

Edinburgh Strategic Sustainable Transport Study - Phase 1



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1 Introduction

Study Context

- 1.1 Edinburgh is a successful and thriving city, home to approximately 513,210 people¹. Over the period 2016 to 2026, it is projected that the population will grow by 7.7%².
- 1.2 High quality transport links, providing connections between where people live, work, receive education, shop and take part in leisure activities are fundamental to allow the city to grow in such a way that is economically and environmentally sustainable and socially equitable.
- 1.3 Edinburgh already has a successful bus and tram network. Though bus patronage across Scotland has been falling over a sustained period, decreasing by a further 1.5% between 2017 and 2018³, bus and tram patronage in Edinburgh has been broadly stable over the last few years. Edinburgh Tram opened in May 2014, and 7.3 million journeys were undertaken on Edinburgh Tram in 2019, a 10% increase on the previous year⁴.
- 1.4 Continued success and growth, in an inclusive and sustainable manner, will require the development and implementation of a coordinated approach to economic development, spatial planning and transport.
- 1.5 At a national level, this coordinated approach is being advanced through the Scottish Government's National Planning Framework and National Transport Strategy (NTS) and, in support of the NTS, the Strategic Transport Projects Review 2 (STPR2).
- 1.6 At an Edinburgh City level, the forthcoming City Plan 2030 (CP2030) will set out the spatial strategy and land allocations to 2030, which will be supported by the City Mobility Plan (CMP). The Edinburgh Strategic Sustainable Transport Study (ESSTS) has been remitted to examine strategic transport corridors within, and potentially beyond, Edinburgh to assess whether, and how, the development of transit-led solutions could deliver against stated transport objectives and support wider policy outcomes such as sustainable economic growth, reducing carbon, promoting equity and supporting healthier lifestyles.
- 1.7 The consideration of transit options will inform elements of the CP2030 by identifying where transit options have the potential to support housing, employment and mixed-use development in a sustainable manner. Transit proposals will also inform elements of the CMP, as policies and initiatives developed through the CMP must be developed to be mutually

¹ National Records of Scotland mid-year population estimates

² www.nrscotland.gov.uk/files//statistics/population-projections/sub-national-pp-16/pop-proj-principal-2016-tab-publication.pdf

³ www.transport.gov.scot/media/44025/scottish-transport-statistics-no-37-2018-edition.pdf

⁴ www.edinburghtrams.com/news/annual-patronage-2018-1

reinforcing with any transit solutions, such that the transport system as a whole is best able to address key challenges and deliver policy outcomes.

- 1.8 The regional dimension is important. Edinburgh is the hub of a sub-regional economy that extends north (to Fife), west (to West Lothian and Falkirk), east (to East Lothian) and south (to Midlothian and the Scottish Borders). There is significant commuting into Edinburgh from these areas (and within and between these areas) and these areas also support significant employment which, in turn, create complex demands for movement. Spatial planning therefore must also be coordinated at a sub-regional level, through SESPLAN and it follows that transport must be considered at a sub-regional level.
- 1.9 The remit for this study does not include proposals / interventions that are likely to be considered by STPR2. These include rail-based options (e.g. via Queensferry, Borders Rail) or enhancements to the strategic highway network (including the Edinburgh Ring Road / Orbital and A90). However, many of the transit-led options considered would have an integral role in enhancing regional travel options; as such, these cross-boundary linkages are highlighted in this report where appropriate.

Study Scope and Purpose

Corridors

- 1.10 The scope of the study focuses on ten strategic corridors which represent those that are more likely to be suitable for transit-based solutions.
- 1.11 The purpose of the Phase 1 study is to examine each of these corridors and identify those that should be prioritised for more detailed consideration of transit options as part of a more detailed Phase 2 study, which will include a transport appraisal for the proposed City Plan 2030.

Modes – Defining Transit

- 1.12 The working definition of transit for the purpose of this study encompasses public transport solutions that would deliver a step-change in provision above existing services, or that could be delivered from more incremental improvements such as service frequency enhancements.
- 1.13 For example, the Edinburgh Tram line materially enhances public transport connectivity and mobility between the city centre and the airport via its impact on capacity, accessibility (given that it serves an alternative corridor to bus), journey time reliability (via segregation) and service quality.
- 1.14 Originally, this tram line was envisaged as part of a wider network, with potential extensions to the south east (BioQuarter and beyond), West (Newbridge), Granton and Newhaven identified and safeguarded through Local Development Plan 1 (LDP1). To date, only the Newhaven extension, which is now under construction, has been progressed.
- 1.15 Tram represents a core component of this study but is considered from a fresh perspective given changes to both local policy and the transport network and development context, which has evolved since these corridors were last considered in the early / mid-2000s.
- 1.16 Bus-based transit options are also considered. Bus Rapid Transit (BRT) is a broad term covering a range of potential vehicle technologies and associated infrastructure (e.g. forms of segregation and guidance). However, the common feature is that BRT transit options would

seek, insofar as possible, to deliver the attributes (capacity, quality, reliability) that drive the step-change in provision required.

Phase 1 and Phase 2

- 1.17 The ESSTS will be undertaken in two phases. This report details the output of Phase 1 of the study and is aimed to identify and assess options, identify those best performing against the objective framework and inform options for CP2030.
- 1.18 Prioritised options will then be taken forward to more detailed consideration in Phase 2, at which time a more detailed transport assessment and appraisal process will be undertaken.

Overview of Approach for Phase 1

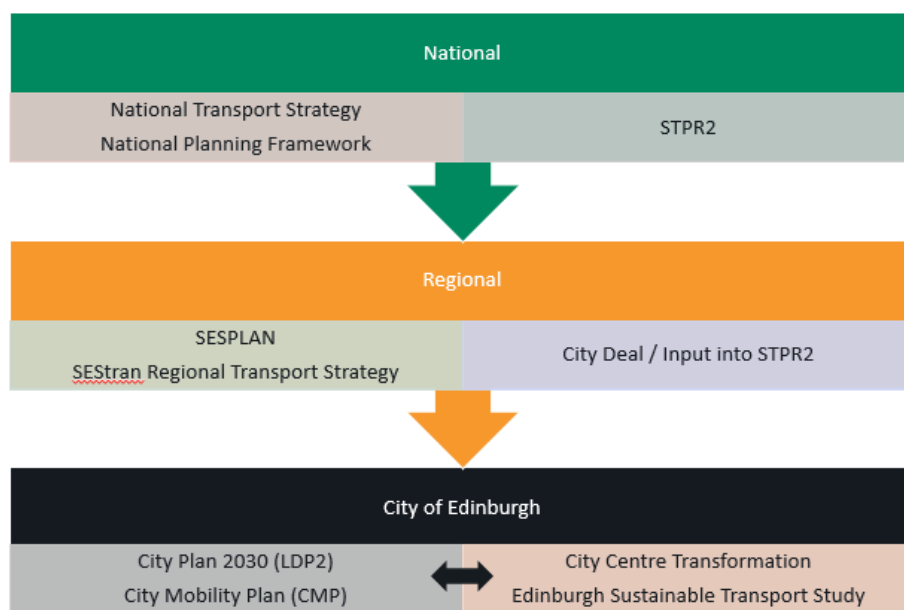
- 1.19 The approach taken to Phase 1 of the ESSTS has been as follows:
- **Review of the strategic policy context:** this review considered the national, regional and local policy background within which strategic transit corridors would be developed;
 - **Objectives development:** Taking the findings of the policy review, commonalities were identified across the objectives to enable study objectives to be developed which were also supportive of wider policy;
 - **Baseline analysis:** A range of existing data sources were used to preliminarily assess and establish a baseline for demand and capacity;
 - **Identification of Priority Transit Corridors:** Transit corridors were then considered and sifted to identify those most suited to strategic transit interventions. The role of strategic active travel was also considered;
 - **Options development:** Those corridors identified as a priority for strategic transit interventions were then further developed with greater consideration of engineering, technological, environmental, complexity, cost-benefit, planning and legal risk factors;
 - **Future transit network:** Considering the outcomes of the study, implications on a future transit network were discussed; and
 - **Recommendations:** Finally, a set of recommendations were provided to inform Phase 2 of the ESSTS study.

2 Strategic Policy Context

Introduction

- 2.1 This chapter provides a short summary of current policy context. Key national, regional and local policies are summarised in Figure 2-1.

Figure 2-1: Policy Framework



National Policy

National Planning Framework

- 2.2 The Third National Planning Framework (NPF) sets out a long-term vision for development and investment across Scotland over the next 20 to 30 years. It is the spatial expression of the government economic strategy and plans for infrastructure investment.
- 2.3 The strategy for a successful, sustainable place highlights the particular scope for the cities network to progress the country's economic agenda. To this end, the Scottish Cities Alliance and local authorities will take forward the priorities set out in the City Investment Plans.
- 2.4 The Scottish Cities Alliance will bring the City Investment Plans together into a shared investment portfolio brochure, communicating a consistent investment message across the cities network.
- 2.5 As an early priority, the Scottish Government will examine current planning authority approaches to aligning planning and infrastructure investment to inform whether further

advice on this is required. The Scottish Government will also work with the Cities Alliance to progress Smart Cities initiatives.

National Transport Strategy 2

- 2.6 The National Transport Strategy 2 (NTS2) was published in draft in July 2019 for consultation. The overarching vision is:

We will have a sustainable, inclusive and accessible transport system, helping deliver a healthier, fairer and more prosperous Scotland for communities, businesses and visitors.

- 2.7 The vision is underpinned by four Priorities, each with three associated outcomes as summarised in Table 2-1 below.

Table 2-1: NTS2 Priorities, Outcomes and Indicators

Priority	Outcome	Indicator
Helps our economy prosper	Will get us where we need to get to	1. Spend on transport and vehicles relative to income 2. Measure of Transport Poverty
	Will be reliable, efficient and high quality	3. Modal share of transport – focus on gender, income, geographic, age, and disability status segmentation
	Will use beneficial innovation	4. Accessibility of key services
Promotes equality	Will be affordable for all	5. Proportion of petrol, diesel and EV car and van registrations
	Will be easy to use for all	6. Use of sustainable transport modes / modal shift to sustainable modes
	Will provide fair access to the services we need	7. Rates of walking and cycling for everyday short journeys
Takes climate action	Will adapt to the effects of climate change	8. Connectivity to employment and key services 9. Movement of freight
	Will help deliver our net-zero target	10. Satisfaction with public transport 11. Performance measures of public transport modes
	Will promote greener, cleaner choices	12. Indicator to be developed
Improves our Health and wellbeing	Will be safe and secure for all	13. Transport casualties and accidents 14. Measure of air quality
Helps our economy prosper	Will enable us to make healthy travel choices	15. Availability of segregated walking and cycling infrastructure
	Will help make our communities great places to live	16. Rates of walking

- 2.8 In order to deliver the strategy, the Scottish Government proposes to take action in three key areas: Increasing Accountability, Strengthening Evidence and Managing Demand.

- 2.9 A Delivery Plan will build on the policies and enablers set out in the strategy.

- A key part of the Delivery Plan will be the update to the Climate Change Plan. To inform this, there will be a strengthening of the evidence base on the role of behaviour change and technology in delivering pathways to net-zero emissions.
- The second Strategic Transport Projects Review (STPR2) will set out a 20-year plan for transport investment through the lens of the Strategy's Priorities and in line with the Sustainable Travel and Investment hierarchies.

- the Transport Bill – which offers an ambitious new model for bus services. It provides local transport authorities with options to influence and improve bus services in their area, ensuring that there are sustainable bus networks across Scotland.

Strategic Transport Projects Review 2 (ongoing)

- 2.10 The Strategic Transport Project Report 2 (STPR2) will consider the interventions required to help support the NTS2 as well as providing a fit with Scottish Government plans, policies and strategies and will ultimately inform the next Infrastructure Investment Plan.
- 2.11 The aims of STPR2 are:
- to conduct a whole-Scotland, evidence-based review (in accordance with Scottish Transport Appraisal Guidance or STAG) of the performance of the strategic transport network across all transport modes against clear criteria on operational performance, safety, and environmental impact, whilst fundamentally supporting Scotland's Economic Strategy, including inclusive growth. Outcomes will be defined in the emerging and updated NTS2; and in so doing,
 - to make recommendations for potential transport investments for Scottish Ministers to consider as national investment priorities in an updated 20-Year Infrastructure Investment Plan for Scotland.
- 2.12 The STPR2 study will:
- recommend to Transport Scotland a programme of interventions for the period 2022 to 2042 which will make a significant contribution to delivering the new NTS2;
 - ensure that the outcomes of STPR2 align with other Scottish Government national plans, policies and strategies, the National Planning Framework, the Climate Change Plan and will consider the commitments made to City and Regional Growth Deals; and
 - use the established STAG methodology, to re-consider the extant recommendations of the first STPR and other candidate interventions in the light of NTS2 policies as part of the initial optioneering exercise.

Regional Policy

SESplan (South East Scotland Strategic Development Plan)

- 2.13 The Strategic Development Plan (SDP) sets out a spatial strategy which seeks to promote a secure and sustainable pattern of growth.
- 2.14 SESplan2 proposed an updated spatial plan but this was rejected by Scottish Ministers in May 2019. As a result, SDP1 (approved 2013) remains current; it is the approved strategic plan and reflects the ambitions and commitment of the six authorities (Edinburgh, Midlothian, West Lothian, East Lothian, Fife and Scottish Borders) to realising the potential of the area and ensuring it continues to play a leading role in a national context.
- 2.15 The SDP provides a framework for the six LDPs in the SESplan area to allocate sufficient land for housing development to ensure that the area's overall assessed housing requirements can be met by new house completions. The scale and distribution of sites is shown in Table 2-2.

Table 2-2: SESplan housing completions by 2024

Location	Potential House Completions
Edinburgh	32,200
East Lothian	6,400
Fife	24,500
Midlothian	10,200
Scottish Borders	10,000
West Lothian	22,300
Total	105,600

Source: Strategic Development Plan, June 2013, Table 4

- 2.16 Many housing development sites are either within Edinburgh or within the city's commuter catchment. This has significant implications for transport demand and commuting, placing pressure on road and rail networks in particular.
- 2.17 There are four Strategic Development Areas located within Edinburgh as shown in Figure 2-2. The other 9 are in the other SESplan local authority areas. The 4 are the city centre, West Edinburgh / Edinburgh Airport, the BioQuarter and Waterfront.
- 2.18 Transport and public accessibility have been key in developing the spatial strategy for the region. The plan recognises that existing commuting patterns by public transport are focused on the city centre; proposed transport improvements seek to help address this, including trams to Newhaven, Tram Line 3, A720 Orbital Bus and A90 corridor improvements.

