help mitigate such adverse impacts. With about 26% of Cross Forth travellers approaching the Bridge from Rosyth/Dunfermline and about 51% from the north and east of Halbeath, intercepting travellers at the proposed Park & Choose sites at Rosyth and Halbeath would significantly help to counter the predicted increases in traffic flows.

Fife Council is pleased to work with Scottish Government / Transport Scotland, SEStran, the City of Edinburgh and West Lothian Councils to develop a Public Transport Strategy for Cross Forth travel, which will address such issues.

**Fife Council is of the view that the Public Transport Strategy that is being developed should address matters such as the Halbeath and Rosyth Park & Choose sites, and associated Bus and High Occupancy Vehicle Priority Measures to address predicted increases in the demand for travel and the funding thereof.**

- **Carbon**
  The embodied carbon assessment is provisional but initial calculations indicate that it is likely to be of the order of 121,000 tonnes of carbon emissions.

  The operational carbon of the bridge, however, is expected to result in an increase of the proposed scheme in 2032 of 20,317 tonnes, which represents 0.16 per cent of total transport sector emissions in Scotland in 2007 (12.4 million tonnes) (Scottish Government, 2009). Although small in an overall Scottish context, this increase does not contribute to the requirement in the Climate Change (Scotland) Act 2009 to reduce emissions by 42 per cent in 2020 (interim target) and 80 per cent by 2050. They are proposing that the increase in carbon emissions as a result of the proposed scheme will require to be offset by greater reductions elsewhere within Scotland.

  If, however, the Council’s suggestion of providing two new Park & Choose sites at Halbeath (1000 spaces) and Rosyth (500 spaces) and the introduction of a cross-Forth ferry/hovercraft service is implemented, public transport mode choice would be significantly increased. Moreover, it is calculated that a consequential carbon emission saving of around 5,000 tonnes of carbon emissions per year would be achieved.

  **Fife Council is of the view that the Public Transport Strategy should address the anticipated increase in carbon emissions.**

- **Contaminated Land**
  Environmental Services Contaminated Land Section are generally satisfied with the information provided, and largely concur with recommendations and proposals made in the above document, relating to the Northern Study Area.
  It is recognised that the report makes recommendations for further investigation of soil, gas and the water environment, when development plans are known.
  To enable us to provide more detailed comment, Environmental Services Contaminated Land Section would appreciate a copy of the following reports.

  - Phase II 2008 GI (Jacobs, ARUP 2009a)

  Environmental Services Contaminated Land Section would also appreciate the opportunity to comment on future reports and monitoring data as this becomes available.
• Noise
Fife Council Public Protection Team broadly concurs with the recommendations and proposals made in the Forth Replacement Crossing Code of Construction Practice (CoCP) dated November 2009. As regards working hours and threshold levels for noise and vibration it is noted that these are in line with generic guidance from DoE Advisory Leaflet (AL)72 (1976) and BS 5228 Parts 1 and 2009. While this guidance will give adequate protection against adverse impacts in most scenarios there may be occasions when local specific circumstances may require some variation in measures and thresholds quoted in the CoCP. In particular the indicated preference for evening or overnight work on the A90 to minimise traffic disruption may require review of noise assessment methodology and ambient noise levels for affected dwellings.

• Air Quality
The proposals indicate a movement of traffic from the existing Forth Road Bridge rather than a significant increase in traffic volumes. The modelling shows a slight increase in NO2 and PM10 concentrations at one location but these are still below the air quality objectives. Air quality effects due to construction will be influenced by the method of construction, condition of haul roads and volume of construction traffic. We would welcome discussions with the applicant at the appropriate time in advance of commencement of the construction works.

Environment, Enterprise & Transportation Committee - 14 January 2010

Response to Hybrid Forth Crossing Bill

Appendix 2

Carbon Emissions

New Forth Crossing Carbon Emissions
It is estimated that the alignment of the New Forth Bridge is 1.6 km longer than the existing Bridge alignment between Ferrytoll and Echline.

The extra 1.6 km travelling between Ferrytoll and Echline is estimated to produce the following amount of extra CO2e as shown in table 1.

Table 1 Existing Forth Road Bridge Carbon Emissions

<table>
<thead>
<tr>
<th>Mode</th>
<th>Extra Distance in Kg CO2e</th>
<th>Extra Distance in tonnes CO2e</th>
</tr>
</thead>
<tbody>
<tr>
<td>Car</td>
<td>6684601.82</td>
<td>6684.60</td>
</tr>
<tr>
<td>Bus</td>
<td>341602.17</td>
<td>341.60</td>
</tr>
<tr>
<td>LGV</td>
<td>1347143.17</td>
<td>1347.14</td>
</tr>
<tr>
<td>HGV</td>
<td>2968802.54</td>
<td>2968.80</td>
</tr>
<tr>
<td>Motorcycle</td>
<td>38070.96</td>
<td>38.07</td>
</tr>
<tr>
<td>Total</td>
<td>11380220.66</td>
<td>11380.22</td>
</tr>
</tbody>
</table>

*Buses have been removed as it is anticipated that they will travel over the existing Bridge

Calculations are based on 2008 traffic flows and Conversion factors from DEFRA 2008

Suggested Additional Public Transport proposals
The creation of two new Park & Choose sites at Halbeath (1000 spaces) and Rosyth (500 spaces). The following assumptions have been made about how they will operate.
1. Both sites operate at an 80% utilisation (around 1200 spaces) 876,000 one-way trips per year
2. Each trip which is using the Park & Choose is done by a single occupancy vehicle
3. The average journey length from each Park & Choose is 20 km

By introducing these schemes it will help improve modal shift away from the private car and reduce carbon levels on an annual basis by 1,694,184 kg CO2e per year or 1,694 tonnes of carbon emissions per year.

