Edinburgh South Suburban Railway – Feasibility Report

Transport, Infrastructure and Environment Committee
6 May 2008

Purpose of report

1 To report on the findings of a report on the potential for reopening the Edinburgh South Suburban Railway (ESSR) to passenger services.

Main report

2 The reopening of the ESSR to passenger services has for many years had a strong measure of support from local people, interest groups and many politicians. The Council has consistently recognised that the project could potentially assist in contributing to improved public transport in Edinburgh and has funded a number of studies to consider the practicality and economics of doing this, including most recently a study by Atkins in 2004.

3 Further to the Atkins’ study the Council asked both the Scottish Executive and Network Rail to consider where the ESSR would fit in their plans. Both organisations published documents in December 2006, the National Rail Strategy and Scotland’s Route Utilisation Strategy, neither of which made any provision for the ESSR.

4 In response and with a desire to make progress a cross-party delegation from the Council met the then Transport Minister Tavish Scott in January 2007 to press the case for reintroducing passenger services on the route. The Minister indicated he was prepared to consider the matter if further work could be done to demonstrate a robust business case.
In conjunction with Transport Scotland and SEStran, the Council commissioned consultants Halcrow to undertake a study into the feasibility of reopening the ESSR in accordance with national STAG assessment guidelines. (A STAG appraisal being a pre-requirement for securing funding from Transport Scotland). The study would, consequently, need to identify underlying transport or planning issues which the scheme would address and consider alternative options for addressing such needs.

A Steering Group and Working Group were set up as part of the study. The Steering Group comprised the study’s co funders of Transport Scotland, SEStran and the Council; its remit being to approve the various stages of the study. The Working Group comprising of First ScotRail, Network Rail, Lothian Buses and the Council provided guidance during the study.

The consultant consulted the E-rail consortium, in order to obtain their development proposals. These were then included within the series of options modelled.

As previously noted any study should identify underlying transport or planning issues which the scheme would address. It was not evident however from the review of strategies and previous studies that the area potentially served by ESSR was the location of any specific transport problem although there is a range of generic issues that apply across the city which the scheme could address.

These potentially included enhancing accessibility to designated employment growth areas, achieving significant transfer of peak period journey-to-work trips from the car to public transport, and to improving the transport connections to the wider transport network including the Edinburgh tram, the national rail network and Edinburgh airport.

The alternative modes of heavy rail, tram, and bus were considered as options to meet these objectives. The potential route capacity and operational issues were key considerations.

In the case of rail, an assessment of the available line capacity at the approaches to Haymarket and Waverley set against recent plans to increase Edinburgh–Glasgow services, and a range of northward services indicated that there was no remaining capacity to accommodate an ESSR service to the City centre stations. The priority from both a national and local perspective is to provide improved transport links to the rest of Scotland, furthering future prosperity. (The study, however, retained a heavy rail option to the City centre in order to compare with the previous Atkins study).

A major growth area lies in the west of the City providing expanding employment opportunities around South Gyle including Edinburgh Park which is served by a station on the main Edinburgh-Glasgow line. The study therefore re-focussed its attention on the opportunities of linking the south side of Edinburgh to South Gyle and beyond through heavy rail, tram and bus.
The list of alternative options looked at are outlined below:

a Heavy Rail – one/two trains per hour peak/off peak Niddrie or Fort Kinnaird via Waverley to North Berwick (Atkins Preferred Option) (A1 & A2);

b Heavy Rail – two trains per hour Newcraighall to Edinburgh Park or Bathgate with four/eight stations (B1, B2 & B3);

c Tram/Train – four/six trams per hour Newcraighall to Gogar (C1 & C2);

d Bus with priorities – six buses per hour Newcraighall to The Gyle; and

e Bus without priorities – four buses per hour Newcraighall to The Gyle.

Each alternative was assessed against the set objectives, operational issues, patronage demand, net revenue costs and capital cost.

The report concludes that all of the options provided only very limited benefits in terms of the adopted objectives, which in any event do not address the priority issues facing the city or region.

All options, except that for a bus service only, would require major capital investment. The heavy rail options (B) incur capital costs of between £19.6 million and £37.9 million.

The findings indicate that the demand for travel along the corridor is relatively light. All options would involve on-going revenue support requiring an annual subsidy, with the best heavy rail option (B) requiring a subsidy of approaching £2 million per annum. In addition there would be abstraction from the existing bus network.

It is considered that further more detailed examination on the rail options would not be justified. Further investigation, however, of a shorter bus proposal to link Morningside and Craiglockhart to Edinburgh Park could be worth consideration.

Financial Implications

It is anticipated that a limited amount of further study can be undertaken from the current budget.

Recommendations

To note that an ESSR service to the City centre cannot be achieved given the planned priority to increase future rail services from destinations outwith Edinburgh.

Agree that priority should be given to using rail capacity at Haymarket and Waverley to accommodate the expansion of strategic and other rail services from destinations outwith the Edinburgh area.
22 That the case for a rail service linking the ESSR to Edinburgh Park is insufficiently strong to warrant a request to the Scottish Government to consider this option further.

23 That further work should be undertaken to investigate the potential for a bus service to link the Morningside/Craiglockhart area to the South Gyle area.

Appendices
Appendix 1 - Executive Summary of the Halcrow report

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Wards affected
3 Drumbrae / Gyle
7 Sighthill / Gorgie
9 Fountainbridge / Craiglockhart
10 Meadows / Morningside
15 Southside / Newington
17 Portobello / Craigmillar

Background Papers
Review of the reintroduction of Passenger Train Services on the Edinburgh South Suburban Railway – Halcrow, March 2008

Dave Anderson
Director of City Development
EXECUTIVE SUMMARY

The Edinburgh South Suburban Railway (ESSR) is a double track railway line passing through the suburbs to the south of the city centre which is used to provide a route for freight traffic across the city avoiding the central station areas. The route is not heavily used, and it is widely perceived that the route represents an under-utilised resource in a congested city.

The reopening of the ESSR has been considered in a number of previous studies including more recently a study by Atkins in 2004. The previous studies have not been undertaken in accordance with Scottish Transport Appraisal Guidance (STAG). These guidelines state that any study should identify underlying transport or planning issues which the scheme would address and consider alternative options for addressing such needs.

In January 2007 a cross-party delegation from the Council met the then Minister for Transport, Tavish Scott, to press the case for reintroducing passenger services on the route. The outcome of this meeting was an agreement that the Council would revise and update the business case for the reintroduction of passenger services. Co-funding for this review was provided by Transport Scotland and the Regional Transport Partnership, SEStran.

Halcrow have therefore been commissioned by the City of Edinburgh Council to review the case for reintroducing passenger
services on the line. The study was managed by a Steering Group comprising the City of Edinburgh Council, Transport Scotland and SEStran, and was supported by a Working Group on which Network Rail, First ScotRail and Lothian Buses were represented.

The brief required the study to review and extend previous studies:

(a) To appraise the broad options to address travel in the corridor potentially served by the ESSR, both those options involving the use of the ESSR as a heavy rail passenger service and alternative options that might meet the same objectives. These options are to represent significantly different levels of investment and public expenditure and different technical solutions by a diverse range of possible interventions in accordance with STAG.

(b) To establish objectives for the corridor by reference to the relevant national, regional and local development and transport strategies, and the identified problems within the area concerned.

(c) In order to undertake the appraisal, to provide ‘order of magnitude’ cost estimates and ‘order of magnitude’ estimates of the potential use, and of user and non-user benefits.

It was agreed to set aside, at this time, the detailed consideration of station locations and design, timetable and ticketing, reliability and rolling stock and staffing, except only so far as is necessary to consider whether the options are practicable and could potentially be delivered. These matters would need to be developed in greater detail for appraisal in further stages of the project in relation to the most promising option(s) arising from this high level analysis. Such a two-stage approach to appraisal is in accordance with STAG.
A review of previous studies and of Census journey to work data established that the corridor around south central Edinburgh in which the ESSR runs, exhibits many characteristics of a sustainable urban community with:

(a) High levels of local employment accessed by walking and cycling;

(b) High levels of public transport use, especially to the city centre, but also for many peripheral journeys; and

(c) Apart from the local trips and the city centre, journeys were dispersed to a wide range of destinations, and the west Edinburgh employment area attracted substantial numbers.

A review of national, regional and local transport strategies showed that the corridor in which the ESSR lies has not been identified as containing any specific problems requiring to be addressed. All the strategies emphasise that the major challenges facing the city and city region arise from the pressure from economic growth which is the increasingly the powerhouse of the Scottish economy, but which is putting pressure on the historic environment and fabric of the city and its transport networks. The strategies emphasise that plans to concentrate growth in a limited number of locations need to be supported by enhancements to the capacity of public transport networks to ensure that there is an adequate supply of labour, but without an unacceptable increase in the levels of car commuting and consequent congestion and other disbenefits.

Consequently national and regional strategies for rail identify that there is a key role that the Edinburgh commuter network must fulfil in order to expand the city's accessibility from an expanding journey-to-work area. In support of this strategy there are ambitious plans to increase the number of trains on the regional rail network, despite the capacity constraints that currently exist.
In general however the ESSR corridor suffers (as do many inner city areas) from the impacts of road traffic on the main radial routes into the city, with the attendant issues of congestion, road safety and damaging environmental effects. This traffic has been identified as originating predominantly beyond the city boundaries and destined for the city centre. The area is therefore embraced within a general policy to minimise the use of the private car and encourage increased use of public transport, particularly in peak periods.

From this analysis the following objectives were set for the ESSR project, if it is to contribute to the wider strategy of the city and region:

A. To enhance accessibility to designated employment growth areas. (Although none lie on the ESSR itself, services could be designed to serve one or more of those designated areas);

B. To achieve significant transfer of peak period journey-to-work trips from the car to public transport (and thereby to reduce congestion and other adverse impacts of car use within the city);

C. To improve the connections between the areas served by ESSR and other public transport systems, including the Edinburgh tram, the national rail network and Edinburgh airport;

D. To enable an increase in volume of rail freight passing across Edinburgh in line with the forecasts in the Freight RUS;

E. To support the planned improvement in the reliability and performance of the existing rail network over the next 10 years;

F. To minimise, the direct environmental impacts of travel in the corridor of the railway, including the protection of residential neighbourhoods from the adverse impacts of intensifying travel movements (noise, pollution, severance and impacts on the built environment);

G. To ensure accessibility for all potential users to any new infrastructure or services.

A range of options have been developed to seek to address these issues. These examined the use of the railway for reinstated suburban passenger services, for an extension of the Edinburgh tram network using the ESSR track, or providing a bus service along the corridor broadly paralleling the railway.
The options were constrained by the practicality of delivering additional capacity on the network. Although it is perceived that the ESSR itself is underutilised, the surrounding network is expected to become intensively used as planned projects are added to the existing services, including the Airdrie – Bathgate scheme, the reopening of the Waverley railway to the Borders, and plans announced by the Minister for Transport for substantial increases in the number of trains between Edinburgh and Glasgow and on the routes to Fife and beyond. Growth in freight traffic is also predicted, some of which can be expected to utilise the ESSR across Edinburgh.

Eight Options were taken forward to the appraisal stage, comprising:

- the preferred scheme arising from the previous study with either 4 or 8 local stations on the ESSR;
- alternative rail schemes to link the ESSR with Edinburgh Park, with either 4 or 8 intermediate stations, and also with the possibility of extending services to/from Bathgate;
- tram-trains using the ESSR from Newcaighall to Gorgie before joining the Edinburgh tram and continuing to the proposed transport interchange at Gogar; and
- two alternative bus options, one incorporating a degree of bus priority measures.
The costs of the options were estimated from current rail, tram and bus industry data sources. In terms of capital costs, all options including four stations are estimated at approximately £20m. Options with eight stations are estimated closer to £40m. Tram options have the most expensive capital costs at £50m owing to the cost of electrification whilst the enhanced bus priority scheme is the cheapest option requiring infrastructure capital costs of £2.5m.

Operational cost for the heavy rail options, each proposing 2 trains per hour, approximate between £3 - 3.5m p.a. The exception to this is the heavy rail option to Bathgate which incurs operational costs of £8.5p.a due to the additional running distance involved. The operational costs of trams are the highest, estimated at £6m and £12m for the 4 and 8 trams per hour options respectively. Buses are the cheapest of the options to run at £1.7m - £2.4m p.a.

The demand and revenues of these options were assessed by the development of a transport model representing the relative cost and convenience of travel by each of these options in comparison with the travel choices that would be available in the absence of any of these options. This takes account of the introduction of the Edinburgh tram and various planned improvements to the rail network that are now in development.

The expectation is that the high frequency of the tram options, and the route of the tram through Edinburgh Park to Gogar Interchange, could attract the highest numbers of users at an estimated 1.5m per annum, and greatest revenue. The best rail option might be expected to carry 0.8m – 0.9m passengers per annum.

However none of the options was predicted to cover operating costs from revenue and all of them would require an annual operating subsidy. This deficit would be highest for the trams (£4.25m per annum) and lowest for either the rail option to Edinburgh Park with 8 intermediate stations at £1.7m per annum, or for bus (£1.6m - £2.2m pa). In terms of the deficit per passenger the worst performing options were heavy rail to Bathgate (£19) or the bus options with and without priorities at £14 and £24 per passenger respectively.

The model also forecast the extent to which the traffic using any of the options could be expected to be derived from people switching from using their cars - to the benefit of the road network and the potential reduction in congestion - or by switching from the bus network with little overall benefit. Mode switch from car was not high
in any option and no more than 17% of the projected demand is expected to come from car users. The high frequency quality bus service option might be expected to attract a similar number of car users in total as the rail options, and at a much lower overall cost.

Financially, B3 Newcraighall to Edinburgh Park is the best of the train options, attracting the highest level of potential users, and although 83% are abstracted from bus, it delivers the highest mode shift from car. Revenue support costs are lower for the train option B3 than for trams, but even so revenue is projected to cover only 50% of operating costs. Capital costs are very high in relation to the numbers involved.

The results are summarised in the following table.

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<th>Option</th>
<th>Operating Cost pa £m</th>
<th>Gross Revenue pa £m</th>
<th>Operating Deficit pa £m</th>
<th>Revenue loss to bus network £m</th>
<th>Revenue as % of costs</th>
<th>Operating Deficit per passenger journey £</th>
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<td>£3.0</td>
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<td>B1 Rail</td>
<td>£3.5</td>
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<td>£8.5</td>
<td>£1.0</td>
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<td>£3.6</td>
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<td>B3 with E-Rail</td>
<td>£3.6</td>
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<td>£1.7</td>
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<td>C1 Tram</td>
<td>£6.3</td>
<td>£2.0</td>
<td>£4.2</td>
<td>£1.4</td>
<td>32</td>
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<tr>
<td>C2 Tram</td>
<td>£12.2</td>
<td>£2.2</td>
<td>£10.1</td>
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<tr>
<td>E Bus</td>
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<td>£0.1</td>
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<td>£0</td>
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<td>£24</td>
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Following assessment against the objectives, it has been concluded that all of the options tested provide only very limited benefits, which in any event do not address the priority issues facing the city or the region. Only the bus options have no negative impacts, and in terms of accessibility to employment and mode shift, they perform as well as rail and at a much lower cost. However unless a high frequency and a high level of priorities is provided, buses will not achieve the same level of mode shift as rail.

The best value may be obtained from a quality bus system, but even this has high on-going revenue implications which are unlikely to be considered value for money and may not be fundable. It is possible that a more modest bus proposal to link Morningside and Craiglockhart to Edinburgh Park and The Gyle would prove to be better value than the option tested in this study.

This evaluation has been limited to the 2016 development plans for the city and region. Taking a longer view might place even greater emphasis on access to the west Edinburgh employment growth zone. But with that comes a greater emphasis too upon public transport networks from the expanding journey-to-work area as foreshadowed in the Edinburgh 2020 Vision discussion paper. It should not therefore be assumed that the case for reinstating passenger services on the ESSR would be stronger in the long term as the on-going priority may still be to develop more strategically important rail network enhancements to serve the needs of a dynamic expanding city region.

To conclude, whilst the capital costs of converting an existing railway seem modest in comparison with other more ambitious schemes to create new railways across Scotland, the real benefits are also very modest. All options had on-going revenue support implications, even disregarding the cost of funding the capital debt. All of the Options tested provide only very limited benefits in terms of the objectives, which in any event do not address the priority issues facing the city or the region.
City of Edinburgh Council
Review of the reintroduction of Passenger Train Services on the Edinburgh South Suburban Railway

March 2008

Halcrow Group Limited
City of Edinburgh Council
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Halcrow Group Limited
City of Edinburgh Council

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EXECUTIVE SUMMARY

The Edinburgh South Suburban Railway (ESSR) is a double track railway line passing through the suburbs to the south of the city centre which is used to provide a route for freight traffic across the city avoiding the central station areas. The route is not heavily used, and it is widely perceived that the route represents an under-utilised resource in a congested city.

The reopening of the ESSR has been considered in a number of previous studies including most recently a study by Atkins in 2004. These previous studies have not been undertaken in accordance with Scottish Transport Appraisal Guidance (STAG) issued by the Scottish Government. These guidelines state that any study should identify underlying transport or planning issues which the scheme would address and consider alternative options for addressing such needs.

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It is always possible to identify opportunities to run more services by train or bus by providing greater subsidies but, with investment projects always in competition for funds, it is necessary to determine whether these services meet real priority needs. It would be possible to determine what improvement to bus services could be achieved by spending the same sum as is required to reinstate passenger services on ESSR and then compare value for money for the alternative options. However in order to make the case for the investment it is also necessary to identify the scale of the problem which the project seeks to address and to determine the priority it should take amongst other issues.

The brief therefore required the study to review and extend previous studies:

(a) To appraise the broad options to address travel in the corridor potentially served by the ESSR, both those options involving the use of the ESSR as a heavy rail passenger service and alternative options that might meet the same objectives. These options are to represent significantly different levels of investment and public expenditure and different technical solutions by a diverse range of possible interventions in accordance with STAG.

(b) To establish objectives for the corridor by reference to the relevant national, regional and local development and transport strategies, and the identified problems within the area concerned.

(c) In order to undertake the appraisal, to provide ‘order of magnitude’ cost estimates and ‘order of magnitude’ estimates of the potential use, and an assessment of user and non-user benefits.

It was agreed to set aside, at this time, the detailed consideration of station locations and design, timetable and ticketing, timetable reliability, rolling stock and staffing, except only so far as is
necessary to consider whether the options are practicable and could potentially be delivered. These matters would need to be developed in greater detail for appraisal in further stages of the project in relation to the most promising option(s) arising from this high level analysis. Such a two-stage approach to appraisal is in accordance with STAG.

A review of previous studies and of Census journey to work data established that the corridor around south central Edinburgh in which the ESSR runs, exhibits many characteristics of a sustainable urban community with:

(a) High levels of local employment accessed by walking and cycling;
(b) High levels of public transport use, especially to the city centre, but also for many peripheral journeys; and
(c) Apart from the local trips and the city centre, car journeys were dispersed to a wide range of destinations, but the west Edinburgh employment area attracted substantial numbers.

A review of national, regional and local transport strategies showed that the corridor in which the ESSR lies has not been identified as containing any specific problems requiring to be addressed. All the strategies emphasise that the major challenges facing the city and city region arise from the pressure from economic growth which is the increasingly the powerhouse of the Scottish economy, but which is putting pressure on the historic environment and fabric of the city and its transport networks. The strategies emphasise that plans to concentrate growth in a limited number of locations need to be supported by enhancements to the capacity of public transport networks to ensure that there is an adequate supply of labour, but without an unacceptable increase in the levels of car commuting and consequent congestion and other disbenefits.

Consequently national and regional strategies for rail identify that there is a key role that the Edinburgh commuter network must fulfil in
order to expand the city’s accessibility from an expanding journey-to-
work area. In support of this strategy there are ambitious plans to
increase the number of trains on the regional rail network, despite
the capacity constraints that currently exist.

In general however the ESSR corridor suffers (as do many inner city
areas) from the impacts of road traffic on the main radial routes into
the city, with the attendant issues of congestion, road safety and
damaging environmental effects. This traffic has been identified as
originating predominantly beyond the city boundaries and destined
for the city centre. The area is therefore embraced within a general
policy to minimise the use of the private car and encourage
increased use of public transport, particularly in peak periods.

From this analysis the following objectives were set for the ESSR
project, if it is to contribute to the wider strategy of the city and
region:

A. To enhance accessibility to designated employment growth
areas. (Although none lie on the ESSR itself, services could be
designed to serve one or more of those designated areas);

B. To achieve significant transfer of peak period journey-to-work
trips from the car to public transport (and thereby to reduce
congestion and other adverse impacts of car use within the city);

C. To improve the connections between the areas served by ESSR
and other public transport systems, including the Edinburgh
tram, the national rail network and Edinburgh airport;

D. To enable an increase in volume of rail freight passing across
Edinburgh in line with the forecasts in the Freight RUS;

E. To support the planned improvement in the reliability and
performance of the existing rail network over the next 10 years;

F. To minimise, the direct environmental impacts of travel in the
corridor of the railway, including the protection of residential
neighbourhoods from the adverse impacts of intensifying travel movements (noise, pollution, severance and impacts on the built environment);

G. To ensure accessibility for all potential users to any new infrastructure or services.

A range of options have been developed to seek to address these issues. These examined the use of the railway for reinstated suburban passenger services, for an extension of the Edinburgh tram network using the ESSR track, or providing a bus service along the corridor broadly paralleling the railway.

The options were constrained by the practicality of delivering additional capacity on the network. Although it is perceived that the ESSR itself is underutilised, the surrounding network is expected to become intensively used as planned projects are added to the existing services, including the Airdrie – Bathgate scheme, the reopening of the Waverley railway to the Borders, and plans announced by the Minister for Transport for substantial increases in the number of trains between Edinburgh and Glasgow and on the routes to Fife and beyond. Growth in freight traffic is also predicted, some of which can be expected to utilise the ESSR across Edinburgh.

Eight Options were taken forward to the appraisal stage, comprising:

- the preferred scheme arising from the previous study with either 4 or 9 local stations on the ESSR;
- alternative rail schemes to link the ESSR with Edinburgh Park, with either 4 or 9 intermediate stations, and also with the possibility of extending services to/from Bathgate;
- tram-trains using the ESSR from Newcraighall to Gorgie before joining the Edinburgh tram and continuing to the proposed transport interchange at Gogar; and
two alternative bus options, one incorporating a degree of bus priority measures.