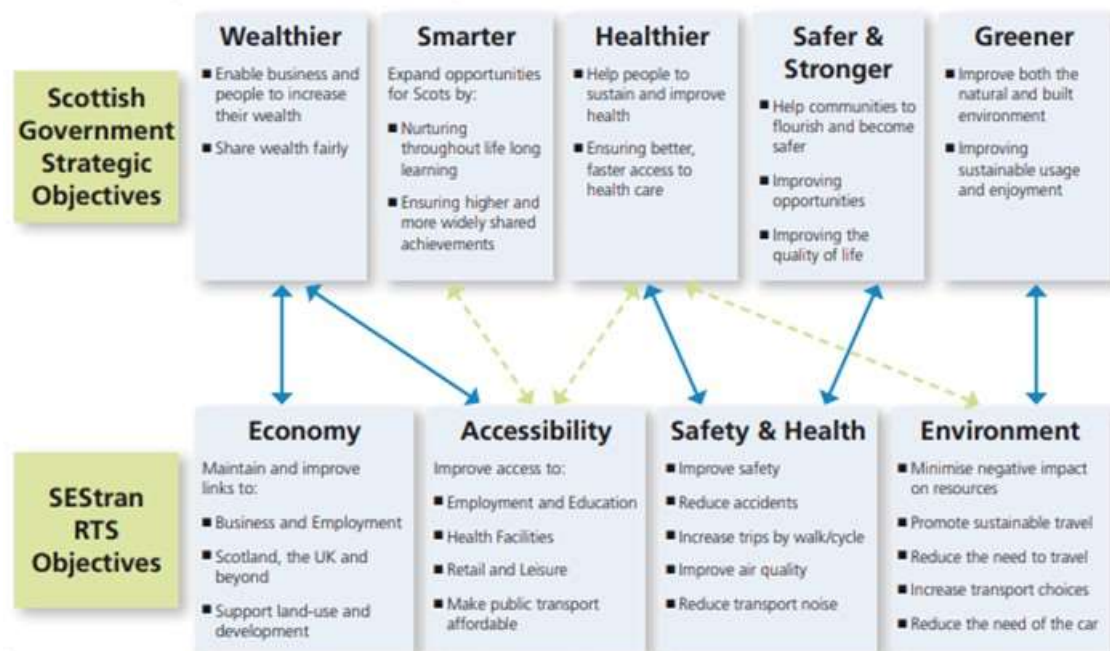
Figure 2-2: SESplan regional core transport investment



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SEStran (South East Scotland Regional Transport Strategy, 2015 refresh)

- 2.20 The SEStran Regional Transport Strategy (RTS) provides a strategic framework for transport management and investment for the partnership area over a 10-15 year period. Originally approved in 2008, a refresh was approved by the Scottish Government in July 2015.
- 2.21 The vision of the strategy is the ‘development of a transport system which enables businesses to function effectively, allows all groups on society to share in the region’s success through high quality access to services and opportunities, respects the environment and contributes to better health’.
- 2.22 Regional Transport Strategy Objectives have been developed under the four main categories covered in the overarching Vision Statement: Economy, Accessibility, Environment, and Safety and Health. These link back to the Scottish Government Strategic Objectives as illustrated in Figure 2-3.

Figure 2-3 SEStran Regional Transport Objectives

- 2.23 A series of policies have been developed supporting the actions to be promoted under the RTS together with an agreed monitoring programme and action plan.
- 2.24 Key themes covered by the strategy include:
- Connectivity - the need for a sustainable approach, supporting the long-term competitive position of the area through resource efficiency, social inclusion and minimum environmental impact.
 - Region-wide measures – including influencing travel behaviour, smart ticketing, freight distribution, etc.
 - Initiatives for specific groups – relevant to: access to healthcare, employment, public transport in rural areas and the needs of disabled people.
 - Regional Transport Corridors - primarily concerned with targeting improvements in public transport towards the main regional corridors of commuting travel within SEStran and between SEStran and its neighbouring areas.

City of Edinburgh (Local) Policy

Edinburgh Local Development Plan (LDP1, adopted 2016)

- 2.25 The Edinburgh Local Development Plan (2016) builds on SESPlan above and sets out the spatial strategy for the city. The majority of growth is targeted around four strategic development areas as follows and also shown in Figure 2-4.

- The city centre;
- The Waterfront;
- West Edinburgh; and
- The South East.

City Plan 2030 (Local Development Plan 2)

- 2.26 The City of Edinburgh Council has now started to prepare a new Local Development Plan, City Plan 2030. Choices, the statutory Main Issues Report stage of City Plan is informed by SDP1, the evidence base of SDP2 as appropriate, National Planning Framework 3 and outputs from the Edinburgh Strategic Sustainable Transport Study.
- 2.27 In particular, the Edinburgh Strategic Sustainable Transport Study (ESSTS) has helped inform site assessment, based on the current and potential (i.e. with transit improvement) transport accessibility and capacity across a long-list of potential sites.

Links between CP2030 and the ESSTS

- 2.28 The ESSTS supports two key elements of CP2030:
- the degree to which current / planned / proposed public transport infrastructure, routes and services can support the development of **established spatial priority areas** such as the city centre, West Edinburgh, South East Edinburgh and the Waterfront; and
 - the degree to which current / planned / proposed public transport infra, routes and services could help bring forward **areas for new development** by providing enhanced levels of public transport accessibility and capacity.
- 2.29 In each case, transport accessibility is one of a number of factors that will determine how and whether sites are taken forward to consultation and potential future adoption within the CP2030 development process.

Figure 2-4: LDP1 Spatial Strategy Summary Map (2016)



City Mobility Plan

- 2.30 The City Mobility Plan supersedes the Local Transport Strategy for Edinburgh. It provides a strategic framework for proposed interventions aimed at helping the safe and effective movement of people and goods around Edinburgh whilst seeking to address associated environmental and health impacts. It comprises a series of objectives and policy measures under the headings of People, Place and Movement which will, collectively, achieve the Vision for the Plan:

"Edinburgh will have a greener, safer, inclusive and connected transport system delivering a healthier, thriving, fairer and compact capital city, and a higher quality of life for Edinburgh residents".

- 2.31 The Objectives of the plan are:
- People objectives seek to improve health, wellbeing, equity, and inclusion by:
 - Improving travel choices for all travelling into, out of and across the city;
 - Improving the safety for all travelling within the city; and
 - Increasing the proportion of trips people make by healthy and sustainable travel modes.
 - Place objectives seek to protect and enhance our environment and respond to climate change by:
 - Reducing emissions from road transport;
 - Reducing the need to travel and distances travelled; and
 - Reducing vehicular dominance and improve the quality of Edinburgh's streets.
 - Movement objective seek to support inclusive and sustainable economic growth by maximising the efficiency of Edinburgh's streets to better move people and goods.

Links between the CMP and the ESSTS

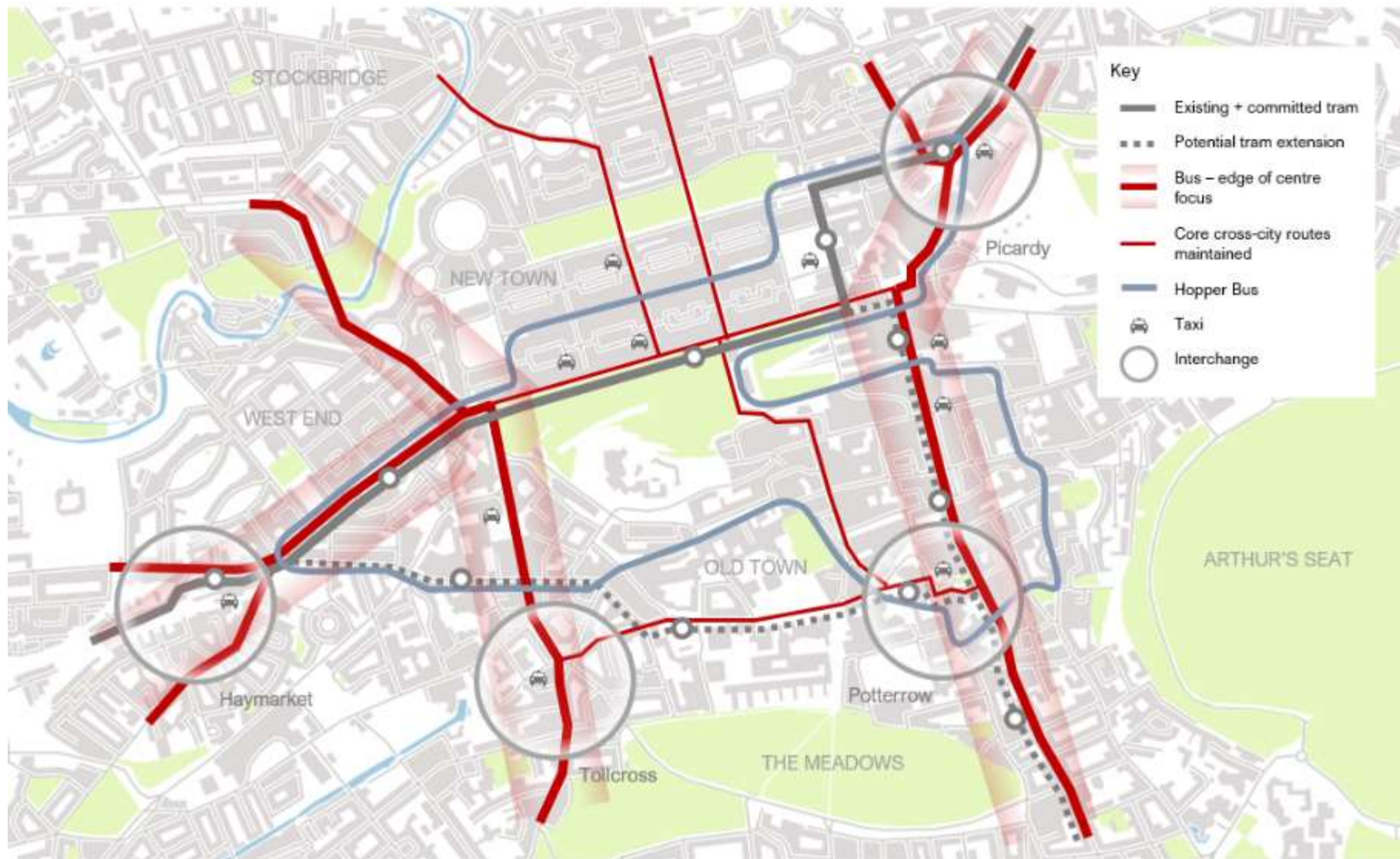
- 2.32 The CMP policy measures will be supported by an Implementation Plan, outlining a series of specific measures to be delivered over the plan period. Key themes are managing demand, optimising streets, creating people friendly streets, planning for new development and strengthening public transport.
- 2.33 The ESSTS is an important input to the development of the CMP. It has helped identify those corridors where transit-based solutions are deliverable and those where continued investment in bus-based solutions are preferred. It has also provided an indication of the long-term development implications of major transport investment, in completing transit links through south east Edinburgh to the Borders Railway and westwards towards Heriot-Watt University and Curriehill station.

City Centre Transformation

- 2.34 The vision of the City Centre Transformation Project has been to create a city centre for all, a place for people to live, work, visit and play. The vision also aims for a city centre that is a place that is at the heart of Edinburgh's communities, its cultural life, the focal point for its economy and one of Scotland's most iconic and important locations.
- 2.35 Through a series of engagement activities, the strategy proposes a wide range of interventions to provide a more liveable city centre in terms of active travel, public transport, traffic reduction and quality of open space. The strategy is supported by a detailed ten-year delivery plan.

- 2.36 Across the whole of the city centre, the strategy will seek to deliver:
- A **walkable city centre** core right at the heart of the World Heritage Site, enabled by a **pedestrian priority zone** and a network of connected, high-quality, car-free streets;
 - **High-quality streets and public spaces** where improvements allow for people to be inspired by the city's unique heritage while they interact, relax or play;
 - A connected network across the city centre of **new segregated and safe cycle routes** to link communities and destinations, including the provision of a **new walking and cycling bridge connecting the Old Town and the New Town**; and
 - A **free city centre hopper bus** to support people moving around a city without a car, linking city centre communities.
- 2.37 The strategy seeks to promote public transport through improved journey times and service reliability. Options explored include limited bus stop rationalisation, improved traffic signal sequencing and the rerouting of selected bus routes to improve core performance. Instead of all routes crossing the city centre via Princes St, some would instead 'kiss' the centre as shown in Figure 2-5.
- Linkages between CCT and ESSTS*
- 2.38 To deliver the emerging strategy, there is a requirement for a mode shift to public transport to help deliver a 10-15% reduction in city centre car traffic in the medium term and a 25-30% reduction in the longer term. The City Mobility Plan and accompanying Action Plans will provide helpful policy / strategy support but won't be sufficiently detailed with regards to individual schemes.
- 2.39 City Centre Transformation recognises the importance of tram in delivering a step-change in public transport provision. As such, it has considered opportunities for Edinburgh Tram, including the potential for a second cross-city route.
- 2.40 In terms of consideration for ESSTS, the study provides insight on the following:
- the overall public transport demand and capacity on key corridors into the city; and
 - the implication for demand and capacity from a combination of planned growth and modal shift consistent with the target reduction of traffic in the city centre.
- 2.41 The potential of public transport options (bus, tram) to provide this level of capacity at a corridor level, and the increase in city centre demand and growth that could potentially be provided by an enhanced tram network.

Figure 2-5: CCT Public Transport Map



3 Objectives and The Case for Change

Developing Study Objectives

- 3.1 It is essential that the ESSTS study is fully consistent and aligned with national, regional and local objectives. In this respect, the ESSTS is not seeking to develop 'new' objectives but seeks to ensure alignment with those that have been or are currently in development.
- 3.2 As summarised in Section 2, relevant current and emerging policy has been reviewed, and the relevant objectives have been compared against each other.
- 3.3 It should be noted that key policy documents are not formally adopted; for example, the NTS2 is a consultation document, CMP objectives have not been formally adopted and the STPR2 national and regional objectives will not emerge until November/December. Objectives are, to an extent, fluid and will therefore need to be reviewed on an ongoing basis, and ESSTS objectives 'refreshed' in the light of any changes.
- 3.4 However, the review identifies a very high degree of consistency across policy documentation (around four key themes of Economy, Equality, Climate Action and Health / Wellbeing). While the detail of the objectives may change (e.g. wording and emphasis), substantive changes to the core objective themes are not expected.
- 3.5 Additionally, given the modal and geographic scope of ESSTS, and its spatial-planning dimension (brownfield and greenfield) it is necessary to set out how options will be assessed to determine their fit with the agreed objectives and expected outcome levels.
- 3.6 In this respect, metrics and measures have been identified through this study which support an assessment of the baseline and options against objective-related criteria.
- 3.7 This objective-led assessment was then combined with a 'deliverability assessment' of shortlisted options to provide an overall qualitative assessment of potential transit options.

Review & Mapping of Objectives and Suggested ESSTS Objectives

- 3.8 The review of the national, regional and local objectives showed strong alignment across each strategic policy level. While the terminology and combination or separation of objectives differs slightly between various policy documents, there are nevertheless consistent objectives across the themes of economic growth, social inclusion, health, environment and safety.
- 3.9 It was agreed that the study objectives should reflect and show clear and explicit alignment to those of the CMP as these are Edinburgh specific. However, the level of consistency between the CMP and regional / national strategy means the ESSTS aligns well to all levels. Table 3-1 summarises relevant objectives from the NTS2, City Plan 2030 and CMP emphasising close alignment across the strategic levels. Note that draft STPR2 Objectives are not yet finalised.