Calculation = \( (876,000 \text{ (Number of Vehicles removed)} \times 0.204 \text{ (Conversion Factor Cars)} \times 20 \text{ (Average Distance Travelled (km))} \) - \( (876,000 \text{ (Number of Vehicles removed)} \times 0.1073 \text{ (Conversion Factor Bus Passenger)} \times 20 \text{ (Average Distance Travelled (km))} \)

Also the introduction of a cross-Forth ferry/hovercraft increasing public transport mode choice will create a carbon saving of 3,138,280 kg CO2e per year or 3,138 tonnes of carbon emissions year.

If both schemes were to be undertaken it would provide a Carbon saving of 4,832,464 CO2e per year or 4,832 tonnes of carbon emissions per year.
Appendix B

Draft note of meeting with the Minister for Transport, Infrastructure and Climate Change, 19th January 2010

Forth Replacement Crossing Meeting
12 noon Tuesday 19th January 2010
Victoria Quay

Present
Cllr Russell Imrie  Chair of SEStran
Cllr Tony Martin   Fife Council
Cllr Gordon McKenzie  City of Edinburgh Council
Cllr Greg McCarra  West Lothian Council
Cllr Martyn Day   West Lothian Council
Stewart Stevenson, MSP Minister for Transport, Infrastructure and Climate Change

In Attendance
Alex Macaulay   SEStran
Bob McLellan   Fife Council
Marshall Poulton  City of Edinburgh Council
Graham Malcolm  West Lothian Council
John Howieson   Transport Scotland
David Anderson   Transport Scotland

1. Cllr Imrie opened the meeting by welcoming the work that had been done by Transport Scotland to develop a Public Transport Strategy for the Forth Replacement Crossing (FRC) (Paper Dated January 2010 attached). He emphasised that the implementation of the strategy was essential to the success of the bridge and stated that the strategy broadly met the aspirations of the three councils and SEStran. The purpose of the meeting was to explore with the minister whether he was able to provide a commitment to delivery of the strategy broadly along the lines of Appendix C of the attached paper.

2. The minister responded by outlining the procedures for establishing the Bill committee. The committee is not yet established but is likely to be shortly with four to five members with no direct electoral interest in the east of Scotland. He emphasised that the new bridge is a ‘distressed purchase’ and as such he is not seeking additional works if this can be avoided although the bridge will be designed for 2016 traffic levels. He outlined that there are two issues for public transport to address, firstly any problems caused during construction and secondly those post construction. He expressed the view that the Bill is not the place to address the public transport issues beyond the provision already included but that they should be pursued as a clearly related activity in a parallel process. With reference to the attached paper he stated that further work is needed to develop the details of the schemes in Appendix C and their relative programme. His view is that while he favours local delivery for many of the schemes it will be a shared responsibility between central and local government.

3. John Howieson expressed the view that provision of Halbeath park and ride and hard shoulder running on the M90 could provide benefits during the construction period.

4. The Minister explained that budgets are tight and he is going through the process of examining possible areas for reduction. However if he can find new sources of funding we should be ready to take advantage of them by developing schemes now with priority given to addressing any adverse effects caused by the bridge. He did not discount Halbeath being part of the construction phase and suggested temporary solutions should be examined.

5. Cllr McCarra referred to the de-humidification on the existing bridge and the Minister and Mr Howieson expressed the view that it would not reinstate the bridge to its original strength and the best use for it was for public transport.

6. Mr Poulton asked what liabilities would be transferred to local road authorities. Mr Howieson
expressed the view that Transport Scotland would deal with Part 1 claims (e.g. noise) but future liabilities would be transferred. The minister stated that this would be subject to future negotiations and agreement at the time of transfer.

7. Cllr Day expressed concerns about increased traffic through Newton and lack of hard shoulder running through junction 1A for the M9. The Minister expressed the view that discussions on these issues should continue.

8. Cllr Imrie reiterated that the authorities do not wish to delay the Bill but were looking for a commitment and methodology for delivery.

9. In summery the Minister saw progress as being in three phases as follows:-

   Phase 1: Establish exactly what needs to be done and when based on developing the work in the attached paper. At this point he would seek a government commitment in principle.

   Phase 2: Seek government commitment to early actions and the respective share of funding between central and local government.

   Phase 3: Commit to later projects at a later date.

Appendix C of the attached papers was accepted as a good starting point for this progress. All parties would have to contribute generally in proportion to their resources and this could include resources in kind rather than financial. The process would establish the best funding route. The Minister’s current preference is for local delivery with project risk lying locally although he is committed to working with the authorities to develop and implement the package.

The meeting closed at 1pm.
Appendix C

Public Transport Strategy for the Forth Replacement Crossing (FRC) dated January 2010
STRATEGIC TRANSPORT PROJECTS REVIEW
INTERVENTION 14: FORTH REPLACEMENT CROSSING
PUBLIC TRANSPORT STRATEGY
January 2010

Public Transport Strategy

1. The public transport strategy in support of the Forth Replacement Crossing seeks to achieve contributions against the planning objectives of the project, building upon a series of schemes and measures recommended within the Strategic Transport Projects Review and those being promoted/developed by adjacent local authorities and SEStrans.

