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2 Strategic context

2.1 Overall transport strategy

2.1.1 Background

The genesis of the tram project can be traced back to a White Paper issued in July 1998, a few months before the Scotland Act 1998 came into force. It was produced by the Scottish Office and entitled 'Travel Choices for Scotland: The Scottish Integrated Transport White Paper'. This invited each local Council to produce a Local Transport Strategy, and advocated the setting up of a Scottish Public Transport Fund to fund key projects.

1998	White Paper – “Scotland’s Transport Future” City of Edinburgh Council Local Transport Strategy (LTS) - Inception
1999	City of Edinburgh Council Integrated Transport Initiative (ITI) - Inception
2000	City of Edinburgh Council LTS 2000 – Published Waterfront Edinburgh Limited (a Joint venture between City of Edinburgh Council, Scottish Enterprise Edinburgh and Lothian) commissions the Feasibility Study for a North Edinburgh Transit Solution (Anderson, Steer Davies Gleave and Mott MacDonald are appointed as advisors)
2001	Feasibility Study for a North Edinburgh Transit Solution – Published City of Edinburgh Council commissions the Edinburgh LRT Masterplan Feasibility Study (Ove Arup & Partners are appointed as advisors)
2002	Transport Edinburgh Limited (now tie) Incorporated Scottish Executive 'Approval in Principle' of the City of Edinburgh Council's ITI Scottish Executive funding grant awarded to support the introduction two Bills into Parliament - Tram Line 2 and Tram Line2
2003	Edinburgh LRT Masterplan Feasibility Study - Published Transport Minister announces £375 Million 'available in principle' for the Edinburgh Tram'.
2004	Tram Line 1 and Tram Line 2 Bill submitted to Parliament City of Edinburgh Council LTS 2004 – Published

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Accordingly, The City of Edinburgh Council resolved in October 1998 to prepare its Local Transport Strategy (LTS), and this was drawn up over the following two years. This has been updated and approved in January 2004 by the City of Edinburgh Council. It sets out a vision for transport in Edinburgh as follows:

“Edinburgh should be a city with a transport system which is accessible to all and serves all. Edinburgh’s transport system should contribute to better health, safety and quality of life, with particular consideration for vulnerable people such as children, the elderly and disabled people; it should be a true Citizen’s Network. The transport system should support a strong, sustainable local economy.”

“People should be able to meet their day to day needs within short distances that can easily be undertaken on foot, by bicycle, or by public transport. Choice should be available for all journeys within the city. The city should develop and grow in a compact form that minimises the need for travel, especially by car.”

The aims of the LTS are set out as follows:

- To improve safety for all road and transport users;
- To reduce the environmental impacts of travel;
- To support the local economy;
- To promote better health and fitness;
- To reduce social exclusion; and
- To maximise the role of streets as places to meet and play.

LTS also sets out that, schemes to be pursued in the longer term, dependent on funding, including “a *light rapid transit system for the city*”.

The strategy included identifying and implementing a series of measures (the ‘New Transport Initiative’, and subsequently the ‘Integrated Transport Initiative’ (“ITI”)), which was presented to CEC’s Transportation Committee in May 1999. The Committee authorised implementation of Phase 1 of the strategy, which was to identify major improvements needed to the city’s transport system. The measures that were identified were a congestion charging scheme, together with a package of improvements to public and private transport.

In May 2000, CEC considered the results of Phase 1 of the ITI and agreed to embark on Phase 2, an examination of the ways of achieving the measures that had been identified. The CEC Executive considered Phase 2 in September 2001. The package of suggested improvements to public and private transport was divided into five areas: rail, tram and guided bus; integrated transport including park and ride; bus improvements; road maintenance; and quality of life and environmental improvements.

The report concluded that the best way to deliver the improvements was to set up a wholly-owned subsidiary to implement such elements of the ITI. CEC established **tie** as a wholly-owned company with the role of project management, procurement and implementation. **tie** was set up in 2002 with its own staff, a majority of private sector board members and the remit to develop the ITI and to take forward the development of three tram line projects. CEC retains the transport strategy function and once agreed projects move to the detailed development and procurement stage, **tie** takes responsibility for these. .

2.1.2 White Paper – “Scotland’s Transport Future”

National planning policy is shaped by the National Planning Framework which commits the Executive to the development of the Edinburgh Tram. This document supports the integrated planning of land-use and transport as exemplified by the Edinburgh and the Lothians Structure Plan.

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National transport policy is set out in the **White Paper “Scotland’s Transport Future.”** This sets out the overall aim of promoting economic growth, social inclusion, health and protection of our environment through a safe, integrated, effective and efficient transport system. It sees the principal challenges in achieving this being changing attitudes to transport choices, stabilising road traffic volumes at 2001 levels by 2021, facilitating the development of new transport links and delivering value for money. Linked to this is maximising opportunities presented by the rapid pace of technological change and ensuring the right governance arrangements are in place to deliver.