Table 3-1: Objective Mapping

NTS 2019	City Plan 2030	City Mobility Plan	Comment & suggested ESSTS objective (align with CMP)
Helps our economy prosper - Will get us where we need to get to - Will be reliable, efficient and high quality - Will use beneficial innovation	A city where everyone shares in its economic success	to support inclusive and sustainable economic growth	- Clear alignment of objectives at national and city level. - Suggested theme for ESSTS “Sustainable Economic Growth and Development”
Promotes equality - Will be affordable for all - Will be easy to use for all - Will provide fair access to the services we need	- A city in which everyone lives in a home which they can afford - A city where you don’t need to own a car to move around	to improve health, wellbeing, equity, and inclusion	- Clear alignment of objectives at national and city level - Suggested theme for ESSTS “Improved equity & social inclusion”
Improves our Health and wellbeing - Will be safe and secure for all - Will enable us to make healthy travel choices - Will help make our communities great places to live	A sustainable city which supports everyone’s physical and mental wellbeing		- Clear alignment of objectives at national and city level - Suggested theme for ESSTS “Improved health, wellbeing & safety”
Takes climate action - Will adapt to the effects of climate change - Will help deliver our net-zero target - Will promote greener, cleaner choices		to protect and enhance our environment and respond to climate change	- Clear alignment of objectives at national and city level. - Suggested themes for ESSTS: “Reduce transport-related carbon emissions” “Improved built & natural environment”

The Case for Change – The Role of Transit Corridors in supporting key objectives

- 3.10 Corridor enhancements which deliver capacity and reliability improvements, improve the quality of the transport offer, and improve connectivity and accessibility to and within the city of Edinburgh will deliver outcomes against each of the five objectives identified in Table 3-1.
- 3.11 A range of desirable outcomes can be achieved, against each of the five objectives as summarised Figure 3-1 and explored more fully in Table 3-2. These outcomes enable strategic transit options to be assessed objectively using a range of associated metrics.

Figure 3-1: Objectives and associated outcomes

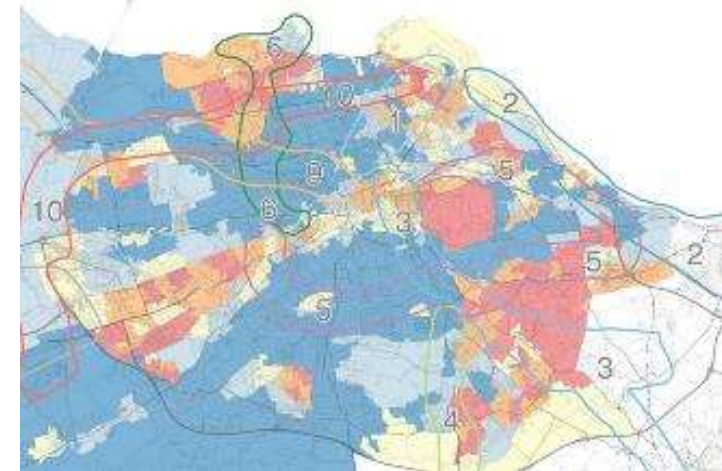


Table 3-2: Elements of Objective Led Assessment

Objective / Outcome	The Role of Transit / Strategic Active Travel
Sustainable Economic Growth and Development	Transit and strategic active travel can support sustainable economic growth through: • Expanded labour market catchments, enabling businesses to recruit from a larger labour pool and giving workers greater access to jobs. • This, in turn, can enhance the attractiveness of key employment locations as places where firms invest, locate and expand. High-quality public transport accessibility is key to supporting development and success of Edinburgh’s strategic development areas where employment will be focused – the city centre, West Edinburgh, the BioQuarter and Waterfront. Active travel can increase overall accessibility, provide ‘first and last mile’ connections and enhance urban environment at key locations. • Increasing connectivity between major employment centre, and encouraging new firms to invest and locate, further support the success of Edinburgh’s high-value economy through increasing the clustering effects of key sectors (e.g. banking and finance, bio-science, legal and business services). This increased clustering increases overall productivity for all forms through ‘agglomeration’ benefits. • Increasing business efficiency by reducing travel times. • Supporting the development of new housing / mixed-used development in a sustainable manner. High-quality transit can increase the scale, rate, density and value (and hence viability) of development, by providing the accessibility, connectivity and capacity for growth. Active travel can support this and positively enhance the quality and attractiveness of communities. • Transit and active travel also encourage modal-shift from cars, increasing the efficiency of the overall transport network and reducing the economic costs associated with congestion, accidents and emissions. 

Objective / Outcome	The Role of Transit / Strategic Active Travel
Improved equity & social inclusion	Transit and strategic active travel can contribute to enhancing equity and social inclusion through: • Providing improved access to jobs, education, healthcare and leisure. Whilst public transport accessibility is generally good to the city centre, a transit network can open up opportunities for cross-city journeys. For example, the tram extension to Newhaven will significantly improve accessibility between Leith Waterfront (an area of high deprivation) and employment opportunities in West Edinburgh. • A high proportion of lower income / more deprived residents do not own or have access to a car; consequently, access to public transport is key to their ability to access jobs and services. • The affordability of public transport is an issue for many. Alongside future development of transit, consideration of a more integrated ticketing system which operates across public transport modes would support social inclusion. • Active travel can provide affordable accessibility and connectivity in corridors / areas that are less well served by public transport.
Reduce transport-related carbon emissions	Transit and strategic active travel can assist in tackling the causes of climate change by: • Encouraging modal shift from single occupancy car journeys to public transport. High-quality transit can deliver substantial modal shift from car, particularly when this is paired with strategic use of Park & Ride infrastructure, such as that currently in place at Ingliston. The mode shift potential of transit also increases as the network develops to offer a greater quality of service and more potential destinations. Active travel can enhance modal shift in transit corridors and also cater for demand / movements that are less well served by public transport (e.g. orbital movements)

Index of Multiple Deprivation



Objective / Outcome	The Role of Transit / Strategic Active Travel
Reduce transport-related carbon emissions (continued)	• Supporting sustainable housing and employment development such as increased density in urban areas and the development of brownfield sites. Higher density urban development reduces the need to travel and encourage shorter journeys and more walking, cycling and public transport usage. The carbon costs associated with providing associated infrastructure and services (electricity, waste, broadband etc) are also lower for higher-density urban development.
Improved built & natural environment	Transit and strategic active travel can support wider enhancement to the public realm and streetscape. • Edinburgh City Council has developed an ambitious plan for City Centre Transformation, focused on enhancing the quality of the city centre environment for all users, and prioritising the role of streets as ‘destinations’ rather than solely for ‘movement’. The City Centre Transformation strategy and enhancement of ‘place’ across the city has the needs of pedestrians and cyclists at its core. The development of transit solutions can be an enabler of this vision by reducing traffic dominance in car and bus-centric locations, thereby assisting in the delivery of the City Centre Transformation Vision. At the individual street level, transit can be integrated within an enhanced streetscape. • For development locations along the route, transit can support the delivery of housing and mixed-use developments at a higher density and rate than would otherwise have been the case. Such density can support increases in local public services (e.g. schools, health facilities, community facilities) and other activity (shops and services) that all contribute to improving resident quality of life and visitor experience. 

Objective / Outcome	The Role of Transit / Strategic Active Travel
Improved health, wellbeing & safety	Transit and strategic active travel corridors can be designed and developed to ensure that active travel links are maintained and enhanced. This would be the case for all transit corridors, but in particular for: • The city centre, where the overall CCT strategy is focused on improving facilities for pedestrians and cyclists, hence supporting healthier lifestyles. • Where transit is developed alongside corridors that have strong existing public realm and active mode provision. This was the case for the Newhaven (Tram Completion) project and would be the case for Granton. • Where there is the opportunity to provide wholly new or fundamentally upgraded transit and active mode provision in proposed transit corridors. This might be the case for potential transit extensions to the West of Edinburgh Park. • Transit can also reduce accidents and emissions at a broad spatial level (through modal shift and reduced car kilometres travelled), and through integrated design of transit / active modes provision involving the reduction of traffic on transit corridors and associated reductions in localised emissions and accidents. 

Key metrics to inform transit option assessment

- 3.12 Quantifying the potential performance of each corridor in numerical terms is outside the scope of this phase of work – instead, a set of key metrics have been identified, linking to the outcomes shown in Figure 3-1 which allow assessment via qualitative means. The metrics used to inform the transit options assessment are as follows:
- Public transport connectivity (incl. reliability, capacity & quality);
 - Accessibility via public transport;
 - Enhanced active travel connections;
 - Level of baseline deprivation in corridor, measured by the Scottish Index of Multiple Deprivation;
 - Provision of direct high-quality public transport access to key housing / mixed use sites (existing designations);
 - Support new employment by enhancing access to and attractiveness of key designated employment areas; and
 - Mode shift potential (shift from car to public transport / active modes) and resulting reduction in car kms.
- 3.13 How these metrics relate to each of the strategic objectives and desired outcomes is shown in Table 3-3 overleaf.

Table 3-3: Objectives and associated measures

Metric	Sustainable Economic Growth and Development		Improved equity & social inclusion		Reduce transport-related carbon emissions	Improved built & natural environment		Improved health, wellbeing & safety		
	Sustainable economic growth	Sustainable land use development	Improved access to jobs, education, healthcare and leisure	Affordability		Positive impact of transport infrastructure on place (new and existing e.g. city centre)	Physical impact of transport measures	Promoting healthier lifestyles via physical activity	Reduced local emissions / improved air quality	Reduced accidents (based on change in car kms)
Public transport connectivity (incl. reliability, capacity & quality)	✓		✓		✓					
Accessibility via public transport	✓		✓		✓	✓			✓	✓
Enhanced active travel connections	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Provision of direct high-quality public transport access to key housing/mixed use sites (existing designations)		✓	✓	✓	✓	✓	✓	✓	✓	✓
Support new employment by enhancing access to and attractiveness of key designated employment areas		✓	✓	✓	✓	✓	✓			
Mode shift potential (shift from car to public transport /active modes) and resulting reduction in car kms.	✓				✓				✓	✓

4 Corridor Overview and Baseline Analysis

Corridor Overview

- 4.1 This chapter provides an overview of the ten corridors that form part of the study. The broad corridors were agreed with City of Edinburgh Council at the study outset and refined at a detailed level during the study. The corridors form the basis for consideration of transit options. The corridors are presented in Figure 4-1 and are described in Table 4-1.

Figure 4-1: Strategic corridors



Table 4-1: Public Transport Strategic Corridors – Description

#	Corridor Name	Corridor Description
1	New Town to Granton via Newhaven	Route: City centre to Granton via Leith Walk, Leith Waterfront, Newhaven.
		Transport Context: - High demand corridor, particularly between Leith Walk and the city centre. - Route of planned 'Tram Completion' from Newhaven via Leith Walk, serving high demand corridor and connecting major Waterfront development area.
		Development context: Waterfront area is major strategic brownfield development designation.
		Opportunities: - Opportunity to extend tram from Newhaven to Granton to serve Waterfront area and provide connectivity from Granton to the city centre (see Corridor 6). - Opportunity to extend tram towards Portobello / Musselburgh (see Corridor 2).
2	Leith to Musselburgh via Portobello	Route: Extends from Leith to Musselburgh via Portobello, enabling development along Salamander Street and Seafield Road.
		Transport Context: Relatively poor transport accessibility in parts of the corridor.
		Development Context: Major brownfield redevelopment opportunities in the northwest of the corridor.
		Opportunities: - Support brownfield redevelopment west of Portobello. - Potential link to Newhaven Tram Route in Leith (Corridor 1). - Good opportunity for improved Active Travel links.
3	City centre to BioQuarter/ Royal Infirmary (and beyond)	Route: Princes St, the Bridges, Cameron Toll, Royal Infirmary / BioQuarter and then to the Borders Railway and Newcraighall or Shawfair.
		Transport Context: - Strong established demand drivers including major employment centre at BioQuarter. - Very high demand bus corridor.
		Development Context: - Major strategic employment site at / around the BioQuarter. - Key development opportunities include Cameron Toll, Craigmillar and Shawfair. - A number of potential sites under consideration as part of CEC site options assessment (part of City Plan 2030 process).
		Opportunities: - Potential to serve major development areas in SE Edinburgh / Midlothian. - Several options exist south of the BioQuarter including via Sheriffhall P&R (and onwards to Dalkeith) and / or to Newcraighall P&R (linking with Borders Rail).

#	Corridor Name	Corridor Description
4	City centre to Easter Bush / Straiton	Route: Princes St, the Bridges, Cameron Toll, then to Easter Bush via Liberton Brae, Burdiehouse and Straiton to Easter Bush.
		Transport Context: Strong existing catchments, reflected in high demand bus services.
		Development Context: A number of potential sites under consideration as part of CEC site options assessment (part of City Plan 2030 process).
		Opportunities: - Potential convenient 'anchor' at Straiton P&R. - Corridor for transit to utilise A701 Link Road which could bring environmental and cost saving advantages. - Potential opportunity for transit-led development for sites emerging through the City Plan 2032 process.
5	South Suburban	Route: Route of former South Suburban railway, currently used for freight services.
		Transport Context: - Historic route provided as an orbital passenger service. Route already provides strategic freight route. - Options previously considered / suggested include rail and tram / train options.
		Development Context: Urban area development sites around Duddingston.
		Opportunities: - Could support orbital movements via segregated link and improve connectivity towards the west of the city. - Relieve capacity on inner sections of the transport network.
6	City centre to Granton	Route: City centre to Granton Waterfront via former rail alignment. Tram route to Granton is protected within existing LDP.
		Transport Context: - Serves established demand and major planned development. - Established and well used active travel link to North Edinburgh via former rail alignment.
		Development Context: - Major Waterfront development underway at Granton. - Major development opportunities including Waterfront and Gasworks sites. - Other major destinations in corridor include Western General Hospital and Craigleith Retail Park.
		Opportunities: - Route would support major development at the Waterfront and Gasworks. - Potential for further extension to Leith (to the east) and / or connection with bus feeder services from the west.

#	Corridor Name	Corridor Description
7	West to Newbridge	Route: - Corridor serving major new development along the A8 corridor, west of Edinburgh Park. Could connect with tram (from Ingliston - the route is safeguarded in the LDP) – or be served by bus transit. Route could serve new Park & Ride at Newbridge though a site would still have to be found. Transport Context: - Corridor currently served by bus. - Current LDP protected tram corridor to Newbridge. Development Context: - Corridor serves part the West Edinburgh strategic development area. - Potential opportunity for transit-led development for sites emerging through the City Plan 2030 process. Opportunities: - Opportunity for transit to enable and support development in corridor and provide enhanced connectivity to West Edinburgh and the city centre. - Opportunity for transit corridor to potential further extension to Broxburn. - Opportunity for a new Park and Ride interchange west of Newbridge.
8	West of Hermiston Gait	Route: - Broad corridor west of Hermiston, encompassing Heriot-Watt University and Curriehill Station and future potential development areas. Transport Context: - Bus services serve Heriot Watt and Hermiston P&R. - Rail services from Curriehill (hourly at present). Development Context: - Significant potential greenfield development land (being considered through the City Plan Process), which transit could help bring forward in a sustainable manner. Opportunities: - Significant greenfield land offers potential for transit-led development & urban expansion. - Opportunities to connect to Heriot Watt, Hermiston Park and Ride and Curriehill Station. - Opportunity to link with existing tram route (around Edinburgh Park or Bankhead) or for bus-based transit options.
9	City centre to Queensferry	Route: - Major strategic corridor to Fife (and the north of Scotland) via the A90. Transport Context: - The most heavily trafficked route in and out of Edinburgh by far. - Key arterial route to the north. Significant delays are made even worse during the summer months and festival periods. - Key rail corridor from Fife to Edinburgh, but capacity issues constrain demand. - Capacity issues for car and bus / coach. Major delays, particularly outbound in evening period. - Existing P&R sites at Ferrytoll and Halbeath perform extremely well.