Background

2. The planning objectives for the Forth Replacement Crossing emphasised the need to maintain levels of service for all traffic at 2006 levels, provide opportunities for sustainable transport modes and to support the Government’s purpose of sustainable economic growth. Development of the crossing proposals has developed the scheme from a single replacement crossing with additional multi-modal capacity to a managed crossing scheme (MCS) making use of both the existing and new bridges. The full planning objectives of the Forth Replacement Crossing Study (Report 6) are:

- Maintain cross-Forth transport links for all modes to at least the level of service offered in 2006;
- Connect to the strategic transport network to aid optimisation of the network as a whole;
- Improve reliability of journey times for all modes;
- Increase travel choices and improve integration across modes to encourage modal shift of people and goods;
- Improve accessibility and social inclusion;
- Minimise the impacts of maintenance on the effective operation of the transport network;
- Minimise the impact on people, the natural and cultural heritage of the Forth area; and
- Support sustainable development and an economic growth.

3. The existing Forth Road Bridge will, once the replacement crossing is available, be used as a public transport corridor in addition to being available for the significant maintenance that is required of the structure. By removal of the vast majority of the traffic from the existing Bridge, the four lanes may be managed to ensure continual use as a public transport corridor whilst such maintenance is carried out.

4. As part of the Managed Crossing Scheme (MCS) the approach roads to the Forth have been designed to allow a variety of uses, paths and alternatives for all travellers. This includes significant enhancements to the traffic arrangements on the north side
together with a modified Ferrytoll Park and Ride entrance and bus plaza whilst on the south side the opportunity will exist to provide priority for buses on the B800 and links to the A90. A copy of the infrastructure proposed as part of the MCS is shown in Annex A.

**Analysis of Cross-Forth Demand**

5. It is well understood that demand for travel across the Forth exceeds capacity in the peak period, resulting in both queuing and the phenomenon of peak spreading. Looking to the future, the land use plans of the adjacent local authorities indicate a continued increase in the demand for travel across the Forth in both directions. Whilst broadly the origins and destinations remain similar to those at present, there is considerable growth in the West Edinburgh and West Lothian areas.

6. Annex B sets out the analysis undertaken to determine the potential for public transport to cater for forecast car based demand in 2022. In undertaking this analysis assumptions have been made on the contributions of the rail projects identified within the STPR affecting cross-Forth demand. This includes the Edinburgh – Glasgow Rail Improvements Programme and its Gogar station to serve Edinburgh Airport. These measures anticipate an increase in rail trips over the Forth of between 4% and 15%, however, there is no significant reduction in car trips over the Forth.

7. Approximately 10% of cross Forth trips in 2005 were made by bus: due to the distribution of growth, the assumption of fixed bus services and the relative attractiveness of the car in the strategic model, this is expected to drop to 5% by 2022. The analysis demonstrates that there is a significant unmet demand for travel across the forth, and that this will change in both its origin and destination as land uses are developed over the coming years. Some 48% of car based travel demand is forecast to be from Fife or Clackmannanshire to the West of Edinburgh and West Lothian, with a further 19% being to the centre and north of Edinburgh. The remainder is more widely dispersed in origin and destination. A series of assumptions about bus attractiveness along seven indicative corridors have been tested and lead to an estimated transfer from car to bus of 300 cars per hour in the peak periods. This increase in bus patronage is equivalent to 8.5% of all cross Forth demand.

8. Two scenarios for public transport enhancements (PT1 and PT2) have been analysed and are shown to benefit public transport (Annex B). The detail of these requires considerable further work to ensure a balance is struck, but features which indicate the greatest contribution to public transport attractiveness include the provision of Park and Ride sites to the North of the Forth and bus-only slip lanes between the A90 and B800.

9. It is clear from the analysis of the longer term land use changes that travel demand will increase south of the Forth (due to major land releases at Winchburgh and West Edinburgh). Both of these have high aspirations in securing public transport mode shares and their promoters propose a range of measures to achieve this including hard shoulder running and queue bypass schemes. The modelling undertaken to investigate the potential benefits of a major series of public transport measures associated with the Forth Replacement Crossing indicates that considerable further work is required to understand the contribution, and the timing of that contribution, of individual measures. The level of prioritisation of public transport together with the land use requirements of
individual schemes and measures should be discussed with City of Edinburgh Council, West Lothian and SEStrans.

Action Plan

10. The analysis demonstrates that the public transport strategy is achievable through utilising a range of schemes and measures (some of which are set out in Annex C). To progress with the delivery of the public transport strategy, the following activities will be prioritised in the short term (2010 – 2012):

   • Continue to work with local authorities/ bus industry stakeholders to develop bus services in advance of opening of FRC, aligned with the land use development plans and travelling populations to both North and South of the Forth;
   • Review the design development of the Halbeath Park and Ride site in order that it can contribute to the traffic management associated with the construction of the FRC. Including the consideration of a short term bus priority system utilising hard shoulder running on the M90 (North of Admiralty) allowing buses to maintain reliable journey times, under ITS control, through the congested network north of Ferrytoll.

11. The analysis of the operation of the MCS indicates that the remaining schemes and measures will be required after opening. The inclusion of ITS within the MCS seeks to ensure the steady flow of traffic within the network and negate the need for additional capacity using the hard shoulder. As land use patterns emerge, the remaining schemes and measures identified within the strategy will be considered for implementation.

12. In the longer term, there is the potential for conversion of the bus-based light rapid transit systems to rail based systems. This would relieve pressure on bus based systems allowing the provision of new bus services to more diverse origins and destinations, whilst rail serves the heaviest demands. The public transport crossings would then accommodate heavy rail, light rail and bus (both strategic and commuter). SEStran have already undertaken work on BRT links to the crossing and further work will be undertaken to fully understand the capabilities for this mode.