The costs of the options were estimated from current rail, tram and bus industry data sources. In terms of capital costs, all options including four stations are estimated at approximately £20m. Options with nine stations are estimated closer to £40m. Tram options have the most expensive capital costs at £50m owing to the cost of electrification whilst the enhanced bus priority scheme is the cheapest option requiring infrastructure capital costs of £2.5m.

Operational cost for the heavy rail options, each proposing 2 trains per hour, approximate between £3 - 3.5m p.a. The exception to this is the heavy rail option to Bathgate which incurs operational costs of £8.5p.a due to the additional distance involved. The operational costs of trams are the highest due to the high frequencies proposed, estimated at £6m and £12m for the 4 and 8 trams per hour options respectively. Buses are the cheapest of the options to run at £1.7m - £2.4m p.a.

The demand and revenues of these options were assessed by the development of a transport model representing the relative cost and convenience of travel by each of these options in comparison with the travel choices that would be available in the absence of any of these options. This takes account of the introduction of the Edinburgh tram and various planned improvements to the rail network that are currently in development.

The expectation is that the high frequency of the tram options, and the route of the tram through Edinburgh Park to Gogar Interchange, could attract the highest numbers of users at an estimated 1.5m per annum, and greatest revenue. The best rail option might be expected to carry 0.8m – 0.9m passengers per annum.

However none of the options was predicted to cover operating costs from revenue and all of them would require an annual operating subsidy. This deficit would be highest for the trams (£4.25m per
annum) and lowest for either the rail option to Edinburgh Park with 8 intermediate stations at £1.7m per annum, or for bus (£1.6m - £2.2m pa). In terms of the deficit per passenger the worst performing options were heavy rail to Bathgate (£19) or the bus options with and without priorities at £14 and £24 per passenger respectively.

The model also forecast the extent to which the traffic using any of the options could be expected to be derived from people switching from using their cars - to the benefit of the road network and the potential reduction in congestion - or by switching from the bus network with little overall benefit. Mode switch from car was not high in any option and no more than 17% of the projected demand is expected to come from car users. The high frequency quality bus service option might be expected to attract a similar number of car users in total as the rail options, and at a much lower overall cost.

The results are summarised in the following table.

<table>
<thead>
<tr>
<th>Option</th>
<th>Operating Cost pa £m</th>
<th>Gross Revenue pa £m</th>
<th>Operating Deficit pa £m</th>
<th>Revenue loss to bus network £m</th>
<th>Revenue as % of costs</th>
<th>Operating Deficit per passenger journey £m</th>
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</thead>
<tbody>
<tr>
<td>A1 Rail</td>
<td>£3.0</td>
<td>£1.1</td>
<td>£2.0</td>
<td>£0.5</td>
<td>35</td>
<td>£4</td>
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<td>£3.2</td>
<td>£1.7</td>
<td>£1.4</td>
<td>£1.0</td>
<td>54</td>
<td>£2</td>
</tr>
<tr>
<td>B1 Rail</td>
<td>£3.5</td>
<td>£0.9</td>
<td>£2.6</td>
<td>£0.4</td>
<td>26</td>
<td>£7</td>
</tr>
<tr>
<td>B2 Rail</td>
<td>£8.5</td>
<td>£1.0</td>
<td>£7.6</td>
<td>£0.4</td>
<td>11</td>
<td>£19</td>
</tr>
<tr>
<td>B3 Rail</td>
<td>£3.6</td>
<td>£1.8</td>
<td>£1.8</td>
<td>£0.9</td>
<td>50</td>
<td>£2</td>
</tr>
<tr>
<td>B3 with E-Rail</td>
<td>£3.6</td>
<td>£1.9</td>
<td>£1.7</td>
<td>£0.6</td>
<td>52</td>
<td>£2</td>
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<tr>
<td>C1 Tram</td>
<td>£6.3</td>
<td>£2.0</td>
<td>£4.2</td>
<td>£1.4</td>
<td>32</td>
<td>£3</td>
</tr>
<tr>
<td>C2 Tram</td>
<td>£12.2</td>
<td>£2.2</td>
<td>£10.1</td>
<td>£1.5</td>
<td>18</td>
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<tr>
<td>E Bus</td>
<td>£1.7</td>
<td>£0.1</td>
<td>£1.6</td>
<td>£0</td>
<td>4</td>
<td>£24</td>
</tr>
</tbody>
</table>

Financially, B3 Newcraighall to Edinburgh Park with nine intermediate stations is the best of the train options, attracting the highest level of potential users, and although 83% are abstracted from bus, it delivers the highest mode shift from car. Revenue
support costs are lower for the train option B3 than for trams, but even so revenue is projected to cover only 50% of operating costs. Capital costs are very high in relation to the numbers involved.

Following assessment against all the objectives, it has been concluded that all of the options tested provide only very limited benefits, which in any event do not address the priority issues facing the city or the region. Only the bus options have no negative impacts, and in terms of accessibility to employment and mode shift, they perform as well as rail and at a much lower cost. However unless a high frequency and a high level of priorities is provided, buses will not achieve the same level of mode shift as rail.

The best value may be obtained from a quality bus system, but even this has high on-going revenue implications which are unlikely to be considered value for money and may not be fundable. It is possible that a more modest bus proposal to link Morningside and Craiglockhart to Edinburgh Park and The Gyle would prove to be better value than the option tested in this study.

This evaluation has been limited to the 2016 development plans for the city and region. Taking a longer view might place even greater emphasis on access to the west Edinburgh employment growth zone. But with that comes a greater emphasis too upon public transport networks from the expanding journey-to-work area as foreshadowed in the Edinburgh 2020 Vision discussion paper. It should not therefore be assumed that the case for reinstating passenger services on the ESSR would be stronger in the long term as the on-going priority may still be to develop more strategically important rail network enhancements to serve the needs of a dynamic expanding city region.

To conclude, whilst the capital costs of converting an existing railway seem modest in comparison with other more ambitious schemes to create new railways across Scotland, the real benefits are also very modest. All options had on-going revenue support implications, even disregarding the cost of funding the capital debt. All of the
Options tested provide only very limited benefits in terms of the objectives, which in any event do not address the priority issues facing the city or the region.
1 INTRODUCTION

1.1 The Edinburgh South Suburban Railway

1.1.1 There is, around the south side of Edinburgh, a double track railway passing through some of the most densely populated residential districts of the city. Although known as the Edinburgh South Suburban Railway, it has not in fact carried suburban passenger services for over 40 years, but has been used to provide a route for freight traffic across the city between east and west avoiding the central station areas. The route is not heavily used, and it is widely perceived that the route represents an under-utilised resource in a congested city.

1.1.2 From time to time proposals have been advanced to make use of the railway once again for passenger services, most recently in 2004. That study evaluated a number of options for using all or part of the ESSR route to provide services into the city centre, and concluded that

“there is a case, albeit a weak one, for the reintroduction of passenger services on the ESSR.”

1.1.3 In responding to that study, the rail industry raised a number of questions concerning the outcome of the report, challenging some of the conclusions.

1.1.4 The Minister for Transport indicated that further work would be necessary, not only to resolve the issues that had been raised, but also to ensure that the proposal represented the best option in relation to the problems and issues facing the city, and in conformity with agreed strategies to address those issues.
1.1.5 Accordingly the present study has been commissioned by City of Edinburgh Council, in conjunction with the South East Scotland Regional Transport Partnership (SEStran) and Transport Scotland, to review the potential strategic role of the ESSR and address the issues which have been raised in relation to the previous proposals.

1.2 Structure of this Report

1.2.1 Chapter 2 provides an overview of the history of the ESSR, and a review of previous studies. In Chapter 3 an assessment of the current trip patterns and travel behaviour in the area served by the ESSR corridor is presented, better to understand the nature of travel issues that the railway might tackle. There follows in Chapter 4 a review of the policy and strategy context at national, regional and local level. From these analyses, specific Objectives were established that transport improvements in the corridor might address, and these are set out in Chapter 5.

1.2.2 The process of Option development is explained in Chapter 6, with consideration of the high level constraints affecting the Options available. The Options derived from this are set out in Chapter 7.

1.2.3 The options were modelled using a logit mode choice model, and the results of the modelling are summarised in Chapter 8. An evaluation of the Options against the Objectives previously determined is described. Chapter 9 provides a summary of the evaluation outcomes.

1.2.4 This Report is supported by the Technical Notes shown in Table 1.1.
<table>
<thead>
<tr>
<th>Subject</th>
<th>Issue Date</th>
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</thead>
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<td>Issues and Objectives</td>
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<td>2001 Census All-mode travel volumes</td>
<td>10-09-2007</td>
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<td>Options</td>
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<td>Tram-Train Option report</td>
<td>05-10-2007</td>
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<td>Bus journey time/frequency matrices</td>
<td>11-10-2007</td>
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<td>Car Parking Issues</td>
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<td>Passenger Demand</td>
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<td>Benchmarking of Rail Demand</td>
<td>January 2008</td>
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*Table 1.1 Technical Notes*
2 BACKGROUND

2.1 History

2.1.1 The Edinburgh South Suburban Railway (ESSR) comprises a circular route departing from the East Coast Mainline at Portobello junction to the east of Edinburgh Waverley station, via Niddrie and Morningside to Craiglockhart before rejoining the main Edinburgh to Glasgow line to the west of Haymarket station. There are connections to the East Coast mainline via the Millerhill freight yard, from Craiglockhart to the West Calder line, to the Edinburgh – Glasgow mainline and the Fife lines via junctions to the west of Haymarket. The route is double track with the exception of the sections from Gorgie to Haymarket Central junction and from Niddrie to Portobello junction which are single lines. The track arrangement is illustrated in Figure 2.1.

2.1.2 The circular route of the South Suburban railway last saw scheduled passenger services in the 1960s. At that time a service of 9 trains per day in each direction was operated, grouped into morning, midday and evening peaks. Mid-morning and mid-afternoon off-peak services had been withdrawn 30 years earlier.
Figure 2.1  ESSR Track Layout Diagram
2.1.3 A passenger service – the Edinburgh Crossrail service - was reintroduced in 2002 on the eastern segment of the ESSR from Portobello junction with new stations at Brunstane and at Newcraighall where P&R facilities are provided. This currently provides a service every 30 minutes to Edinburgh Waverley and cross-city to Haymarket, Edinburgh Park and beyond.

2.1.4 The remainder of the line remains open for freight traffic, acting both as a freight by-pass for Haymarket and Waverley and also as the main access to the Millerhill freight yard from the north and west of Scotland and from England via the West Coast Mainline and Carlisle. The line is signalled to full passenger operational standards and is very occasionally used as a diversionary route for passenger services.

2.1.5 The existence of a relatively lightly used double track rail line through densely developed areas to the south of Edinburgh has been viewed as an under utilised asset, and proposals have been made on a number of occasions to reintroduce a passenger service.

2.1.6 In 2002 Atkins was commissioned by CEC to evaluate the feasibility of reintroducing passenger services. Their study\(^1\), completed in 2004, considered capacity and operational constraints affecting the route, developed a range of costed options for services around all or part of the circle from Waverley, undertook simple demand forecasts and provided an economic evaluation.

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\(^1\) Atkins: Review and Options Analysis of Edinburgh South Suburban Railway; March 2004
2.1.7 The recommended option was to extend **off-peak** North Berwick services every hour across Edinburgh to Haymarket and then via the ESSR to a terminus at Niddrie. Throughout the day an additional hourly shuttle would operate between Waverley and Niddrie. Overall this would provide **an hourly service in peak** stepping up to **every 30 minutes off-peak**. The capital cost of this option was estimated at £15 million, and an annual revenue deficit of £546,000 was predicted\(^2\). A benefit cost ratio (BCR) of 1.64 was estimated, including travel time savings, accident and decongestion benefits.

2.1.8 At that time proposals were also under development for extending the Edinburgh Crossrail service from Newcraighall to Tweedbank in the Borders (the Waverley Railway), and to develop a tram route from Edinburgh City Centre to Newcraighall via Cameron Toll and the Edinburgh Royal Infirmary (Tramline 3). Atkins was therefore commissioned to undertake a further study to examine the extent to which the three projects would overlap, resulting in either a loss of projected traffic and revenue to other schemes or an increase in traffic arising from the synergy to be secured through improved connections and better overall public transport.

\(^2\) At 2003 prices; excluding Optimism Bias.
2.1.9 Their report\(^3\) considered three route and timetable options for the ESSR with or without the co-existence of the Waverley line or Tramline 3. The study concluded that there would be some abstraction from ESSR by the tram, and that there could be some synergy with the Waverley line if the ESSR service extended to Newcraighall, although the additional benefits might not outweigh the additional costs. Overall the preferred option for ESSR continued to be the same, and a BCR greater than 1.0 was still forecast, with or without the other projects.

2.1.10 In responding to these studies Network Rail and ScotRail raised a number of issues that they felt needed further investigation:

- Due to the physical constraints of the route, which is largely on embankment or in cuttings, exceptional costs are likely to arise in making the former station sites on the ESSR compliant with current accessibility regulations;
- Track access costs were (at that time) under review by the Office of Rail Regulation and were likely to be revised upwards;
- Signalling costs appeared to be under-estimated in comparison with other contemporary schemes in progress;
- The traffic forecasts for the intermediate stations on the ESSR appeared optimistic if compared with the actual numbers recorded at Newcraighall and Brunstane and should be benchmarked against other comparable situations to validate them.

\(^3\) Atkins: Study of Major Transport Schemes in South East Edinburgh; October 2004
• The capacity of the platforms at the west end of Waverley station, the capacity of the track and signalling between Waverley and Haymarket Central Junction, and the ability of the single track section between Haymarket Central Junction and Gorgie to accommodate the additional services proposed were all considered to be a serious limitation. In view of these constraints, it was their view that the proposed ESSR service could only be accommodated if other services then proposed were not to proceed, and a judgement would be required as to whether these services would be of greater benefit to the region than the ESSR or not.

2.2 E-Rail

2.2.1 A proposal has been advanced by the private sector company E-Rail to deliver private sector money towards the cost of building the ESSR rail project by harnessing the planning land uplift which occurs when a new transport service is introduced. The land uplift is derived from the improved accessibility that the railway might bring and the anticipated increase in development land values. These private sector contributions would reduce the cost to the public sector of the initial construction of the railway. The associated development could also add to the potential market for the services and increase the revenue available to the operator.
2.3 **Subsequent network developments**

2.3.1 Since these studies, there have been a number of major developments to the transport and rail strategies of Scotland. The National Transport Strategy\(^4\), and its daughter paper, Scotland’s Railways\(^5\), were developed by the Scottish Government and published in 2006. The South East Scotland Regional Transport Partnership (SEStran) has been put onto a statutory basis and has prepared the first Regional Transport Strategy\(^6\) for the region. The City of Edinburgh and neighbouring councils are in the process of developing a City Region Plan which will embrace the principles of sustainable transport in an integrated framework. Network Rail has completed a Route Utilisation Strategy (RUS) for Scotland\(^7\) and for rail freight, and is working on a RUS for the East Coast Mainline between Edinburgh and London.

2.3.2 Meantime specific project work in and around Edinburgh has been progressed, including:

- Approval for work on the Waverley Railway to the Borders;
- Approval for work on reinstatement of the railway from Bathgate to Airdrie, which includes electrification of the line between Bathgate and Edinburgh;
- Further development work and parliamentary approval for Edinburgh tramline 1 (although tramline 3 has been deferred for the present);
- Feasibility work on an increased frequency of service between Edinburgh and Glasgow via Shotts;

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\(^4\) Scottish Executive: Scotland’s National Transport Strategy; December 2006
\(^5\) Scottish Executive: Scotland’s Railways; December 2006
\(^6\) SEStran: Regional Transport Strategy 2008-2023; April 2007
\(^7\) Network Rail: Scotland Route Utilisation Strategy; March 2007
• New proposals for a rail/tram interchange station at Gogar near Edinburgh airport and for the creation of a chord south of Dalmeny to enable trains between Edinburgh and Glasgow/Stirling to access a proposed Gogar Interchange station (these plans replace the former Edinburgh Airport Rail Link proposals); and
• Proposals for a substantial increase in train services between Edinburgh and Glasgow, and to Fife, and additional services to Newcraighall, all in support of the anticipated economic growth of the Edinburgh City Region.

2.4 Reasons for review.

2.4.1 Since the Atkins reports in 2004 no substantial development work has been done on the ESSR proposals. A number of issues were, however, raised by stakeholders at that time, and further issues are raised by analysis of impacts of other projects subsequently developed and strategies published. CEC is therefore now seeking a review of previous work to identify these impacts and address issues arising, as well as given consideration to matters previously raised.

2.4.2 The issues which appear most substantial and relevant fall into four areas:
• The strategic fit of ESSR with the newly produced strategies at national, regional and local level;
• The operational issues arising out of comments on the original report, and from consideration of other studies and projects which have since been developed;
• Costings are already out of date, and some areas which have not been covered have been identified;
• The robustness of the demand forecasts and changes in the underlying circumstances affecting demand assumptions has been questioned.
2.4.3 There are a significant number of reasons why the demand figures should be not only validated but also updated to take into account of changes since 2004:

- higher rail fares and lower bus fares in real terms;
- new Park & Ride strategies;
- changes to the tram proposals;
- changes to the bus network;
- planned land-use changes.

2.4.4 The previous ESSR reports have not been undertaken along STAG principles, which is to say the underlying problems which the ESSR project might be expected to resolve have not been identified and alternative non-rail solutions have not been evaluated for comparison. As a result despite the positive BCR for the scheme as previously assessed, it is impossible to say that there are not more cost effective ways of achieving those same benefits.

2.4.5 The STAG process requires that transport projects are developed in order to meet defined issues. These may relate to identified gaps in transport provision, to a requirement to meet economic objectives (e.g. improved range of commuting access), social goals to meet the needs of specific disadvantaged groups, or environmental goals (e.g. mode shift from car to relieve congestion and enhance the urban environment). Such overarching goals and priorities are set out in the National, Regional and Local policies and plans. However the issue that ESSR is intended to address has not been clearly identified, although there is some reference to improved opportunities for orbital travel.
2.4.6 It is always possible to identify opportunities to run more services by train or bus by providing greater subsidies, but with investment projects always in competition for funds it is necessary to determine whether these services meet real priority needs. In order to make the case for the investment it is also necessary to identify the scale of the problem which the project seeks to address and to determine the priority it should take amongst other issues. The un-stated assumption that the ESSR represents an underutilised resource that could usefully be put to better use can then be properly tested. This is an important issue since the Scottish Government requires that transport projects are evaluated through STAG principles as a condition of any funding approval in order to ensure that the chosen project is the most cost-effective means of delivering the most important outcomes.

2.5 The brief

2.5.1 The present study was therefore commissioned with the following brief:

(d) To appraise the broad options to address travel in the corridor potentially served by the ESSR, both those options involving the use of the ESSR as a heavy rail passenger service and alternative options that might meet the same objectives. These options to represent significantly different levels of investment and public expenditure and different technical solutions by a diverse range of possible interventions in accordance with STAG.

(e) To establish objectives for the corridor by reference to the relevant national, regional and local development and transport strategies, and the identified problems within the area concerned.
(f) In order to undertake the appraisal, to provide ‘order of magnitude’ cost estimates and ‘order of magnitude’ estimates of the potential use, and of user and non-user benefits.

2.5.2 It was agreed to set aside, at this time, the detailed consideration of station locations and design, timetable and ticketing, timetable reliability, rolling stock and staffing, except only so far as is necessary to consider whether the options are practicable and could potentially be delivered. These matters would need to be developed in greater detail for appraisal in further stages of the project in relation to the most promising option(s) arising from this high level analysis. Such a two-stage approach to appraisal is in accordance with STAG.

2.5.3 The potential ‘ESSR’ stations at Abbeyhill and Portobello actually stand on the East Coast mainline. They could therefore be provided without any ESSR service being operated, and served by existing services from Newcraighall or from North Berwick. In this sense, unless their potential value lies in the connection to other ESSR stations, the case for their provision can be considered independently of ESSR itself. These potential stations are therefore only included in this study in so far as they may generate travel to or from locations served by the current ESSR freight route.
ANALYSIS OF CURRENT TRAVEL

3.1.1 Analysis of the travel patterns and transport issues arising from and within the ESSR corridor has been undertaken by reference to previous studies. This has been supplemented by an original analysis of the 2001 Census journey to work data to better understand the characteristics of commuting in and around the area.

3.2 Previous Studies

3.2.1 In 2003 Ove Arup undertook a high level analysis of major travel corridors in Edinburgh that might have generated sufficient demand to justify investment in Light Rapid Transit (trams). The LRT Masterplan Feasibility Study 8 analysed the scale of demand (including new development opportunities) in the area covered by potential tram route options, including the ESSR corridor. They found that:

a) There had been a rise in the number of cars and private light goods vehicles registered to Lothian residents from 280,000 in 1996 to 308,000 in 2000, a 10% increase;

b) The use of motor vehicles on Lothian’s motorways and ‘A’ class roads had risen from 2,977 million vehicle-kilometres in 1995 to 3,201 million in 1999 (a 7.5% increase);

c) Daily commuting into Edinburgh grew from 51,000 trips in 1981 to 72,000 in 1991 and an estimated 88,000 in 2001, a growth of 72% in 20 years;

8 Edinburgh LRT Masterplan (Ove Arup & Partners for CEC - January 2003)
d) Between 2000 and 2015 the population of The City of Edinburgh was projected to increase by 19,000 (4.2%), that of East Lothian by 8,200 (9%) and Midlothian by 3,200 (4%);

e) Whilst 15% of Scotland’s population lived in the Lothians, 18% of Scotland’s jobs were in the area;

f) Forecasts showed a projected increase of 34,500 jobs in the area between 2000 and 2015, outstripping the number of new workers by almost two to one and leading to an increase in in-commuting from outside the city;

g) Unemployment in the Lothians in 2001 was 2.7% (Scotland 4.3%; UK 3.2%);

h) All large travel markets were radial to the city centre; the strongest flows within the city were from Silverknowes, South Leith, Corstophine, Portobello and Moredun/The Inch to the central area whilst the combined flows from South Gyle and Stenhouse to the city centre were of medium volume, but combined with other flows created the greatest single corridor movement;

i) Flows to the south and southwest of the city were generally lower and more dispersed, and hence appeared to offer few prospects to support high quality transport investment;

j) The route of the Edinburgh South Suburban Railway poorly matched the major desire lines for travel and was too circuitous to be attractive to significant travel numbers. (Seven route corridors were assessed by a STAG appraisal and ESSR scored lowest.)
3.2.2 The Local Transport Strategy\(^9\) also sets out many principal transport issues and trends:

a) Bus trips in Edinburgh have increased by 27% (an average of 3.4% pa) over the period from 1997 to 2005. This is ascribed to an increase in population and, to a greater extent, increase in employment, together with improvements to the infrastructure and services. Over the same period bus travel across Scotland has increased by a modest 5%.

b) 50% of journeys to work by Edinburgh residents in 2005 are walking, cycling or public transport and this proportion has increased by 3% over the previous five years.

c) Despite the rise in public transport and sustainable travel, the overall volume of car trips has still risen due to population growth. Growing wealth leads to increasing car ownership and average journey lengths increase as travel (i.e. motoring) costs reduce in real terms. The largest proportion of car commuting is from residents outside the city and to job locations outside the city centre.