#	Corridor Name	Corridor Description
		Development Context: - Future development pressure, particularly from continued growth in south Fife. Development sites already allocated in Queensferry, Kirkliston and development pressure at Craigiehall. Opportunities: - Strategic corridor interventions will be under consideration in STPR2, including rail, highway and bus / ferry. - Development of a new Park and Ride site, as well as expansion to existing P&R sites in Fife. - Targeted bus priority improvements at Blackhall junction and other locations.
10	West Edinburgh to North Edinburgh	Route: - Major growth corridor with potential to improve connectivity to Edinburgh tram and Edinburgh Gateway station. The corridor covers orbital movements from West Edinburgh towards north Edinburgh including the Waterfront and the Ferry Road corridors. Transport Context: - Currently poorly served by public transport and high levels of general traffic congestion. There has been investment in Edinburgh tram and Edinburgh Gateway station but benefits of these have not been fully realised. - Airport growth and development in West Lothian will add further transport demand. Development Context: - The corridor serves the largest opportunity for commercial (employment) development in Edinburgh. Key development sites include Edinburgh Park completion, Cammo and West Craigs residential, International Business Gateway (IBG) and Crosswinds. Opportunities: - Improved connectivity between the north and west of Edinburgh to major development sites. - Future developments, particularly those with limited on-site parking (or covered by current or future controlled parking zones) are anticipated to further increase demand for public transport along this corridor, supporting the case for, and potential viability of, increased provision. - The redevelopment of Gyle shopping centre could deliver improved interchange facilities. - Several multiple deprivation areas served along the route.

Baseline Analysis

- 4.2 The overall suitability of corridors for transit solutions will, in part, be informed by the socio-demographic factors (which inform base levels of demand), the spatial planning context (informing future demand), transport accessibility and socio-economic factors.

Population and Employment Density – Existing Land Use

- 4.3 Figure 4-2 outlines areas of the City of Edinburgh local authority area with high and low population density based on the results of the 2011 census. This is presented for key geographic areas (known as Scottish data zones) and are composed of aggregates of the smaller census output areas to represent communities. Population density is based on the number of people per hectare in these areas. Higher population density areas generally have employment sectors and local services including shops and leisure facilities within a smaller geographic area. This encourages and enables more people to access these services by public transport and sustainable modes of transport including walking and cycling. These areas also support high capacity public transport infrastructure investment.
- 4.4 Visibly, areas surrounding the core commercial central area have some of the highest population densities. These include several large clusters of data zones including the residential areas in Leith, Fountainbridge, Bruntsfield and Southside. Areas of Leith Walk in particular have some of the highest local population densities in Scotland. These areas of higher population density, which are on some of the city's key arterial routes with a number of public transport connections, continue to see significant population growth associated with the development of several brownfield sites.
- 4.5 Other areas with higher than average population densities include housing estates in areas between Wester Hailes and East Craigs, Muirhouse and Pilton and Craigmillar to Liberton. Some localised areas within local town centres areas such as Queensferry, Portobello, Stockbridge and Morningside exhibit higher population densities.
- 4.6 Corridor 1 running along Bonnington Road parallel to Leith Walk has a high population density compared to the other corridors. The inner-city centre section of Corridor 3 also has a very high population density through the busy South Side area; there is then a gradual reduction beyond Newington towards Cameron Toll. Corridor 5 includes some sections of high population density, but this is not continuous along the route. They are also difficult to serve given the circuitous nature of the corridor.
- 4.7 Corridor 6 has clusters of high population density areas around Haymarket and Pilton. Corridor 10 has areas with higher than average population density along the section north of Ferry Road.
- 4.8 Low population density areas are generally on the outskirts of the city, particularly areas beyond the city bypass. This can be seen for Corridors 7, 8, 9 and the western edge of Corridor 10. Corridor 2 also has a large industrial area along Seafield Road resulting in a low average population density, whilst this is much higher in the adjacent Portobello area.
- 4.9 Figure 4-3 shows employment distribution in terms of jobs per hectare for the same Scottish data zones. The major employment areas are in the city centre along Lothian Road, Haymarket, West End, George Street, Waverley and the bridges corridor. Outside the central area, there is high employment density in West Edinburgh from the Gyle to Edinburgh Park, despite a very low population density in the same area (as shown in Figure 4-2).

Figure 4-2: Population Density (People per hectare, 2011)

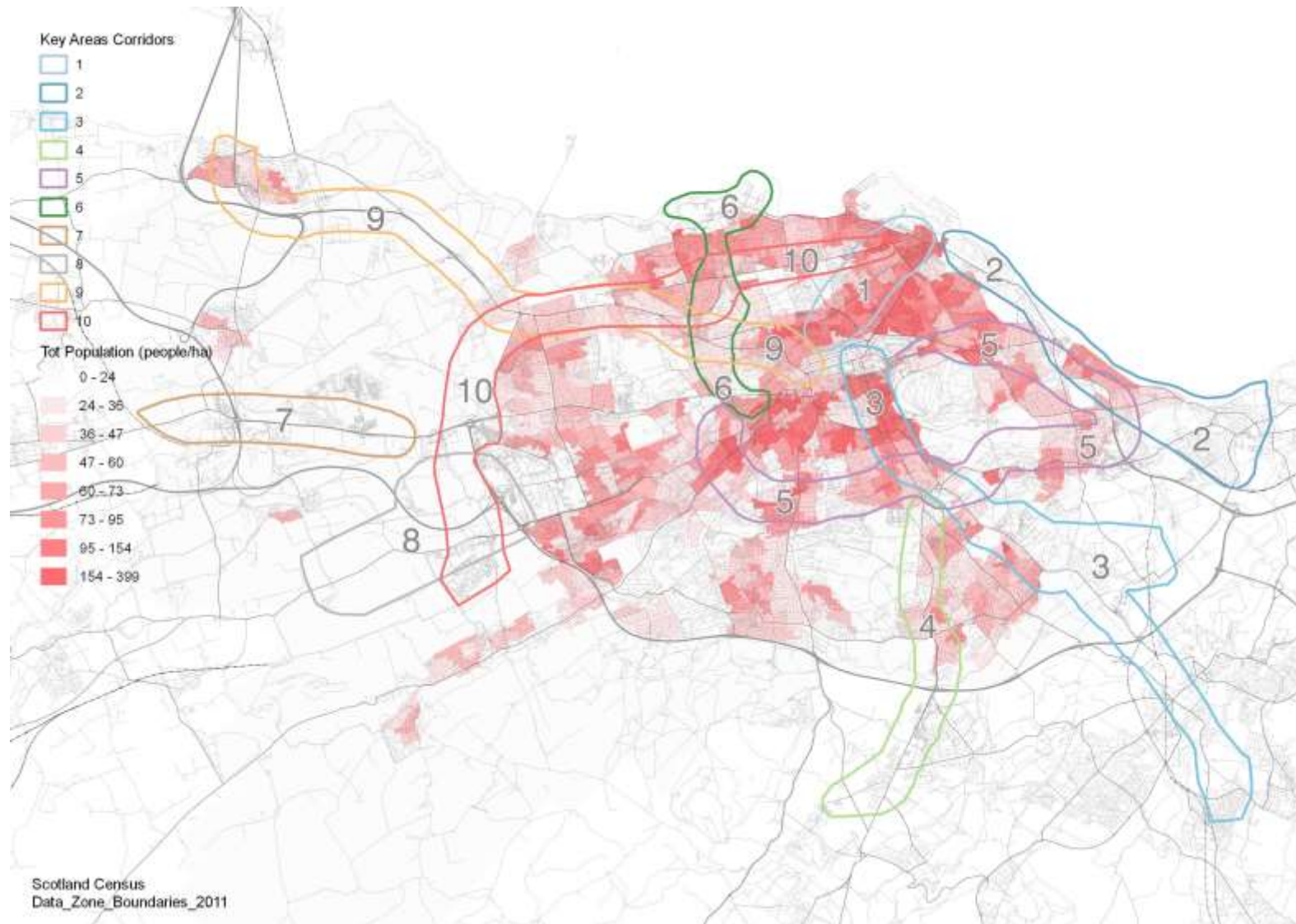
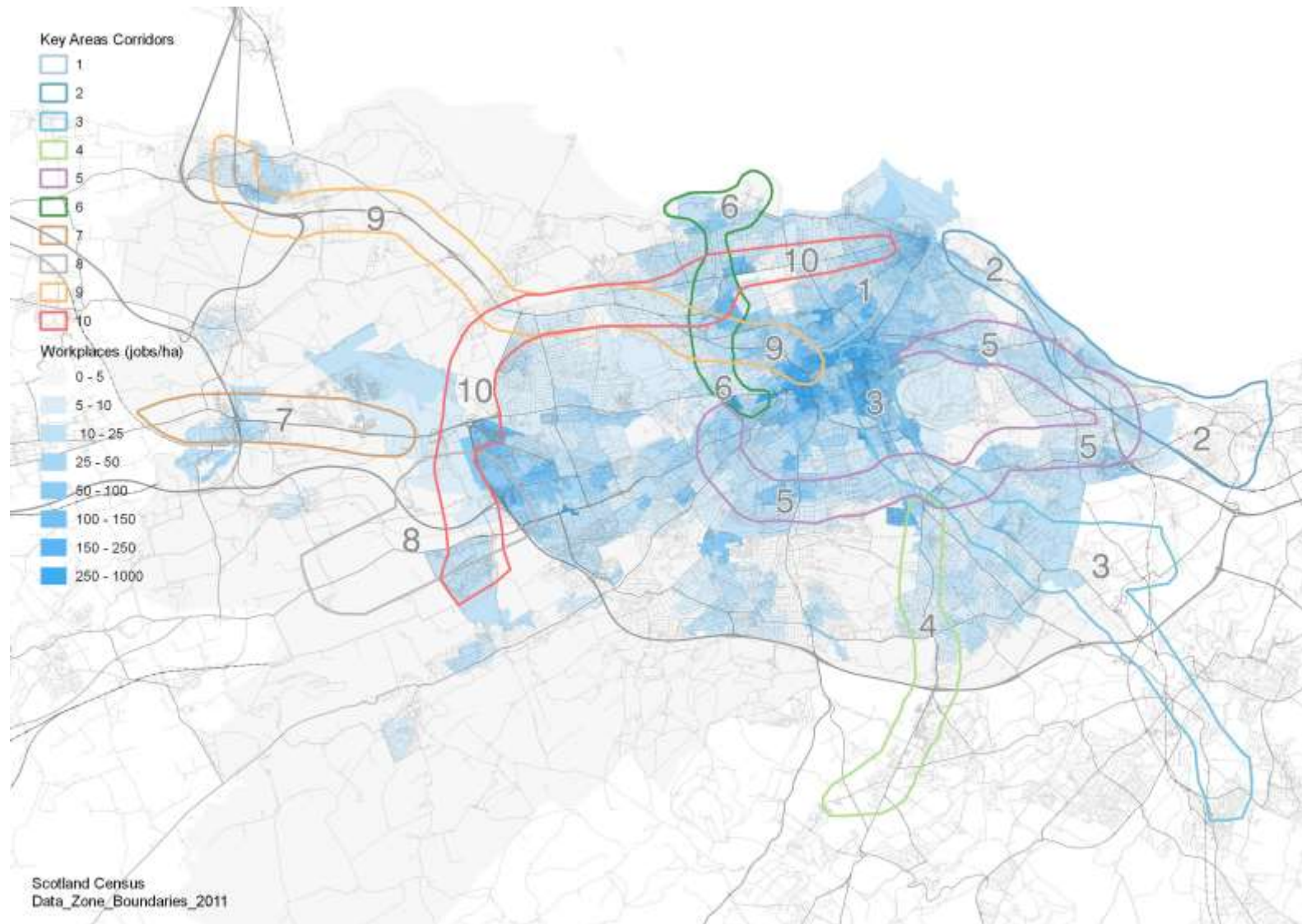


Figure 4-3: Employment Distribution (2011)



- 4.10 Corridor 1 has relatively high levels of employment density as well as population. Corridor 3 also has higher employment density in the city centre and areas towards the south east around the BioQuarter and Royal Infirmary. Corridor 6 has local areas of high employment density including Haymarket, Crewe Toll and Granton.
- 4.11 Potential tram demand in each of these corridors is high due to higher population and employment densities when compared with other areas across the city.

Index of Multiple Deprivation

- 4.12 Figure 4-4 shows areas of deprivation throughout Edinburgh based on the 2016 Scottish Index of Multiple Deprivation (SMID). The SMID combines aspects of deprivation including income, employment, health, education, skills and training, geographic access to services, crime and housing to provide a relative measure of deprivation at the data zone level.
- 4.13 Corridor 3 includes a number of significantly deprived data zone areas along the southern section of the route, furthest from the city centre. Corridor 6, in the northern section towards Granton exhibits very high levels of deprivation. Corridor 10 also covers some of these areas north of Ferry Road between Muirhouse Green and Ferry Road Drive.
- 4.14 A high or low SMID does not, in itself, suggest that these areas have a higher or lower potential transit demand. There are counterbalancing factors, where high SMID may be characterised by lower average trip rates (which suggests lower demand potential) but also benefits from higher non-car ownership which is associated with higher potential transit demand.
- 4.15 However, SMID is a strong indicator of where transit can help support equity and social inclusion. Investment in transport infrastructure along corridors with high SMID would help improve accessibility to some of the most deprived communities in the city.

Public Transport Accessibility (PTAL)

Access to the Public Transport Network

- 4.16 The Public Transport Accessibility Level (PTAL) presented in Figure 4-5 outlines the rating for a selected place based on how close it is to public transport, taking into account walking time to access public transport (i.e. to a stop or station) services and how frequent services are in the area.
- 4.17 The PTAL map shows high levels of public transport accessibility in Edinburgh city centre, along key arterial routes into the city centre such as the A900 (Leith Walk), A1 (between the city centre and Meadowbank), A8 (as far as Sighthill) and the A71 (as far as Saughton).
- 4.18 However, in between these routes, and across the city, there are numerous areas with low public transport accessibility, particularly in north west and south west Edinburgh. Accessibility levels are also low in the south and east of the city particularly around Danderhall and Newcraighall.
- 4.19 It is also noticeable that accessibility in some inner corridors, such as towards Granton, are poorer than those towards, for example, Leith, the south-east and west.