Summary

13. The Public Transport Strategy in support of the Forth Replacement Crossing sees the implementation of a series of schemes and measures to contribute to the planning objectives for the Crossing. The contribution of these has been assessed against the likely demand for travel across the Forth and three key measures are recommended for prioritisation to facilitate not only the scheme objectives, but mitigate the impacts of constructing the MCS.

David Anderson
January 2010
Elements included within the MCS which contribute to prioritising public transport

North of the Forth

- ITS Halbeath to Newbridge provides: Lane and speed limit control, Ramp Metering, Strategic message signing, Traffic monitoring system, CCTV
- Junction design recognises potential for LRT
- Revised layout at the Park and Ride; permitting segregated bus lanes and signed control
- Bus Priority through the new interchange, including segregated bus lanes and signed control
- Existing Bridge provides a dedicated Public Transport Corridor

South of the Forth

- New Crossing and approaches designed to allow hard shoulder running
- Existing Bridge provides a dedicated Public Transport Corridor
- A8000 Northbound bus lane and bus priority through signalised junctions
- Existing A90 could provide a Park and Ride Site
- ITS Halbeath to Newbridge provides: Lane and speed limit control, Ramp Metering, Strategic message signing, Traffic monitoring system, CCTV
- New Bridge over A80 designed to accommodate LRT
- Direct bus only lane from Existing Bridge joining the existing bus priority lane on the A90
- Direct bus only link - Edinburgh A90 towards Existing Bridge
ANNEX B

ANALYSIS OF PUBLIC TRANSPORT STRATEGY

Introduction

1. Developing the schemes and measures which contribute to the Public Transport Strategy requires that the current and predicted patterns of cross Forth travel are estimated. This analysis describes the patterns of future demand that could form the market for public transport initiatives to target. It presents the detail of the analysis of the potential operational performance of a range of measures. The analysis is consistent with the remaining transportation modelling for the Forth Replacement Crossing conducted using the Forth Replacement Crossing local micro-simulation model.

Existing Travel Demand across the Forth

2. Current peak demand for travel across the Firth of Forth by all modes in the morning is in the southbound direction and in the evening in the northbound direction. This is consistent with commuter movements between households in Fife and employment destinations to the south of the Forth, principally Edinburgh.

3. Approximately 10% of peak-period cross Forth trips are currently made by bus and 25% by rail. The existing observed maximum hourly vehicle flows in the peak periods are around 3,400 vehicles per hour: this includes buses and commercial vehicles. The distribution of car trip demand across the Forth is presented in Table 1 (morning, southbound) and highlights the dispersed destinations for travel. Car trips constitute around 80-85 per cent of all road traffic in the peak periods (approximately 2,700-2,900 cars per hour).

<table>
<thead>
<tr>
<th>Origins</th>
<th>Destinations</th>
</tr>
</thead>
<tbody>
<tr>
<td>Clackmannanshire and West Fife</td>
<td>0% 1% 2% 1% 2% 2% 1% 0% 10%</td>
</tr>
<tr>
<td>Dunfermline &amp; Rosyth</td>
<td>1% 2% 3% 1% 4% 3% 1% 17%</td>
</tr>
<tr>
<td>South Fife Coast</td>
<td>1% 4% 7% 3% 7% 4% 4% 4% 34%</td>
</tr>
<tr>
<td>South Central Fife</td>
<td>1% 1% 2% 1% 1% 2% 1% 10%</td>
</tr>
<tr>
<td>Rest of Fife</td>
<td>1% 1% 1% 2% 1% 1% 1% 9%</td>
</tr>
<tr>
<td>Perth &amp; Kinross</td>
<td>0% 1% 2% 1% 3% 4% 1% 0% 12%</td>
</tr>
<tr>
<td>Dundee, Angus, HITRANS, NESTRANS and ZETRANS</td>
<td>1% 1% 1% 1% 1% 1% 1% 1% 9%</td>
</tr>
</tbody>
</table>

Table 1: Existing (2005) travel patterns by car across the Forth Road Bridge (AM Southbound)

Notes:
Table based on analysis of the Transport Model for Scotland (TMfS:05A)
Row and column totals do not necessarily match due to rounding and figures do not necessarily sum to 100% due to rounding.

Figure 1 summarises the major travel demand distributions highlighted in Table 1.

Figure 1: Principal desire lines (existing)

4. The largest proportion of morning peak demand stems from the South Fife Coast between Kirkcaldy and North Queensferry, which accounts for around 34 per cent of cross-Forth car traffic (1,150 cars per hour). Areas within Edinburgh account for the majority of destinations, particularly the west and north. Rural West Edinburgh (including the Airport), West Lothian, and more distant destinations to the south and west also account for significant levels of cross-Forth car trip demand.

5. Demand for travel to Edinburgh city centre by car via the Forth Road Bridge is relatively low at around 10 per cent of the total demand because travel by public transport to central Edinburgh for travellers resident north of the Forth is often more attractive than travel by car.
Future Travel Demand across the Forth

6. Forecast changes in land use patterns and a number of committed transport interventions, including the Forth Replacement Crossing, are expected to result in changes in travel patterns over time. By 2022, the Transport Economic Land Use Model of Scotland (TELMoS) forecasts significant population and employment growth in West Lothian. Due to the changing land use patterns and the base assumption inherent within TMfS that the bus services in future years remain unchanged, the bus share of cross Forth travel is forecast to reduce to 5% by 2022. Rail share is forecast to remain relatively unchanged.

7. Table 2 indicates the pattern of southbound car trips in the morning peak across the Forth Replacement Crossing (five years after opening) forecast by the TMfS:05A. Figure 2 summarises the major travel demand distributions highlighted in Table 2.