3.2.3 The Strategy concludes that:

‘Public Transport improvements proposed by the Council will make a significant contribution to better transport, but on their own will be insufficient to stem growing traffic levels and hence congestion resulting from new development and increased car ownership.’

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\(^9\) Local Transport Strategy 2007-2011; City of Edinburgh Council; March 2007
3.3 **2001 Census Journey to Work Data Analysis**

3.3.1 For this Review we have added to previous sources by analysing the 2001 Travel to work data, looking specifically at travel between areas that would potentially be served by the ESSR. The basis of the dataset is the matrix of journey to work travel between a home within 1000 metres of any existing station or possible station sites on ESSR (including Portobello and Abbeyhill) – i.e. those most likely to be existing or future local rail users. It does not include those going (by rail or otherwise) across the city boundary, or those using these zones as a base for Park & Ride although not living within one of them, nor journeys wholly internal to a station zone. As such it is only a rough indicator of the LOCAL value of potential rail services if all the stations were available. Movements of less than 20 trips are disregarded due to the very small sample sizes on which such estimates are based.

3.3.2 This is 2001 data, and since then

- Edinburgh Royal Infirmary has moved out from the city centre to Little France;
- Crossrail has opened with new stations at Newcraighall and Brunstane;
- Development at South Gyle and Edinburgh Park has been rapid;
- The Edinburgh Fastway guided bus link used by buses from the City Centre to Edinburgh Park has opened.
- A new station at Edinburgh Park has opened;
- Housing renewal and regeneration has begun at Craigmillar.
3.3.3 The principal features of this matrix of journey-to-work data for 2001 are:

a) As destinations, Waverley and Haymarket stand dramatically above all other zones, accounting together for 47% of all work trip destinations.

b) The other major destinations are (in the west) Edinburgh Park/South Gyle and Curriehill, (to the south) Newington and (in the east) Portobello.

c) Haymarket also stands out as the largest single trip origin (16% of all trips). Elsewhere the number of work trip origins are more evenly spread with the largest numbers coming from Gorgie, Abbeyhill, Wester Hailes and Morningside. Zones producing the smallest numbers are Newcraighall, Edinburgh Park and Craigmillar, this last principally because of the redevelopment in progress in 2001 (although the level of unemployment in this area of multiple deprivations will also have depressed the number of commuting trips).

d) For movements from potential ESSR stations the major outward flows are:
   - To Waverley and Haymarket, together accounting for 55% of all trips from the ESSR station zones;
   - from Abbeyhill and from Niddrie to Portobello;
   - from Gorgie to Curriehill, South Gyle and Edinburgh Park.

e) The largest destinations for journeys by car are also Waverley and Haymarket, although this is only 33% of all car trips in this matrix compared to 47% of trips by all modes. These are also the main destinations for public transport trips, over 10,000 daily, accounting for 54% of all public transport trips between these zones. Car mode share to these destinations is only 22% and
27% respectively whilst public transport mode share is 48% and 47%. Walking/cycling accounts for the remaining 25 – 30% of trips. (From the Haymarket zone to Waverley zone in fact 55% of trips were by walking and cycling.)

f) Outside the city centre, the main destinations for car trips were Edinburgh Park/South Gyle, principally from Wester Hailes, Gorgie and the city centre, and to Portobello from near zones at Brunstane, Niddrie and Abbeyhill. These flows are thus either local to the west end or local to the east end. Car trips entirely between ESSR station zones account for only 15% of all car trips in the matrix. Car mode share is highest at 56% for trips to Edinburgh Park (this was before the Edinburgh Fastway and Edinburgh Park stations were in use), and nowhere else is it above the citywide average car mode share of 50%.

g) Outside the city centre the principal public transport destinations are Curriehill, South Gyle and Edinburgh Park (even before the busway and new station there had been opened). Mode share for public transport for commuting trips to Curriehill at 58%, and for trips from Gorgie at 54% both exceed even the share to the city centre. (It should be observed that Curriehill features as a major destination in the data because Heriot Watt University lies within the 1km range as the crow flies. However the station is not well located in relation to the university and it should not be supposed that the rail service necessarily plays a significant part in the provision of public transport to the zone. Similar considerations may apply at other zones.)

h) Internally within the ESSR zones the greatest volumes of trips are to Portobello from Niddrie and
Abbeyhill, though car mode share for these trips is low at 29% and 36% respectively. The next highest flows are to Newington from the adjacent zones of Morningside and Blackford. However over 50% of these trips are by walk and cycle and the car mode share is again low.

i) Mode split for groups of zones was as follows:
- For journeys wholly internal to ESSR (including Abbeyhill and Portobello): 39% by car: 27% by public transport: 34% walk/cycle;
- For journeys between ESSR zones and other station zones: 33% by car: 39% by public transport: 28% walk/cycle;
- For journeys wholly between other station zones: 32% by car: 45% by public transport: 23% walk/cycle.

j) Public transport has the highest mode share where railway stations currently exist. This is not solely because of use of the railway since the rail corridors also contain some of the highest frequency bus services. E.g. the highest mode share for public transport is Wester Hailes to Curriehill (72%) which, although they both have stations, has only a very limited peak rail service but an excellent bus service to the main employment site at Heriot Watt University. Car mode share is higher between zones within the ESSR corridor, though still below the overall Edinburgh average of 50%. Walking and cycling also have a higher mode share within the ESSR corridor with large number of short trips between adjoining zones.

3.3.4 The implications of this analysis of data are considered further in section 4.12 below.
4 POLICY CONTEXT

4.1.1 A review of the policy context was undertaken before considering the objectives which any enhancement of public transport services in the ESSR corridor might be expected to meet.

4.1.2 This review considered the National, Regional and Local development, planning and transport strategies relevant to the area, and the strategies adopted by Network Rail through their Route Utilisation Strategy programme.

4.2 The National Transport Strategy
(The National Transport Strategy; Scottish Executive; December 2006))

4.2.1 The National Transport Strategy sets five high level Objectives for transport in Scotland:

(a) Promote Economic Growth

(b) Promote Social Inclusion

(c) Protect Environment and Improve Health

(d) Improve Safety

(e) Improve Integration

4.2.2 These objectives were unchanged from “Scotland’s Transport Future” in 2004 and represent long term aims for the development of the nation.
4.2.3 To give the policy a more specific and transport orientated direction, the Transport Strategy goes on to define three measurable ‘Strategic Outcomes’:

A. Improvements to Journey Times and Connections, a reduction in congestion and improvement to integration between modes;

B. A Reduction in Emissions and improvements to the environment;

C. An Improvement in Transport Quality, accessibility and affordability, greater use of sustainable transport, a wider offer of mode choice and provision of effective value for money alternatives to the private car.

4.2.4 The strategy identifies a key challenge to break the links between economic growth, increased traffic and increased emissions. The outcomes are all encompassed with an overarching objective to resolve how transport services can cater for projected growth that comes with increasing wealth whilst ensuring sustainability. Such sustainability is set out as a set of policy directions:

(a) Encouragement for increased use of sustainable (and healthy) modes of travel for short journeys.

(b) Increased use of public transport where it is effective to do so.

(c) Diversion of long distance intercity travel from domestic air and from road to rail.

(d) Diversion of heavy freight flows from road to rail or sea.
(e) Minimising the adverse impacts of roads (especially congestion) and of air travel (especially at airports).

4.2.5 The Transport Strategy then develops some greater detail on the measures to be developed so that these Outcomes are effectively pursued.

- Improve Journey Times and Connections:
- Aim for reliable & predictable journeys
- Encourage more sustainable travel:
- Secure a reduction in emissions and environmental impacts.
- Improve Quality, Accessibility and Affordability

4.2.6 Scotland’s Railways\textsuperscript{10} is a daughter paper to the National Transport Strategy and sets out how the national Objectives and policies can be interpreted in the context of rail development and investment.

4.2.7 The document states as a context that rail is expensive, and consequently investment in rail must be:

- Affordable and efficiently delivered.
- Sustainable and environmentally sensitive.
- Targeted at key strategic outcomes where rail is the most effective solution.

4.2.8 In this context, the document considers that rail has a particular strength for certain activities, and identifies that what railways do best is:

- Fast long-distance services between major urban centres;

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\textsuperscript{10} Scotland’s Railways; Scottish Executive; December 2006
• High quality mass commuter services into major employment centres;
• Carrying regular high volume freight flows.

4.2.9 The strategy for railways adopts the same high level objectives as the National Transport Strategy, and interprets each in the context of rail’s identified strengths.

**Improve Journey Times and Connections**

A. Reliable and robust timetables must be delivered
• Faster/more frequent services on main inter-urban corridors.
• Freight capacity to be increased (especially to ports).
• Increased capacity on major commuter routes with more and longer trains.
• New stations only where they can be served by local trains and do not add delays to inter-urban services.

B. Better integration between rail and other modes
• Improved connections between inter-urban and local services.
• Improved interchange with other modes and better access on foot and cycle.

C. Reduced environmental impact of rail

4.2.10 On the 27th September 2007 the Minister for Transport, Infrastructure and Climate Change made a statement to Parliament outlining a strategy to deliver ‘Improved Journey Times and Connections’ on routes between Glasgow and Edinburgh. This strategy comprises plans to increase the number of trains between the two cities from 5 / 6 per hour up to 13 per hour over 10 years, to electrify the principal route via Falkirk, and to provide a new interchange station between the rail network and the Edinburgh Tram at Gogar. These proposals
supercede the former Edinburgh Airport Rail Link plans (EARL), but aim to deliver the strategic outcomes of the National Transport Strategy.

4.2.11 In the National Transport Strategy and its rail sub-paper, inner suburban travel movements are identified as a market often best served by light rail or bus networks as frequencies on heavy rail are generally uncompetitive, and because local services with frequent stops are incompatible with fast inter-city and outer suburban operations. In this context ESSR does not feature amongst the specific network developments identified in the national strategies, although since ESSR does not share tracks to any significant extent with high speed services the latter reason does not necessarily apply.

4.2.12 However there is also considerable emphasis upon improving urban public transport so as to encourage a mode switch from car, to integrate local and long distance networks and to provide consumer choice. Public transport investment in the ESSR corridor could potentially contribute to these objectives.

4.3 SEStran Regional Transport Strategy (RTS)
(Regional Transport Strategy 2008 – 2023; SE Scotland Transport Partnership; March 2007)

4.3.1 The RTS identifies that the greatest pressure upon the region arises from the economic growth of the city, where job creation by a dynamic city economy is outstripping residential development constrained by the city boundaries, and leading to a substantial increase in commuting into the city from an expanding catchment area. The historic city has limited capacity to absorb increased traffic levels, and traffic congestion is already
perceived to be both an environmental threat, and a potential constraint on further economic growth.

4.3.2 The RTS has therefore set out an overarching aim to move towards a less car-dependent economy. This means that:

a) Development must be planned to minimise car dependence; and

b) Since growth is taking place outside the Edinburgh city centre, public transport requires to adapt to reflect this, whilst strategic planning has to encourage new development in locations that can be efficiently and effectively served by sustainable transport.

4.3.3 The Strategy establishes objectives for transport development in the region:

a) To ensure that transport facilitates economic growth;

b) Reducing the negative effects of congestion and to improving journey time reliability;

c) To improve accessibility for those with limited transport choice (including affordability); and

d) To ensure that development is environmentally sustainable and will support efficient sustainable and public transport provision.

4.3.4 The strategy develops specific policies for rail development that determine how rail services and the rail network will contribute to the regional aims.

- Selective cost effective investment and service support towards an integrated rail-based regional transport network, integrated also with planned development;
• A presumption in favour of targeting investment to enhance capacity on heavily used and congested rail corridors for passengers and/or freight;

• Promotion of mode shift of freight to water or rail;

• Transport interventions should contribute towards reducing emissions of CO2 and greenhouse gases;

• Schemes supported in the National Transport Strategy will be given priority.

4.3.5 Overall SEStran identifies the priority being to target improvements to public transport in the principal corridors of commuting travel so as to:

• Make public transport more attractive to those who drive;

• Expand the labour market;

• Open up new opportunities for employees.

4.3.6 From these objectives, SEStran has developed a range of specific priority schemes that support them, to a greater or lesser extent. On rail, SEStran supports the National Transport Strategy for Rail, specifically including additional services on the Shotts line, faster services on Intercity routes, network enhancements for freight and capacity of the Edinburgh suburban network. They would further wish to see:

• Faster services to London and Manchester;

• Better integration between long-distance and local service timetables;
• An additional station on the Edinburgh – Glasgow line at Winchbrough (part of the West Edinburgh Planning Framework);

• Through services from Ayr and from Dumfries to Edinburgh;

• Extension of the Borders rail link to Carlisle.

4.3.7 On the Edinburgh South Suburban Railway the RTS states that SEStran would wish to 'see proposals for this under-utilised resource taken forward'.

4.3.8 The fact that the ESSR is probably underutilised in the sense that it could theoretically carry more trains, and is certainly underutilised in the sense that, as a corridor of land, it could (with investment) provide for more person movements, does not of course constitute an objective of transport policy, although it does represent an opportunity that might contribute to the solution to some possible problems.

4.3.9 The Regional Transport Strategy (RTS) identifies a critical role for rail in providing capacity for increased commuting from an expanding labour catchment area to meet the employment growth expectations of the city. The RTS proposes to prioritise improvements to the quality, capacity and reliability of the regional commuter network. In this context, although the RTS expresses support for further consideration of ESSR, it does not fall within the priority category of services. Further any adverse effect of ESSR on other services would be positively contrary to the strategic objectives.
4.4 Edinburgh & Lothians Structure Plan
(Edinburgh and Lothian Structure Plan 2015; East Lothian, Edinburgh, Midlothian and West Lothian Council; June 2004)

4.4.1 The Structure Plan is based on the preferred strategy of the previous SEStran RTS (of 2001) of major improvements to public transport infrastructure and provides a land-use framework for choices as to how these schemes are prioritised. The delivery of the infrastructure will be crucial to the successful implementation of the Structure Plan.

4.4.2 The overarching aim of this Structure Plan is to provide in full for the development needs of Edinburgh and the Lothians in accordance with the principle of sustainable development, whilst maintaining and enhancing the environmental heritage that underpins the area’s quality of life.

4.4.3 The Structure Plan seeks to encourage a more sustainable pattern of development by:

- Maintaining and enhancing economic competitiveness;
- Promoting a more inclusive society;
- Protecting and enhancing the natural and built environment;
- Integrating land-use and transport.

4.4.4 The Structure Plan objectives (amongst others) are to:

- Identify strategic employment locations which are, or can be made, highly accessible by foot, cycle and public transport;
- Identify new transport infrastructure required to support the local economy;
• Increase access to employment opportunities through a more balanced distribution of employment land, shopping and leisure, by giving preference to locations with easy access by foot, cycle and public transport;
• Locate new development so as to reduce the need to travel, particularly by private car;
• Reduce commuting to Edinburgh from landward council areas;
• Maximise accessibility for all in the community by foot, cycle and public transport;
• Identify new transport infrastructure required to support the development strategy.

4.4.5 The settlement strategy is based on the need to give priority to brownfield land, focusing most new development in core development areas where infrastructure capacity exists or where new infrastructure would be cost effective on existing or proposed rail/tram corridors and/or have the potential for a good level of access by bus-based public transport.

4.4.6 The regional public transport system is currently focussed on Edinburgh, particularly the city centre, and only the city centre has good public transport accessibility from the rest of the Lothians. Because there are now limited development opportunities in the centre however, the strategy will encourage major new economic activity outwith the city centre. In order for this to take place in a way which is consistent with the Structure Plan’s key aims, a major investment in public transport, walking and cycling will be needed to locations other than the city centre, boosting the public transport accessibility of a number of core development areas and helping to ensure more sustainable travel patterns.
4.4.7 Fifteen core development areas are identified, three of which lie within the City of Edinburgh boundaries: The city centre, the Waterfront and Edinburgh Park / Gyle / Sighthill. Beyond 2015 no additional core development areas are envisaged within the city (although the development within the 3 areas identified will continue) and locations will have to be sought elsewhere.

4.4.8 Although the Plan is related to the previous Regional Transport Strategy, these overarching aims remain central to the new RTS, and the land use plan and transport strategy appear to remain essentially consistent with one another. The most evident change is that whereas the Structure Plan proposed to bring about a reduction in commuting into the City of Edinburgh, the RTS accepts that an increase is inevitable as a consequence of the imbalance in jobs and employees in the city, and seeks to ensure that the increase is accommodated in a sustainable manner.

4.5 West Edinburgh Planning Framework

( West Edinburgh Planning Framework; Scottish Executive; 2006)

4.5.1 The National Planning Framework for Scotland (April 2004) refers to the West Edinburgh Planning Framework as a mechanism to ensure a co-ordinated approach to land use and transport issues in one of the fastest growing parts of the country. This is an area incorporating the international airport, the Royal Highland Showground, the Heriot Watt University campus and the Gogarburn and Edinburgh Park business centres, together with existing development areas east and west of the airport. The West Edinburgh Planning Framework highlights the unique opportunity
which West Edinburgh offers as an international business location.

4.5.2 The framework addresses issues of congestion, the integration of land use and transport and the provision of modern transport infrastructure at this strategic location. The proposals arising from this vision include:

- the implementation of committed development, the rounding off and more intensive development of "Core Development Areas" and the integration of development with a greatly improved public transport network;
- the introduction of tram links into and through the area for rapid transit within and between Leith, the City Centre and West Edinburgh, and for local distribution;
- the introduction of rail links to Edinburgh Airport to improve accessibility and reduce journey times from other parts of Scotland and the UK;
- the integration of transport modes within West Edinburgh by means of the construction of a high quality transport interchange at Edinburgh Airport as well as commuter park and ride facilities served by bus, tram and rail, building on wider efforts to promote sustainable transport, manage traffic congestion and help meet wider environmental and social inclusion objectives;
- the taking forward of public transport investment, the management of road traffic and parking, and planned new road links in an integrated and managed process, the primary aim being no net detrimental impact to the free flow of traffic on the motorway and trunk road network.
4.6  City of Edinburgh Council: Local Transport Strategy
(Local Transport Strategy 2007-2012; The City of Edinburgh Council; March 2007)

4.6.1 The Scottish Executive’s National Planning Framework highlights potential constraints to continuing economic success including transport infrastructure capacity constraints leading to congestion and unreliability.

4.6.2 Growth areas identified in the City’s Local Transport Strategy (LTS) include, in South East Edinburgh, the South East Wedge (Shawfair) which is primarily planned residential development, the redevelopment of Craigmillar with a substantial increase in housing, and the Royal Infirmary with surrounding medi-park. Until the tram (tramline 3) is built, ‘this area’s accessibility problems which are already manifest could be exacerbated’.

4.6.3 The Vision for Transport is that:

“Edinburgh aspires to be a city with a transport system that is accessible to all and serves all. The transport system should support a sustainable and prosperous economy. It should contribute to better health, safety and quality of life for all Edinburgh’s citizens and visitors, particularly children, the elderly and disabled people. The Council will seek to maximise people’s ability to meet their day to day needs within short distances that can easily be undertaken without having to rely on a car. Choice should be available for all journeys within the city (i.e. providing alternatives to the car).”
4.6.4 Specific Objectives for the transport system are:

A. To facilitate reliable and convenient access to the city and movement within it, in particular by reducing congestion;

B. Maximise the opportunities to meet travel needs on foot or cycle;
   - Make cycling safer and easier.

C. Where people choose to make longer journeys, provide good public transport choices to the maximum extent possible.
   - Provide bus-bus interchanges;
   - Develop bus priority measures;
   - Extend multi-modal ticketing, including the tram;
   - Extend bus-tracker information system;
   - Support for key shortfalls in the bus network;

D. To implement the tram project;

E. To reduce the need to travel, especially by car;

F. To reduce the adverse impacts of travel, including road accidents and environmental damage;

G. To recognise the many roles that streets have for a community;

H. To improve the ability of people on low incomes and people with mobility impairments to use the transport system;

4.6.5 On rail the Local Transport Strategy identifies the key role of rail in improving access to the city from the labour catchment area, and enhancing inter-city links. Policy PT22 states that the City Council will work with others to improve rail services and promote new rail schemes where appropriate, including reopening the ESSR to
passengers, although no link is made between this policy and the stated objectives.

4.6.6 Towards the end of the plan period when many of the rail and tram projects will be in place, the first priority will be to ensure the integration of this substantial new infrastructure with the rest of the region’s transport system. This will be pursued through two major new projects: the extension of the tram network to the south east of the city and the creation of an orbital quality public transport system along the corridor of the Edinburgh bypass.

4.7 Edinburgh 2040 Vision

(A Vision for Capital Growth; City of Edinburgh Council; April 2006)

4.7.1 The City of Edinburgh Council has published a discussion paper to address the issue of how the city region may develop beyond the end of existing formal plans and strategies – i.e. beyond 2016.

4.7.2 The Vision predicts that economic activity in the city will continue to expand, placing continuing pressure on transport networks to bring increasing numbers of workers (and other trips) into the city. Since the historic city is physically constrained, and of great historic value and intrinsic urban quality, the present policies to minimise the use of the private car will require to be continued and strengthened.

4.7.3 The City Council proposes that development should be concentrated where public transport can provide comprehensive and attractive travel options. That public transport will require to be expanded to cater for greatly increased levels of demand. The Vision is therefore that
development will be concentrated on corridors served by rail and around the principal railway stations which will form development hubs and interchange points with other modes. These development areas will take the form of extended fingers along high quality rail-served travel corridors, with some outer orbital links between routes. This structure would, over time, supersede the present structure of the region which loosely comprises a city surrounded by free-standing towns separated by greenbelt.

4.7.4 This Vision places great emphasis on the ability of the rail corridors into the city to expand and cater for long-distance commuting from an expanding catchment area. As such it presents a long term vision of a potential strategic role for rail in the sub-region.