Figure 4-4: Scottish Index of Multiple Deprivation (2016)

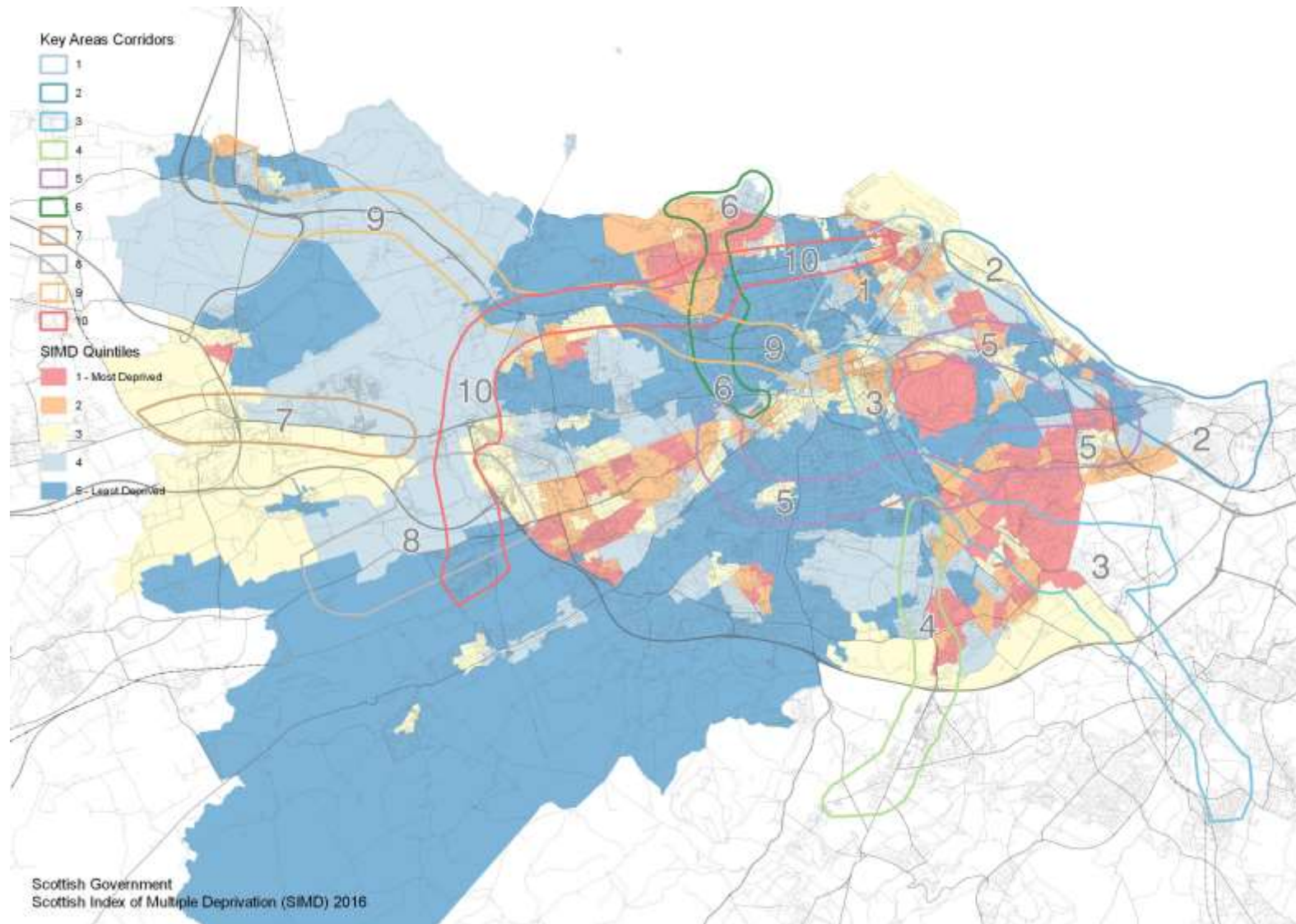
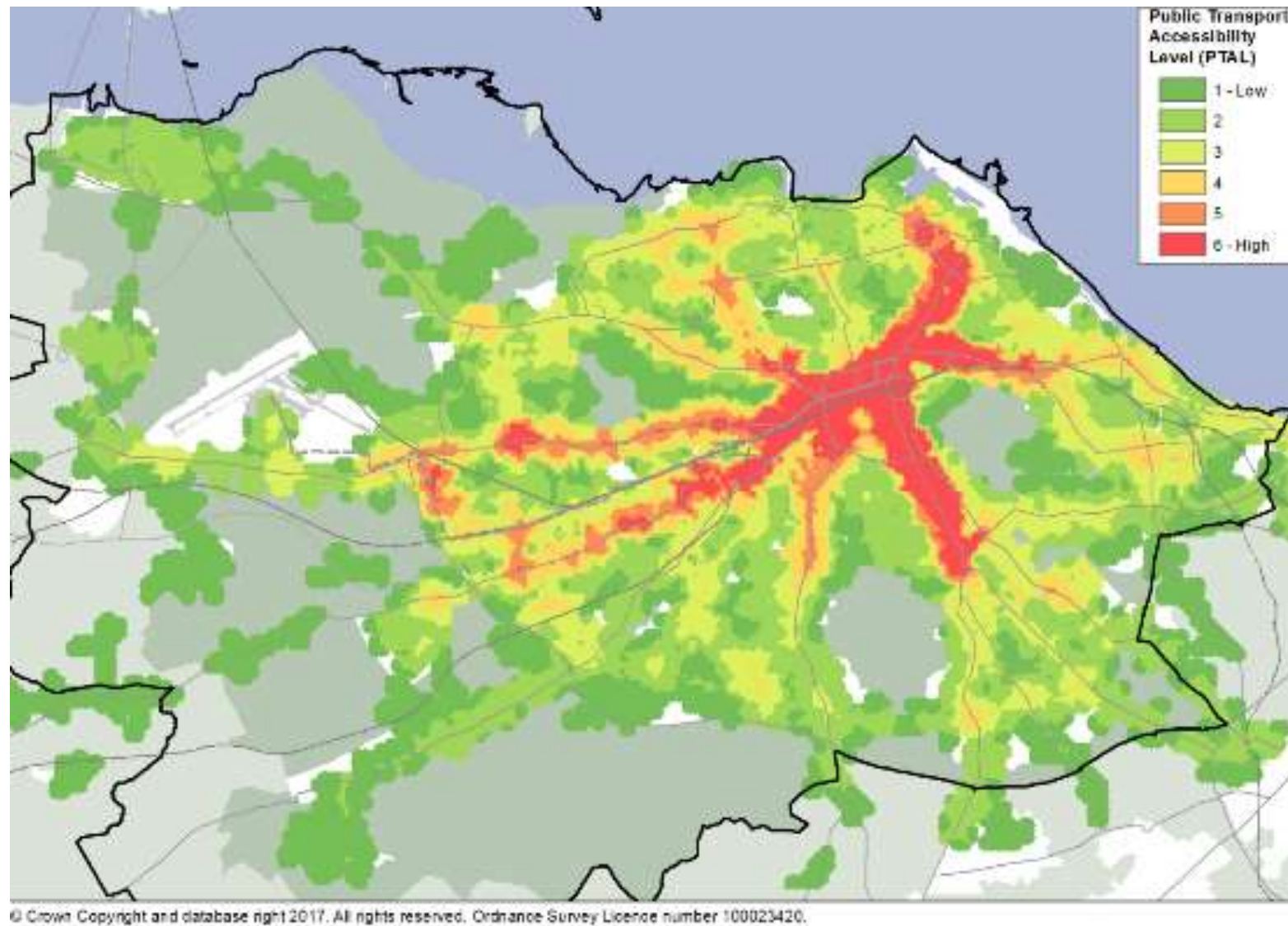


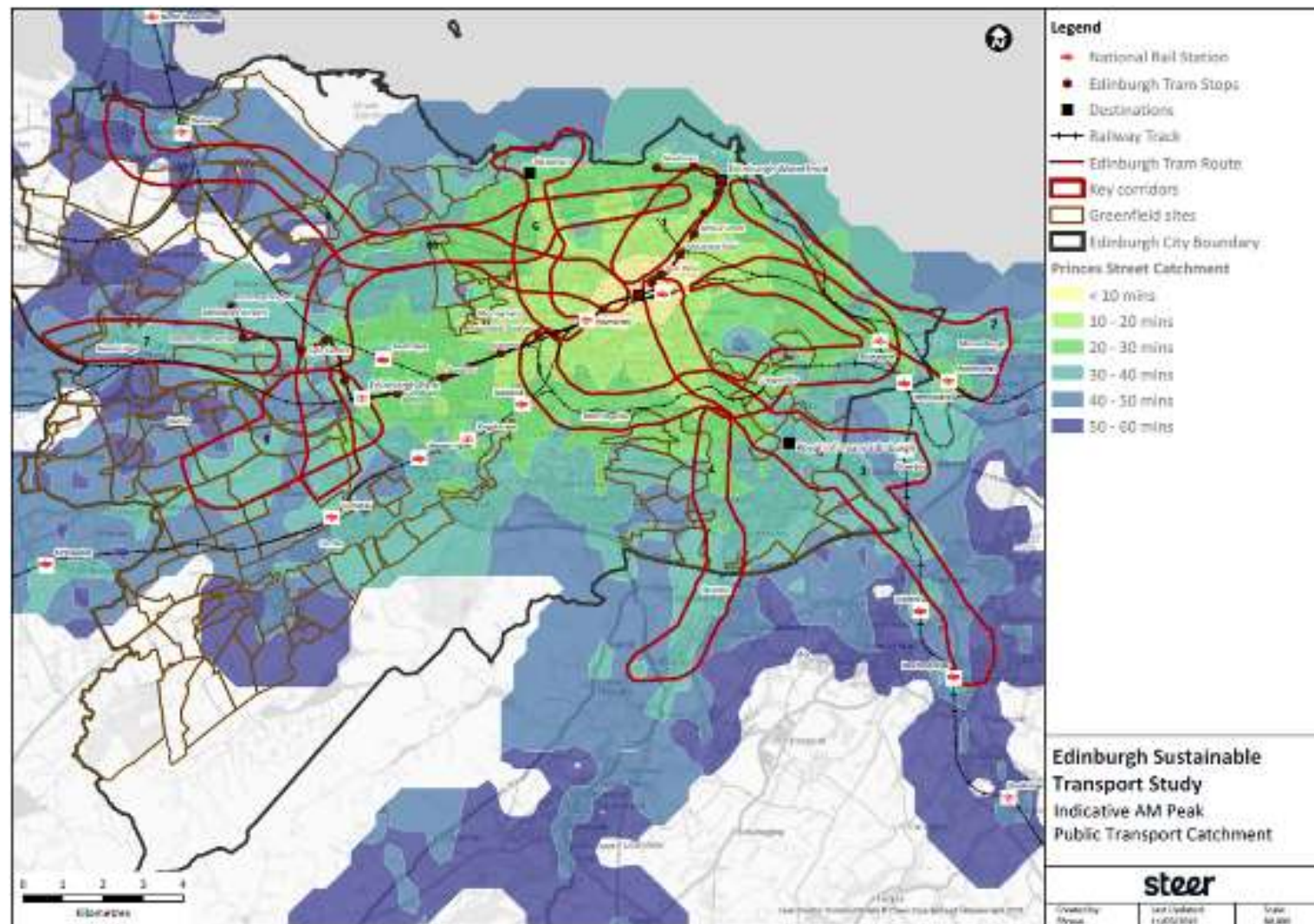
Figure 4-5: Accessibility to the Transport Network



Journey Times to the City Centre and Edinburgh Park

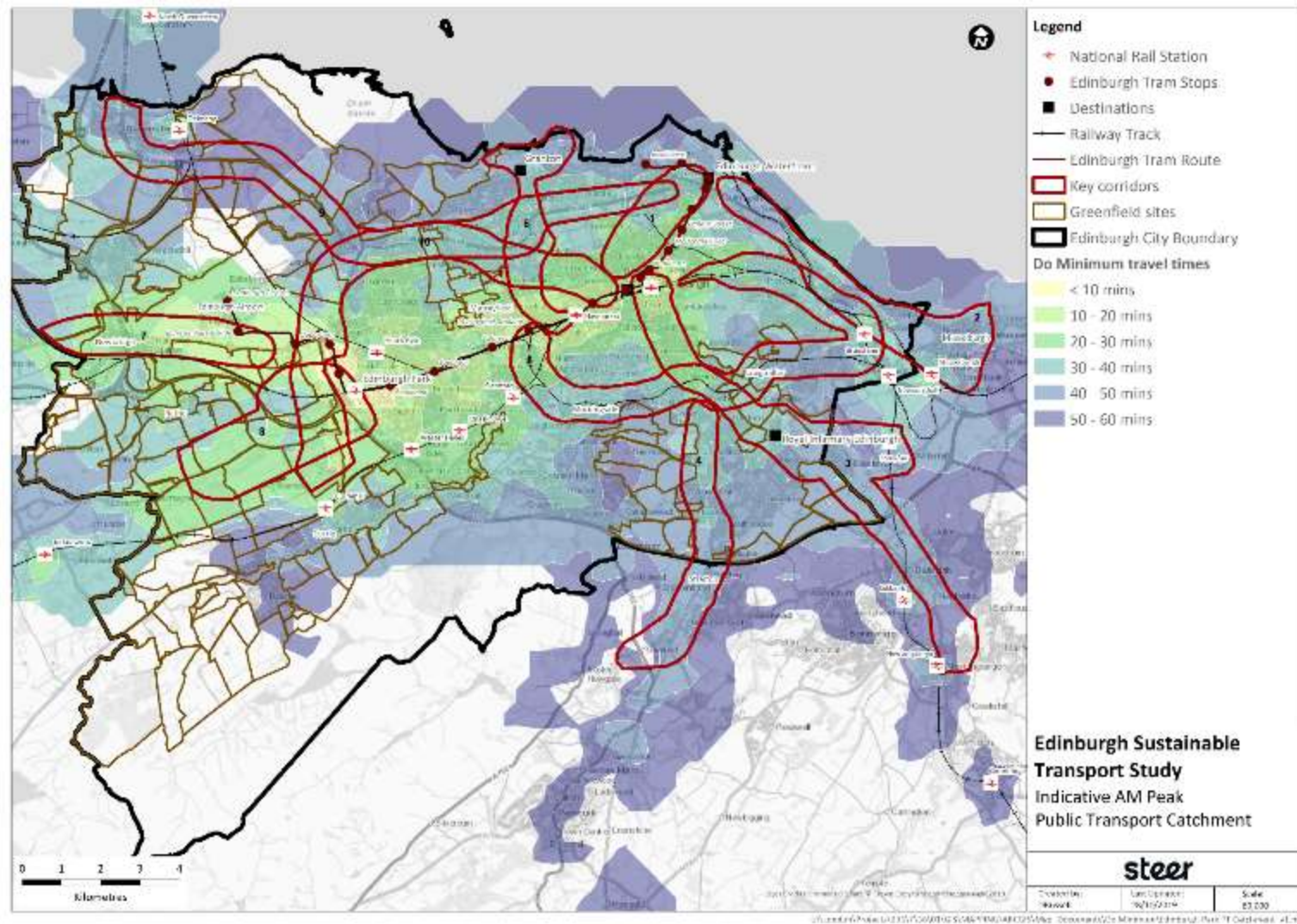
- 4.20 Public transport accessibility measured as a function of journey time to / from the city centre and to / from Edinburgh Park is shown in Figure 4-6 and Figure 4-7 respectively.
- 4.21 Journey time analysis to the **city centre** indicates similar patterns in transport accessibility to the PTAL analysis, emphasising short travel times for those travelling within the city centre, however those travelling from the city boundary (such as Queensferry in the north west) or from nearby communities in Midlothian (such as Newtongrange and Loanhead) can typically expect significantly longer journey times (up to an hour) despite distances being comparatively short (up to 8 miles).
- 4.22 When public transport accessibility is considered from strategic growth areas outside the city, such as **West Edinburgh**, travel times indicate poorer levels of accessibility particularly from north, south and south west Edinburgh. For example, journey times from areas such as Granton and Pilton in the north of the city (approximately 4 miles from Edinburgh Park, with a travel time of around 45 mins), Balerno and Currie in the south west (approximately 3 miles from Edinburgh Park, taking between 40mins and 1 hour travel time) and Gilmerton and Fairmilehead in the south (approximately 4.5 miles, and 40mins to 1 hour travel time) also have longer journey times than would be expected for the distance travelled.
- 4.23 A feature of strategic employment development areas is that, while they have good public transport accessibility to the city centre, the level of accessibility is significantly poorer for other movements. This reflects the city centre focus of much of the existing public transport network, and manifests itself in the form of considerably lower public transport mode shares for non-central locations.