<table>
<thead>
<tr>
<th>Destinations</th>
<th>East Lothian</th>
<th>Scottish Borders</th>
<th>Edinburgh City Centre</th>
<th>North and North West Edinburgh</th>
<th>East and South Edinburgh</th>
<th>West Edinburgh</th>
<th>West and Southwest Edinburgh</th>
<th>Rural West Edinburgh</th>
<th>West Lothian</th>
<th>The South &amp; West</th>
</tr>
</thead>
<tbody>
<tr>
<td>Clackmannanshire</td>
<td>0%</td>
<td>0%</td>
<td>2%</td>
<td>0%</td>
<td>2%</td>
<td>3%</td>
<td>1%</td>
<td>11%</td>
<td></td>
<td></td>
</tr>
<tr>
<td>and West Fife</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Dunfermline &amp; Rosyth</td>
<td>1%</td>
<td>1%</td>
<td>3%</td>
<td>1%</td>
<td>3%</td>
<td>4%</td>
<td>6%</td>
<td>2%</td>
<td>19%</td>
<td></td>
</tr>
<tr>
<td>South Fife Coast</td>
<td>1%</td>
<td>1%</td>
<td>4%</td>
<td>1%</td>
<td>3%</td>
<td>5%</td>
<td>6%</td>
<td>5%</td>
<td>27%</td>
<td></td>
</tr>
<tr>
<td>South Central Fife</td>
<td>1%</td>
<td>1%</td>
<td>2%</td>
<td>1%</td>
<td>2%</td>
<td>2%</td>
<td>5%</td>
<td>4%</td>
<td>16%</td>
<td></td>
</tr>
<tr>
<td>Rest of Fife</td>
<td>0%</td>
<td>0%</td>
<td>1%</td>
<td>0%</td>
<td>1%</td>
<td>2%</td>
<td>2%</td>
<td>2%</td>
<td>9%</td>
<td></td>
</tr>
<tr>
<td>Perth &amp; Kinross Council area</td>
<td>0%</td>
<td>0%</td>
<td>2%</td>
<td>1%</td>
<td>0%</td>
<td>1%</td>
<td>2%</td>
<td>2%</td>
<td>4%</td>
<td>2%</td>
</tr>
<tr>
<td>Dundee, Angus, HITRANS, NESTRANS and ZETRANS</td>
<td>1%</td>
<td>1%</td>
<td>1%</td>
<td>1%</td>
<td>1%</td>
<td>1%</td>
<td>1%</td>
<td>1%</td>
<td>0%</td>
<td>14%</td>
</tr>
</tbody>
</table>

Notes:
Table based on analysis of the Transport Model for Scotland (TMfS:05A)
Row and column totals do not necessarily match due to rounding and figures do not necessarily sum to 100% due to rounding

8. TMfS:05A forecasts significant growth in the total demand for cross-Forth travel. Again, the majority of cross-Forth future traffic demand is forecast to originate from the South Fife Coast area. However its relative proportion is forecast to decline as greater growth in other areas (in particular Dunfermline & Rosyth and South Central Fife) is forecast. All markets north of the Firth of Forth are forecast to grow over the period to 2022.
9. A large increase in demand to destinations in West Lothian is forecast (up from 12% to 25% of all cross-Forth car traffic by 2022). Demand to Rural West Edinburgh also increases from 18% to 20% of all cross-Forth car traffic and demand to more distant destinations to the south and west rises from 9% to 13%. Consequently, the relative proportion of cross-Forth car traffic towards Edinburgh is forecast to decline.

10. Although the relative importance of Edinburgh as a destination for travel by car is forecast to diminish over the period to 2022, the number of car trips towards the city as whole is still forecast to increase by approximately 200. Within Edinburgh, forecast growth is concentrated towards the north and west, with little change in car-based travel to the south and east and a decline in car-based travel to Edinburgh city centre.

Figure 2: Principal desire lines (2022)

11. In summary, approximately 48% of car based travel demand is forecast to be from Fife or Clackmannanshire to the west of Edinburgh and West Lothian, with a further 19% being to the centre and north of Edinburgh. The land use pattern changes that drive change in origins and destinations present a significant opportunity for the introduction of new bus services to provide a competitive service and increase the bus based share of cross Forth travel.
Identification of Potential Bus Services

12. Given the forecast land use growth as outlined above, the changing patterns of travel are likely to result in the introduction of new, amended or enhanced bus services, as shown in figure 3. The exact nature of these services and the timing of them will be determined by the commercial environment in which they operate. Notwithstanding this, for the purpose of this exercise a review of the future car based travel patterns has been carried out, as reported above, and from this a number of potential new services identified that could potentially be introduced or substantially enhanced form existing services.

Figure 3: New or Enhanced Bus Services Map

These services as presented in Figure 3 are listed in Table 3 below.