4.8 **Scotland’s Route Utilisation Strategy**  
*(Scotland Rail Utilisation Strategy: Network Rail: March 2007)*

4.8.1 The Route Utilisation Strategy (RUS) for Scotland was undertaken by Network Rail as one of a set of such network reviews undertaken across Britain. These are required by the Office of Rail Regulation which has determined that the terms of reference are to identify a strategy to accommodate growth on the railway in a way that is deliverable, affordable and consistent with improvements to safety and performance. Each RUS is required to set out a range of short term (10 year) measures that would make effective and efficient use of railway capacity, and to develop that capacity in response to demand. The RUS also sets out longer term opportunities to reduce journey times and increase service frequencies. The recommended measures have been selected on the basis of their value for money across the 10-year period of the strategy.
4.8.2 The RUS was developed in tandem with Scotland’s Railways and uses the same underlying analysis of where future demand will arise.

4.8.3 Although it is an independent rail industry strategy, it is set in the context of national policy and priorities and is largely consistent with the National Transport Strategy. The RUS underwent a STAG appraisal against the strategic objectives of the NTS. The overall policies and objectives are therefore those of ‘Scotland’s Railways’, within the context of the rail industry’s own priorities.

4.8.4 The RUS identifies current ‘gaps’ between service delivery and current or projected demand which are priority issues:

- **Overcrowding** is currently occurring on parts of the network and traffic is increasing. Train services into Edinburgh which are at peak capacity include services from Glasgow, Fife local services, Dunblane and Stirling service, and intercity services through Fife;

- **Track capacity** is heavily utilised on many key sections. This constrains the extent to which additional services can be accommodated and has significant impact on existing services. Sections of line working at full capacity include Larbert to Stirling (following the opening of the Stirling to Alloa line and rerouting of coal traffic by that route), Haymarket to Inverkeithing and Newbridge junction to Bathgate. The line between Edinburgh and Glasgow via Shotts is also intensively used by freight.

- **Growth:** due to the strength of the Edinburgh economy, the highest projected growth is in South East Scotland, principally services to Edinburgh from Fife and from Falkirk/Stirling. The highest levels of freight growth are also projected to impact on this
area with increasing traffic between Glasgow/Fife and England via the East Coast mainline.

- **Performance**: overall Scotland falls short of the performance targets set by the Office for Rail Regulation (ORR). Key locations of network congestion which impact on performance are the approaches to Edinburgh and Glasgow, single line sections on suburban networks and the mix of fast and slow services sharing the same tracks. The single track section between Niddrie and Portobello, coupled with constraints at Portobello junction itself, the availability of through platforms at Waverley, paths west of Haymarket and the single track line to Bathgate combine to have the greatest impact upon reliability and performance of services across the whole of the central belt.

4.8.5 Network Rail proposes a range of enhancements for the short and medium term, including track and signalling projects and train capacity increases, but conclude that these

"will not meet the projected growth in demand on existing routes in the longer term."

4.9 **The Freight RUS**

*(Freight Rail Utilisation Strategy: Network Rail: March 2007)*

4.9.1 Network rail has undertaken a strategic review of the requirements for freight on the national Network – the Freight RUS – with similar objectives to the other Route Utilisation Strategies: to identify current gaps between freight requirements and network capacity and performance, and to estimate projected new capacity and performance constraints on projected growth in the medium term.
4.9.2 In the present network, the principal issues of freight capacity in Scotland are the volume of coal traffic using the Glasgow South Western (GSW) route to Carlisle and using a route via Falkirk and the Forth Railway Bridge to access Longannett power station with coal supplies from Ayrshire and Hunterston deep sea terminal. Measures have already been taken to increase capacity on the GSW route, and the number of coal trains using the Forth Bridge will drop substantially with the opening of the Stirling – Alloa – Longannett line in 2008. However this alteration will give rise to a new capacity issue in relation to the section of line between Larbert and Stirling, which is addressed in the Scotland RUS.

4.9.3 The growth projections are faced with significant uncertainty about the future pattern of coal supply, which depends in large measure on the ports of entry for imported coal (which supplies 80% of the UK coal powered electricity generation capacity). At the highest range of potential demand, coupled with limited increase in deliveries at East Coast ports, a significant further investment in capacity via the GSW route will be required, but there will also be a 50% increase in traffic via Edinburgh and the East Coast Mainline (ECML) to English power stations. Such trains would use available spare capacity on the Shotts line between Glasgow and Edinburgh and the ESSR route around Edinburgh. At the lower end forecast no further increase in coal traffic in Scotland may arise.

4.9.4 The other significant growth market for rail freight is in container traffic to/from those ports which handle containerised traffic. At present virtually all such traffic to Scotland is focussed on the freight facilities at Mossend (Glasgow) and Grangemouth, with some continuing to Aberdeen. The primary route is via the West Coast Main Line but some is routed into Scotland via the ECML.
The core assumption is that growth in container traffic will require that additional services use the ECML and ESSR.

4.9.5 The deep-sea container market is rapidly adopting 9’ 6” high containers that can only be conveyed by train on standard wagons on a limited number of routes – in Scotland only on the West Coast. Such containers can be carried in purpose designed low floor wagons on other routes (including the ECML and ESSR) but these operations are inherently more expensive and less efficient. The Freight RUS therefore identifies a likely medium/long term requirement to increase capacity for carrying these larger containers on the ECML and ESSR, which would entail engineering work to achieve ‘gauge clearance’ at structures and stations. This work is not programmed in the RUS.

4.9.6 Taking the freight market as a whole, the Freight RUS estimates that the ESSR will see an increase of between 20% and 60% in the number of freight trains by 2016. The route is identified as having sufficient capacity to cater for this level of growth.

4.10 The East Coast Mainline RUS

(East Coast Main Line Route Utilisation Strategy: Draft for Consultation; Network Rail; June 2007)

4.10.1 Network Rail is currently working on the East Coast Mainline RUS which covers the railway from London Kings Cross to Edinburgh and its branches, including, in Scotland, the North Berwick service. This RUS has reached the stage of a consultation draft.

4.10.2 The analysis in the East Coast RUS does not identify train capacity on long-distance cross-border services
from Edinburgh as a current issue of concern. It also indicates low projected traffic growth prospects for long distance travel on the route where air travel has a very strong competitive edge.

4.10.3 However the analysis of delays and the causes of performance problems highlights that Edinburgh station and its approaches are the location of the highest level of direct and reactionary delays to passenger train operators on the entire route. The consequences of delay in Edinburgh exceed by a factor of three the delays which arise at any other station on the line. (This historic analysis does not of course take into account the present rebuilding work at Waverley and the benefits that this rebuilding will eventually deliver.)

4.10.4 The issues that underlie this level of performance, and in particular the knock-on effects following any initial causes of a delay, include:

- An extended length of two track railway between Newcastle and Edinburgh;
- The mixture between high speed passenger trains, local stopping services and heavy freight;
- The interaction of services on this section of route with other congested routes and locations (e.g. Newcastle, Leeds, Birmingham and the ECML itself south of Doncaster);
- The irregular timings of ECML services arriving in Scotland from London due to different calling patterns;
- The number of conflicting train movements at junctions between Dunbar and Edinburgh Waverley, including access to the single platform face at Dunbar in both directions of travel, access to the North Berwick branch, access to Cockenzie power
station, access to Millerhill freight yard, Portobello junction and cross-overs on the approach to Waverley station. At each of these locations trains in opposing directions of travel require to be scheduled so as to avoid conflicting movements, and when for any reason a train is running out of schedule it causes delays to other services on the line.

4.10.5 The RUS therefore concludes that in relation to the Scottish end of the East Coast Mainline, the key priority is to rectify the poor performance within and to the east of Edinburgh Waverley. The RUS has not however reached the stage of identifying the key strategies to be adopted to address this issue.

4.11 Route Utilisation Strategies summary

4.11.1 The Route Utilisation Strategies together have identified a number of significant capacity constraints in and around Edinburgh, four of which are relevant to ESSR;

- the Portobello junctions to the east of Edinburgh;
- the capacity of Waverley station itself;
- the station throat area to the west of Waverley; and
- the junctions to the west of Haymarket.

Congestion at these locations has a significant effect upon the reliability of the entire south-east Scotland network.

4.11.2 The RUS also identifies growth pressure that has the potential to exacerbate these problems, and in particular identifies the growing demand for capacity between Glasgow and Edinburgh, and into Edinburgh from Fife. The RUS does identify reconfiguration at Portobello junction in conjunction with opening the Waverley line to
the Borders as a priority project, and this potentially could ease one of the constraints upon the development of ESSR. Nevertheless the RUS warns that the pressure upon the approaches to Waverley from the west, including the Haymarket junctions, can only increase as a result of the Airdrie – Bathgate scheme and proposed additional services between Glasgow and Edinburgh via Shotts, and there are no infrastructure ‘solutions’ advanced to address these pressures. The RUS concludes that various development schemes will have to be prioritised to make best use of the capacity which is available.

4.11.3 It should be noted that Network Rail is currently under an legal obligation by the Office of Rail Regulation under the terms of its licence to improve the reliability of the Network. The reliability performance targets will be reviewed as part of the High Level Output Statement to be prepared by the Scottish Government for the period 2009 to 2014. Although it will be a matter to be determined by Scottish Ministers, it is not currently envisaged that these targets would be relaxed, and indeed continued improvements are priority objectives in the National Rail Strategy (as in the SEStran RTS). Network Rail’s conclusions from the RUS are therefore of considerable weight.

4.12 Summary of Priority Issues

4.12.1 This review has found that the National, Regional and Local transport strategies are agreed upon the priority issues for Edinburgh and its transport.

4.12.2 The City is economically successful and is currently the growth engine of the Scottish economy. The strategies aim to encourage and support that growth by providing
for employment growth at key brownfield sites within the city and through the development of the area to the west of the City at Gyle / Edinburgh Park, around the airport and at Ingliston / Newbridge.

4.12.3 The growth in jobs has been and will continue to outpace the growth in the locally resident workforce, which will draw in an increasing number of commuters from the wider area around the city. Already the major cause of congestion around the city is the influx of car commuters from outside the city boundaries. The key challenge is to ensure that as the level of commuting increases still further this is not translated into a corresponding increase in car traffic.

4.12.4 The priority is therefore to increase the capacity of public transport networks into the city, and especially into the designated development areas within and to the west of the city, to cater for the growth in movement, and to enhance the quality of those networks so that they are the preferred choice of a large proportion of the commuter market.

4.12.5 Since 2001 projects have already been delivered towards these objectives through the provision of the Edinburgh Park Fastway route, the opening of a railway station at Edinburgh Park and the provision of Park & Ride sites at Ingliston and at Hermiston. Further projects, currently at various stages of development, include reopening the Airdrie – Bathgate railway, further Park & Ride sites and the Edinburgh tram, serving major employment growth sites in the city and to the west, and an orbital high quality bus corridor broadly following the A720 Edinburgh by-pass as proposed in the Regional Transport Strategy.
4.12.6 The National Strategy for Rail (and also the Scotland RUS) have also identified increased capacity and additional services into Edinburgh from the west and from Fife as key national schemes to be developed to support the economic growth of the city. The Regional Strategy also identifies a need for an enhanced public transport orbital corridor linking major residential areas in East and Midlothian with the employment growth sites in West Edinburgh. The Edinburgh Airport Rail Link (EARL) was envisaged not solely as a service for air passengers, but would also as a means to provide a major improvement to the accessibility of the West Edinburgh development zone, would have supported a further major multi-modal interchange and would also have released capacity on the existing railway for local development (for example at Winchburgh). Although Network Rail described the issue of how to meet the long-term growth in demand on the rail network west of Edinburgh as unresolved, the Minister’s statement on the 27th September – see 4.2.10 above – sets out the main strategic changes which are now envisaged by the Scottish Government.

4.12.7 None of the designated employment growth zones are located along the ESSR.

4.12.8 Alongside the priority given to facilitating the economic growth of the city with new sustainable transport networks, there is also a consensus in the various strategies that measures need to be taken to tackle congestion, safety hazards, pollution and other adverse impacts of road traffic within the city. Strategies at all levels support measures to secure an increase in the use of public transport and sustainable travel modes, especially for short trips.
Projects to achieve this objective include the extensive provision of greenways – the city’s bus priority routes – as well as the Edinburgh tram and investment in walking and cycling networks.

Analysis of the census data has shown that the area served by the ESSR has levels of walking and cycling and public transport use which are well above the city average. The problems of traffic in those areas are largely considered to be the result of through traffic from areas further from the city centre, including those coming into the city from beyond the city bypass. Certainly since the ESSR corridor has lower levels of peak car use than the city average it follows that other areas have levels of use that are above the city average.

Rail services are generally effective in moving large volumes of people efficiently, quickly and with low environmental impacts. The National Transport Strategy identifies outer-suburban commuting routes as an efficient and effective use of rail, and the development of radial routes is a priority at national, regional and local levels. However the orbital travel flows along the ESSR are not of an order of magnitude that matches such long distance commuting services, whilst the radial flows are provided for by direct and frequent bus services. The area shows strong sustainable characteristics with high levels of local employment within zones and in adjoining zones, and a high proportion of walking and cycling. It is not evident that rail services on ESSR would make more than a marginal improvement in travel opportunities for existing travellers. The situation may change with the emergence of new major employment sites around the city.

The National Rail Strategy has set an objective to encourage the transfer of freight from road to rail and to
this end ensuring adequate freight capacity is a national priority. Network Rail has identified through the Freight RUS that demand for rail freight through Edinburgh is increasing, principally on route to England via the East Coast Main Line. Given the identified capacity constraints on the section of track through central Edinburgh between Portobello in the east and Haymarket in the west, the ESSR clearly performs a very important role for rail freight and comprises a significant element of the national rail strategy, although the present infrastructure has the capacity to cater for projected freight growth without investment.

4.12.13 The strategies recognise a role for public transport in addressing the social exclusion of certain communities of multiple deprivation, and in particular good public transport is necessary to enable such communities to have access to jobs, to retail and to health facilities. The Craigmillar area on the ESSR is such an area of multiple deprivation, and a housing regeneration programme is currently underway. Rail services however are rarely the answer to such social needs (except in the absence of suitable bus services and local employment opportunities) due to higher fares. The Craigmillar area is comprehensively served by city bus routes.
5 OBJECTIVES

5.1.1 It is not evident from the review of strategies and previous studies that the area potentially served by ESSR is the location of any specific problem issues that require to be resolved as a matter of regional or local priority. Although investigation into the potential benefits of reintroducing passenger services on the ESSR is included within both regional and local transport strategies, none of the strategies have identified specific issues in that corridor and none have proposed the reintroduction of rail passenger services as a resolution to any of the specific issues which have been identified.

5.1.2 However there are a range of generic issues concerning access to employment and promoting sustainable travel modes that apply across the city and thus enhanced public transport is a generic policy. It is only on this basis that issues can be identified which ESSR might address.

5.1.3 Therefore if a project to reinstate rail services on the ESSR is to be of any value in meeting some of the national, regional or local transport issues, it is suggested that the following scheme specific objectives would be relevant:

A. To enhance accessibility to designated employment growth areas. (Although none lie on the ESSR itself, services could be designed to serve one or more of those designated areas);

B. To achieve significant transfer of peak period journey-to-work trips from the car to public transport (and thereby to reduce congestion and other adverse impacts of car use within the city);
C. To improve the connections between the areas served by ESSR and other public transport systems, including the Edinburgh tram, the national rail network and Edinburgh airport;

D. To enable an increase in volume of rail freight passing across Edinburgh in line with the forecasts in the Freight RUS;

E. To support the planned improvement in the reliability and performance of the existing rail network over the next 10 years;

F. To minimise, the direct environmental impacts of travel in the corridor of the railway, including the protection of residential neighbourhoods from the adverse impacts of intensifying travel movements (noise, pollution, severance and impacts on the built environment);

G. To ensure accessibility for all potential users to any new infrastructure or services.
6 OPTION DEVELOPMENT

6.1 Context

6.1.1 The ESSR review is set within the specific context of the possible reinstatement of passenger services on the south Edinburgh freight railway, or alternative ways of meeting travel demand in that corridor. In that context this study does not seek to address all possible travel demands in the area, or tackle all the transport problems present in that area, but only those specific problems where the ESSR itself, or alternative schemes in the corridor of ESSR, would provide a potential solution.

6.1.2 The potential 'ESSR' stations at Abbeyhill and Portobello actually stand on the East Coast mainline and not on the freight route. They were historically served primarily by local services which have since disappeared to Leith, Musselburgh and to Rosewell, as well as the North Berwick trains and the small number of ESSR trains that ran up until the 1960s.

6.1.3 Their location on a section of the existing railway that has been identified in Network Rail's Route Utilisation Strategy as having significant capacity and congestion issues is likely to be problematic. However if there should be a sound business case for either of them, they could be provided independently of any ESSR service, served instead by existing services from Newcraighall or from North Berwick. In this sense, unless their potential value lies in the connection to other ESSR stations, the case for their provision can be considered separately from the ESSR. Such consideration is however outwith the brief for this project and these station sites are considered only in the context of whether they contribute to services along the ESSR route itself.
6.1.4 The ESSR as a freight route has been identified as a key element of the rail freight network in Scotland and, although there is considerable uncertainty around freight market projections, the expectation is that freight use of the route may grow by up to 60% over the next ten years. In the circumstances the route is not currently under any threat and will continue to be an asset and an opportunity in the future. This study is focussed on whether there is any present merit in reinstating passenger services in the context of known developments. For this reason the baseline land uses, forecast travel patterns, the transport network and the evaluation have been undertaken against a single year – 2016 – for which most relevant developments are known and many are committed. The forecasts and options do not seek to consider scenarios for development beyond that year.

6.1.5 The options developed at this stage have taken a broad view of the key opportunities and most evident constraints. Options which appear to face insurmountable obstacles have been discarded, but further work to validate the feasibility and infrastructure implications of the options which remain, together with the costs, will be undertaken in parallel with work to assess the potential demand and revenue during the further stages of project development beyond the scope of this study.

6.2 Constraints
6.2.1 Previous studies have recognised that the rail network in central Edinburgh is heavily used and yet physically constrained by the local surrounding land uses amidst one of Europe’s foremost conservation townscapes.

6.2.2 Theoretical capacity is derived from the headway. This is the spacing, in time, between successive trains on the
same track taking into account the distance between
signals and the safety margins between them, and the
speed of trains. Headways in the Edinburgh area\(^\text{11}\) are
reported to be as follows:

- Between Waverley and Portobello Junction: 3
  minutes.
- Between Waverley and Haymarket: 2 minutes
  (south lines) and 3 minutes (north lines).
- West of Haymarket: 4 minutes.
- ESSR (Millerhill – Craiglockhart): 5 minutes

6.2.3 Network Rail has undertaken a detailed capacity
assessment evaluation as part of the Scotland RUS,
which has identified the practical maximum capacity for
regular scheduled train movements for each section of
route in Scotland. The practical capacity is partially
determined by the headway, but also by the track
configuration, signal spacing and train performance -
including the time taken to decelerate and stop at
stations and to restart and accelerate back to running
speed, since a stationary or slow moving train represents
a blockage of the track concerned to any other train
movement on the same track.

6.2.4 The practical capacity is somewhat less than the
theoretical capacity suggested by the simple interval
between trains following one another along a section of
track with a safe gap between successive services. The
most significant factor in identifying capacity is the extent
of movements between tracks. To illustrate this issue,
consider the implications of a train departing Edinburgh
Waverley westbound from the south side of the station
that requires to leave the city on the line to the Forth
Bridge. There are four tracks through Princes Street

\(^{11}\text{Network Rail Scotland RUS Appendix A}\)
Gardens to the west of the station; from south to north these are the westbound Glasgow line, the eastbound line from Glasgow, the westbound Forth Bridge line and the eastbound line from the Forth Bridge. This notional train will require:

- A platform at Waverley station; matched with
- A path out of Waverley station on the westbound Glasgow line; synchronised with
- A gap in the trains approaching Waverley on the eastbound line from Glasgow; synchronised with
- A gap in the trains heading westbound on the line to the Forth Bridge; matched with
- A spare and vacant platform at Haymarket station, and subsequently across the Forth Bridge and through Inverkeithing junctions etc, to the ultimate terminus of the service.

Only the eastbound tracks from the Forth Bridge are unaffected by this single train movement.

6.2.5 Much effort is made during highly skilled timetable planning processes to ensure that such complex movements are kept to the absolute minimum level in the timetable, and that the necessary gaps exist simultaneously to allow a free path across the network.

6.2.6 But what works on paper can readily be disrupted in practice by small inaccuracies in the day to day operation of the service for a wide range of reasons, whether occasioned by track, signal or train performance, train or station operations, passenger behaviour or the weather. Any small disturbance to the planned schedule affecting any one of the three tracks involved in this notional manoeuvre would result in the train coming to halt waiting for a clear track to proceed. In doing so, it will block whatever line it is on at the time
and all trains behind it. Thereafter the delayed trains will fail to turn-up at the scheduled time to take up their allotted paths through junctions and stations along the route, leading to further interaction with other services. This ripple effect is termed ‘reactionary delays’ and can spread both a considerable distance and lengthy period of time from the original incidence of the disturbance to the planned timetable.

6.2.7 Network Rail routinely records the ‘reactionary delays’ arising from incidents occurring on each route section of the network. This measures the knock on effect of any incident across the network as a whole and impacting on all operators.

6.2.8 The measurement of reactionary delays is the number of cumulative delay minutes per annum which occur as a result of disturbances initially arising on each section of route. These are shown in Table 6.1.