Figure 4-6: Accessibility (Journey Time) to the City Centre



Source: Steer TRACC analysis

Figure 4-7: Accessibility (Journey Time) to West Edinburgh



Public Transport Demand

- 4.24 The case for transit-based solutions will tend to be stronger for corridors where existing public transport demand is higher. This is because transit can provide the overall capacity in an efficient manner (e.g. a tram has a capacity of nearly three times that of a bus) to cater effectively for high demand volumes, and support frequent service levels.
- 4.25 Analysis of modelled public transport demand has been undertaken using the City of Edinburgh Council VISUM multi-modal model. Figure 4-8 presents Bus, Rail and Tram passenger demand for the morning peak (07:00-08:00).
- 4.26 This shows that those arterial routes with high public transport accessibility levels and high population densities also have high passenger demand.

Figure 4-8: AM Base Model Public Transport Demand



Buses per Hour

- 4.27 Figure 4-9 highlights the number of buses per hour in an average AM peak hour. This shows that a significant number of buses travel through the city centre with a number of routes having over 75 buses per hour. Over 160 buses per hour travel along Princes Street from Lothian Road to Frederick Street.
- 4.28 The key routes with up to 75 buses per hour are arterial routes from the West along the A8 and Dalry Road, the south east along the A7 through Southside and Newington, the east via London Road and the north east along Leith Walk. These routes represent those areas with the highest public transport demand as outlined previously in Figure 4-8.
- 4.29 An analysis of bus volume over capacity has been undertaken based on the base year modelled public transport demand and the number of buses per hour. Volume per bus has been calculated as two hour modelled public transport demand from VISUM divided by the service frequency over two hours. Capacity per bus has been assumed to be 80 passengers, which reflects the typical number of seats per bus.
- 4.30 Results of this analysis are presented in Figure 4-10. Chiefly, these highlight areas where bus capacity is a constraint. The high number of buses per hour towards the city centre generally results in a low volume capacity ratio of under 50%. Areas of over-capacity, such as the area around the Gyle, are generally localised, possibly indicating that local movements are under-served. Future infrastructure and service improvements along Corridor 10 may help better serve demand in such areas.
- 4.31 Other localised areas with a bus volume capacity greater than 100% include Holyrood, an area in Corridor 1 around Pilrig and some sections in the southeast along Corridor 3 towards the BioQuarter and Royal Infirmary.

Figure 4-9: AM Base Model number of buses per hour

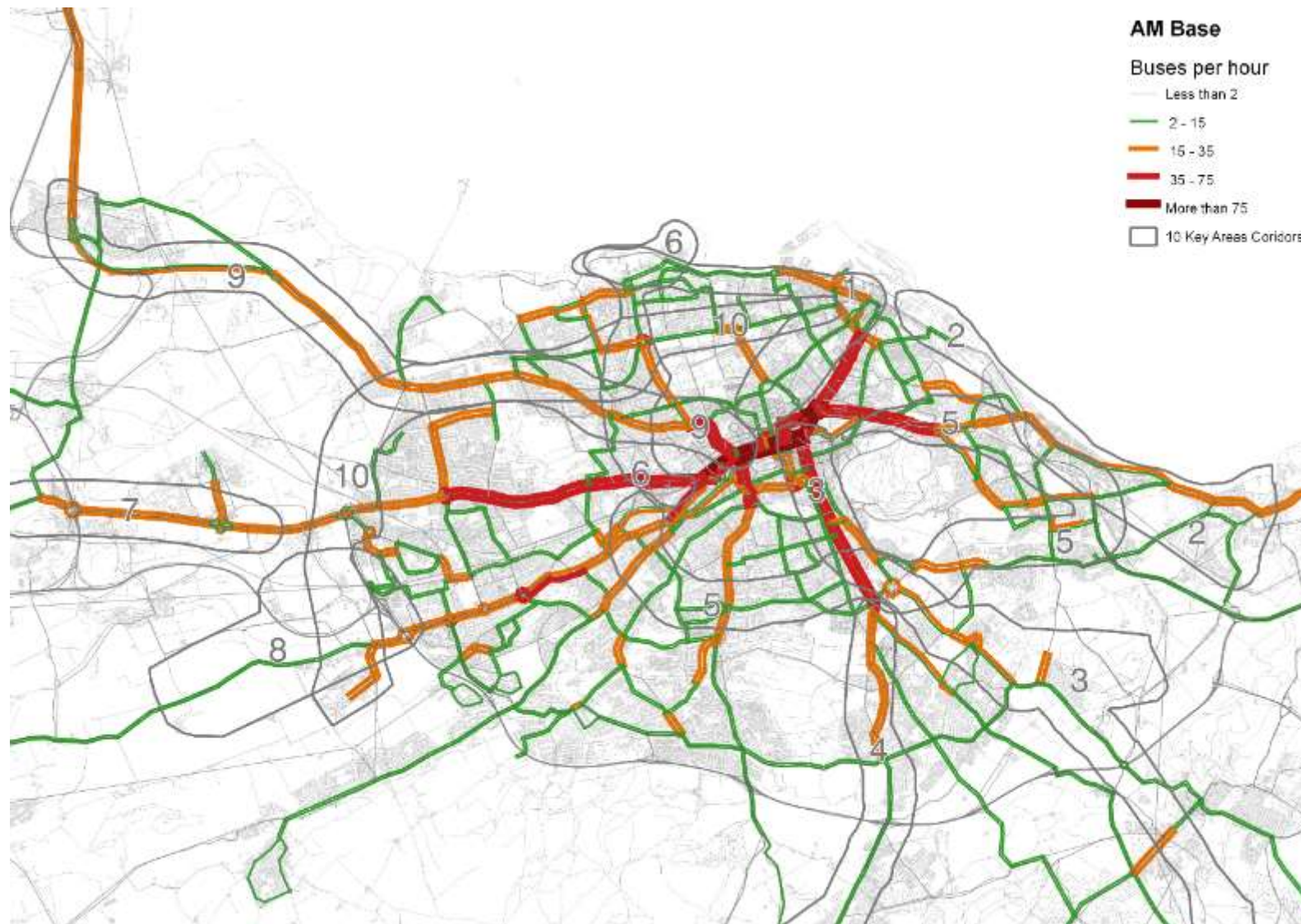


Figure 4-10: AM Base Model Bus Volume Capacity Ratio



5 Identification of Priority Transit Corridors (sifting stage)

- 5.1 The ten corridors have been reviewed and assessed to identify those that are more suitable for the consideration of transit solutions in the short to medium-term. As part of the review, the potential for each corridor for the development or enhancement of strategic active travel connections has also been reviewed.

Transit Assessment

- 5.2 The assessment considers the key drivers that underpin the rationale for development of transit. The key drivers have been used to develop a set of five performance criteria against which the potential suitability and viability of transit in each corridor was considered.

Key Drivers of Transit Assessment

- 5.3 We have developed five criteria that underpin whether transit is suitable in each to the ten corridors. The criteria, or key drivers of the assessment, are summarised in Table 5-1.

Table 5-1: Transit Assessment - Key Criteria

Key Driver of Assessment	Description / Success Factors	Evidence for assessment
The level of 'in-scope' existing demand.	Transit provides an efficient and effective solution serving higher demand corridors. Key success factors for transit include: • Key attractors on route. Typically, this could be city centre, key destination en route (e.g. Edinburgh Park, BioQuarter, Hospitals, Stadia etc.). • Strong in-scope residential demand. • Ability to extend effective catchment beyond immediate route through strategic P&R or major interchange (e.g. with rail network). • Presence of 'anchors' at / towards end of route, or major destinations at either end. Examples on the existing line include Edinburgh Park and the Airport, which serve to create strong 2-way flows which is positive in demand / capacity terms.	Informed by: • Identification of major attractors / generators on route. • In-scope residential demand and employment demand, and existing public transport demand (from baseline assessment).

Key Driver of Assessment	Description / Success Factors	Evidence for assessment
Ability to serve / enable major development	- Brownfield and greenfield. Transit can encourage high density development and increase the rate and value of sites. - Demand from development sites can contribute to success of transit service.	- Review of proposed major developments – existing designations and potential new development areas. - Review of routing opportunities and options for transit.
Baseline Inequality / Deprivation	Promoting equity is a key objective and transit can support positive equity outcomes where enhanced public transport provision improves accessibility to work, education, leisure and other opportunities.	The Scottish Index of Multiple Deprivation provides a measure of deprivation at a detailed spatial level, which is used to inform the level of deprivation in the corridor.
Comparative journey-time vs. bus and other alternatives	The proportion of in-scope demand attracted to transit will depend on how attractive transit is compared to 'existing' travel options. Key factors underpinning an attractive transit route are: - Direct routing. Results in faster journey times for point on the route (demand and benefits) and, other things being equal, would have a lower capital and operating cost. - Faster and more reliable journey times, ideally achieved through segregation. - Fewer stops. A tram route would typically have a stop every c. 800m whereas a bus route might be every 500m.	- Current journey times based on TRACC analysis, information from transport models. - Understanding of bus journey time / reliability issues in corridors / sections. - Review of transit options and scope / potential to deliver faster / more reliable journey times.
Ability to attract significant modal shift	The success of transit in fostering a more sustainable transport network relies on its ability to attract people out of their car. This can be achieved through: - Strategic Park & Ride location which intercept vehicle traffic before it reaches more congested urban areas. - Providing 'new' cross city connectivity, to increase the attractiveness of public transport for trips where car mode share is higher (e.g. orbital movements).	- Existing levels of car ownership and mode share. - Understanding of key movements where car share is higher (e.g. to non-city centre locations, orbital and cross city movements). - Scope for transit to significantly increase mode share through providing an attractive service. - Presence of / scope for strategic P&R provision.
Route feasibility and cost	Route / alignment feasibility: Opportunity for / ease of securing a corridor serving key demand drivers, with high priority and / or segregation.	- Review of route / alignment opportunities on route. - Engineering feasibility of securing an attractive route.

Key Driver of Assessment	Description / Success Factors	Evidence for assessment
	• Ability to utilise / extend from existing routes (for which incremental costs are lower). • Operational considerations – limitation of frequency / capacity.	• Consideration of extendability on existing lines, utilising the existing 'core' network. • Consideration of operational issues / constraints.

Transit Assessment – Summary Findings

- 5.9 Each corridor has been given a qualitative score (between 0 and +3), against each of the criteria in Table 5-1. A high score (e.g. +2 or +3) indicates that the corridor is more suitable for transit against an individual criterion. Results are summarised in Table 5-2.
- 5.10 The scores for each of the criteria have then been totalled to give an indication of those corridors that are more or less suitable for transit. The total scoring should not be viewed as an absolute measure of which corridors are best as there has been no attempt to weight criteria. Rather, the scores are intended to show there is a 'natural boundary' between those corridors that perform better across a range of criteria compared to those that don't.

Summary of Transport Recommendations by Corridor

- 5.11 Below we summarise those corridors that perform strongly in terms of their transit potential. These are then discussed in more detail in subsequent chapters.

Options / Corridors Taken Forward for Further Assessment

- 5.12 Based on the assessment, the following corridors were identified as being more suitable for the consideration and development of transit solutions.
- Corridor 3 – South East via BioQuarter
 - Corridor 6 – Granton
 - Corridor 7 – towards Newbridge
 - Corridor 8 – West of Hermiston

Note on Corridor 1 (to Newhaven)

- 5.13 The assessment identified a strong case for considering transit options serving Granton. The serving of Granton would be achieved either through a route along Corridor 6, or through an extension of the tram from Newhaven (which is under construction) along the Waterfront to serve Granton from the east (as an extension / leg of Corridor 1).
- 5.14 The recommendation is that the Newhaven to Granton option should be taken forward as a Granton / Corridor 6 sub-option, given that Corridor 6 and the extension from Newhaven essentially amount to alternative means by which transit could connect Granton to the city centre. A further option would be to develop a transit 'loop' which connected the Leith / Newhaven and Granton corridors via the city centre.

Table 5-2: Transit Assessment - Summary Findings

Corridor	Base demand	Development Demand (existing LDP)	Accessibility to support new areas for development in sustainable manner	Baseline inequality (Scottish IoMD)	Route alignment feasibility	Attractiveness to passengers (proxy for Value for Money)	Score (unweighted)	Suitability for tram / transit (Y / N)
New Town to Granton via Newhaven (1)	2	3	0	2	2	1	10	Y
Portobello / M'burgh (2)	2	2	0	2	1	1	8	N
South East via Bio-Q (3)	3	3	3	3	2	2	16	Y
Straiton (4)	2	1	2	2	1	1	9	N
South Suburban (5)	2	1	0	2	1	1	7	N
Granton (6)	2	3	1	3	2	2	13	Y
Newbridge (7)	1	2	3	1	3	2	12	Y
West of Hermiston (8)	1	1	3	1	3	2	11	Y
Queensferry (9)	2	1	2	1	1	1	8	N
W Edin North – South (10)	1	1	2	2	1	1	8	N

Transport Recommendations by Corridor – Options not Prioritised for Transit

- 5.15 The focus of this study, and of the sifting process outlined above, has been to identify those corridors that are more suitable for the development of transit options.
- 5.16 This assessment is therefore focused on corridor suitability specifically for a transit-type intervention. The assessment does not suggest that the transport issues or needs in other corridors (those not identified for transit) are less strategically important or of lower priority – merely that the likely range of interventions for these corridors will be based around non-transit options. Indeed, some corridors such as the A90 are strategic in nature and of importance at a national and regional (as well as city) level.
- 5.17 The reasons for which these corridors have not been shortlisted for transit-type interventions are summarised in Table 5-3. Though not the primary purpose of this study, the potential transport priorities and options for those corridors not prioritised for transit are also summarised in Table 5-3. Further detail is also provided in Appendix A for reference.