Table 3: New or Enhanced Bus Services

<table>
<thead>
<tr>
<th>Service</th>
<th>Origin</th>
<th>Destination</th>
<th>Potential route</th>
<th>Possible intermediate stops</th>
<th>Peak Frequency (buses per hour)</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>Dunfermline</td>
<td>Livingston</td>
<td>A823, A623(M), M90, A90, A904, B9020, A899</td>
<td>A823, Rosyth P&amp;R, Ferrytoll P&amp;R, Echline, Newton, Winchburgh, Broxburn, Uphall</td>
<td>4</td>
</tr>
</tbody>
</table>
Potential Impact of the Public Transport Strategy on Cross-Forth Travel Demand

Introduction

13 A series of modelled scenarios have been developed to assess the potential impact of the public transport strategy on the future performance of the road network in the vicinity of the Forth Crossing. These scenarios are:

- Managed Crossing Strategy (MCS) with unconstrained 2022 demand (Ref Case)
- MCS with service enhancements and reduced car demand (PT1)
- MCS with service and infrastructure enhancements and reduced car based demand (PT2)

Figure 4 outlines the methodology used to develop these scenarios.
Derivation of Reduced Demand Levels in 2022

14. For the purposes of this exercise the unconstrained car based demand in 2022 has been reduced to take account of:

- STPR Rail Projects; and
- New Bus Services

Impact of STPR Rail Projects

15. The STPR recommendations are aimed at addressing the country’s future demands for travel on the strategic network. Many of these interventions are focused on improving public transport provision and some of these are expected to influence cross-Forth travel demand in ways that will accommodate the increased growth by non-car modes and therefore retain cross-Forth levels of service for longer. Three major rail-based STPR interventions are of particular relevance. These are:

- Intervention 15 - Edinburgh to Glasgow (Rail) Improvement Project (EGIP);
- Intervention 13 - East of Scotland Rail improvements; and
- Intervention 23 - Aberdeen to Central Belt rail improvements

16. The resulting impact of these measures is an increase in rail trips over the Forth of between 4% and 15%, however, there is no significant reduction in car trips over the Forth.
Impact of New Bus Services

17. The introduction of the new bus services as outlined in Table 3 would result in approximately 20 additional buses in a southbound direction in the morning peak hour. Adopting the principles of industry standard elasticity factors an assessment has been made of the potential transfer from car to bus in 2022. Abstraction factors relating to a transfer from car to bus have been developed, which differentiate between:

- existing and new trips (with higher rates applied to new trips);
- direct and indirect trips (with higher rates applied to direct trips); and
- direction of travel (with higher rates applied to southbound trips).

18. Applying these abstraction rates, the car-based demand in the morning peak is forecast to reduce by 1,200 vehicles over the four-hour period 0600 hrs to 1000 hrs. Of these 925 would be southbound trips, of which 600 would use park and ride facilities at Halbeath, Pitreavie and Ferrytoll. The consequence of this transfer would be to achieve a 10% mode share for buses for southbound trips in the morning peak, the same proportion as currently modelled in the base year (2005).

19. It is considered that these assumptions present a realistic scenario from which to base the operational assessment. It could be argued that the potential transfer to bus would be greater than this as no account has been taken for new services in the area that do not involve the need to travel across the Forth (ie West Lothian to Edinburgh).

Modelled Scenarios

20. The operational assessment determines the improvements in performance resulting from the implementation of the additional public transport interventions, over and above those contained as part of the MCS. Two such scenarios have been assessed and compared against the MCS with unconstrained 2022 demand levels.

MCS with service enhancements and reduced car demand (PT1)

21. This scenario consists of:

- Managed Crossing Scheme
- Reduced demand to reflect additional transfer to buses; and
- Introduction of Halbeath Park and Ride and Pitreavie Park and Ride/Choose facilities.

MCS with service and infrastructure enhancements and reduced car demand (PT2)

22. This scenario consists of the measures in PT1 plus the following additional infrastructure measures shown in Figures 5.1, to the north and 5.2 to the south:

- hard shoulder running southbound for buses between Halbeath and Admiralty with appropriate levels of priority using the ITS strategy;
- bus priority at Admiralty Junction;
- extended bus lane between A90 northbound and the B800;
• west facing bus only slip roads between the B800 and the M9 Spur;
• hard shoulder running southbound for buses between the M9/B800 bus only slips and Newbridge Roundabout; and
• bus priority between M9 and A8 eastbound via Newbridge Roundabout. (This has been modelled by routing buses only via the segregated left turn movement to the A8 with bus priority signals, whilst all general traffic is routed via the existing approach to the signalised roundabout itself.)

Figure 5.1: Network Enhancements to the North
Figure 5.2: Network Enhancements to the South

Performance of the Modelled Scenarios

Details of the Modelled Scenarios

23. The comparative performance of the three modelled scenarios is discussed in the following paragraphs. The PT1 and PT2 scenarios described in section 13 were modelled using the Corridor Operational Model that was developed for the Forth Replacement Crossing. The results are based on analysis of the modelled scenarios under a 2022 forecast scenario, and comparison against the 2022 MCS reference case scenario.

24. 2022 MCS scenario was used as a reference case for this analysis instead of 2017 MCS. The overall demand increases by 3% from 2017 to 2022 in the AM period, however the trip distribution changes significantly due to changes in development areas between 2017 and 2022. This change in distribution results in zero growth in cross Forth trips southbound in the AM, with a reduction in trips from the North to Barnton of 7% and an increase of trips to Newbridge of 5%. The reduction of trips from the North to Barnton (the main existing bus service route across the Forth) in the AM between 2017 and 2022 causes a reduction in journey time for this movement in 2022. 2017 MCS is not a suitable reference case for this analysis as the reduction in journey times in PT1 and PT2 between the North and Barnton attributed to the PT improvements will not be detected from the general reduction due to the change in trip distribution.

25. The PT2 modelled scenario includes a proposed section of hard shoulder running on the M90 southbound south of the A92 merges to Admiralty, and includes through
junction hard shoulder running at the Masterton junction. To assess the feasibility of the potential implementation of through junction hard shoulder running at Masterton, the guidance in the Highways Agency’s Interim Advice Note IAN 111_09 was used to determine and confirm that there would be sufficient scope within the existing carriageway to meet the advice on lane width adjustments. Note that this has not been subject to any detailed design process, and as it would require approval by Transport Scotland’s Standards Branch should only be considered as potentially feasible at this stage.