6.2.9 An incident occurring on a single line, or at a junction affecting more than one track, and where the capacity utilisation is high, will have a bigger impact than one occurring on lightly used plain double track sections. From the data it will be noted that the greatest cause of delay arises from any disturbance to the timetabled services between Waverley and Haymarket. The large number of trains involved, the wide dispersal of those trains across the network after leaving Edinburgh, and limited ‘spare’ capacity in the Waverley area combine to magnify any initial disruption. The second greatest level of reactionary delays arise from the Bathgate branch where an intensively used single track route means that any delay in a service travelling in one direction has an immediate and unavoidable impact on trains travelling in the opposite direction.
Table 6.1: Reactionary Delays by location of initial timetable disturbance

<table>
<thead>
<tr>
<th>Route Section</th>
<th>Minutes delay pa</th>
<th>Route Section</th>
<th>Minutes delay pa</th>
</tr>
</thead>
<tbody>
<tr>
<td>Bathgate branch</td>
<td>34,821</td>
<td>Haymarket West – Newbridge Jct</td>
<td>17,653</td>
</tr>
<tr>
<td>Haymarket East Jct – Haymarket West Jct</td>
<td>14,083</td>
<td>Waverley – Haymarket East Jct.</td>
<td>109,430</td>
</tr>
<tr>
<td>Craiglockhart Jct – Slateford Jct</td>
<td>0</td>
<td>Slateford Jct – Midcalder</td>
<td>4,323</td>
</tr>
<tr>
<td>Craiglockhart Jct – Gorgie Jct</td>
<td>0</td>
<td>Gorgie Jct – Haymarket Central Jct</td>
<td>0</td>
</tr>
<tr>
<td>Gorgie Jct – Haymarket West Jct</td>
<td>0</td>
<td>Niddrie West Jct – Craiglockhart Jct</td>
<td>1,583</td>
</tr>
<tr>
<td>Millerhill – Niddrie South</td>
<td>3,581</td>
<td>Niddrie West Jct – Portobello Jct</td>
<td>0</td>
</tr>
<tr>
<td>Niddrie South Jct – Niddrie West Jct</td>
<td>0</td>
<td>Niddrie South Jct – Portobello Jct</td>
<td>8,042</td>
</tr>
<tr>
<td>Powderhall Jct – Portobello Jct</td>
<td>0</td>
<td>Waverley – Powderhall Jct</td>
<td>25,422</td>
</tr>
</tbody>
</table>

Source: Scotland RUS Appendix A

6.2.10 The practical track capacity takes some account of the probability and frequency of such occurrences and allows some small margins of error to compensate for the natural variability of operation. The practical train capacity is generally assumed to be 75% of the theoretical capacity, although consideration of specific junction layouts, sections of single track and the mix of
fast and slow services can lead to a different local assessment. In practice some sections of the busiest routes are operating above the theoretical capacity for short periods, but this practice eliminates the margin for day-to-day operational variability and is a factor leading to unreliable timekeeping.

6.2.11 Network Rail’s Scotland RUS has assessed the practical capacity of all the routes in Scotland (prior to allowing for the work in progress to increase platform capacity at Waverley station). The results for lines around Edinburgh are shown in Table 6.2, along with the current level of peak movement.

6.2.12 The National Transport Strategy’s subsidiary paper, Scotland’s Railways, identifies economic growth in the Edinburgh region as a key issue, and sets out proposals to secure service enhancements to support this development. Subsequently the Scotland RUS has identified a number of short and medium term investments to deliver capacity to accommodate that growth. In the October 2007 Transport Scotland released a report\(^\text{12}\) on further enhancements to services between Edinburgh and Glasgow designed to meet the expectations of increased traffic on the railway and aspirations for improved services which are aimed at enabling the railway to fulfil its maximum potential role in the central belt. Taken together, these proposals are summarised in Table 6.3.

### Table 6.2 Practical Route Capacity and Peak Utilisation (based on 75% of theoretical capacity)

<table>
<thead>
<tr>
<th>Route Section</th>
<th>Practical Capacity</th>
<th>Current Peak demand</th>
<th>Current Peak utilisation (%)</th>
<th>Peak demand period</th>
</tr>
</thead>
<tbody>
<tr>
<td>Bathgate branch</td>
<td>4</td>
<td>5</td>
<td>125%</td>
<td>During freight movements (1 per day)</td>
</tr>
<tr>
<td>Haymarket West – Newbridge Jct</td>
<td>12</td>
<td>10</td>
<td>83%</td>
<td>0800 – 0900</td>
</tr>
<tr>
<td>Haymarket East Jct – Haymarket West Jct</td>
<td>24</td>
<td>21</td>
<td>88%</td>
<td>0800 – 0900</td>
</tr>
<tr>
<td>Haymarket West Jct – Dalmeny Jct</td>
<td>9</td>
<td>8</td>
<td>78%</td>
<td>0800 – 0900</td>
</tr>
<tr>
<td>Waverley – Haymarket East Jct.</td>
<td>24</td>
<td>23</td>
<td>96%</td>
<td>0800 – 0900</td>
</tr>
<tr>
<td>Haymarket East Jct – Slateford Jct</td>
<td>16</td>
<td>6</td>
<td>38%</td>
<td>1600 – 1700</td>
</tr>
<tr>
<td>Slateford Jct - Midcalder</td>
<td>12</td>
<td>8</td>
<td>67%</td>
<td>1800 – 1900</td>
</tr>
<tr>
<td>Gorgie Jct – Haymarket West Jct</td>
<td>3</td>
<td>1</td>
<td>33%</td>
<td>Various times of the day</td>
</tr>
<tr>
<td>Gorgie Jct – Haymarket Central Jct</td>
<td>3</td>
<td>1</td>
<td>33%</td>
<td>Various times of the day</td>
</tr>
<tr>
<td>Craiglockhart Jct – Gorgie Jct</td>
<td>3</td>
<td>1</td>
<td>33%</td>
<td>Various times of the day</td>
</tr>
<tr>
<td>Craiglockhart Jct – Slateford Jct</td>
<td>3</td>
<td>2</td>
<td>67%</td>
<td>Various times of the day</td>
</tr>
<tr>
<td>Niddrie West Jct – Craiglockhart Jct</td>
<td>6</td>
<td>3</td>
<td>50%</td>
<td>Various times of the day</td>
</tr>
<tr>
<td>Niddrie South Jct – Niddrie West Jct</td>
<td>11</td>
<td>2</td>
<td>18%</td>
<td>Various times of the day</td>
</tr>
<tr>
<td>Millerhill – Niddrie South</td>
<td>9</td>
<td>6</td>
<td>67%</td>
<td>During freight movements</td>
</tr>
<tr>
<td>Niddrie West Jct – Portobello Jct</td>
<td>3</td>
<td>1</td>
<td>33%</td>
<td>Various times of the day</td>
</tr>
<tr>
<td>Niddrie South Jct – Portobello Jct</td>
<td>6</td>
<td>5</td>
<td>83%</td>
<td>During freight movements</td>
</tr>
<tr>
<td>Powderhall Jct – Portobello Jct</td>
<td>12</td>
<td>8</td>
<td>67%</td>
<td>1800 – 1900</td>
</tr>
<tr>
<td>Waverley – Powderhall Jct</td>
<td>16</td>
<td>8</td>
<td>50%</td>
<td>1800 – 1900</td>
</tr>
</tbody>
</table>

Source: Scotland RUS Appendix A
Table 6.3 Current and Planned services levels to/from Edinburgh

<table>
<thead>
<tr>
<th>Rail corridor</th>
<th>Current 2007 frequency trains per hour</th>
<th>Planned frequency 2016-20 trains per hour</th>
</tr>
</thead>
<tbody>
<tr>
<td>Services from the North via the Forth Bridge</td>
<td>5 or 6</td>
<td>10 Additional services to Edinburgh from Inverness, Perth, Dundee and Inverkeithing</td>
</tr>
<tr>
<td>Services on the Edinburgh – Glasgow mainline via Falkirk</td>
<td>6</td>
<td>10 Additional services to Glasgow via Gogar and to Falkirk Grahamston</td>
</tr>
<tr>
<td>Airdrie – Bathgate Services</td>
<td>2</td>
<td>4 To Glasgow via Bathgate and Airdrie</td>
</tr>
<tr>
<td>Services from Glasgow Central / Carlisle via Slateford</td>
<td>2 or 3</td>
<td>4 Additional services to Carlisle and England and to Glasgow via Shotts or Carstairs</td>
</tr>
<tr>
<td>Total westbound from Edinburgh</td>
<td>15 to 17</td>
<td>28</td>
</tr>
<tr>
<td>Services from the South and East</td>
<td>5 or 6</td>
<td>8 Additional services to The Borders and to Dunbar</td>
</tr>
</tbody>
</table>

6.2.13 Substantial work is nearing completion to optimise the capacity of Waverley station within its existing boundaries by adding more through platforms, extending the length of terminal bay platforms, simplifying and resignalling approach track layouts and electrifying additional approach tracks and platform tracks. This work will also increase the number of paths between Waverley and Haymarket to 28 per hour in each direction. The work has been made necessary to enable a number of planned new routes and services to be introduced over the period from 2009 to 2012 and to accommodate longer trains on many services.
6.2.14 Network Rail’s Scotland RUS states:

“The current works at Waverley (station) will provide additional capacity to meet medium term needs\textsuperscript{13}. Provision for increased demand into Edinburgh should be considered holistically with planned developments at Haymarket and proposals for light rail.”

Options evaluated for meeting medium term growth comprise:

- Retention of the new bay platform to the north of the station at Haymarket
- Extension of platforms 12, 13 and 18 at Waverley to accommodate 6-car trains.

6.2.15 The practical capacity shown in Table 6.2 between Waverley and Haymarket is 24 trains per hour, and the work in progress at Waverley will increase this to 28. The planned total number of services into Edinburgh from the west shown in Table 6.3 is 28 and the additional capacity is thus fully allocated to service enhancements planned by the Scottish Government.

6.2.16 It should also be borne in mind that this section of the network also has to carry a significant number of movements of empty trains moving to and from the depot at Haymarket, as well as occasional freight trains, and special excursion trains, all over and above the regular scheduled passenger services.

6.2.17 Due to the capacity constraints, the practice of running services from the east (North Berwick) as far as Haymarket and terminating there will not be accommodated and it is envisaged in the network proposals that all services from Waverley will continue

\textsuperscript{13} [including planned new services though excluding any consideration of ESSR]
westwards to destinations beyond Haymarket. This removes the specific opportunity identified in Atkins’ 2004 report of extending North Berwick services (off-peak) around the ESSR.

6.2.18 It is envisaged that in the medium term up to 4 trains per hour from the west may need to terminate at Haymarket in order to limit the number between Haymarket and Waverley to 28 and thus ensure a robust timetable can continue to be operated. These would use the newly constructed terminating bay platform on the north side of Haymarket, and may also require a new bay platform to be constructed on the south side of Haymarket, although such a development has not yet been programmed. The role of Haymarket as a terminal point has been greatly increased in recent years by the extent of office developments around the station, and its role as an interchange for other parts of the city will be greatly increased by the opening of the tram route there.

6.2.19 In considering the potential use of the new bay platform (or platforms) at Haymarket, it is necessary to bear in mind that trains entering or leaving the bays must minimise any conflict with other train movements in order to avoid a deterioration in the reliability of the network as a whole. Accordingly it is envisaged that the north side bay will only be scheduled for use by trains to/from the line to the North West towards the Forth Bridge, and that any bay to the south would be used only by services leaving the mainline at Haymarket west junction to/from the line to Midcalder.

6.2.20 Any movements between the ESSR line at Haymarket Central junction and the south bay would be in conflict with all other services using Haymarket platforms 3 and 4, whilst any movements from the ESSR to the north bay would require to cross all four east and westbound lines.
If the intense level of operation envisaged in the planned network is delivered, it is the considered view that ESSR services will be unable to access Haymarket station, either in existing platforms or any new bay platform. This supports the view expressed by Network Rail in 2004 that the ESSR option recommended by Atkins (their Option 8; this study’s Options A1 and A2) could only be delivered if one of the other aspirations for improved services westward from Edinburgh were not to proceed.

6.2.21 Heavy rail options B1, B2 and B3 propose that ESSR services would use Haymarket West junction to gain access to the Edinburgh – Glasgow mainline. At this point, to the west of Haymarket West junction where services to Carlisle and to Glasgow Central diverge from the mainline, the practical capacity of the route is 12 trains per hour and 10 services are proposed. This leaves two opportunities in each hour to run additional services. Whilst a detailed timetable simulation would be required to confirm that these options can be operated robustly, at the level of an overall capacity assessment the options appear to be consistent with the projected capacity of the line.

6.3 Electrification
6.3.1 Plans to electrify the services between Edinburgh Waverley and Glasgow Queen Street, and to Stirling, were included in the Minster of Transport’s statement to Parliament in October 2007. The Airdrie – Bathgate scheme is also to be electrified. These new electric services will add to the electric network in Edinburgh which already includes the East Coast Main Line and the line from Edinburgh to Carstairs and Carlisle / Glasgow Central. These proposals do not include electrification of the ESSR freight line.
6.3.2 The Office of Rail Regulation has advocated converting more freight services to electric haulage, but these proposals have not at present led to any schemes for freight line electrification.

6.3.3 Whilst the freight trains remain diesel-hauled on the ESSR, there is no incompatibility with the overhead electric supply system required to run trams on the line. Should that situation change, there are likely to be substantial technical issues about sharing the route between 25kv AC mainline power systems and the 750v dc tram system.

6.4 **Baseline Services – Rail**

6.4.1 Network Rail and First ScotRail, in partnership with Transport Scotland, have announced ambitious plans to enhance the frequency of services into Edinburgh on every route in order to meet the projected levels of new demand expected to arise from the development of the booming city region. The current proposals for service levels are summarised in Table 6.4. The levels of service shown are all-day recurring patterns. A small number of additional trains may run in peak periods (though most peak enhancement will comprise longer trains rather than extra services). Frequencies are likely to be lower after 1900 and on Sundays.
### Table 6.4 Frequency of expected rail services between potential ESS stations (period 2016 - 2021)

| Services from the North via the Forth Bridge.  
(Planned total 10 in each hour; currently alternately 5 or 6). | Half-hourly services to Dundee, alternate trains continuing to Aberdeen.  
Half-hourly services to Perth, alternate trains continuing to Inverness.  
Half-hourly services to Cowdenbeath, alternate trains continuing to Kircaldy via Glenrothes.  
Half-hourly services to Kircaldy, alternate trains continuing to Cowdenbeath via Glenrothes.  
Half-hourly services to Inverkeithing (through service from Newcraighall) |
|---|---|
| Services on the Edinburgh – Glasgow mainline.  
(Planned total 14 in each hour; currently 8.) | Six trains every hour to Glasgow Queen Street via Falkirk High.  
Two trains every hour to Dunblane.  
Two trains every hour to Falkirk Grahamston  
Four Trains every hour to Glasgow Queen Street via Bathgate and Airdrie |
| Services from Glasgow Central / Carlisle via Slateford  
(planned total 4 in each hour; currently 2 or 3). | Every hour a service to Carlisle and destinations in England.  
Three services every hour to Glasgow Central via Shotts or Carstairs |
| Services from the South and East  
(planned total 8 or 9 in each hour; currently 5 or 6). | Half-hourly to the Borders (Waverley railway )  
Half-hourly to Newcraighall P&R (through service from Inverkeithing)  
Half-hourly to Drem and alternate trains to North Berwick or Dunbar.  
Two or three trains an hour to Newcastle and destinations in England. |
6.5 Baseline Services – Tram
6.5.1 The level of tram service assumed is a service of 8 trams per hour westward from Haymarket to the proposed Gogar Interchange.

6.6 Baseline Services – Bus
6.6.1 The level of bus service assumed is that which currently operates, with the exception of those changes which are proposed to support the introduction of the Tram. These routes provide a modest level of service along sections of the ESSR corridor itself between Newcraighall and Gorgie, although there is no continuous bus route along the whole corridor. Radial bus routes between the ESSR zones and the city centre are however very frequent, and some of these services operate across the centre out towards the west end of the city, whilst others continue to the Forth Waterfront, Leith and Musselburgh. The level of through bus provision between the potential ESSR zones is shown in Table 6.5. In addition to these through services numerous connecting opportunities are also available by changing services in the city centre.

6.7 Access to Growth Areas
6.7.1 The principal objective has been defined as improving access to designated growth areas in the region. The Edinburgh and Lothians Structure Plan identifies three key employment growth areas around the city; specifically the City Centre, The Waterfront area and the West End.

6.7.2 The West Edinburgh Planning Framework identifies the west end of the city (Gyle, Edinburgh Park and Sighthill), with Gogar, Inliston and the Airport as a business growth location of national significance due to unique national and international linkages.
Table 6.5 Frequency of through bus services between potential ESSR stations
(daytime off-peak buses per hour) (November 2007)

<table>
<thead>
<tr>
<th></th>
<th>Fort Kinnaird</th>
<th>Niddrie</th>
<th>Craigmhillar</th>
<th>Cameron Toll</th>
<th>Newington</th>
<th>Blackford</th>
<th>Morningside</th>
<th>Craiglockhart</th>
<th>Gorgie</th>
<th>Edinburgh Park</th>
<th>Haymarket</th>
<th>Princes Street</th>
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</thead>
<tbody>
<tr>
<td>Newcraighall</td>
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<td>Cameron Toll</td>
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<td>Craiglockhart</td>
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<td>Gorgie</td>
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<td>22</td>
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</table>

6.7.3 The Regional Transport Strategy and the City’s Local Transport Strategy both identify an additional employment growth point at the Edinburgh Royal Infirmary and adjacent ‘medipark’ research centre. This area is not served by rail, but is on major arterial bus routes and potentially (in the long term) could also be served by extensions to the tram network.

6.8 Mode shift from car to public transport
6.8.1 The review of issues in the area potentially served by ESSR (or alternatives) has identified that travel between
the area and the city centre is already very well served by public transport with:

- very frequent bus services on all radial routes;
- very high mode share for public transport and for sustainable modes (walking and cycling);
- comparatively low car use, well below citywide averages.

### 6.8.2 Direct access

Direct access\(^{14}\) by public transport is comparatively poor to the major employment growth areas to the west of the city, although these areas are rail served and potentially could be linked to the ESSR. All strategies for this area require that the planned growth is supported by improved public transport in order to offset the increase in the number of people requiring to travel into the area and minimise the impacts of additional car trips.

### 6.8.3

Although some of the growth areas cannot reasonably be served by direct services from the ESSR corridor due to the absence of rail infrastructure or opportunities, the options, forecasts and evaluation take into account trips that can be made to and from these destinations by interchange to and from ESSR line services.

### 6.9 Integration with other modes

The integration of modes and of routes so as to allow seamless interchange and maximum accessibility is a consistent objective of transport policy at all levels. Given the inherently limited number of destinations that can be served directly from ESSR, the provision of effective connections will also add significantly to the range of destinations available and may have a positive effect on use of the service.

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\(^{14}\) A number of the bus services on the radial routes from the area served by ESSR into the city centre do continue to the west end of the city providing through links by indirect routes as shown in Table 5.5.
6.9.2 Interchange opportunities with the wider rail network potentially exist at the existing railway stations at Waverley, Haymarket, Newcraighall, Brunstane or Edinburgh Park. Interchange with the Edinburgh tram can potentially be achieved at Haymarket or Edinburgh Park. Interchange with bus services is possible at most potential ESSR station sites, although not all will be of equal value to potential travellers since the bus network will give a different range of potential trip possibilities. Some locations also involve differences in level, street crossing requirements and variable pedestrian links which make interchange more or less easy to achieve. Any tram interchange, and also a bus interchange at Haymarket, would provide access to the airport.

6.10 Protection of freight capacity

6.10.1 The ESSR, although perceived to be under-utilised, nevertheless fulfils a crucial element of the rail network of the Edinburgh region by enabling freight trains to avoid the congested city centre stations and associated junctions. The Scottish Government, Regional and Local Transport Authorities and the rail industry are unanimous in their desire to ensure that the railway is able to attract more traffic to rail from road. The Freight RUS has identified that, over the next ten years, a 60% increase in the number of trains using the ESSR (primarily trains in transit between the East Coast Main Line (ECML) and Glasgow via Shotts) may occur. This growth can be accommodated on those lines without investment. It is an agreed objective of this study to protect that capacity so as not to prejudice the ability of the network to cater for that growth. In consequence no option for the ESSR has been considered that would require the closure of the existing railway to freight.
6.11 Improvements to network performance

6.11.1 The previous work by Atkins, and the analysis contained in the various RUS reports, has identified that the Edinburgh area contains a significant number of critical locations where the reliability and robustness of the timetable can be compromised. Due to the track layout and conflicting movements, and the limited spare capacity over and above that required for scheduled services levels, any untoward delays which result in trains arriving off their timetabled path lead to knock on delays for other services at these pinch points in the network. These locations extend from Portobello junction where the ESSR and Crossrail join the ECML, through the track layout at the east end of Waverley station, the availability of through platforms for cross-city services, the very busy track layout at the west end of Waverley, the limited capacity at Haymarket station, Haymarket East junctions for the line to Carstairs and Shotts via Slateford, the Haymarket central junction with the ESSR from the east, and Haymarket west junction from ESSR to the west and out to the junction at Newbridge where the Bathgate services leave the Glasgow mainline.

6.11.2 Within the period to 2016 significant changes to this network and services operating on the network are planned. Some of these could have adverse implications for the robustness and reliability of the network, and plans therefore include measures to mitigate those effects as well as to improve the current robustness of the network in the Edinburgh area.

6.12 Environmental Impacts and Accessibility

6.12.1 These objectives do not assist in defining options, but will be of relevance in both design and in evaluation.
7 The Options

7.1 Option A

7.1.1 The recommended proposal out of the previous study of the ESSR by Atkins in 2004 was to provide:

- an hourly shuttle service throughout the day from Niddrie on the ESSR via Morningside and Gorgie to Haymarket and Waverley serving the city centre;
- an hourly service in off-peak periods from Niddrie to Waverley continuing through to North Berwick on existing timings.

Taken together, these services would provide an hourly peak service between Niddrie and Waverley via Gorgie increasing to every 30 minutes in off-peak periods. (Since ESSR is not electrified, this option requires that off-peak services to North Berwick would be diesel operated although, as peak period North Berwick services would not continue through to Niddrie, they could continue to be electric units.) The preferred option had four new stations located at Niddrie, Cameron Toll, Morningside and Gorgie.

7.1.2 The 2004 study concluded that

"there is a case, albeit a weak one, for the reintroduction of passenger services on the ESSR"

and this option had the highest overall net benefits of the eight heavy rail options considered.

7.1.3 In 2004 the capacity to run ESSR services between Waverley and Haymarket may have existed, specifically by taking the opportunity to extend North Berwick
services which terminated at Haymarket. At that time Network Rail envisaged that the proposal would conflict with other aspirations to enhance services westward from Haymarket. As those enhancements have been developed it has become clear, as shown in section 6.2 of this report, that the capacity will not exist to deliver that recommended ESSR option alongside the other schemes contained in the Scottish Government’s plans for the regional network.

7.1.4 The Objectives set in Chapter 5 did not suggest that service to the city centre should be a priority, but instead placed greater emphasis on new or improved linkages to the employment growth areas around the city. This option does not therefore contribute strongly to the objectives.

7.1.5 Nevertheless this proposal will be included as Option A1 in this study in order to provide a comparison between the benefits of this previously preferred option and alternative options, destinations and modes.

7.1.6 A variant option, Option A2, proposes 8 intermediate stations on the ESSR to test the benefits of closer spaced stops and easier access, although with more stops a slower service will be result. For the purpose of the evaluation the additional stations also correspond with the stations identified by Atkins. It should not be assumed that these are the optimal locations without further detailed study in a subsequent stage of the appraisal of the project.