Table 5-3: Transport Priorities in non-Transit Corridors

Corridor	Why not prioritised for transit	Transport priorities for corridor
Corridor 2	- Relatively low demand along corridor reflects the low population density of parts of the corridor, as well as the impact of the coast on limiting effective catchment. - Routing via Leith (as proposed tram extension) would be circuitous and less direct than existing bus alternatives. This limits potential demand for the route and its likely benefits. - Corridor includes brownfield development sites, but not at scale of other corridors. There are limited opportunities serving new sites under consideration as part of City Plan process. - The feasibility of securing route priority and / or segregation alignment limited by highway and frontage constraints. - Analysis of existing demand and capacity indicates growth is not constrained by transit.	- Enhancement of active travel links between Musselburgh, Portobello and Leith as part of an enhanced coastal network. - Development of bus options to improve accessibility to key brownfield sites. - Opportunities to integrate bus / active travel with tram extension at / around Leith.
Corridor 4	- Inner section of corridor shared with Corridor 3, and Corridor 3 is the stronger option for transit development (lower base demand and development potential than Corridor 3). - Feasibility of the parts of route limited by gradients.	- Focus on bus-based corridor enhancements. - Depending on transit option proposed for Corridor 3, there would be opportunities to enhance provision towards Straiton.
Corridor 5	- There are fundamental feasibility issues that mean that the use of south-suburban alignment for a transit / metro type service is likely to be undeliverable and unviable; these include: - Inter-running with strategic freight route would not allow for high frequency passenger headway; - Inability to access city centre limits potential. A rail option would be unfeasible due to constraints at Waverley /	None

	Haymarket. Tram-train mooted as alternative to overcome this; however, the city centre tram network's similar constraints represent a significant obstacle; and – Tram-train cost and deliverability are very uncertain. There are myriad issues re overhead line, signalling, track compatibility, platforms, level access. • Notwithstanding feasibility issues, previous studies have suggested the business case is weak for a south-suburban rail option given the inability of options to adequately serve the city core, which would be fundamental to the demand and benefits case. • Relief of city centre constraints better utilised supporting service enhancements in other corridors.	
Corridor 9	• Comparatively low population and employment density within much of corridor makes it unsuitable for transit. • Limited expected demand from existing LDP sites or potential future sites. • Consideration of demand and capacity indicates growth is not constrained by transit. • Feasibility of the route alignment is poor because of highway capacity constraints and congestion, and limited opportunity for priority or segregation.	• To be considered in the context of STPR2. • Development of Park and Ride sites serving this primary traffic corridor. • Focus on A90 as a strategic corridor catering for public and private transport.
Corridor 10	• Base level and expected demand from new brownfield development is anticipated to be lower than on other corridors. • The corridor orbital nature and the dispersion of development along it makes it very hard to successfully serve with transit. • Transit solutions operate more effectively on linear corridors serving areas of high-demand. Corridor 10 is orbital in nature which means its demand potential is lower and is hard to effectively serve with a mass transit-based solution. • Consideration of demand and capacity indicates that growth is not constrained by transit. • No clear transit route / axis that could serve existing and development demand effectively.	• Whereas transit is not considered viable for this orbital corridor, a focus should be on considering how / whether orbital bus services on the corridor could be made viable to cater sustainably for future development and increase accessibility for residents within the corridor. • Priority to consider how active travel connections on corridor and into key hubs (e.g. Edinburgh Gateway) could help promote sustainable development in the corridor.

6 Corridor 6: Granton Transit Options

Rationale for Transit in Corridor

- 6.1 A proposed transit corridor would most likely utilise the former trackbed to provide a north-south transit corridor between Haymarket and Granton Waterfront.
- 6.2 This could facilitate the provision of a corridor offering significant levels of segregation and priority to secure fast and reliable journey times, resulting in significantly enhanced transport accessibility within the corridor. This in turn would potentially support wider connectivity to the west of Edinburgh (via existing tram connections) and to the south / towards Leith (depending on future network development).
- 6.3 The corridor serves major existing destinations such as the Western General Hospital and Craighleith Retail Park. In addition, the northern section of the corridor includes major brownfield development opportunities around the Waterfront and the Gasworks site. There is also an opportunity to integrate transit with the emerging Granton Masterplan, which is currently under development.
- 6.4 The corridor also currently provides an established, predominantly off-road, active travel route which is of a high quality and exhibits high levels of use; this is also expected to increase as a result of future development.

How transit contributes to wider objectives?

- 6.5 The development of transit in the Granton corridor has the potential to support the objectives and related outcomes outlined in Table 6-1.

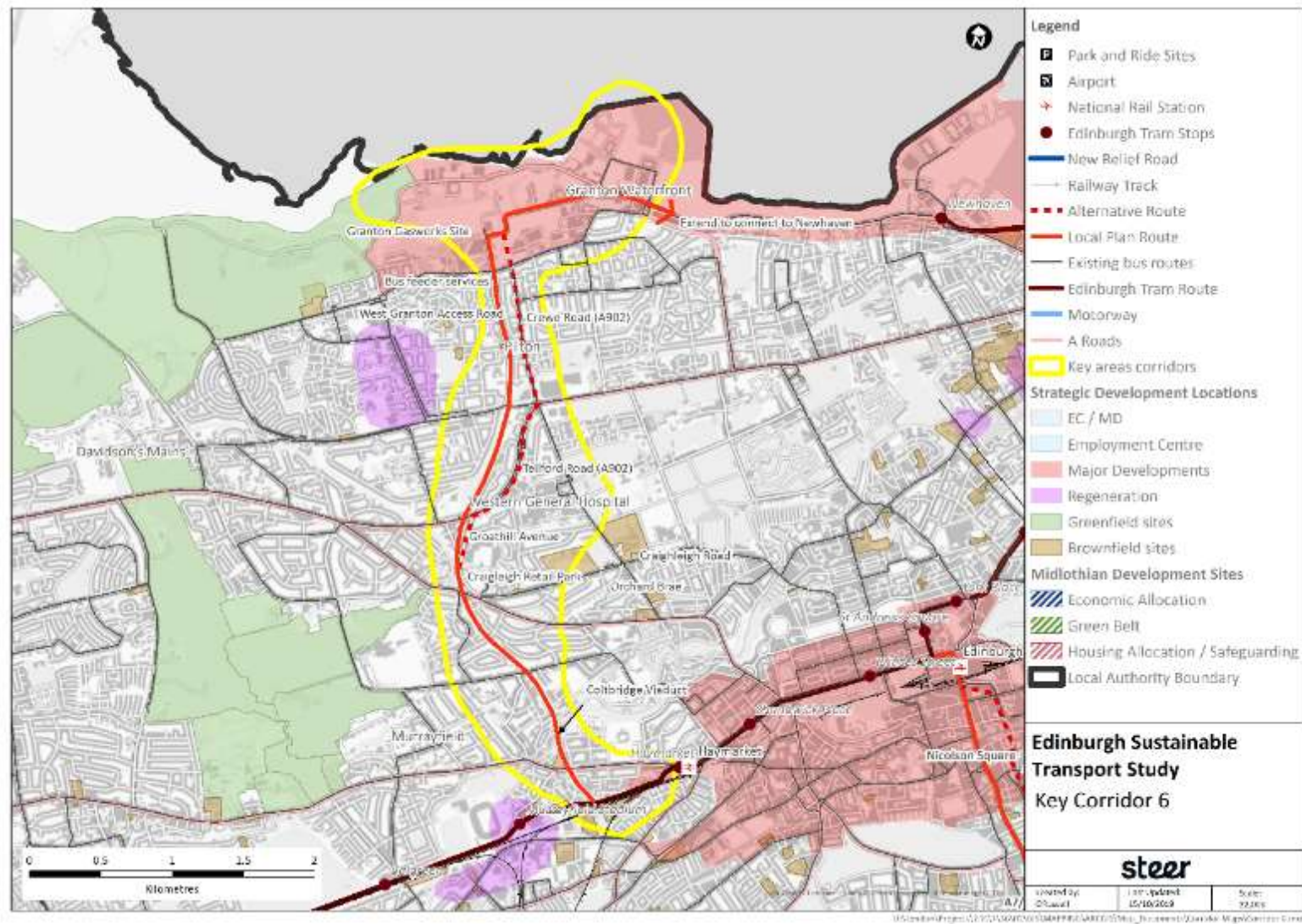
Transit Options – Modes and Routing

- 6.6 For this Phase of the study, we have identified potential route options as shown in Figure 6-1.
- 6.7 A tram route was developed in the early / mid-2000s and formed part of the route considered by the Scottish Parliament for powers and funding. The route to Granton was granted planning permission (now lapsed) but was not part of the tram route originally funded (which then comprised the route from the Airport to Newhaven). The route is safeguarded through the Local Development Plan 1.
- 6.8 The Local Plan Route supports an established and successful cycle corridor. The development of any transit option would need to ensure that active travel connections are maintained. The key constraint on this section is the Coltbridge Viaduct, which would need to accommodate both cycle and transit infrastructure.

Table 6-1: Granton Corridor compliance with objectives

ESSTS objective	Commentary	Assessment
Sustainable Economic Growth and Development	- Supporting the rate, density and value of development in major brownfield sites. - Increasing access to employment areas through enhanced connections to West Edinburgh (via existing tram) and potentially to the South East and / or Newhaven (dependent on future transit network development). - Improving business efficiency for firms in the corridor.	✓✓✓
Improved equity & social inclusion	- Improved public transport accessibility to jobs, education, healthcare and leisure for residents of an area of high deprivation. - Supporting regeneration of place through supporting redevelopment of brownfield areas and reducing traffic.	✓✓✓
Reduce transport-related carbon emissions	- Provision of direct high-quality public transport access to key housing / mixed use / employment sites could encourage fewer / shorter trips overall through the sustainable development of brownfield sites. - Some mode shift potential, especially for movements currently poorly catered for by public transport (e.g. Granton to West Edinburgh).	✓✓
Improved built & natural environment	- Transit can support development of high-quality place in brownfield sites and provides opportunities to enhance streetscape along the corridor, and an indirect enabler of CCT through ability to reduce bus. - Potential negative impacts on the natural environment and on what is currently essentially a linear park. Impacts would need to be mitigated through careful design. This could require additional greenspace to be provided at an adjacent / nearby location, and consideration as part of the City's green infrastructure (in the broader context of the Council's Climate Change Adaptation Plans).	✓
Improved health, wellbeing & safety	- Health enhanced through retention and further development of the active travel corridor in conjunction with enhanced public transport, leading to healthier lifestyles and fewer emissions. - Potential impact on greenspace provision affecting local residents. - Modal shift and scope to reduce traffic volumes / speed would reduce accidents and emissions.	✓

Figure 6-1: Granton Corridor Transit Options



Modal Options

- 6.9 While both tram and BRT options would be potentially feasible, a tram-based option would offer the benefit of being able to connect with the existing route at Haymarket providing a connection direct to the city centre and, via interchange at Haymarket, a connection to Edinburgh Park and the Airport. The on-street options for a BRT option south of the Viaduct to connect through to the city centre are more limited.

Transit Route Options

- 6.10 The Local Plan route has been reviewed alongside potential alternative routings. The alternative options are presented for the southern and northern sections of the corridor.

Southern Section from Haymarket to Craighleith Road

- 6.11 The initial conclusion is that the former trackbed running south from Craighleith Road to Haymarket via the Coltbridge Viaduct offers the most viable transit option, and that on-street alternatives would not be able to deliver the degree of priority and segregation that would make transit an attractive viable option. The Coltbridge viaduct represents a key challenge for securing transit alignment, given width and level constraints and that the corridor is a high-quality and very popular walking and cycle route.
- 6.12 This reinforces the view that tram (rather than BRT) would be the more attractive mode on this section as securing an on-street alternative is extremely challenging within the southern section of the corridor and only tram could provide the quality of connection into the city centre via the existing tram route at Haymarket.
- 6.13 The trade-offs and issues for the route alternatives on the southern section are summarised in Table 6-2.

Northern Section from Craighleith Road to Granton Waterfront

- 6.14 The existing LDP safeguard Route runs partly along the former trackbed and partly alongside West Granton Access Road. This has the benefit of providing a segregated route, but this alignment does not service the major developments within the corridor (Western General Hospital and Craighleith Retail Park as well as an alternative on-street alignment using Groathill Avenue, A902 Telford Road and Crewe Road would. As well as the alignment, the fact that the former trackbed is in deep cutting would make stops on this section less attractive than if they were provided at-grade. The A902 is relatively wide and uncongested, meaning that securing an attractive transit alignment (i.e. with segregation and / or priority to secure journey time reliability) on this section should be feasible.
- 6.15 We therefore suggest that there is a strong case for considering an on-street routing option on the northern sections. An on-street option would also allow for reconsideration of how transit would serve and integrate with development proposals at Granton Waterfront.

Beyond Granton Waterfront

A further consideration is whether any transit route would terminate at Granton Waterfront (as per the existing LDP safeguard route) or be extended towards Newhaven. If developed as a tram solution then the Granton section running along the Waterfront would provide opportunity to join up with the tram at Newhaven. This would allow for various service options, including a potential loop service to operate.

Table 6-2: Granton Corridor Southern Section Options

Route section	Option A (Local Plan, viaduct and former trackbed)	Option B (on-street_	Initial view
Viaduct	Viaduct (former rail, now cycle route). - Provides fully segregated route providing for attractive transit service. - Co-location of tram / transit & cycling across Coltbridge Viaduct would require one-way working or 'tag on' cycle bridge. - A 'tag on' solution was granted planning permission in 2007 but the quality of design was significantly lower than would now be considered acceptable. - One-way working would impact on tram reliability and the width available for shared cycle/pedestrian use.	On-Street - A wholly on-street alternative via Orchard Brae is not considered suitable for a high-quality transit route due to alignment / corridor width constraints and delays from traffic congestion. - An on-street route would require to cross Dean Bridge – this is an even more environmentally sensitive location than at Coltbridge.	- Viaduct option on southern section of route likely to be essential to delivering an attractive transit option. - Must retain existing cycle/pedestrian facility. - Integration with existing tram network makes tram a more attractive transit option, incl. access to Edinburgh Park and Airport.
Viaduct to Craighleith Road	Former trackbed. - Provides fully segregated route providing for attractive transit service. - Stops in deep cuttings (requiring lifts) reduces attractiveness. - Established cycle corridor – retaining this would require extensive retaining works and major works at bridges to accommodate within cuttings. - Significant tree and vegetation loss.	On-Street No realistic alternative on-street option that would meet requirements to provide an attractive transit corridor [i.e. ability to provide a segregated route through southern section].	Former trackbed provides the more attractive and viable option for transit.