In terms of delivering the vision, the White Paper specifically states *“We [SE] are supporting City of Edinburgh Council’s proposals to introduce a modern tram network to Edinburgh, to tackle congestion and link communities with areas of economic growth. Trams will provide fast, efficient, mass transport and provide a real alternative to travel by private car.”*

2.1.3 Regional and Local Transport Strategy

SESTRAN, a body of the 10 local authorities covering the south east of Scotland have produced and agreed a **Regional Transport Strategy**. One of the aspirations of this Regional Transport Strategy is *“a desire to see high quality, reasonably-priced bus, and rail and tram links from the region into Edinburgh and within the City itself.”*

The vision of CEC’s **Local Transport Strategy** is as follows:

“Edinburgh aspires to be a City with a transport system that is accessible to all and serves all. Edinburgh’s transport system should contribute to better health, safety and quality of life.... The transport system should support a strong, sustainable local economy.”

The document includes the following policy: - *“The Council will work with partners and external agencies to introduce a tram system to serve the City of Edinburgh.”*

2.2 Feasibility Study for a North Edinburgh Rapid Transit Solution – July 2001

In support of the development of the City of Edinburgh LTS a potential Rapid Transit Solution (RTS) for linking the Waterfront development in the North of Edinburgh to the city centre was commissioned. This was performed by a partnership of Andersen, Steer Davies Gleave and Mott MacDonald and published in July 2001.

The ‘Waterfront Report’ as it came to be known, examined potential technical solutions for a RTS, the options considered were initially:

- Bus Based - Quality Bus, Alternative Fuel;
- Guided Bus Based - Kerb Guided and Electronic Guided;
- Light Rapid Transit - Light Rail; and
- Automated Guideway - Monorail, People Mover and Maglev.

After initial assessment of the relative merits and demerits of each transport mode they were judged against 4 key questions:

- 1) Will the technology work in the available corridor?
- 2) Does it achieve the overall quality desired of the system?
- 3) Does the technology match the scale and form of network proposed, including future developments?
- 4) Will the technology attract the anticipated patronage or have adequate capacity?

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Leading on from the above assessment the following options, as discussed in the 'Waterfront Report', were discounted:

- Transitional Bus;
- Monorail;
- Guideways;
- Magnetic Levitation; and
- People movers.

Two remaining options - Guided Bus and Light Rail, were taken forward for detailed assessment against the criteria in the table below:

Criterion	Guided Bus	Light Rail Transit
Alignment	If segregated similar issues to LRT, otherwise easier to design.	Dedicated alignment design required whether segregated or not.
Public Utilities Impacts	If segregated similar issues to LRT, otherwise no relocation required.	All longitudinal services beneath swept path must be relocated.
Traffic Impact	Will need to contend with existing bus service on street.	Greater priority afforded thus reduced impact if properly policed.
Modal Interchange	No major benefit over existing bus services.	Benefit of incorporating new mode of transport at interchange.
Journey Time	Guided bus will not receive any greater priority than normal buses if un-segregated.	Greater priority afforded to LRT on un-segregated sections thus reducing journey times.
Patronage	Not perceived as significantly different from conventional bus thus reduced patronage.	Reduced journey times, improved reliability and comfort will result in increased patronage.
Carrying capacity	Would require additional vehicles for the same peak capacity.	Increased carrying capacity with peak capacity of 2500 persons per hour.
Depot Site	No dedicated infrastructure required.	Dedicated infrastructure required.
Capital Cost	Reduced capital costs.	Increased capital costs.
Operating costs	Comparable to LRT but increased lifecycle replacement costs.	Comparable to guided bus but fewer lifecycle replacement costs.
Revenue	Less revenue.	More revenue.
Construction Programme	Programme contracted due to works extent being significantly reduced.	Programme lengthened due to works extent being significantly increased.
Accessibility	More difficult access for disabled persons, push chairs etc.	Greater accessibility for all including disabled persons with level access.
Comfort/Ride Quality	Inferior comfort levels due to irregularity of road surface.	Superior comfort levels with LRV's fitted with resilient wheels and high spec. suspension on rails.
Frequency/Reliability	More frequent but not as reliable due to reduced	Improved frequency/reliability mainly due to given priority.

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	priority traffic impacts.	
Image	Perceived by public as normal bus.	Improved public image over buses.
Safety	Reactionary operation therefore path not as easily perceived.	Improved safety due to fixed path easily perceived (pedestrian/driver).
Air Quality/Noise Impacts	Increased air quality and noise impacts due to the bus vehicles generally being diesel powered. These impacts can be reduced by adopting dual powered busses.	Reduced impact as LRV's being electronically powered do not discharge noxious emissions and equipped with resilient wheels and skirting, as well as, using continuously welded rail, means noise is minimised.

* Highlighted cells denote which option is better against each criteria.

Following this detailed analysis Tram was selected as the preferred transport solution

Three route options were derived from a long list of twenty six configurations that evolved as part of a brainstorming session facilitated by Mott MacDonald.

Following the detailed assessment and consultation the preferred solution of a Light Rail system was identified and the route configuration now known as the North Edinburgh Loop was proposed.

This proposal was submitted to full City of Edinburgh Council and has been incorporated in the LTS 2000 and 2004.

The Executive Summary to this report is provided in Appendix A.

2.3 Edinburgh LRT Masterplan Feasibility Study – January 2003

This report was commissioned (December 2001) by the City of Edinburgh Council to build on the initial work proposed under the 'Waterfront Report'. The main conclusions of this report are summarised below. The Executive Summary is provided as Appendix A.

The specific remit for Ove Arup and Partners was to develop:

- A "viable network" of LRT routes which, in conjunction with other modes, will best meet LTS and other project specific objectives;
- An outline Capital, Revenue and Operating costs for the LRT lines;
- Sufficient data on LRT routes for use in overall assessment and prioritisation of scheme with the ITI; and
- Inputs to the development of the road user charging scheme business case and to support applications to the government for approval and funding of the ITI.