7.2 Option B
7.2.1 To access the major growth area of west Edinburgh, an option to provide a ‘heavy rail’ service from the ESSR to the west of the city has been considered. Trains from the ESSR operating westward to Gorgie can access the
Edinburgh to Glasgow main line at Haymarket west junction and continue to Edinburgh Park. A similar concept was considered by Atkins in their previous study but eliminated at an early stage. Circumstances have since changed in relation to the operating patterns on the network, and this study has also focussed on the identified need to improve access to Edinburgh Park and other western growth areas which has provided a new strategic context. This option will therefore be included for re-evaluation.

7.2.2 The alternative option of extending the service from ESSR to South Gyle and the proposed new Gogar Interchange has been discounted on practical operational grounds. Such a movement would require ESSR trains to cross the busy Edinburgh to Glasgow route (also carrying the Edinburgh to Stirling and Edinburgh to Glasgow via Bathgate and Airdrie services) and to match available paths on the line out to the Gyle - which will also be busier as a result of additional Fife services and some Glasgow trains being routed via Gogar. Such a move, if it is possible at all, would have a very high risk of disruption to the timetable covering a wide area of the network in the event of any delay to any service involved, and would therefore fail the objective of ensuring that reliability is sustained.

7.2.3 For operational reasons, Edinburgh Park will not provide a satisfactory western terminus for the proposed ESSR service as there are no turn-back facilities and very little slack in the timetable to permit reversal manoeuvres on the mainline. An alternative possible turn-back option has been identified at Newbridge junction where the existing track layout makes suitable provision.

7.2.4 The Edinburgh and Lothians Structure Plan, and the longer term Edinburgh 2020 Vision document, both
envisage that the growth of Edinburgh will increasingly spread into the wider catchment area, and specifically that growth will be encouraged along the main rail arteries into the city. The main Edinburgh – Glasgow route has been identified in the RUS as a route facing capacity constraints, with very high track utilisation beyond Winchburgh junction where services routed via Gogar will rejoin services to Glasgow/Stirling via the existing route. It is therefore considered impractical to extend ESSR services beyond that point towards Linlithgow. On the other hand, the route via Bathgate will be reengineered as a modern double track artery with a major increase in available capacity. The option to further extend ESSR services via Livingston North to Bathgate therefore exists.

7.2.5 Work by Atkins\(^\text{15}\) reviewed the potential synergy to be obtained if the ESSR scheme were to be extended to either Brunstane or Newcraighall in order to create an interchange with the Borders Railway Project. The context of their evaluation was that:

- The Borders Railway was expected to operate as a through service from the Borders via Newcraighall, Waverley, Haymarket and Edinburgh Park to either Bathgate or Stirling/Dunblane;

- The preferred ESSR option would operate via a less direct and slower route into Haymarket and Waverley.

7.2.6 Their analysis suggested that, in this combination of circumstances, the benefits of creating the interconnection would be low (potentially an estimated 3.8% increase in trips) and were unlikely to justify the additional costs.

\(^{15}\) Major Projects Review; Atkins for CEC, 2004
7.2.7 In this study a different scenario emerges. It is now assumed that Borders services will probably terminate at Edinburgh Waverley, but in conjunction with an option to operate ESSR services to Edinburgh Park, an interchange between the two routes at Newcraighall would make cross-platform connections possible from the Borders and Midlothian to Edinburgh Park. This might be more attractive than the option of changing trains at Waverley, with potentially a long walk from east end to the west end platforms.

7.2.8 Atkins previous work identified the infrastructure required to enable 2 trains per hour to be operated on the ESSR alongside freight services. With two or three trains in each hour out of Edinburgh Waverley to Haymarket taking the route to Glasgow or Carlisle via Slateford at Haymarket east junction, this theoretically ensures two vacant paths an hour going westward from Haymarket west junction. This level of service should therefore be compatible both with the objectives of sustaining freight capacity on the ESSR and of ensuring that there is no detriment to the reliability of the rest of the network.

7.2.9 **Option B1** therefore comprises a heavy rail service between Newcraighall and Edinburgh Park via the ESSR operating at two trains per hour. To ensure comparability with Option A, this option will also include four new stations located at Niddrie, Cameron Toll, Morningside and Gorgie.

7.2.10 **Option B2** is as Option B1 but the proposed service is extended westward to Bathgate.

7.2.11 **Option B3** is as Option B1 but with 8 intermediate stations on the ESSR corresponding with those used for Option A2.

7.3 **Option C**
7.3.1 The use of the ESSR line as a possible route for a tram operation was considered in the Edinburgh LRT Masterplan as part of preliminary work to identify a preferred tram network for Edinburgh\textsuperscript{16}. The route was evaluated as one of 7 options considered. Although from the outset it was recognised that the corridor contained fewer potential trips than the other routes being evaluated, the fact that the heavy rail infrastructure already existed was seen as a possible opportunity to create a route at relatively modest cost and with less environmental impact than new construction.

7.3.2 The study concluded in regard to ESSR that:

- it had relatively limited traffic potential compared with other routes, and in particular that, since radial trips to the city centre predominate, tramline 3 from Newcraighall and Cameron Toll direct to Princes Street had much higher travel benefits;

- that it would be impossible to run trams on the heavy rail route between Portobello and Haymarket due to the dense heavy rail traffic levels over that section and street running would therefore be necessary over the city centre portion of the route;

- that the uncertainties surrounding the operation of trams and heavy rail services on the same track would inevitably lead to delays in implementation of such a scheme.

7.3.3 The use of the ESSR by trams was therefore excluded from the final shortlist of preferred tram development routes, although the proposed tramline 3 parallels ESSR for approximately 2km between Newcraighall and Cameron Toll. Tramline 3 is not currently being

\textsuperscript{16} Edinburgh LRT Masterplan; Arup Transport Planning for CEC; 2003
developed though it remains an aspiration of the City Council in the medium term.

7.3.4 Taking a tram around the ESSR to Haymarket and then linking it there into the tram route into the city centre would not achieve the strategic objectives set for this study. For this reason, as well as the reasons deduced by the previous study, a tram variant on the rail option A2 taking the trams into the city centre was not pursued.

7.3.5 However this present review of ESSR has identified the potential links between ESSR corridor and western development locations as the key objective. The tram line to Edinburgh Park, Gyle and Edinburgh Airport has been approved and construction is underway, and this western section passes close to the western end of ESSR in the vicinity of Gorgie, creating a possible opportunity to link the heavy rail ESSR infrastructure to the light rail infrastructure going westward. As a result it is possible to envisage tram-train operation on the lightly used ESSR, merged with operation on the new tram infrastructure to Edinburgh Park, avoiding bringing trams onto the busy heavy-rail passenger network.

7.3.6 Four options for making the link between ESSR and the tram route have been considered, in each case by making a spur from the ESSR between Gorgie and Haymarket West junctions. Following site assessment, two alternative routes by which trams operating on the ESSR could gain access to the westbound tramline at Saughton were deemed feasible, and could be considered to enable the concept of tram-train and a westward link to be pursued.

7.3.7 The concept of mixing trams and trains on the same infrastructure has had only a little application as yet – principally in the Karlsruhe area in Germany, but also in...
the shared use of track between the Tyne & Wear Metro and Network Rail between Heworth and Sunderland. The Tyne & Wear Metro is totally segregated from road traffic and has many characteristics more closely related to heavy rail than light rail. The shared running of street trams and trains has yet to occur in the UK. Documentation has however been prepared by both the Rail Safety and Standards Board (RSSB) and Her Majesty’s Rail Inspectorate (HMRI) to cover this eventuality. Therefore whilst this is still an area of innovation there is a general acceptance of the concept, subject to further work to resolve the practical problems.

7.3.8 In the absence of detailed work on the operational and technical issues involved in mixing trams and freight trains on the ESSR, the example of the Tyne & Wear Metro to Sunderland has been taken as a guideline concerning the feasible service frequency levels. There are 4 trams worked alongside one freight path and one heavy rail passenger train in each hour in each direction.

7.3.9 An advantage of tram technology is usually that stations can be expected to be smaller and cheaper to construct. However in the case of shared tram and heavy rail operations there is a need to ensure grade-separated pedestrian movements, which does not apply for tram systems. The formation of the ESSR which is largely in deep cutting and partially on embankment will add considerably to normal station construction costs, and especially fully accessible pedestrian access costs. It is considered likely that the cost of resolving these issues will limit the number of stops that can be justified. For the purpose of testing this option 10 new tram stations will be assumed at Newcraighall (with interchange to the adjacent Crossrail station there), Fort Kinnaird, Niddrie, Cameron Toll, Newington, Blackford, Morningside, Craiglockhart, Gorgie on the ESSR (corresponding to
rail options A2 and B3), and at Stenhouse on the tram link between ESSR and tram line 1.

7.3.10 **Option C1** is therefore to operate 4 trams per hour along the ESSR between an eastern terminal point adjacent to Newcraighall station and Gorgie, and thence via the tram line currently under construction to Edinburgh Park and Gogar via a new tram link line between the two systems constructed to the south of the Edinburgh – Glasgow mainline.

7.3.11 **Option C2** sensitivity test to examine the potential effect of increasing the level of service on this route to 8 trams per hour, to correspond with the proposed frequency of service on the tram line. No assessment has been attempted of the ability to operate trams this frequently between freight services on the ESSR. It should be noted that the only existing UK example of tram-train operation between Heworth and Sunderland works at a maximum potential service level of 6 trams per hour, one local train service and one freight path, due to the double space safety margin required between a light tram vehicle and a following heavy rail train.

7.4 **Bus Rapid Transit**

7.4.1 For comparison with new rail-based public transport options, public transport schemes which are road based have been considered. Edinburgh has a highly developed quality bus network, with a significant level of bus priority measures in place, a bus fleet which is on average both younger and more accessible than most other cities in the UK, and the highest bus ridership amongst the population outside London. Bus routes parallel parts of the ESSR, but there is no through service which matches this study objective to directly
connect the ESSR corridor to the western employment growth area. For the most part public journeys between these two areas require a journey via the City Centre and a change of bus there.

7.4.2 Increasingly the provision of a dedicated right of way for high quality bus services is being developed as an alternative to tram, under the general title of Bus Rapid Transit (BRT). A small number of schemes have been built in the UK including the Edinburgh Fastway provided for Lothian Buses service 22 between Saughton and Edinburgh Park, with several more schemes in development. There are two main advantages over tram:

- Lower infrastructure costs (especially by avoiding the electrical supply infrastructure);

- The ability to combine dedicated reserved route sections where required to avoid delay in congested areas, with conventional on-street running within housing or employment areas where congestion does not impede progress.

7.4.3 Against these benefits is a higher operating cost than tram where traffic volumes are high due largely to needing a larger number of smaller vehicles. It is also often thought likely that BRT has generally lower traffic mode switch potential from private cars due to a poorer image associated with the bus in comparison with modern purpose-designed tram systems, although the very high level of use of one or two BRT schemes appears to challenge this view.

7.4.4 In conjunction with the review of other bus options the possibility of identifying a dedicated BRT route between Newcraighall and Edinburgh Park was considered. The area comprises a mixture of high density urban
development – mostly residential in use – and lower density suburban areas with very mixed uses, including housing, retail, university campus sites and employment areas. The areas of greatest on-street congestion where a dedicated reserved track busway would deliver significant benefits are largely in the most densely developed areas and especially at the points where an orbital bus broadly following the ESSR corridor would require to cross the city’s main radial corridors. At most of these intersections only one option was identified for providing a dedicated busway, which was to use the ESSR and convert it from railway to busway.

7.4.5 As this would be entirely contrary to the objective of ensuring the continued availability of the route to cater for the projected growth in rail freight, this option was not pursued.

7.5 Option D

7.5.1 The alternative to a continuous reserved BRT alignment is a more selective approach to providing bus priorities along congested route sections comprising a mixture of bus lanes, parking controls and restriction on conflicting moves by road traffic, and traffic signal prioritisation. These measures have been applied with significant effects within Edinburgh under the ‘greenways’ programme, which is on-going. Part of the ESSR corridor between Newcraighall and Cameron Toll is within the SE Edinburgh Bus Priority study area which is currently being reviewed to identify the scope for such enhancements.\(^{17}\)

7.5.2 The case for making significant investment in bus priorities depends upon the number of buses and volume of passengers who can potentially benefit from the

improvement to operations that can be made. This has to be considered against the disbenefits to other road users, including other bus services that may be delayed by giving priority to one route over another where routes intersect. City of Edinburgh Council and Lothian Buses have each reviewed the greater part of the corridor served by ESSR between Fort Cameron Toll and Craiglockhart and a small number of priority measures have been put in place. However the extent of such measures is limited by the low value to be obtained from the current low frequency of orbital buses (principally service 38) which benefits from them.

7.5.3 **Option D** comprises an enhanced frequency of orbital bus service at 6 buses per hour to match the majority of radial services in the city, coupled with a higher level of bus priority measures commensurate with this increased level of service. The proposed route, designed to meet the same objectives and travel demands as heavy rail and tram options, extends from an interchange and Park & Ride site at Newcraighall via Fort Kinnaird, Cameron Toll, Morningside, Craiglockhart, Lanark Road and Calder Road to The Gyle. A range of bus priority measures are already in place along the route, but further selective improvements are proposed where there are issues about the free flow of buses. Virtually all roads selected for this orbital route are already used by other services in part, which means that the benefits of further bus priority measures will be shared with those services in many instances.

7.6 **Option E**

7.6.1 The frequency of service proposed in Option D is higher than anything that has been offered in Edinburgh for an orbital route. The existing orbital service 38, which shares some of the corridor, requires revenue funding support from the City Council to sustain current
operations, only recently enhanced to 4 buses per hour in order to meet social needs. As discussed above, at lower level of operation it is difficult to justify investment in priority measures, partly because there are disadvantages to other road users, including other bus services on radial routes.

7.6.2 In order to test the value of the proposed priority measures in Option D, Option E proposes a lower frequency at 4 buses per hour and without any investment in bus priority measures over and above those that already exist.

7.6.3 The Options considered are summarised in Table 6.1. Maps of the Options are shown at Appendix A.

7.7 **Fares**

7.7.1 The fares assumed in the heavy rail options A and B are distance-related fares, derived from the fares currently applied on local services in the Lothians. The tram and bus options C, D and E assume a common flat fare of £1.00 (2007 prices).
<table>
<thead>
<tr>
<th>Option</th>
<th>Mode</th>
<th>Frequency</th>
<th>Stations: New and (existing)</th>
</tr>
</thead>
<tbody>
<tr>
<td>A1 rail</td>
<td>Heavy Rail</td>
<td>1 train per hour peak Niddrie to Waverley only 2 trains per hour off-peak; alternate trains terminating in Waverley or extending to North Berwick in existing path.</td>
<td>Niddrie, Cameron Toll, Morningside, Gorgie, (Haymarket), (Waverley) (plus, off-peak, all stations to North Berwick).</td>
</tr>
<tr>
<td>A2 rail</td>
<td>Heavy Rail</td>
<td>As A1</td>
<td>Fort Kinnaird, Niddrie, Craigmillar, Cameron Toll, Newington, Blackford, Morningside, Craiglockhart, Gorgie, (Haymarket), (Waverley) (plus, off-peak, all stations to North Berwick).</td>
</tr>
<tr>
<td>B1 rail</td>
<td>Heavy Rail</td>
<td>2 trains per hour</td>
<td>(Newcraighall), Niddrie, Cameron Toll, Morningside, Gorgie, (Edinburgh Park)</td>
</tr>
<tr>
<td>B2 rail</td>
<td>Heavy Rail</td>
<td>2 trains per hour</td>
<td>(Newcraighall), Niddrie, Cameron Toll, Morningside, Gorgie, (Edinburgh Park), (Uphall), (Livingston North), (Bathgate).</td>
</tr>
<tr>
<td>B3 rail</td>
<td>Heavy Rail</td>
<td>2 trains per hour</td>
<td>(Newcraighall), Fort Kinnaird, Niddrie, Craigmillar, Cameron Toll, Newington, Blackford, Morningside, Craiglockhart, Gorgie, (Edinburgh Park).</td>
</tr>
<tr>
<td>C1 tram</td>
<td>Tram/train</td>
<td>4 trams per hour</td>
<td>Newcraighall, Fort Kinnaird, Niddrie, Craigmillar, Cameron Toll, Newington, Blackford, Morningside, Craiglockhart, Gorgie, Stenhouse (then as tram line one to Gogar).</td>
</tr>
<tr>
<td>C2 tram</td>
<td>Tram/train</td>
<td>8 trams per hour (sensitivity test)</td>
<td>As C1</td>
</tr>
<tr>
<td>D bus</td>
<td>Bus with priorities</td>
<td>6 buses per hour</td>
<td>Newcraighall, Fort Kinnaird, Niddrie, Cameron Toll, Morningside, Craiglockhart, Lanark Road and Calder Road to The Gyle with existing bus stops at approximately 400m spacing.</td>
</tr>
<tr>
<td>E bus</td>
<td>Bus without priorities</td>
<td>4 buses per hour</td>
<td>As D</td>
</tr>
</tbody>
</table>
7.8  **Capital Contribution from E-Rail.**

7.8.1 E-rail Ltd has proposed a funding mechanism, based upon proposals by a number of potential land developers to provide additional development in proximity to potential stations on the ESSR. E-Rail proposes to deliver private sector money towards the cost of building the ESSR rail project by harnessing the planning land uplift which will occur when the new transport service is introduced. The land uplift is derived from the improved accessibility that the railway might bring and the anticipated increase in development land values that are expected to ensue.

7.8.2 E-Rail Ltd is not a developer but an intermediary business, and the actual proposals on which their estimates are based are those of a number of property development companies who have been willing to make a conditional commitment of funding towards ESSR. These companies have made legally binding agreements to make financial contributions through E-Rail, each agreement relating to an individual station site. The agreements become valid if a contract is awarded to start work on making a fixed track passenger transport service along the alignment of ESSR with a station within 1 km of that site on or before January 2012, and they are payable upon the granting of outline planning consent at any time before or within twenty years after that event. The contributions would not be available towards bus based public transport improvements.

7.8.3 Development opportunities and developer contributions have been advanced in relation to twenty six sites at seven potential station locations along the line of the ESSR as shown in Table 7.1. Each site is a stand-alone
opportunity and each can proceed in isolation from the others.

**Table 7.1: E-rail development proposals**

<table>
<thead>
<tr>
<th>Station location</th>
<th>Development proposal</th>
<th>Scale of development</th>
<th>Capital Contribution (minimum estimate)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Fort Kinnaird</td>
<td>Housing</td>
<td>280 housing units</td>
<td>£1,200,000</td>
</tr>
<tr>
<td>Craigmillar</td>
<td>Housing</td>
<td>365 housing units</td>
<td>£387,500</td>
</tr>
<tr>
<td>Cameron Toll</td>
<td>Retail / leisure</td>
<td>100,000 sq.ft.</td>
<td>£500,000</td>
</tr>
<tr>
<td></td>
<td>Housing</td>
<td>242 housing units</td>
<td>£1,125,000</td>
</tr>
<tr>
<td>Blackford</td>
<td>Housing</td>
<td>48 housing units</td>
<td>£227,500</td>
</tr>
<tr>
<td>Morningside</td>
<td>Housing</td>
<td>355 housing units</td>
<td>£860,000</td>
</tr>
<tr>
<td>Craiglockhart</td>
<td>Housing</td>
<td>225 housing units</td>
<td>£650,000</td>
</tr>
<tr>
<td>Gorgie</td>
<td>Mixed use</td>
<td>1,330 housing units</td>
<td>£1,200,000</td>
</tr>
</tbody>
</table>

Data supplied by E-Rail Ltd.

7.8.4 The potential contribution at all seven locations identified by E-Rail shown in Table 7.1 amounts to £6,130,000 on what they consider to be a conservative estimate. They suggest that potentially the contribution could be larger and their central estimate is £7,875,000.

7.8.5 The contributions are all contingent upon getting outline planning consent for the schemes they are proposing. The sites have not been identified in the Local Plan as redevelopment opportunities, so applications for planning consent will be judged on their merits when they are put forward against the planning guidelines that apply in each relevant area. E-Rail suggests that they would not have made a financial commitment if they were not confident that their proposals would be acceptable. On the other hand, since they will not be called upon to make the agreed contributions if planning consent is refused, they have
little 'down-side' risk in making the funding offer which is totally contingent upon that consent being obtained. Consequently it is not possible to confirm that the potential development and the associated contributions conform to city planning policy or can be realised.

7.9 **Option Costs**

7.9.1 Option capital and operating costs have been assessed using disaggregated unit costs for contemporary construction and operations from the rail and bus industries.

7.9.2 For consistency, the costs of vehicles in rail, tram and bus options have been annualised and treated as revenue expenses, which is normal practice in the rail and bus industries although tram projects, which generally procure scheme-specific vehicles, more commonly treat the vehicles as a capital expense.

7.9.3 In relation to Options A1 and A2, there is a difference worthy of note between Atkins’ assessment and the results of this study. Atkins assumed that A1 with four stations could be operated with two train units, whereas A2 with 8 stations (and consequently taking more time with more stops) would require three. This would make option A2 notably more expensive to operate than A1. However our assessment, based upon an assumed timetable constraint that trains could not pass one another anywhere between Craiglockhart and Haymarket due to the single track section through Haymarket central junction, is that three units would be needed for option A1, but no additional unit would be required for A2. This makes our estimate of A1 more expensive, but does not add to the cost of option A2.
This issue could only be resolved through a more detailed timetabling exercise and evaluation than is possible at this strategic level of analysis and would form part of a stage 2 appraisal if a scheme were to go forward to more detailed design.

7.9.4 Approved assessment methodology requires that the capital costs are subject to an ‘optimism bias’ adjustment to counteract the tendency for costs to rise, for unforeseen additional costs to be incurred and for estimates to be unduly optimistic. At this level of cost analysis an uplift of 66% is recommended.