26. A number of assumptions were also made to overcome some limitations of modelling the ITS strategy to extend the lane and speed control to the hard shoulder running sections, and to retain the merging behaviour of vehicles at the Masterton southbound merge on the through junction running section.

27. The relative performance of the models was based upon comparing bus and car journey times for selected routes from Fife to Edinburgh and West Lothian.

Results of Assessment

28. Including the additional bus services identified in table 3, the performance of the three models is discussed below. The table presents the journey times for selected routes extracted from the model analyses for the 2022 reference case and the two public transport scenarios PT1 – the scheme plus additional bus services, and PT2 – the scheme plus additional bus services and infrastructure. The table shows the key routes to Barnton as a comparison between the three models followed by the journey times of the new services for comparison. Table 4 presents details of the journey times averaged over the four hour modelled period.
<table>
<thead>
<tr>
<th>Existing Services Comparison</th>
<th>Reference Case: 2022 Scheme</th>
<th>2022 Scheme + Additional Bus Services</th>
<th>PT2: 2022 Scheme + Additional Bus Services and Infrastructure</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Car</td>
<td>Bus</td>
<td>Car</td>
</tr>
<tr>
<td></td>
<td>Journey Time (mm:ss)</td>
<td>Journey Time (mm:ss)</td>
<td>Journey Time (mm:ss)</td>
</tr>
<tr>
<td>Halbeath to Barnton</td>
<td>18:00</td>
<td>21:36</td>
<td>16:27</td>
</tr>
<tr>
<td>Ferrytoll to Barnton</td>
<td>10:42</td>
<td>12:31</td>
<td>11:05</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>New Service Comparison</th>
<th>Reference Case: 2022 Scheme</th>
<th>2022 Scheme + Additional Bus Services</th>
<th>PT2: 2022 Scheme + Additional Bus Services and Infrastructure</th>
</tr>
</thead>
<tbody>
<tr>
<td>Service C: Kirkcaldy to Edinburgh</td>
<td>24:24</td>
<td>24:42</td>
<td>25:29</td>
</tr>
<tr>
<td>Service D: Cowdenbeath to Livingston</td>
<td>18:22</td>
<td>16:05</td>
<td>31:12</td>
</tr>
<tr>
<td>Service E: Dunfermline to Edinburgh</td>
<td>23:36</td>
<td>23:25</td>
<td>46:16</td>
</tr>
<tr>
<td>Service G: Dunfermline to Linlithgow</td>
<td>17:37</td>
<td>17:17</td>
<td>38:58</td>
</tr>
</tbody>
</table>

* Note new services C, D, E and F route via Newbridge

**Scenario PT1**

29. As can be seen in table 4, by comparing the 2022 scheme (Reference Case) to the 2022 scheme with increased bus services (PT1), there are some increases in the bus travel time. The increase for journey times for buses when comparing the reference case to PT1 is largely due to an increased dwell time at Ferry Toll, where the increased services can cause buses to queue for a short period before reaching the Ferrytoll bus stop. This is a function of the 'artificial' increase in the numbers of buses that have been modelled in order to increase the sample size of the number of buses included in the journey time analysis. The bus journeys north of the Forth see some improvements, with a reduction from Halbeath to Barnton of approximately 1 minute (4%) for the whole AM period. The bus journey time saving improves for this movement during the peak hour to a saving of approximately 2 minutes (7%) in PT1.

30. There are also some reductions in the cross Forth car journey times. The main reduction of car journey time are forecast to be experienced north of the Forth, due to the reduction in car based trips in the more congested part of the network. Greater reductions in journey times are forecast in the most congested hours. For example, between Halbeath and Barnton, the car based journey times are forecast to reduce by approximately 4.3 minutes (18%) in the 0800-0900 period.
Scenario PT 2

31. To assess the additional bus journey time savings resulting from the PT infrastructure improvements PT2 was compared to PT1. The PT infrastructure improvements reduce the bus journey times for the main existing service paths across the Forth. Ferrytoll to Barnton bus journey time has the largest saving of approximately 2 minutes (14%), Halbeath to Barnton has a journey time reduction of 4% and Dunfermline to Barnton reduces by 6% for the whole AM period, with the peak hour having a slightly higher saving.

32. The public transport infrastructure improvements generally result in improved proposed new services bus journey times. New services B, F and G improve by approximately 5 to 6.5 minutes (13% to 24%) for the whole AM period. New bus service E, from Dunfermline to Edinburgh has the most significant journey time improvement for the whole AM period of 12 minutes (26%) as this route uses the bus only segregated left turn at Newbridge. The infrastructure changes have however increased the journey time for some bus services, namely to new service C and D. The delay to service C is due to cars rerouting though Kirkliston. The delay to service D is caused at Newbridge, the service approaches Newbridge from the M9 North and turns right along A89, the M9 North approach is significantly queued, due to the bus only segregated left turn, and buses merge into the queue early on causing the delay. A bus gate to give priority to buses turning right at Newbridge would improve this however this would cause additional delay to general traffic.

33. The main delay to cars from the infrastructure changes on approach to the Newbridge junction, are due to the change of the segregated left (M9 North to A8 Edinburgh) to a bus only lane, which causes more queuing to the cars approaching the junction. This has an effect on new service C, which routes through Kirkliston. The additional delay on the spur and M9, caused from vehicles blocking back from Newbridge, causes some cars to reroute through the local road. The car rerouting through Kirkliston creates an additional delay of approximately 10 minutes to bus service C. However, by way of comparison, the buses travelling a similar section from approximately Scotstoun to the M9 (Note the buses use the B800 before joining the Spur using west facing slips and finish the journey on hard shoulder) see a journey time from 0700-0800 of under 5mins in comparison to the car which takes nearly 10 minutes.