The approach taken was two phase.

Phase 1 comprised a comparison of the nine identified transport corridors and their appraisal against preliminary criteria based on the Scottish Transport Appraisal Guidance (STAG) 1. This comparison led to recommended seven schemes (see table below) for a more detailed assessment at **Phase 2**, which formed the basis of the recommendation on priorities for LRT implementation.

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Corridor	Scores	Ranking
Queensferry	+9	4
North Edinburgh Loop	+22	2
West Edinburgh	+24	1
South Edinburgh	+6	5
South East Edinburgh	+17	3
South Suburban	+4	7
South Orbital	+5	6

Following the detailed appraisal it was recommended the top Three were taken forward for further detailed consideration.

This further analysis resulted in the conclusion that the North Edinburgh Loop (Line 1) be accorded the highest priority among the corridors tested and that the Masterplan should include both the West (Line 2) and South East (Line 3) lines as high priority schemes.

This proposal was submitted to full City of Edinburgh Council and has been incorporated in the LTS 2000 and 2004.

The Executive Summary to this report is provided in Appendix A.

2.4 Parliamentary Submission

The recommendations in the 'Feasibility Study for a North Edinburgh Rapid Transit Solution', 'Edinburgh LRT Masterplan Feasibility Study', City of Edinburgh LTS and the City of Edinburgh ITI culminated in funding support in June 2002 from the Scottish Executive to develop the North Edinburgh Loop (Line 1) and the Western Route (Line 2) for Parliamentary submission.

The Bills and supporting documents were lodged in Parliament in January 2004.

2.4.1 Scottish Transport Appraisal Guidance (STAG)

As part of the supporting documentation submitted to Parliament **tie** has compiled a STAG and completed further extensive work and consultation on tram Line 1 and tram Line 2. This detailed work assessed the projects against the key STAG criteria and have confirmed that both lines meet or exceed the Scottish Executive criteria.

In addition to the wider economic aspects of the tram lines they estimate costs and revenue was examined and has confirmed that there is a robust economic case for tram Line 1 and tram Line 2.

The STAG documents were submitted to the City of Edinburgh Council for CEC Executive approval and thereafter submitted to the Parliament in January 2004. The documents have subsequently updated and re-submitted to the Parliament in September 2004.

A summary of the conclusions of these reports is provided in Section 4,, and the Executive Summary for both the Line 1 and 2 STAG are provided as Appendix A.

Throughout the project development **tie** has reviewed the key documents that have been submitted to Parliament, these reviews are ongoing and were last formally reported in September 2004 when the Updates to STAG and PFC were issued to Parliament. Since this submission **tie** has continued to review the key drivers of the Economic and Financial Case and have ascertained that there has been no material change since this time.

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tie will continue to review the this existing analysis and will undertake the required assessment on the preferred configuration as the Final OBC is developed during 2005.

2.4.2 Preliminary Financial Case

In addition to the STAG work tie examined and submitted to Parliament a Preliminary Financial Case (PFC) for each of tram Line 1 and tram Line 2.

The PFC assessed the financial aspects of the proposals and examined how much each tram line could be procured for, the options for effecting such procurements and the risks inherent in these procurement options.

The PFC documents were submitted to the City of Edinburgh Council for CEC Executive approval and thereafter submitted to the Parliament in January 2004. The documents have subsequently updated and re-submitted to the Parliament in September 2004.

The Executive Summary for both the Line 1 and 2 PFC are provided as Appendix A.

2.4.3 Environmental Statement

The Environmental Statement was submitted along with the Bills to Parliament and examines the assessment of the following:

- The environmental character of the area likely to be affected by the development through baseline studies;
- Predict the possible effects, both beneficial and adverse, of the development on the environment;
- Introduce design and operational modifications or other measures to avoid, reduce or offset adverse effect, and where possible, enhance positive effects; and
- Summarise the results of the Environmental Impact Assessment in the Environmental Statement

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3 Project objectives, benefits and constraints

3.1 Project objectives

The projects support the National, Regional and Local Transport Strategies. More specifically the tram is designed to address the five areas outlined below:

- **Local economy and accessibility** – To achieve an integrated, efficient, accessible and high quality public transport system that promotes economic growth to the local community, improving its performance and competitiveness. This is fundamental to achieving both the social inclusion and economic development elements of the transport vision, through:
 - Increased number of people with access to the public transport network; and
 - Increased number of people with access to employment opportunities at Granton, Leith, Muirhouse, Pilton and Newhaven.
- **Sustainability and environment** – To encourage more sustainable travel and comply with the targets set by the Air Quality Amendment Regulations. This is fundamental to achieving the environmental, sustainability, health & fitness and traffic aspirations:
 - Increased share of travel on public transport and non-motorised modes; and
 - Reduced global emissions and control local air quality in order to comply with air quality standards.
- **Traffic congestion** – To enable cars to be used efficiently, reducing congestion and delays on key routes. This is fundamental to the achievement of economic development and environmental aims of the vision:
 - Reduce the number of trips made by car; and
 - Reduce road traffic volume on key urban routes.
- **Safety** – To aim at less deaths by road traffic accident, by reducing vehicle volumes, speeds and making roads safer for both users and non-users. This is fundamental to achieving the safety elements of the vision:
 - Reduce the number of road traffic accidents and casualties in Edinburgh.
- **Social benefits** – To take the new system as an opportunity to promote social and community benefits, which are fundamental to the respective elements of the vision:
 - Improve liveability of streets; and
 - Improve access to transport system by people with low incomes, no access to car, the elderly or mobility impairments.