7.10 Cost Summary
7.10.1 Capital cost rounded to the nearest £100,000, and operating costs rounded to the nearest £10,000 pa. are summarised together in Table 7.2. Costs are at a current (i.e. 2007) price base.
### Table 7.2  Total Capital and Operating Costs
(2007 prices)

<table>
<thead>
<tr>
<th>Option</th>
<th>Service Description</th>
<th>TOTAL CAPITAL COSTS</th>
<th>Potential capital input from E-rail</th>
<th>Operation cost per annum</th>
</tr>
</thead>
<tbody>
<tr>
<td>A1 rail</td>
<td>1 tph peak Niddrie-Waverley, 2 tph off peak Niddrie-Waverley/North Berwick (4 intermediate stations)</td>
<td>£19.2m</td>
<td>£4.9m</td>
<td>£3.04m</td>
</tr>
<tr>
<td>A2 rail</td>
<td>1 tph peak Fort Kinnaird-Waverley, 2 tph off peak Niddrie-Waverley/North Berwick (8 intermediate stations)</td>
<td>£38.6m</td>
<td>£6.1m</td>
<td>£3.17m</td>
</tr>
<tr>
<td>B1 rail</td>
<td>2 tph Newcraighall - Edinburgh Park (4 intermediate stations)</td>
<td>£19.6m</td>
<td>£4.9m</td>
<td>£3.47m</td>
</tr>
<tr>
<td>B2 rail</td>
<td>2 tph Newcraighall – Bathgate</td>
<td>£19.6m</td>
<td>£4.9m</td>
<td>£8.50m</td>
</tr>
<tr>
<td>B3 rail</td>
<td>2 tph Newcraighall - Edinburgh Park (9 intermediate stations)</td>
<td>£37.9m</td>
<td>£6.1m</td>
<td>£3.60m</td>
</tr>
<tr>
<td>C1 tram</td>
<td>4 trams/hr Newcraighall – Gogar</td>
<td>£49.1m</td>
<td>£6.1m</td>
<td>£6.26m</td>
</tr>
<tr>
<td>C2 tram</td>
<td>8 trams/hr Newcraighall – Gogar</td>
<td>£49.1m</td>
<td>£6.1m</td>
<td>£12.23m</td>
</tr>
<tr>
<td>D bus</td>
<td>6 buses /hr with bus priority measures. Newcraighall – Edinburgh Park – the Gyle</td>
<td>£2.5m</td>
<td>£0m</td>
<td>£2.37m</td>
</tr>
<tr>
<td>E bus</td>
<td>4 buses /hr with no additional priority measures Newcraighall – Edinburgh Park – the Gyle</td>
<td>£0m</td>
<td>£0m</td>
<td>£1.70m</td>
</tr>
</tbody>
</table>
8 EVALUATION

8.1 Introduction

8.1.1 This chapter provides an overview of the results of modelling the projected demand and revenue of the options.

8.1.2 The modelling methodology adopted was to take travel patterns and travel cost from 2001 Census journey-to-work tables, and from the Transport Model for Scotland (TMfS), together with additional data from other sources, to generate a set of demand and cost matrices. TMfS trip matrices incorporate planned developments in the ESSR corridor, although these were reviewed and refreshed along the line of route to ensure that they were fully up-to-date.

8.1.3 The next step was to develop a logit model to determine the mode choice of travellers in the demand matrices, based on the costs associated with the travel choices available to them. The costs and demand were adjusted to reflect the planning data, the base-line and transport interventions contained in the Options. The mode choice parameters were benchmarked against a set of comparable railway stations and calibrated to ensure the compatibility of the results.

8.1.4 The model is based upon a single year. 2016 was chosen on the basis that the development parameters are known, the baseline rail, tram and bus networks are reasonably predictable, and it is probably the earliest year in which any of the rail options could be implemented, allowing for planning lead times including funding. The morning peak hour and typical off-peak hour were modelled. The most likely source of
patronage will be travel to work trips in the peak periods when congestion on the highway network is at its worst. This is also the critical period for the assessment of many of the scheme benefits, which potentially arise from congestion relief. The most robust data set for travel patterns in this area is the 2001 census travel to work information. This is available from the census data at “output area” level (around 20 households) and was matched to station catchments.

8.1.5 The E-Rail development proposals that underpin their scheme to secure developer contributions to the capital costs of ESSR would also result in additional development, over and above that contained in the TMfS. These developments cannot be considered to be committed as planning consent has not as yet been sought or granted for them. However in order to test the potential impact of this development (which would be a necessary precondition to securing the capital contributions), each of the rail and tram options has been tested in the model both with and without the additional level of development proposed by E-Rail.

8.1.6 The outputs from the model are reviewed against each of the Objectives determined for the ESSR corridor.

8.2 Demand and Revenue
8.2.1 The estimated total demand and revenue for each option is set out in Table 8.1.
Table 8.1 Demand and Revenue Estimates

<table>
<thead>
<tr>
<th>Option</th>
<th>Demand pa</th>
<th>Gross Revenue</th>
<th>Abstraction from Bus</th>
<th>Net Revenue</th>
</tr>
</thead>
<tbody>
<tr>
<td>A1 rail</td>
<td>496,000</td>
<td>£1,067,000</td>
<td>£548,000</td>
<td>£519,000</td>
</tr>
<tr>
<td>A2 rail</td>
<td>822,000</td>
<td>£1,729,000</td>
<td>£966,000</td>
<td>£763,000</td>
</tr>
<tr>
<td>B1 rail</td>
<td>385,000</td>
<td>£912,000</td>
<td>£392,000</td>
<td>£520,000</td>
</tr>
<tr>
<td>B2 rail</td>
<td>396,000</td>
<td>£950,000</td>
<td>£392,000</td>
<td>£558,000</td>
</tr>
<tr>
<td>B3 rail</td>
<td>888,000</td>
<td>£1,792,000</td>
<td>£863,000</td>
<td>£929,000</td>
</tr>
<tr>
<td>C1 tram</td>
<td>1,432,000</td>
<td>£2,011,000</td>
<td>£1,418,000</td>
<td>£593,000</td>
</tr>
<tr>
<td>C2 tram</td>
<td>1,549,000</td>
<td>£2,179,000</td>
<td>£1,491,000</td>
<td>£688,000</td>
</tr>
<tr>
<td>D bus</td>
<td>160,000</td>
<td>£161,000</td>
<td>0</td>
<td>£161,000</td>
</tr>
<tr>
<td>E bus</td>
<td>68,000</td>
<td>£69,000</td>
<td>0</td>
<td>£68,000</td>
</tr>
</tbody>
</table>

8.2.2 In our considered opinion, and in line with views expressed by both Network Rail and First ScotRail, the rail network capacity will not be available to operate Options A1 and A2 between Haymarket Central junction and Waverley station unless ESSR services take precedence over other planned enhancements to the regional rail network. However modelling these options enables comparisons to be made with the previous study in 2004, and also to compare the effects with the other options developed for this present study.

8.2.3 Similarly Option C2, representing the operation of trams at 8 trams per hour, is not compatible with sustaining freight capacity on the ESSR, and this option has been
modelled to test the sensitivity of the tram option to the frequency of service.

8.2.4 In terms of patronage and gross revenue the tram options C1/C2 have the potential to carry the largest numbers and to earn the most revenue. However this is projected to be achieved through substantial abstraction from existing bus services. The greatest net increase in public transport demand arises from the heavy rail options with 8 intermediate stations, A2 and B3.

8.2.5 Comparison between options with 4 stations and options with 8 stations (A1 v. A2, or B1 v. B3) demonstrates the projected increase in patronage that additional stations attract. The projected overall increase in demand is considerable. The provision of additional stations does not appear to abstract from the demand at the 4 stations, but rather it adds to the demand by attracting additional local travel between them that the route cannot otherwise cater for. More generally, the model predicts that the availability of frequent alternative bus services, albeit often by indirect or connecting routes, means that potential patrons of the ESSR options are restricted to those who have easy direct access to a station/tram stop. More stations therefore increase the catchment of potential users of the service, and increase the abstraction from bus routes. This finding also has implications for car parking demand and interchange.

8.2.6 Trips boarding the service at each station have been predicted for each option, and the results are shown in Table 8.2.
Table 8.2 Station / stop zone boardings
('000 boardings pa)

<table>
<thead>
<tr>
<th>Option</th>
<th>A1</th>
<th>A2</th>
<th>B1</th>
<th>B2*</th>
<th>B3</th>
<th>C1</th>
<th>C2</th>
<th>D*</th>
<th>E*</th>
</tr>
</thead>
<tbody>
<tr>
<td>Newcraighall*</td>
<td>--</td>
<td>--</td>
<td>21.6</td>
<td>22.2</td>
<td>30.2</td>
<td>36.4</td>
<td>39.0</td>
<td>9.2</td>
<td>4.3</td>
</tr>
<tr>
<td>Fort Kinnaird</td>
<td>--</td>
<td>47.2</td>
<td>--</td>
<td>--</td>
<td>49.2</td>
<td>59.4</td>
<td>64.2</td>
<td>12.9</td>
<td>6.0</td>
</tr>
<tr>
<td>Niddrie</td>
<td>26.7</td>
<td>31.5</td>
<td>28.5</td>
<td>28.8</td>
<td>55.0</td>
<td>66.2</td>
<td>73.9</td>
<td>9.4</td>
<td>4.4</td>
</tr>
<tr>
<td>Craigmillar</td>
<td>--</td>
<td>14.4</td>
<td>--</td>
<td>--</td>
<td>23.8</td>
<td>26.5</td>
<td>30.3</td>
<td>5.3</td>
<td>2.9</td>
</tr>
<tr>
<td>Cameron Toll</td>
<td>51.8</td>
<td>62.4</td>
<td>42.4</td>
<td>43.5</td>
<td>79.3</td>
<td>99.7</td>
<td>108.6</td>
<td>18.7</td>
<td>6.8</td>
</tr>
<tr>
<td>Newington</td>
<td>--</td>
<td>35.3</td>
<td>--</td>
<td>--</td>
<td>47.0</td>
<td>62.5</td>
<td>69.0</td>
<td>11.6</td>
<td>5.6</td>
</tr>
<tr>
<td>Blackford Hill</td>
<td>--</td>
<td>12.8</td>
<td>--</td>
<td>--</td>
<td>20.3</td>
<td>27.0</td>
<td>29.4</td>
<td>5.0</td>
<td>2.0</td>
</tr>
<tr>
<td>Morningside</td>
<td>71.7</td>
<td>83.1</td>
<td>59.2</td>
<td>61.4</td>
<td>97.1</td>
<td>135.0</td>
<td>146.0</td>
<td>34.3</td>
<td>15.1</td>
</tr>
<tr>
<td>Craiglockhart</td>
<td>--</td>
<td>82.8</td>
<td>--</td>
<td>--</td>
<td>103.8</td>
<td>157.4</td>
<td>169.4</td>
<td>--</td>
<td>--</td>
</tr>
<tr>
<td>Gorgie</td>
<td>89.4</td>
<td>100.4</td>
<td>87.0</td>
<td>88.1</td>
<td>122.5</td>
<td>208.7</td>
<td>223.5</td>
<td>--</td>
<td>--</td>
</tr>
<tr>
<td>Colinton Road</td>
<td>--</td>
<td>--</td>
<td>--</td>
<td>--</td>
<td>--</td>
<td>--</td>
<td>--</td>
<td>6.4</td>
<td>1.9</td>
</tr>
<tr>
<td>Calder Road</td>
<td>--</td>
<td>--</td>
<td>--</td>
<td>--</td>
<td>--</td>
<td>--</td>
<td>--</td>
<td>13.9</td>
<td>6.6</td>
</tr>
<tr>
<td>Edinburgh Park*</td>
<td>--</td>
<td>--</td>
<td>92.1</td>
<td>92.1</td>
<td>92.1</td>
<td>153.9</td>
<td>161.6</td>
<td>20.8</td>
<td>7.7</td>
</tr>
<tr>
<td>Gyle*</td>
<td>--</td>
<td>--</td>
<td>--</td>
<td>--</td>
<td>--</td>
<td>--</td>
<td>--</td>
<td>125.6</td>
<td>130.2</td>
</tr>
</tbody>
</table>

*additional trips over and above those in the baseline projection

8.2.7 The forecast demand has been benchmarked against other comparable railway stations in the Edinburgh and Glasgow suburban areas.

8.2.8 A consistent pattern emerges that, in all options, demand is greatest for short distance trips from Morningside, Craiglockhart and Gorgie, and least at the eastern end of the line.

8.2.9 Although the projections imply that a larger number of stops would generate additional travel, the stations do not all perform equally well, and further detailed analysis would be required to determine the optimal number of stations and best performing locations.
8.3 **E-Rail**

8.3.1 The additional development proposed by E-Rail has the unsurprising effect of increasing trips on each option. The proportional increase in the number of trips and the additional gross revenue are show in Table 8.3.

**Table 8.3. Impact of E-Rail development proposals on demand and revenue**

<table>
<thead>
<tr>
<th>Option</th>
<th>Base no. of trips pa</th>
<th>% increase with E-rail development</th>
<th>Base gross revenue pa</th>
<th>Additional E-Rail revenue pa</th>
<th>Gross revenue pa with E-Rail development</th>
</tr>
</thead>
<tbody>
<tr>
<td>A1 rail</td>
<td>496,000</td>
<td>5.8</td>
<td>£1,067,000</td>
<td>£60,000</td>
<td>£1,127,000</td>
</tr>
<tr>
<td>A2 rail</td>
<td>822,000</td>
<td>4.9</td>
<td>£1,729,000</td>
<td>£77,000</td>
<td>£1,806,000</td>
</tr>
<tr>
<td>B1 rail</td>
<td>385,000</td>
<td>8.3</td>
<td>£912,000</td>
<td>£61,000</td>
<td>£973,000</td>
</tr>
<tr>
<td>B2 rail</td>
<td>396,000</td>
<td>8.2</td>
<td>£950,000</td>
<td>£64,000</td>
<td>£1,014,000</td>
</tr>
<tr>
<td>B3 rail</td>
<td>888,000</td>
<td>6.7</td>
<td>£1,792,000</td>
<td>£103,000</td>
<td>£1,895,000</td>
</tr>
<tr>
<td>C1 tram</td>
<td>1,432,000</td>
<td>5.9</td>
<td>£2,011,000</td>
<td>£112,000</td>
<td>£2,123,000</td>
</tr>
<tr>
<td>C2 tram</td>
<td>1,549,000</td>
<td>5.9</td>
<td>£2,179,000</td>
<td>£121,000</td>
<td>£2,300,000</td>
</tr>
</tbody>
</table>

8.4 **Car Parking**

8.4.1 There are currently 14 off-street car parks around Edinburgh City Centre which are intended for long term parking (ie: full day/commuter parking). There are also on-street parking spaces provided in central Edinburgh, with the intention that these spaces are prioritised for short term parking, by limiting the duration of stay and by parking cost, to achieve greater turnover of spaces.
8.4.2 A long-standing Outer Parking Zone in Edinburgh extends from Canonmills to Warrender Park Crescent and from Haymarket to Leith Street. Parking in this area is by pay and display, and other parking in the existing Peripheral Controlled Zone is reserved for residents.

8.4.3 Due to pressure on the number of on-street parking spaces, and conflict between residents and commuter parking, City of Edinburgh Council has been extending the area covered by the Outer Parking Zone to take in a further ring around the city in the north, west and south of the city. As these new areas have been introduced, there has been concern that commuting motorists are simply parking further out from the city centre, in the next-nearest residential areas where all day parking is unregulated and free.

8.4.4 There is a ring of operational, or soon to be opened, park and ride sites around Edinburgh, designed and located to intercept motorist, particularly commuters, en-route into the city. The sites at Ferrytoll, Ingliston, Hermiston and Newcraighall provide approximately 2,600 spaces, with a further 900 to come on-stream at Straiton and Sheriffhall within the next year. All these sites are free-of-charge to park, except Newcraighall which costs 50p per day or part thereof on a pay-and-display basis. Newcraighall, which is at the eastern end of the ESSR corridor, is principally a rail-based park and ride site, although some buses pass or enter this site, whilst the other P&R sites are bus-based. Ingliston will be integrated with the Edinburgh Tram Line 1 when this is constructed.

Impact of South Suburban Railway

8.4.5 Morningside Station lies just on the outer boundary of the new Peripheral Controlled Zone S2. As such, on-street parking is controlled on the city side of the railway
line, but not on the southern side. Also on the south side, Blackford Hill and Newington Stations and, to the west, Glenlockhart and Gorgie, lie outwith the present Outer Controlled Zone.

8.4.6 The charging regime in the city centre is designed to make off-street parking more attractive than on-street parking, but for many the cost of parking is not (as yet) a deterrent to driving into the city centre. Unless the charging regime is altered, these people would not be potential customers of ESSR.

8.4.7 The provision, and expansion, of Park and Ride facilities on the outskirts of the city is designed to intercept motorists at suitable points on the road network, and provide onward travel by bus or rail. It is unlikely that those motorists who park and ride would alter their habit and drive further into the city to then travel onward on ESSR.

8.4.8 The demand modelling shows that the great majority of trips at all stations on the ESSR, with the exception of Newcraighall, are local to the vicinity of each station. Even with the limited provision of only four stations on the route, there is very little projected demand arising from adjacent zones. The demand for local parking in the vicinity of the stations is therefore expected to be low. No attempt has been made to quantify such potential demand or to identify the scope (if any) for station car parking, since it would be contrary to the City Planning Policy to facilitate or attract additional car trips into these areas of the city, even for the purpose of joining public transport.

8.4.9 Nevertheless it would be expected that anyone seeking to park and use the ESSR stations would seek to park in the uncontrolled areas, thereby increasing pressure for
space on these streets, and leading to further calls for parking controls to be introduced. It is beyond the scope of this study to consider the extent to which such controls might be necessary.

8.4.10 Newcraighall is an established P&R facility with excellent road links to the A1, and it would be served by some of the ESSR options which provides a potential P&R service. However the rail services proposed in the base case will provide 4 trains per hour to the City Centre, with alternate trains continuing through to South Gyle and/or the proposed Gogar Interchange. There are also interchange opportunities to Edinburgh Park by rail or by tram at Haymarket. In the face of such competition from other routes, the effect of the ESSR options is therefore limited to providing a link between Newcraighall and Morningside and Craiglockhart. The estimated demand for such trips, and consequently the demand for parking capacity at Newcraighall, is estimated to be very low. This matches the findings of the previous study by Atkins which examined the inter-action between ESSR and the Waverley Railway and concluded that the interchange benefits were small because equal or better interchange opportunities exist at Waverley.

8.5 Demand and Capacity

8.5.1 Table 8.4 shows the projected peak hour demand, together with the capacity provided by the proposed service in each Option.

8.5.2 The city centre (options A1 and A2) attracts a similar number of peak trips as the rail option (B1, B2 and B3) to Edinburgh Park. In both cases, additional stations increase demand significantly. In general the more frequent service options attract more peak users than the less frequent options since the higher frequency provides greater advantages over alternative routes in
the network. However the demand for a commuting journey is finite, and consequently option C2 which provides 8 departures per hour does not appear to add significantly more travellers than option C1 at 4 departures per hour. The extension of the service to Bathgate (option B2) does not appear to increase the number of peak hour trips to Edinburgh Park although a few new peak trips are attracted from Livingston and Bathgate to Craiglockhart and Morningside.

Table 8.4: Peak Hour Demand and Capacity

<table>
<thead>
<tr>
<th>Option</th>
<th>Peak trips per hour</th>
<th>Peak hour departures</th>
<th>Peak trips per train/tram/bus</th>
</tr>
</thead>
<tbody>
<tr>
<td>A1 rail</td>
<td>422</td>
<td>2</td>
<td>211</td>
</tr>
<tr>
<td>A2 rail</td>
<td>710</td>
<td>2</td>
<td>355</td>
</tr>
<tr>
<td>B1 rail</td>
<td>414</td>
<td>4</td>
<td>104</td>
</tr>
<tr>
<td>B2 rail</td>
<td>426</td>
<td>4</td>
<td>106</td>
</tr>
<tr>
<td>B3 rail</td>
<td>752</td>
<td>4</td>
<td>188</td>
</tr>
<tr>
<td>C1 tram</td>
<td>1,540</td>
<td>8</td>
<td>192</td>
</tr>
<tr>
<td>C2 tram</td>
<td>1,665</td>
<td>16</td>
<td>104</td>
</tr>
<tr>
<td>D bus *</td>
<td>172</td>
<td>12</td>
<td>14</td>
</tr>
<tr>
<td>E bus *</td>
<td>73</td>
<td>8</td>
<td>9</td>
</tr>
</tbody>
</table>

Note * this is the net increase in bus travel: actual numbers using the new service will be higher by abstraction from other routes and services.

8.5.3 Peak demand in Options A1, A2 and B3 is approximately comparable to the capacity likely to be provided by a 2-car train, which is consistent with the cost assumptions. Since the track capacity in the Edinburgh area is constrained, best use of available capacity would be achieved by allocating all available train paths to services operated by well-loaded 6-car units. These
volumes are not, therefore, making full use of the network capacity utilised in providing the service.

8.5.4 Similarly peak demand in tram option C2 corresponds with the likely capacity. In Option C1 however peak demand may exceed capacity and some peak journeys may be require to be formed of double tram units to cater for demand. (This possibility is not reflected in the costs of this option.)

8.5.5 Train options B1 and B2, and the bus options D and E project peak demand which is low in relation to the service capacity and the vehicle resources deployed. These options are consequently an inefficient use of peak resources in operating terms.

8.6 Operating Costs and Revenues
8.6.1 The estimated operating costs of each option, and the forecast revenues, are shown in Table 8.5.

8.6.2 Disregarding option A2 which we consider undeliverable, the best financial performance is achieved by Option B3, the operation of 2 trains per hour between Newcraighall and Edinburgh Park with 8 intermediate stations. This option also requires the lowest subsidy per passenger. Even so the revenue is only estimated to cover around 50% of operating costs, leaving a subsidy requirement of £1.8M per annum. With the E-Rail development this might fall to £1.7M pa.

8.6.3 The extension of the service to Bathgate adds considerably to operating costs, but brings in very little net additional revenue.

8.6.4 The rail and tram options all draw part of their patronage from existing or potential bus users, with the result that the rest of the bus network will lose some revenue. The higher frequency of tram operations leads to much
higher abstraction from bus services than the rail options. The bus options will also draw some of their patronage from existing services, notably service 38 which parallels the proposed route for a significant distance, and the model projects the net increase in overall patronage by bus rather than the total numbers using the new bus options.