34. Table 4 shows an increase in average journey time for cars travelling a similar path to the new bus services of up to 8 minutes for the whole AM period, as a result of some of the bus priority infrastructure improvements. The principal impact to cars is on the approach to Newbridge, given the priority afforded to buses on the hard shoulder and approach to the roundabout which causes delays back to the M9 Spur. The average car journey time to traverse the M9 Spur is increased by approximately 6 minutes (from 5.5 minutes to 11.5minutes) with the new PT infrastructure over the whole AM period. During the peak hour (0800 to 0900) the delay to cars increases to 11 minutes on the M9 Spur.

35. Note that a viable alternative to the Newbridge bus priority measures that have been modelled for this assessment would be to implement a set of bus pre-signals to control general traffic in advance of the segregated left turn lane, and allow buses running on the hard shoulder to enter the general traffic stream and access the A8 via the segregated left turn lane. This would still provide for significant benefits to public
transport users and would help minimise the impact on general traffic by also allowing non-public transport vehicles to continue to use the segregated left turn lane rather than being routed via the signalised roundabout itself.

Summary

36. This test focused on two possible schemes, to provide additional capacity via modal shift to bus. The first scheme tested the benefit of adding additional cross Forth bus services and reducing the car demand, the second scheme tested the benefits gained by giving the new bus services additional infrastructure and priority at key locations over the cars. The outcome from the tests would show that both schemes give benefits to the journey times of public transport users, with the second scheme giving potentially more.
### ANNEX C

**SCHEMES AND MEASURES AVAILABLE TO SUPPORT MANAGED CROSSING STRATEGY IN DELIVERING PUBLIC TRANSPORT STRATEGY**

<table>
<thead>
<tr>
<th>Intervention</th>
<th>Timescale for Delivery</th>
<th>Indicative Cost (£)</th>
<th>Lead Authority</th>
</tr>
</thead>
<tbody>
<tr>
<td>Halbeath Park and Choose</td>
<td>Short term (&lt;5 years)</td>
<td>£7-10 m (from Fife Council work)</td>
<td>Fife Council</td>
</tr>
<tr>
<td>Rosyth Park and Choose</td>
<td>Short term (&lt;5 years)</td>
<td>£4-6m (from Fife Council work)</td>
<td>Fife Council</td>
</tr>
<tr>
<td>Hard Shoulder Running for buses on M90 north of Admiralty (works arrangement)</td>
<td>Short term (&lt;5 years)</td>
<td>£5m</td>
<td>Transport Scotland</td>
</tr>
<tr>
<td>Improvements at Admiralty Junction</td>
<td>Short term (&lt;5 years)</td>
<td>£0.5m - £1M</td>
<td>Fife Council/Transport Scotland</td>
</tr>
<tr>
<td>Hard Shoulder Running for buses on M9 approach to Newbridge</td>
<td>Short term (&lt;5 years)</td>
<td>£0.5m - £1M</td>
<td>City of Edinburgh Council</td>
</tr>
<tr>
<td>Improvements to Newbridge Interchange</td>
<td>Medium term (5 - 10 years)</td>
<td>£4.5m (from Halcrow work for City of Edinburgh Council)</td>
<td>City of Edinburgh Council/Transport Scotland</td>
</tr>
<tr>
<td>New slips from B800 to M9 Spur including dedicated right turn lane.</td>
<td>Medium term (5 - 10 years)</td>
<td>£2m - £3M</td>
<td>City of Edinburgh Council/Transport Scotland</td>
</tr>
<tr>
<td>Hard Shoulder Running for buses on M90 north of Admiralty (corridor enhancement)</td>
<td>Medium term (5 - 10 years)</td>
<td>£10M</td>
<td>Transport Scotland</td>
</tr>
<tr>
<td>Bus lanes on A8 westbound Bus Lane on A89 Eastbound</td>
<td>Short term (&lt;5 years)</td>
<td>£7.2m (from Halcrow work for City of Edinburgh Council)</td>
<td>A8 Westbound £2m - £2.5M</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>A89 Eastbound £0.5m - £1M</td>
</tr>
</tbody>
</table>

Notes: see over
• The costs are at Q4 2006 prices
• The costs quoted here are offered as an indicative guide only.
• The costs do not include VAT or optimism bias.
• Hard shoulder running costs are subject to further investigation of the condition of the hard shoulder.
• Hard shoulder running is based on southbound only in accordance with IAN 111/09 Managed Motorway Implementation Guidance - Hard Shoulder Running. Through junction Hard Shoulder running is assumed at Masterton interchange in accordance with IAN 112/09 Managed Motorway Implementation Guidance – Through Junction Hard Shoulder Running. Estimate seems high as lane configuration can be accommodated within existing carriageway.
• Improvements to Admiralty Junction allows for bus priority measures at the gyratory and dynamic use of the hard shoulder on the slip roads. Priority bus control on slip road including widening of carriageway to create splitter island for signals. New control on gyratory and westbound approach on Admiralty Road.
• Newbridge public transport priority measures
• Bus Lane A8 westbound carriageway approximate linear length 2km including bus priority signals at Lochend Road
• Bus lane A89 eastbound carriageway approximate linear length 600m including bus priority signals.
• New slips from the M9 Spur to the B800 includes for widening of the B800 to provide a dedicated right turn lane.
• M9 Approach to Newbridge assumed road markings with sufficient carriageway width or minor localised widening. Widening of the A8 between the Newbridge M9 Slip and Lochend Road.