3.2 Benefits of the system

Although Edinburgh's economic success brings many benefits to both the City and the wider region, it also creates problems, such as traffic congestion. There are a range of objectives of the tram that should either support the benefits or address the problems. These are detailed below.

Integration of land use and transport planning

By providing a tram system to serve and connect Core Development Areas (CDA) across the City, the need for car dependence to access employment, residential and retail areas should be minimised. A tram system will ensure that there is effective, high quality public transport

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linking the City's strategic development and regeneration sites. Without a tram system, it is likely that major developments will be less likely to succeed and where they do, will contribute significantly more to City wide congestion as a direct result of the failure to integrate land use and transport policies. Such developments will also be likely to be diverted to less sustainable locations in the greenbelt and elsewhere with less potential for effective transport integration. Areas in the Line 1 catchment that will benefit include the City Centre the Granton Waterfront and Leith Docks development areas, whilst for the full Line 2 Newbridge/Ratho/Kirkliston CDA, South Gyle and Edinburgh Park will be the main beneficiaries.

Traffic congestion

Tram, rather than directly reducing existing congestion, will operate primarily to permit further development without aggravating additional congestion. The tram system has the potential to reduce traffic congestion by encouraging drivers to use the tram instead of their car. As other tram schemes in the UK have shown, there is greater potential for modal shift from car to tram than to buses, or guided buses, particularly if the tram is in operation before the development comes online and travel patterns have already been established. Modal shift from car is a key objective of the Local and Regional Transport Strategies because it will help to relieve the problems of traffic congestion that are experienced in the City and the wider region. The analysis carried out following standard STAG methodology showed that the system would provide a relatively high level of benefit for non users of the tram, more so than for users. An explanation for this is that the modelling work predicts severe congestion by 2026 and any reduction in congestion caused by modal shift, however small, could result in a small benefit to a large number of people travelling. In reality this means that as some car users switch to tram, capacity is released on the road network which cuts journey times for remaining car drivers. In addition, faster journeys for remaining bus users, as well as for those switching from slower bus to faster tram provide overall benefits. Thus the de-congestion benefits are predicted to be cumulatively significant.

Environment

CEC has a statutory responsibility under the Environment Act 1995 to work to comply with the national air quality objectives. Air quality monitoring is carried out periodically and, for the seven pollutants CEC is required to monitor, one was found to be unlikely to meet its objective. Consequently, CEC declared an Air Quality Management Area in December 2000 covering parts of the City centre area on the basis that the nitrogen dioxides objectives are likely to be exceeded in 2005. Vehicles within the City have been shown to account for up to 88% of emissions of nitrogen oxides. CEC is currently implementing its Air Quality Action Plan (AQAP) in relation to nitrogen dioxide pollution. Trams will contribute to the objectives of the AQAP by providing a large number of journeys through the City centre so improving mobility and accessibility but without adding to current levels of nitrogen dioxide as trams have zero emissions at point of use. Trams can also be much quieter than buses providing a higher quality environment for those living, working and travelling in the area.

Social inclusion

This can be facilitated by better public transport, which allows improved access to jobs and services for those without access to a car. Although neither line will serve anywhere not currently served by bus, and will have greater spacing between stops than bus has, it will reduce public transport journey times and, particularly if Line 1 is taken into account, greatly enhance the reliability of trips to employment centres (Sighthill, The Gyle, Edinburgh Park, Gogarburn, the Airport and Newbridge) in the West, as well as journeys from there to the northern parts of the City. For those living close to a stop, this will provide a significant benefit although for those living between stops walk time will be increased compared to the bus. This will be partially offset by the level of frequency and reliability tram offers compared to the bus. In terms of journey time savings, (comparing scheduled bus journey times with those

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scheduled for the tram, and taking into account waiting times) these will be improved by between five and fifteen minutes for destinations on the tram corridor. This improvement does not take into account the greater reliability of trams compared with bus, which will lead to reduced waiting times on the new mode. As congestion increases these time savings will increase particularly where segregated running is a feature of the route. The tram therefore improves accessibility for many in travelling to employment, education and leisure opportunities.

Integration

The introduction of tram will provide an opportunity to significantly improve integration between transport modes. The major advantage here is that integration can be planned before the start of services; this is much more effective than trying to achieve integration between already established services. The tram operator designate is required to work with bus operators to ensure integration between the modes. The interchange at Haymarket and close proximity to Waverley Station and Edinburgh Park Station mean integration with heavy rail will be good. These interlinking services, along with the proposed frequency of the service, means tram will afford easier access to employment and service areas. Tram will also facilitate enhanced integration between public transport and travel by air through serving Edinburgh Airport. The integration of the bus, rail, air and tram network will mean considerable improvement for the travelling public. This could lead to demand for additional feeder services to the main network thus further benefits in terms of both integration and inclusion.