### Table 8.5: Operating Costs and Revenues

<table>
<thead>
<tr>
<th>Option</th>
<th>Operating Cost pa</th>
<th>Gross Revenue pa</th>
<th>Operating Deficit pa</th>
<th>Revenue loss to bus network</th>
<th>Revenue as % of operating costs</th>
<th>Operating Deficit per passenger journey</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>£'m</td>
<td>£'m</td>
<td>£'m</td>
<td>£'m</td>
<td></td>
<td>£</td>
</tr>
<tr>
<td>A1 rail</td>
<td>£3.04</td>
<td>£1.07</td>
<td>£1.97</td>
<td>£0.55</td>
<td>35</td>
<td>£4</td>
</tr>
<tr>
<td>A2 rail</td>
<td>£3.17</td>
<td>£1.73</td>
<td>£1.44</td>
<td>£0.97</td>
<td>54</td>
<td>£2</td>
</tr>
<tr>
<td>B1 rail</td>
<td>£3.47</td>
<td>£0.91</td>
<td>£2.56</td>
<td>£0.40</td>
<td>26</td>
<td>£7</td>
</tr>
<tr>
<td>B2 rail</td>
<td>£8.50</td>
<td>£0.95</td>
<td>£7.55</td>
<td>£0.40</td>
<td>11</td>
<td>£19</td>
</tr>
<tr>
<td>B3 rail</td>
<td>£3.60</td>
<td>£1.79</td>
<td>£1.81</td>
<td>£0.86</td>
<td>50</td>
<td>£2</td>
</tr>
<tr>
<td>B3 with E-Rail</td>
<td>£3.60</td>
<td>£1.89</td>
<td>£1.70</td>
<td>£0.59</td>
<td>52</td>
<td>£2</td>
</tr>
<tr>
<td>C1 tram</td>
<td>£6.26</td>
<td>£2.01</td>
<td>£4.25</td>
<td>£1.42</td>
<td>32</td>
<td>£3</td>
</tr>
<tr>
<td>C2 tram</td>
<td>£12.23</td>
<td>£2.18</td>
<td>£10.05</td>
<td>£1.49</td>
<td>18</td>
<td>£6</td>
</tr>
<tr>
<td>D bus</td>
<td>£2.37</td>
<td>£0.16</td>
<td>£2.21</td>
<td>£0</td>
<td>7</td>
<td>£14</td>
</tr>
<tr>
<td>E bus</td>
<td>£1.70</td>
<td>£0.07</td>
<td>£1.63</td>
<td>£0</td>
<td>4</td>
<td>£24</td>
</tr>
</tbody>
</table>

8.6.5 This traffic loss will be thinly spread across a large number of routes which will lose marginal traffic, although parallel service 38 will inevitably suffer a particularly large loss in traffic. The cumulative effect on the bus operators is large enough that they may need to make economies in their operations to compensate for the loss of overall revenue, although these savings will in all probability be made where current operations are
most marginal and not specifically on routes which serve the ESSR corridor.

8.7 Evaluation against Objectives

Accessibility to Employment

8.7.1 Objective A is

To enhance accessibility to designated employment growth areas.

8.7.2 In relation to the ESSR corridor, the designated employment growth area in regional and local plans is the West Edinburgh Planning Area, including Edinburgh Park and Ingliston. Options A1 and A2 do not serve this area. Option B serves Edinburgh Park, whilst options C, D and E serve both Edinburgh Park and the Gyle, and potentially could be extended to the Airport and beyond.

Mode Shift

8.7.3 Objective B is

To achieve significant transfer of peak period journey-to-work trips from the car to public transport.

8.7.4 The forecast demand for the Options tested is largely derived from mode shift from other modes. The journey to work within Edinburgh can be considered to be an inelastic market, which is to say that since there is very low unemployment, the number of journeys to work will match the employed workforce regardless of marginal changes to the transport network. However changes to the transport network can alter people’s choice of transport mode.

8.7.5 Table 8.6 shows the forecast transfers of trips to each option from car or from bus.
8.7.6 In terms of removing cars from the road network heavy rail option B3 to Edinburgh Park with 8 intermediate stations, the tram options C1 and C2 and the high frequency bus option D all have the greatest effect. The heavy rail and bus options do so at a lower cost per car trip saved than the tram.

Table 8.6: Mode Shift

<table>
<thead>
<tr>
<th>Option</th>
<th>Demand Per 24 hours</th>
<th>Transfer from car</th>
<th>Transfer from bus</th>
<th>Net revenue cost pa. (subsidy plus bus revenue lost)</th>
<th>Net revenue cost per day per car removed (see note)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>No. %</td>
<td>No. %</td>
<td>£’m</td>
<td>£</td>
<td></td>
</tr>
<tr>
<td>A1 rail</td>
<td>1,599 191 12</td>
<td>1,409 88</td>
<td>£2.52m</td>
<td>£101</td>
<td></td>
</tr>
<tr>
<td>A2 rail</td>
<td>2,651 257 10</td>
<td>2,394 90</td>
<td>£2.41m</td>
<td>£72</td>
<td></td>
</tr>
<tr>
<td>B1 rail</td>
<td>1,243 173 14</td>
<td>1,070 86</td>
<td>£2.95m</td>
<td>£131</td>
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</tr>
<tr>
<td>B2 rail</td>
<td>1,278 208 16</td>
<td>1,070 84</td>
<td>£7.94m</td>
<td>£294</td>
<td></td>
</tr>
<tr>
<td>B3 rail</td>
<td>2,865 480 17</td>
<td>2,444 83</td>
<td>£2.67m</td>
<td>£43</td>
<td></td>
</tr>
<tr>
<td>B3 with E-Rail</td>
<td>3,057 512 17</td>
<td>2,546 83</td>
<td>£2.30m</td>
<td>£34</td>
<td></td>
</tr>
<tr>
<td>C1 tram</td>
<td>4,619 439 10</td>
<td>4,180 90</td>
<td>£5.67m</td>
<td>£99</td>
<td></td>
</tr>
<tr>
<td>C2 tram</td>
<td>4,996 587 12</td>
<td>4,410 88</td>
<td>£11.54m</td>
<td>£151</td>
<td></td>
</tr>
<tr>
<td>D bus</td>
<td>516 516 100</td>
<td>0 0</td>
<td>£2.21m</td>
<td>£33</td>
<td></td>
</tr>
<tr>
<td>E bus</td>
<td>220 220 100</td>
<td>0 0</td>
<td>£1.63m</td>
<td>£57</td>
<td></td>
</tr>
</tbody>
</table>

Note: Assumes each car makes two peak trips per day on 260 days of the year

Integration of Transport Networks

8.7.7 Objective C is

To improve the connections between the areas served by ESSR and other public transport systems, including the Edinburgh tram, the national rail network and Edinburgh airport.
8.7.8 Options A1 and A2 would potentially serve Haymarket and Waverley stations, providing direct links to intercity trains and the tram network. All the other options interconnect with heavy rail at both Newcraighall and Edinburgh Park, the latter giving onward connections to Glasgow via Falkirk and via Airdrie. The modelling indicates some growth in rail traffic from the outer commuter area of Edinburgh on the basis of these connections (or in the case of option B3 from through services from Bathgate and Livingston), although amounting to no more than 5% of the projected traffic on the ESSR.

8.7.9 Tram and Bus Options C1, C2, D and E also offer potential connections at Gogar with the rail service to Fife and to the Airport.

**Freight traffic**

8.7.10 Objective D is

*To enable an increase in volume of rail freight passing across Edinburgh in line with the forecasts in the Freight RUS.*

8.7.11 The level of operation at 2 trains per hour for all the heavy rail options would leave 2 freight paths per hour between Millerhill and Gorgie which is considered to be sufficient to enable growth in the current level of service by 60% as projected by Network Rail’s Freight RUS. Similarly tram Option C1 is based on operating 2 trams and one freight train in each 30 minute cycle, corresponding to the present operating frequency between Heworth and Sunderland on the Tyne & Wear Metro.

8.7.12 Nevertheless all these options would constrain freight timings to fit between passenger train movements. A detailed timetabling exercise would be required to
ascertain whether these constraints could be matched to the availability of freight paths on other sections of the network, and it is possible that the operating pattern would have adverse consequences for freight train scheduling and efficiency.

8.7.13 The current view is that Option C2, with twice as many tram movements, would be totally incompatible with maintaining freight capacity.

8.7.14 Bus options have no implications for freight and allow the greatest freedom for freight trains to operate as required by freight customers and by the availability of paths across the wider network.

**Network reliability and Performance**

8.7.15 Objective E is

> To support the planned improvement in the reliability and performance of the existing rail network over the next 10 years.

8.7.16 The heavy rail options A1 and A2 are incompatible with accommodating the planned growth in the intercity and Edinburgh outer suburban networks. Any proposal to attempt to integrate them would lead to a loss of robustness in the timetable and deterioration in network performance.

8.7.17 The other heavy rail options B1, B2 and B3 are designed to utilise gaps in the pattern of service west of Haymarket West junction. All three options give rise to additional conflicting moves between east-bound and west-bound services at Newbridge junction. Further detailed timetable simulation would be necessary to identify whether these movements would have significant adverse effects on timetable reliability. In any event the addition of these services on a heavily trafficked route
can be expected to remove some of the redundancy in the available capacity, limiting the opportunities to recover from any disturbance to the timetable, wherever it may have originated.

8.7.18 Options B1, B2 and B3 also use Newcraighall station where they share the station with Crossrail and Borders Railway services. These options have been assumed and costed on the basis that ESSR services will have the benefit of a bay platform or turnback siding to minimise (although not eliminate) conflicting movements.

8.7.19 Tram options C1 and C2 avoid operating on congested sections of the heavy rail network, although trams entering or exiting from ESSR in the vicinity of Gorgie junction could potentially conflict with the few freight movements that use the section of line between Gorgie Junction and Haymarket West (and vice versa).

8.7.20 None of the options create positive opportunities to enhance network performance.

**Environmental Impacts**

8.7.21 Objective F is

_to minimise the direct environmental impacts of travel in the corridor of the railway, including the protection of residential neighbourhoods from the adverse impacts of intensifying travel movements._

8.7.22 The heavy rail and tram options all entail the creation of new station infrastructure at selected sites. These sites are generally well screened from adjoining residential areas due to the local geography, with sites often in cuttings. The site at Cameron Toll on the other hand is elevated and could have significant local visual and noise impacts.
8.7.23 Electric operation of the tram options may be expected to be marginally less noisy and to produce marginally less local air pollution that the diesel power of the other options.

8.7.24 It can be anticipated that there will be some effect from car parking at or near stations, but the modelling indicates that this is likely to be limited in extent.

8.7.25 Increased bus operations in options D and E would be significant compared with the current level of bus service on the orbital roads, although considerably less than the level of bus activity on the radial routes in the area.

8.7.26 All options result in a reduction in car trips, albeit very small in relation to the overall volume of car movements, with environmental benefits. However this benefit is discounted in the summary appraisal table since it would double count the benefits of mode shift separately identified.

**Accessibility**

8.7.27 Objective G is

> To ensure accessibility for all potential users to any new infrastructure or services.

8.7.28 It is assumed that, regardless of the mode, the vehicles and infrastructure will be fully accessible and will comply with the Disability Discrimination Act.

8.7.29 Because the ESSR rail alignment is largely in cutting, though sometimes on embankment, access to stations always involves a change in level from surrounding streets. Due to the presence of heavy freight trains, pedestrian crossing on the level cannot be accepted, even in conjunction with the use of the route by tram-trains. A particular hazard may arise in that crossing the
track on the level is likely to be a standard feature of the tram operation elsewhere in the city, and design solutions will be necessary to ensure that this does not happen on shared track.

8.7.30 In general access to the bus options will be simpler and involve less severance and restriction to pedestrian access, shorter access routes and no changes in levels, pedestrian steps or gradients. Bus stops will also be more closely spaced, reducing the distances that passengers require to walk to access the service at both ends of their journey.

8.8 Summary Assessment Table
8.8.1 Table 8.7 summarises the evaluation in the preceding section against the objectives.

<table>
<thead>
<tr>
<th>Table 8.7 Option Appraisal Summary Table</th>
</tr>
</thead>
<tbody>
<tr>
<td>Options</td>
</tr>
<tr>
<td>---------</td>
</tr>
<tr>
<td></td>
</tr>
<tr>
<td>A1 rail</td>
</tr>
<tr>
<td>A2 rail</td>
</tr>
<tr>
<td>B1 rail</td>
</tr>
<tr>
<td>B2 rail</td>
</tr>
<tr>
<td>B3 rail</td>
</tr>
<tr>
<td>C1 tram</td>
</tr>
<tr>
<td>C2 tram</td>
</tr>
<tr>
<td>D bus</td>
</tr>
<tr>
<td>E bus</td>
</tr>
</tbody>
</table>
8.8.2 Only the bus options have no negative impacts and, in terms of accessibility to employment and mode shift, they perform as well as rail and at a much lower cost.

8.8.3 However unless the bus service operates at a high frequency with a significant level of priority over other traffic, buses would have a lower impact on mode choice than rail which is the most significant objective.
9 CONCLUSIONS

9.1 Priority Issues

9.1.1 The key issues for Edinburgh and the Edinburgh city region were consistently identified in national, regional and local strategies:

A. Support for economic growth in the region by putting infrastructure in place to support employment. Key sites are identified in various plans, but none are on ESSR itself. However by extending the ESSR to west Edinburgh the ESSR corridor can be linked to the major employment growth area of the city.

B. Growth in commuting into the city - historic and projected – has been identified as a critical issue. This means access to jobs at the employment growth sites (and most particularly west Edinburgh) from the areas with expanding housing and labour. It is not internal trips within the city, which are already a model of sustainability with high proportions of walking and public transport use, but inward commuting from the expanding journey-to-work area that is identified as the problem that requires to be tackled.

C. The relief of congestion is an agreed aim, which is primarily driven by commuting and occurs on radial routes into the city and also on the city bypass. This already predominantly comprises traffic originating outside the city boundaries and accessing jobs within the city, which is also the major growth trend.

9.1.2 This scenario leads to an shared emphasis in national, regional and local strategies on:
(i) Prioritising the use of existing capacity, and new investment in extra capacity, on improved links from the outer-commuter area into the employment growth zones;

(ii) Encouraging greater use of public transport, especially for commuter trips into the City from beyond and intercity travel;

(iii) Encouraging both walking & cycling, and public transport for short local trips;

(iv) Improving access to health;

(v) Improving access to work for areas of high unemployment and to health and other services for areas of multiple deprivations.

(vi) Concentrating railway investment on inter-city links, meeting the rising demand for outer suburban commuting, and providing capacity for growth in rail freight;

9.1.3 From this analysis it has not been possible to identify any strategic role for transport improvements in the ESSR corridor.

9.2 Local Issues

9.2.1 There is a general desire to ensure that, within the city, sustainable transport modes and public transport is maximised for short trips. This policy is supported in national, regional and local policy. Improved transport in the ESSR corridor could therefore have a potential supporting role in contributing towards mode shift from car and the consequent relief of congestion, and in improving public transport access to western employment growth zone.

9.2.2 The transport and traffic problem of this part of the city has been identified in the Local Transport Strategy as
the impact on the community of commuting from the wider city journey-to-work area into the city centre, and not the local travel behaviour of those who live in the inner suburbs.

9.2.3 The ESSR corridor is a densely populated inner suburban area. There are currently many jobs within the corridor and excellent access on foot, by cycle and by bus to plentiful employment in the city centre. In consequence the area has exceptionally high levels of sustainable travel, many very short commuting trips and levels of public transport use which are well above the city average. This is in a city where public transport use per capita is second only to London. In this situation it is at least arguable that improve access to more distant job opportunities would be contrary to the City Council’s objective of minimising the need to travel and would serve rather to encourage longer commuting trip patterns.

9.2.4 In terms of mode shift, Options B3 (heavy rail with close spaced stations), C1 (tram-train) and D (high priority bus) attract the greatest number from their cars. This is achieved at very different costs. In revenue deficit terms alone, the train or bus options effectively costs around £30-£40 per day for each car removed from the network. If capital costs are taken into consideration, the value for money of the bus in this regard is very much greater.

9.3 Other Impacts
9.3.1 Despite seeking to identify opportunities to fit rail-based options where there is identifiable capacity on the network, there is every prospect that additional trains will have an adverse effect on service reliability in this very congested part of the Scottish network. Analysis of reactionary delays by Network Rail has shown how this congestion has a ripple effect when any out-of-course
event disrupts the planned timetable, rippling out over a large part of the network. Only more detailed timetable evaluation can show whether such effects would be of a minor or major impact in relation to the rail based options in this study.

9.3.2 Similarly, additional trains on the ESSR will impose a timetable straight-jacket on freight which, although overall capacity should be sufficient, may require new paths across the network in order to fit the constraints imposed by passenger service on ESSR. Again a detailed timetable study would be required to assess whether these constraints would have a significant impact.

9.3.3 The main environmental impact of improved public transport in the ESSR corridor is derived from mode shift from car to public transport. In other respects the tram has a modest potential environmental benefit from its use of electric traction.

9.3.4 To a modest degree, bus services would be more access to the residents, both because bus stops will be more closely spaced and hence closer to people’s homes, and because the rail alignment is largely in cutting or on embankment and therefore imposes a change of level to obtain access.

9.4 Costs

9.4.1 The capital and revenue costs of the Options are summarised in Table 9.1.
### Table 9.1 Summary of financial costs (2007 prices)

<table>
<thead>
<tr>
<th>Option</th>
<th>Total Capital Costs</th>
<th>Operation cost per annum</th>
<th>Operating deficit pa</th>
<th>Bus revenue losses pa</th>
<th>Gross revenue cost per day per car trip removed*</th>
</tr>
</thead>
<tbody>
<tr>
<td>A1 rail</td>
<td>£19.2</td>
<td>£3.04</td>
<td>£1.97</td>
<td>£0.55</td>
<td>£101</td>
</tr>
<tr>
<td>A2 rail</td>
<td>£38.6</td>
<td>£3.17</td>
<td>£1.44</td>
<td>£0.97</td>
<td>£72</td>
</tr>
<tr>
<td>B1 rail</td>
<td>£19.6</td>
<td>£3.47</td>
<td>£2.56</td>
<td>£0.39</td>
<td>£131</td>
</tr>
<tr>
<td>B2 rail</td>
<td>£19.6</td>
<td>£8.50</td>
<td>£7.55</td>
<td>£0.39</td>
<td>£294</td>
</tr>
<tr>
<td>B3 rail</td>
<td>£37.9</td>
<td>£3.60</td>
<td>£1.81</td>
<td>£0.86</td>
<td>£43</td>
</tr>
<tr>
<td>B3 Rail with ERail</td>
<td>£31.8</td>
<td>£3.60</td>
<td>£1.70</td>
<td>£0.59</td>
<td>£34</td>
</tr>
<tr>
<td>C1 tram</td>
<td>£49.1</td>
<td>£6.26</td>
<td>£4.25</td>
<td>£1.42</td>
<td>£99</td>
</tr>
<tr>
<td>C2 tram</td>
<td>£49.1</td>
<td>£12.23</td>
<td>£10.05</td>
<td>£1.49</td>
<td>£151</td>
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<tr>
<td>D bus</td>
<td>£2.5</td>
<td>£2.37</td>
<td>£2.21</td>
<td>0</td>
<td>£33</td>
</tr>
<tr>
<td>E bus</td>
<td>£0</td>
<td>£1.70</td>
<td>£1.63</td>
<td>0</td>
<td>£57</td>
</tr>
</tbody>
</table>

Note *: Operating deficit plus bus revenue loss per net additional public transport trip

#### 9.4.2
The tram options are significantly more expensive to build than heavy rail due to the cost of electrification. Operating costs are also estimated to be higher for the tram as a consequence of the higher frequency of service proposed, requiring more vehicles and more drivers.

#### 9.4.3
Whilst the revenue is also projected to be higher for the tram, based on higher ridership, this is achieved at the
expense of the bus network rather than by mode switch from car. The impact therefore is to attract people away from the self-funding bus network where the great majority of services are commercially viable, onto a tram service that would need on-going revenue support, an inefficient application of public funds.

9.4.4 B3 is the best of the train options, attracting the highest level of potential users, and although 83% are abstracted from bus, it delivers the highest mode shift from car. Revenue support costs are lower for the train option B3 than for trams, but even so revenue is projected to cover only 50% of operating costs. Capital costs are very high in relation to the numbers involved. The ERail proposal, if delivered, could potentially reduce the operating subsidy by 7% to £1.7m pa and the capital costs to the public sector by 16% to £31.8m.

9.4.5 Although theoretically paths exist to accommodate Option B3, the trains would introduce new conflicting moves onto the congested rail network west of Haymarket and at Newbridge junction, and would also constrain the freight paths available around the ESSR with potential impacts across central Scotland. These constraints could have potentially negative impacts on wider network reliability which would need further investigation. In any event the level of demand for ESSR services is low compared with the other services competing for space on the network, and these short trains would represent a poor utilisation of the available track capacity.

9.4.6 Mode shift achieved by the enhanced bus option D is almost as effective as it is for rail option B3. The revenue support costs per passenger of the enhanced bus option D are similar to those of the rail option B3, but
capital costs are estimated to be only 7% of those of the rail option.

9.4.7 Even this option would require an estimated £2.2M pa in revenue subsidy, and capital expenditure of £2.5M. The subsidy is high compared with support to other bus services in the City, and it is doubtful that it would be perceived as either value for money or fundable.

9.5 Conclusions
9.5.1 All of the Options tested provide only very limited benefits in terms of the objectives, which in any event do not address the priority issues facing the city or the region. Whilst the capital costs of converting an existing railway seem modest in comparison with other more ambitious schemes to create new railways across Scotland, the real benefits are also very modest.

9.5.2 All options had on-going revenue support implications, even disregarding the cost of funding the capital debt. The ERail proposals could marginally reduce the operating deficit, but fall a long way short of covering the direct operating costs or capital requirements of a rail scheme. ERail funding is not available to a bus-based scheme.

9.5.3 The best value may be obtained from a quality bus system, but even this has high on-going revenue implications which are unlikely to be considered value for money.

9.5.4 Analysis of the projected demand suggests that potential passengers are concentrated towards the western end of the route, and it is possible that a shorter bus proposal to link Morningside and Craiglockhart to Edinburgh Park and The Gyle would:
A. Plug an apparent gap in the present bus market network where the present alternative of travelling via the city centre is unduly lengthy, slow and unattractive;

B. Might achieve most of the mode shift benefits of the scheme as tested as the projected bus travel was greatest over this section;

C. Could capture most of the benefits of Option D at a lower cost and thus offer better value money than any of the tested options.

9.5.5 This possibility would require further evaluation and would require both capital investment in bus priorities and a partnership commitment to an enhanced level of service.

9.5.6 This evaluation has been limited to the 2016 development plans for the city and region. Taking a longer view might place even greater emphasis on access to the west Edinburgh employment growth zone. But with that comes a greater emphasis too upon public transport networks from the wider journey-to-work area as foreshadowed in the Edinburgh 2020 Vision discussion paper. It should not therefore be assumed that the case for reinstating passenger services on the ESSR would be stronger in the long term as the ongoing priority may still be to develop more strategically important rail network enhancements to serve the needs of a dynamic expanding city region.
Appendix A - Maps