Accessibility

Trams are accessible to people with mobility impairments as access to vehicles and at stops will be fully accessible. In comparison, a little more than half of the LB fleet has low floor access at present although LB are required under the Disability Discrimination Act to have all their vehicles as fully compliant low floor vehicles by 2014. If current levels of LB fleet replacement are maintained, all their vehicles will be fully accessible within six years. Even on low floor buses however, access for people with mobility impairments cannot be guaranteed due to inconsiderate or illegal parking of other vehicles at bus stops, and/or poor driver discipline, such that the bus does not reach the kerb. Trams will always have access to stops and every tram will have level boarding. For people with mobility impairments who live close to tram stops, the tram will therefore represent a major improvement in the provision of accessible public transport. The greater distance between stops will reduce accessibility for some although the guaranteed level access once at the stop will provide a benefit over the current situation of accessing buses.

Economic regeneration

In the parts of Edinburgh served by Tram such as Leith Docks, Granton Waterfront and Sighthill, regeneration is a key priority. Tram enables the development of brownfield sites by providing sustainable transport connections to areas either currently poorly served by public transport or experiencing congestion, particularly at peak times. This therefore can significantly contribute to City regeneration. For example, without Line 1 it is unlikely the largescale redevelopment of Leith Docks could go ahead bringing with it high quality living, leisure and employment opportunities. In addition to opening up brownfield land for redevelopment and despite the difficulty in quantifying, it is probable that the tram will have a positive impact on the image of the area and hence help to stimulate further inward investment. For certain employers whose workforces may be more than usually reliant on public transport access, the Tram may act as a catalyst to encourage them to locate in areas that they would have previously discounted. In addition, by contributing to reducing growth in congestion, Tram will be assisting with maintaining the economic viability of North and West Edinburgh.

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Streetscape

Linked to economic regeneration is the image of a City conveyed by its streetscape. In spite of its historical importance, parts of Edinburgh's urban environment are of much poorer quality than is desirable. Experience in France has shown that investment in trams has been used as a mechanism to improve streetscape and environmental amenity in general, bringing both economic and social benefits. In recognition of this important role of tram, a Tram Urban Design Manual has been, and is continuing to be developed by CEC.

Reliability

Trams are more reliable than buses for two main reasons: firstly, they tend to benefit from greater segregation from general traffic and are thus protected from the vagaries of traffic congestion; and, secondly, they generally utilise off-vehicle ticket sales with multi-door boarding, rather than only the driver selling tickets, which reduces dwell time and the variability of dwell time at stops compared with bus. It is theoretically possible that bus operation could be modified to produce the same level of reliability.

3.3 Project constraints

The system will need to address the effect on the World Heritage Status of Edinburgh and **tie** is seeking to minimise or eliminate any adverse impact the tram system may have, by working closely with CEC Planning Committee to develop complementary solutions. The initial design work proposed as part of the recommended procurement option is targeted on the most sensitive sections of the route, with the aim of facilitating planning solutions in these areas. The topography, layout, numerous ancient monuments and Sites of Special Scientific Interest, have all been evaluated and have shaped the routing of the tram system, **tie** is committed to minimising any adverse impact on these areas.

During the construction phase there will be periods where 'restricted' or 'no construction' can be achieved in certain areas, primarily during the Edinburgh Festival and the run up to Christmas. **tie** will need to ensure that the scheduling of construction takes into account when areas will be curtailed, and minimise any potential down time by pragmatic targeting of resources.

tie is also aware that there are a limited number of tram manufacturers that can meet the system requirements. As part of the recommended procurement option, **tie** is therefore seeking to compete the vehicle element and transfer the successful bidder to the infrastructure provider separately. This will enable better competition on both elements and avoid the possibility that preferred tram vehicle provider may be commercially restricted to a sub-optimal infrastructure provider.

4 STAG Appraisal

4.1 Introduction

This section summarises the key conclusions arising from the STAG 2 analysis undertaken by Mott MacDonald in respect of Line 1 in July 2004 and Faber Maunsell in respect of Line Two in July 2004. The remainder of this section is drawn from the executive summary of these STAG 2 documents. The Executive Summary of both STAG 2 reports is provided in Appendix A.

4.2 STAG 2 inputs

CEC is examining ways of providing the City with the transport infrastructure necessary to promote and support a growing local economy and create a healthy, safe and sustainable environment. As a key component of the strategy of public transport investment in Edinburgh, CEC is proposing to develop a network of modern light rapid transit rail systems, or trams. The tram system is being developed in stages and will focus on the major City transport corridors.

Scheme descriptions

Line One consists of a Northern Loop, linking the City Centre with Granton, Newhaven and Leith, passing through the Waterfront development area and then along the line of the former Roseburn railway corridor to Haymarket. Line Two of the Edinburgh Tram Network links the City Centre to Murrayfield, Edinburgh Park, the Gyle, airport and the Newbridge park and ride at the western extremity. Both lines are expected to provide a number of positive benefits including economic regeneration and improved accessibility as described in Section 2.

Tram Specification

It is assumed that the trams will be semi-low floor or total low floor vehicles. This implies a floor height of between 300 and 400mm. This type of vehicle has been adopted in order to ensure that the alignment characteristics will cater for most currently available rolling stock.

Construction

One of the early activities required for construction is the diversion of Public Utilities from beneath the tramway. This has, historically been undertaken, either as an advanced works contract or as part of the main works contract. Generally the inclusion of this phase within the main contract provides a reduction in programme due to the ability to coordinate efficiently within the main contract. The 30-month construction period is based upon the utilities diversions being undertaken as advance works ahead of the main infrastructure contract.

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Costs

The costs developed for the STAG 2 include capital costs, operating costs and life cycle costs, and have been prepared using a combination of benchmarking, previous experience and engineering judgement. The capital costs for Line 1 were estimated at £243m including specified contingency (or £274m including Optimism Bias), and for Line 2 were estimated at £278.5million including specified contingency (or £320.9million, including Optimism Bias) set at a base point of Quarter 2 2003.

Costs have been derived from a comprehensive database compiled from analyses of costs for the infrastructure works of completed and proposed LRT schemes throughout the UK, currently advised prices from vehicle manufacturers and preliminary diversionary works estimates obtained from utilities companies. The resulting estimates take account of the prevailing factors influencing this particular scheme including location, relative complexity, environment and anticipated programme.

Operations

The single overarching objective from the operational viewpoint is to minimise journey times, so as to maximise the attractiveness of the service and minimise operating costs and rolling stock resources. The key is to achieve free flow wherever possible so that the running speed is the maximum safe speed for any particular type of environment.

4.3 STAG 2 Appraisal

STAG2 appraisal of both Lines 1 and 2 examining the key issues of:

- Environment;
- Safety;
- Economy;
- Integration; and
- Accessibility and Social Inclusion.

The matters arising from this analysis is set out in detail in the STAG 2 reports which have previously been submitted to the Executive. The appraisals has identified that Tram Lines 1 and 2 would:

- Enhance the accessibility of key areas within the City thereby improving access to employment and social opportunities, especially for those without private transport;
- Result in expected Improvements in Air quality as a result of the reduction in number of cars. This is a fundamental requirement of the environmental/sustainability aspiration of the City;
- Reduced Traffic congestion as illustrated by the economic benefits arising from the introduction of the scheme; and
- Provide a safe and secure environment both on board and at the stops. There will be no increase in the number of accidents in 2009 as a result of the introduction of the tram.

It is therefore concluded that the introduction of the Tram Lines 1 and 2 are consistent with the objectives of CEC and will contribute well to the realisation of the Vision for Edinburgh.

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4.4 Cost to Government

As required by STAG, the report includes consideration of the economic welfare impacts of the proposal as part of the Transport Economic Efficiency (TEE) assessment. The appraisal provides a review of what users are willing to pay in order to use the tram line; the financial impact on private sector transport providers; and impacts arising from land use or other impacts of the tram line.

The benefits and costs of both projects have been calculated over a 30-year period and are summarised below.

The Benefit Cost Ratio was calculated as 1.21 for Line 1 and 1.40 for Line 2, which both represent good value for money in economic terms.

	Line 1	Line 2
Present Value of Benefits (PVB)	£236 million	£288 million
Present Value of Costs (PVC)	£196 million	£206 million
Net Present Value (NPV)	£40 million	£82 million
Benefit Cost Ratio (BCR)	1.21	1.40

5 Procurement Strategy

5.1 Introduction

tie have set out to develop a Procurement Strategy that addresses both the issues experienced on recent light rail procurements and the specific circumstances affecting Edinburgh.

The resultant structure is a series of contracts which, managed as a group, will transfer risk effectively to the private sector, advance the scheme as quickly as possible and provide strong value for money.

This section of the IOBC includes:

- The background to how **tie** arrived at the Proposed Procurement Strategy;
- The key differentiators between this and other approaches to procurement in the light rail sector;
- A description of the process by which **tie** will implement its procurement strategy;
- A detailed description of the key contracts that **tie** will enter into;
- The opportunities for review and refinement of the proposed strategy; and
- A section setting out the answers to key questions about the proposed Procurement Strategy.

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5.2 Background to Procurement Strategy**5.2.1 The Light Rail Market Environment**

The UK Light Rail sector has encountered difficulties in the last five years. These have affected both existing projects and those in procurement.

These problems can be traced back to the mid to late 1990s, when there was strong competition between contractors to win the initial light rail schemes, which at the time were seen as pilots for a new wave of projects. There were significant differences in risk allocation between the different schemes let at this time, which reflected the lack of standardisation in privately financed projects during this period.

With the benefit of hindsight, it is clear that many of the issues which have arisen on the earliest light rail schemes were due to unrealistic expectations by both the public and private sectors of the latter's ability to absorb and manage risk. Light rail schemes have been among the most complex schemes undertaken as public private partnerships. Unlike many other schemes they can include the risks associated with:

- Substantial revenue from passengers and third parties, and the difficulty of forecasting this over the long term (20-30 years);
- Competition from unregulated businesses (buses), and the inherent conflict between integrated transport planning and the Competition Act 1998;
- Competition for market interest from less complex projects for both the civils work (simpler construction projects and PFIs) and the trams and equipment (direct procurement of assets from established systems in Continental Europe);
- A complex integration of fixed and moveable assets;
- Multiple interfaces with other stakeholders (utilities, network rail etc);
- Influence of planning authorities on specific solutions (affecting the quantum of works required); and
- Inflexibility in resources (little choice of suppliers of equipment, long lead time required to train operating staff e.g. drivers).

On the earliest schemes, it appears that the private sector showed over-confidence in respect of these risks, and, in some cases, the public sector showed a lack of foresight. This may have been related to a lack of understanding of the flexibility which is required to run a public transport system under a long term contract, and the risks in forecasting public transport revenues for a specific service over the long term.

The result is that on many of the projects that have been completed, neither the public nor private sectors are happy with the outcome. Contractors have lost significant amounts on the underlying construction projects due to changes in scope over which they have little control. The tram operators are facing escalating costs, competition from buses and revenues which fall short of what is required to cover fixed costs. Meanwhile the public sector has realised that it has little ability to control the behaviour of the tram operators due to the lack of suitable sanctions available under their project agreements.

This outcome has made the private sector extremely wary of light rail projects. This is documented in the National Audit Office report of 2004 commenting on the effectiveness of light rail schemes. Unfortunately, this industry feedback arrived too late to inform the development of a number of procurements in England, which have encountered significant problems with affordability, with costs increasing due to bidders factoring in significant

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margins to deal with the risks that they have difficulty pricing accurately. These affordability issues have led to significant delays on these projects.

However, schemes which are at an earlier stage of procurement have the opportunity to learn from the issues which have arisen on both existing schemes and the stalled procurements. This is exactly what **tie** have set out to do.

5.2.2 Issues Specific to Edinburgh

In procuring the tram network **tie** has to deal with certain key issues that make Edinburgh's context different from that of other promoters of light rail schemes. The specific issues that **tie** has addressed are:

- The effects of the project running through an historic city centre with World Heritage Status, and consequentially, significant constraints in terms of aesthetics, environmental impact and restrictions on possessions along the proposed route;
- The impact of a local bus operator with majority market share and which also happens to be publicly owned; and
- A desire to achieve an ambitious timetable of delivery without compromising on quality or increasing the cost of the project.

All of the above have been taken into account by **tie** in their analysis of what provides best value for money.

5.2.3 tie's Objectives for Procurement Strategy

tie's basic objectives in developing a procurement strategy were:

- achieving best value for money;
- achieving timely delivery of the system;
- achieving 'win/win' solutions for relationships with the private sector;
- achieving meaningful integration of light rail and bus services; and
- achieving flexibility for future expansion of the network/phasing of delivery.

tie set out from the start to avoid the problems which have been encountered on other light rail schemes.

In order to do this, **tie** have sought to harness first hand experience from key individuals involved in those schemes. **tie** has successfully achieved this by:

- recruiting individuals into the project team with breadth and depth of experience of other light rail projects;
- appointing a proposed operator (Transdev) with experience of procuring and operating light rail schemes in the UK and overseas; and
- selecting advisers with a broad experience of light rail and other public/private procurements.

tie have taken the position that there are no 'sacred cows' with regard to how contracts between the public and private sector are structured. In particular, **tie** have taken the view that the DBFO (Design, Build, Finance, Operate) approach, which has been successfully

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implemented on projects which have a relatively simple technical nature, may not be appropriate for a complex technical project with a large number of interfaces which require management. **tie** has looked outside the world of the conventional PFI project, and considered the approaches used in other sectors, for example, commercial property development.

tie has arrived at a proposed solution where it will take a greater degree of control over the process during the early 'development' phase than the public sector has done on earlier deals. This will result in **tie** progressing the overall project sufficiently in advance of seeking bids from Infracore bidders that it will be able to offer the private sector a better defined basis on which to bid and less onerous risk allocation, such that they will be able to price their bids with a greater degree of accuracy and certainty than has been achieved on earlier deals.

In this way, **tie** will significantly reduce the risks in, and cost of, the overall project.

5.2.4 Development of Preferred Procurement Strategy

The strategy was initially developed by **tie**'s Procurement Working Group during 2004 which comprised **tie**, Partnerships UK, **tie**'s financial adviser at the time, Grant Thornton, **tie**'s legal adviser, DLA and **tie**'s technical adviser.

The first stage of developing the Procurement Strategy was the decision to select the operator for the system well in advance of being able to let contracts for the fabric of the system.

The **tie** board approved the Early Operator Involvement strategy in March 2003. The ITN for the role of operator was issued in June 2003. Intensive negotiations were held with two bidders and Transdev were appointed preferred bidder in April 2004. A contract was signed with Transdev to undertake this role in June 2004, and they are co-located in **tie**'s office, working closely with **tie**'s team to develop the scheme.

The second stage in formulating the strategy was to decide the general approach to the procurement of infrastructure and vehicles. The option which best fitted **tie**'s requirements was the Infrastructure and Integrator Consortium Option which now forms the basis of the Proposed Procurement Strategy. (A full description of the options which were considered and the reasons for arriving at this solution are set out in Appendix B to this IOBC.)

This approach to the procurement has been further developed and tested over the last year and will be tested again during formal market sounding to be undertaken during the summer of 2005.

The third stage of developing the procurement approach is to determine the preferred method of funding and financing for the infrastructure provider/integrator.

The above process has involved significant involvement of the City of Edinburgh and the Scottish Executive. The key documents which have been produced through this process are set out in Appendices B and F.

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5.3 Key Distinguishing Features of Preferred Procurement Strategy

The procurement strategy that **tie** is proposing for this project has been developed to address the challenges facing all light rail procurements and the specific issues associated with Edinburgh.

It is a unique approach and this section sets out the main ways in which the proposed procurement strategy differs from market norms. However, it is also important to understand that most of the differences relate to the process of procurement and not the outcome of the procurement.

The outcome of the procurement strategy will be two contracts with different private sector entities: an operating contract (developed on the basis of the Development Partnering and Operating Franchise Agreement (“DPOFA”)) and an infrastructure contract (including vehicle maintenance). This outcome is reasonably similar to the approach on Docklands Light Railway, and other schemes in preparation.

As stated in 5.2.1, the light rail market does not have a fixed template for how transactions should be undertaken. However, there has been a general approach on projects to date that a single contract has been let for all key activities in providing the tram service. **tie**'s approach clearly differs from this, in the ways set out below.

5.3.1 Introduction of Operator at Early Stage

A key plank of the Procurement Strategy is the decision to select the operator for the system well in advance of completing the Parliamentary process and having authority to let contracts for the fabric of the system.

The principal reasons for early involvement of the operator were that it:

- allows **tie** to use the operator's knowledge and experience during the Parliamentary approval, business case, planning, design, and commissioning phases, to ensure that the system will be capable of being operated effectively;
- allows input from an experienced operator on fares policy;
- facilitates proper planning of an integrated service network, especially with bus operations; and
- facilitates a phased build out of the system, as has been successful on the Docklands Light Railway project.

5.3.2 Separation of Operations and System Delivery

The separation of operations and system construction is a consequence of early operator involvement.

It allows those responsible for providing vehicles and infrastructure to concentrate on their strengths, with consequent benefits to contract pricing.

A full description of the reasons for pursuing early operator involvement is set out in Part 1 of Appendix B to this IOBC – Summary of Conclusions of Procurement Working Group.

5.3.3 Establishment of Joint Revenue Committee

Edinburgh is in an almost unique position, in that the main bus operator in the city is majority owned by the public sector. Therefore, the procurement strategy is seeking to exploit this

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opportunity by establishing TEL, with responsibility for coordinating the services of Lothian Buses and the tram.

Because of the large cost of transferring revenue risk over the long term to an operator, tie has decided to share revenue risk with the operator on a 3 year cycle. During each cycle, revenue risk will be shared between the operator and TEL, on a 30:70 basis. At the end of each cycle TEL will use the Joint Revenue Committee (and their advisers) to forecast a median expectation of traffic on which the pain/gain revenue share mechanism will be referenced for the subsequent 3 year cycle.

The advisers to the Revenue Setting Committee are being procured at present, and will initially be tasked with developing a new model that will forecast flows for the combined effects of the tram network and EARL.

5.3.4 Early Involvement of Designer

This allows tie to advance design work for sensitive sections of the lines, thereby reducing the planning and estimating risks to which bidders for the infrastructure contract are exposed to. It will also facilitate the advanced works on utility diversions.

5.3.5 Utilities Undertaken as Advanced Works

A significant benefit arising from undertaking design early is that tie can procure utility diversions early, thereby reducing programming and cost risk for the infrastructure providers, and creating the best opportunity to minimise disruption and maximise construction productivity.

5.3.6 Separate Selection of Infrastructure and Vehicle Providers

tie's approach of having separate competitions for infrastructure and vehicles means that it will be able to select its preferred option for each of the vehicles and the infrastructure. There are a relatively small number of vehicle providers in the light rail market, and asking them to partner with infrastructure providers would restrict the range of choice available to tie.

5.3.7 Hybrid PFI Funding

Were a PFI approach to be preferred, tie is proposing a payment mechanism for the Infraco which includes payments to the Infraco during the construction period on the basis of progress with the project and payments throughout the Infraco contract period linked to the availability and performance of the system. .

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5.4 Overview of Procurement Process**5.4.1 Introduction**

tie's analysis has resulted in a structure which it believes will provide the best value for money of all of the options available.

A key element to achieving this is the disaggregation of the procurement of the separate contracts required to achieve a tram service. However, tie also aims to retain the benefits of a structure which would normally be achieved through a single integrated procurement process

tie's intention is to achieve this by novating design and vehicle supply contracts to the Infraco. While this carries risks, tie believes that these can managed through a robust procurement process. Further detail on this is given in para 5.4.5 below.

tie's approach to the procurement process is an essential element of the procurement strategy and is best understood by breaking it down into three stages. Each of these three stages are described in sections 5.4.2- 5.4.4.

5.4.2 Selection of Operator

This first stage of procurement has already been completed.

During this stage tie let the DPOFA with the system operator (Transdev);

Early operator involvement is a key element of tie's approach to procurement. The involvement of the operator has assisted already with development of the conceptual design and the Parliamentary process. Further information on the process has been included in section 5.6 of this document.

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5.4.3 Project Development

During this phase, tie’s focus will be on development of the system definition and requirements, to establish a solid platform for the procurement of the vehicles and infrastructure contracts.

Key activities will be development of the design, progression of planning applications, diversion of utilities and development of tender documentation. In addition, negotiations with third parties will be undertaken at this stage, and further work will be carried out on the expected revenue arising from the system.

During this phase the contracts tie will procure and use will be:

- Joint Revenue Committee (details in Section 5.9);
- System Design Services Contract (SDS) and Technical Support Service Contract (TSS) (details in Section 5.7);
- Utilities Diversion Agreements and Utilities Diversion Framework Contract (details in Section 5.8); and
- Third Party Interface Agreements (eg NR, BAA) (details in Section 5.10).

Figure 5.1 below shows the contracts that tie will have entered into at the end of this second stage of procurement,

Figure 5.1