Commentary on Strategic Active Travel Connections

- 6.16 The Granton Corridor is already an established active travel corridor in the city providing high quality walking and cycling infrastructure for those travelling to / from north and north-west Edinburgh to the city centre. This connection through to Haymarket is due to be greatly enhanced by the proposed Roseburn to Union Canal project, which is due to be delivered by 2021. It is already well used, with average daily cycle flows over 1600, and use is expected to increase further.

- 6.17 City of Edinburgh Council has aspirations to further enhance the active travel infrastructure in the corridor to better cater for existing, and forecasted, demand. This presents large additional challenges for future combination with a new transit route, particularly in relation to the known constraints at Coltbridge Viaduct, and in relation to most road bridges over the former railway (e.g. Queensferry Road) and the need for large retaining structures to provide adequate width.
- 6.18 The City's long-term objectives will be best achieved through a corridor solution that provides for and prioritises the needs to enhanced transit and active-mode provision and capacity. There are inherent trade-offs within this, and these will need to be addressed through an integrated cross-modal corridor approach. This study has reaffirmed the conclusion that the best (and only, in terms of delivering step change) transit route would be via the former rail corridor (safeguarded in the Local Plan), but also acknowledges that challenges and trade-offs this entails with respect to active travel.

Key Issues / Challenges

- 6.19 There are several key challenges in developing a transit option in Granton. These mainly relate to the need to ensure that the transit alignment on the former trackbed sections and Coltbridge viaduct are developed and designed to ensure that:
- **Active Travel Requirements are fully catered for:** The design needs to ensure the current high-quality segregated cycleway is maintained / enhanced. Consideration needs to be given to the capacity requirements to support active travel and public transport volumes within the corridor. Walk and cycle usage has increased substantially in this corridor and active mode provision will need to be planned to accommodate further anticipated / forecast growth.
 - **Accessibility and mobility needs are met:** Previous proposals (those developed in the mid-2000s) for passengers with limited mobility are now unacceptable – e.g. long ramps at Ravelston Dykes stop would need to be replaced with lifts.
 - **Environmental Impacts are mitigated.** Significant potential environmental impacts at Coltbridge Viaduct and through Ravelston require mitigation through design.
- 6.20 Addressing the above will entail the development of enhanced design solutions from those developed in the 2000s. These are likely to be challenging and may require extensive works and / or increased land take to deliver a design solution that provides for the needs of active travel and transit.
- 6.21 While this will imply a higher cost, such measures are likely to be required to ensure the acceptability of the proposals (to local politicians and stakeholders) and to secure powers to construct a transit option. The measures would ensure that broader policy outcomes (healthier lifestyles, equity, environment) are integral to the scheme design and development.

Key Deliverability Issues

- 6.22 At this stage of scheme development, it is not possible to be definitive about the deliverability of transit in any particular corridor. However, through an appreciation of key deliverability risks and how these may apply in each corridor (and to a tram or bus based / BRT option) we have undertaken a high-level assessment of key deliverability risks. This is presented in Table 6-3.
- 6.23 The key findings, at this stage, are that:

- Overall, the deliverability risk associated with tram is lower than that of BRT.
- The key risks for either tram or BRT relate to the challenges of securing an acceptable transit alignment along the southern sections of route on the former rail alignment. This will entail the development of a high-quality design solution that provides for the accessibility needs of passengers and mitigated environmental impacts. The scheme would need to be developed as part of an integrated cross-modal strategy to deliver attractive transit and active travel solutions to cater for long-term demand.

Table 6-3: Deliverability Risks - Granton Corridor

Deliverability risk	Tram	BRT	Comment
Engineering feasibility risk	L / M	L / M	- Transit option likely to be feasible, but will be challenging to achieve a design that also delivers a higher quality cycleway along the Craigleith to Roseburn section. Previous proposals for passengers with limited mobility now unacceptable – e.g. long ramps at Ravelston Dykes stop would need to be replaced with lifts. - While a design solution is likely to be feasible, there will be significant trade-offs with cost and acceptability. - BRT feasible, though may entail routing trade-offs.
Ability to secure desired transport outputs	L / M	M	Tram links to existing network provide stronger connectivity.
Technology risk	L	L	Both options use proven technology.
Environmental & property impacts risk	M	M	- Significant potential environmental impacts at Coltbridge Viaduct and through Ravelston require mitigation through design. - Impacts within corridor not possible to fully mitigate.
Acceptability risk	M	M	Tram likely to be more acceptable to politicians, stakeholders and public. Active travel trade-offs likely to be key acceptability issue.
Project complexity / interdependency risk	L / M	M	Integrates with development, but not dependent. BRT can't utilise existing tram network.
Value for Money risk	M	M	- Uncertain, but will be a key challenge for both options. - Achieving a feasible and acceptable engineering and design solution will have cost implications.
Planning risk - Powers & consents	L / M	M	Powers required for both options. Tram stronger policy-led grounding and powers previously secured.
Legal / regulatory risk	L	L / M	Operation of BRT would require consideration of operational model in conjunction with Lothian Buses and Edinburgh Tram.
Overall deliverability risk	M/H	M/H	- Environmental / property impacts, and those on green corridor, pose biggest risks. - These could emerge as showstopper risks.

Indicative Timeframe

- 6.24 The timeframe for delivery of transit is important to understand, in particular in relation to the emerging City Plan 2030 – which will consider spatial development options - and at a more local level to understand how transit can be developed to support and integrate with specific regeneration and development proposals, such as the Granton Masterplan.
- 6.25 The level of scheme development on the Granton corridor, from the work in the early 2000s provides a good basis from which to develop transit proposals. However, as the policy context and infrastructure needs have matured, our view is that, given the time required to undertake option and scheme development (STAG 1 and STAG 2), to secure funding and powers and then to procure and implement a transit option, delivery of transit towards the end of the City Plan 2030 period (i.e. late 2020s) would be a realistic delivery timeframe.

7 Corridor 3: South East Corridor Transit Options

Rationale for Transit in Corridor

- 7.1 The South East Corridor contains, from a strategic planning and demand-led perspective, all the key facets that support the development of a highly successful transit corridor. These include having strong existing demand generators (the University, Cameron Toll, Royal Infirmary), designated major employment centres (the BioQuarter), the potential for supporting further sustainable housing and mixed-use development, and the presence of strategic P&R. The corridor would also potentially serve existing and planned housing and employment areas in Midlothian.
- 7.2 The ability for the corridor to fulfil its full potential for sustainable growth and development has some limitations in overall effective capacity for significantly increased demand towards the city centre. While future development is possible, a transit solution is ideally required to enable and support growth of suitably high levels of density and value as we approach 2030.
- 7.3 However, the same constraints in overall effective capacity also serve to present the key challenge to securing an attractive transit alignment within the corridor.

How transit contributes to wider objectives?

- 7.4 The development of transit in the South East Corridor has the potential to support the objectives and related outcomes outlined in Table 7-1.

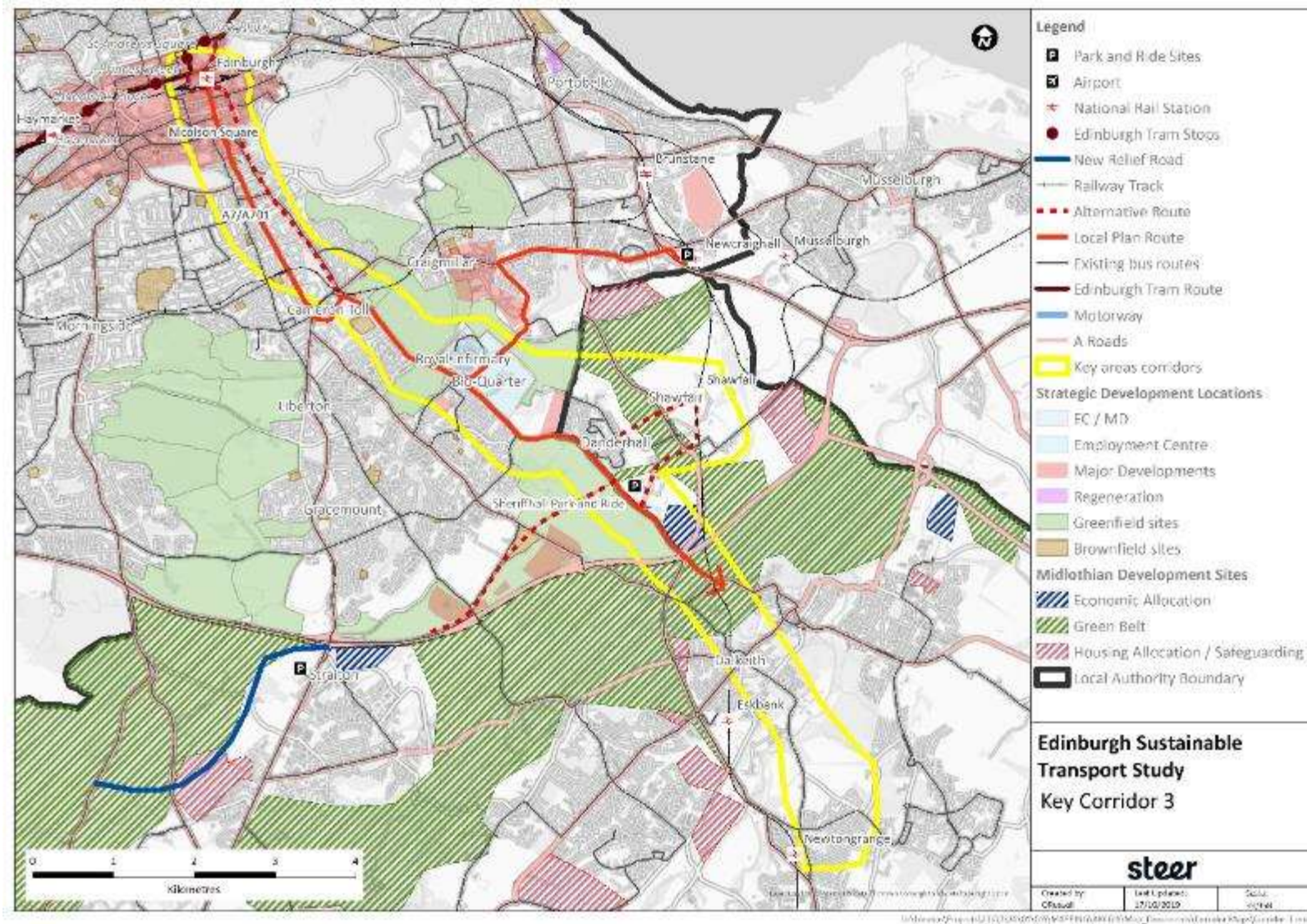
Transit Options – Modes and Routing

- 7.5 For this Phase of the study we have identified potential route options as shown in Figure 7-1.
- 7.6 An indicative tram route was developed in the early 2000s, and has been safeguarded through the Local Development Plan 1. The route development in the South East Corridor was significantly less developed than that in Granton. The Local Plan Routes comprise the A7 / A701 corridor is a key arterial corridor from the city centre to Sheriffhall Park & Ride / Dalkeith, and a spur to Newcraighall, as shown in Figure 7-1.
- 7.7 The inner section of the A7 / A701 corridor is highly constrained, with the highway width offering limited opportunity for segregation, high frontage activity and numerous side roads. These constraints become more acute towards the city centre, where the volume of pedestrians also increases substantially. The corridor is also a high-volume bus corridor (around 75 per hour per direction) and subject to high levels of congestion. These constraints imply that, to secure a transit route on this corridor, will involve a wider review of how limited road-space is used to accommodate public transport, walking and cycling and other road users.

Table 7-1: South East Corridor compliance with objectives

ESSTS objective	Commentary	Assessment
Sustainable Economic Growth and Development	- Improving access to the city centre and the BioQuarter – a major employment designation located on the corridor. - Potentially enhanced connections to West Edinburgh / Granton and / or Newhaven (dependent on future transit network development). - Supporting the sustainable development of planned / potential development areas south of the BioQuarter including sites within Edinburgh and Midlothian. - Improving business efficiency for firms in the corridor.	✓✓✓
Improved equity & social inclusion	- Improved public transport accessibility to jobs, education, healthcare and leisure for residents living in areas of high deprivation within the corridor. - Supporting regeneration of place through supporting regeneration within the corridor, and by reducing traffic.	✓✓✓
Reduce transport-related carbon emissions	- Provision of direct high-quality public transport access to key housing / mixed use / employment sites could encourage fewer / shorter trips overall through the sustainable development of brownfield sites. - Significant modal shift potential via P&R. - Mode shift potential through the improvement of transit provision for movements currently poorly catered for by public transport (e.g. cross-city centre trips) – dependent upon the extent of a future transit network.	✓✓✓
Improved built & natural environment	- Transit can support development of high-quality place in brownfield sites, and opportunities to enhance streetscape along the corridor. - Opportunity to enhance the streetscape between the BioQuarter and city centre through good design, and traffic reduction measures and bus rationalisation which could be facilitated by tram.	✓✓
Improved health, wellbeing & safety	- Health enhanced through provision of maintenance of active travel corridor and enhanced public transport, leading to healthier lifestyles and fewer emissions. - Modal shift and scope to reduce traffic volumes / speed would reduce accidents and emissions.	✓✓

Figure 7-1: South East Corridor Transit Options



Modal Options

- 7.8 Both tram and BRT options would be potentially feasible for this corridor. However, the potential routing options for each mode may differ, reflecting the greater flexibility of BRT in its ability to operate at steeper gradients and to operate on-street (without bespoke supporting infrastructure) in some places.

Transit Route Options

- 7.9 Essentially, a tram option would be limited to the A7 / A701 corridor on its inner section, whereas there would be the potential for BRT to use the parallel axis to the east running Cameron Toll – Dalkeith Rd – Pleasance – Market Street. The latter option is likely not to be viable for tram due to the gradient constraint at Pleasance.

Cameron Toll to City Centre

Table 7-2: Cameron Toll to City Centre Options

Route section	Option A (Local Plan) – Tram or BRT	Option B – BRT only	Initial view
Cameron Toll to city centre	A7 / A701 corridor. - Only feasible routing for tram option (could be BRT). - Significant challenges in securing attractive journey time and reliability. - Segregation would not be feasible (acceptable – property take), and effective priority would be difficult to achieve. - Consideration would need to be given to how a combination of bus rationalisation and traffic reduction could facilitate attractive journey times.	Inner – Re-examine Cameron Toll – Dalkeith Rd – Pleasance – Market Street – Waverley Bridge - Gradient at Pleasance likely to preclude tram as an option on this corridor. - Bus-based options on this section could be considered as either an alternative or to complement a tram option. - Could also accommodate services from Corridor 4 (Straiton).	- Need to consider both options in more detail. - How routes connect into the city centre (and connect with or interchange with existing / future tram / transit network) will also be key.

Routing within / Across City Centre

- 7.10 Considering the routing of a potential tram network within the city centre there are two key issues:
- Buildability between North Bridge and Nicholson Square. Issues include: Utilities, impact on buses and general traffic, the ability to also cater for cyclist movements within this corridor, residents' access and tram operational performance.
 - Constraints around capacity of Princes Street to accommodate additional trams.
- 7.11 City centre route options are considered further in Chapter 10 of this report.

Cameron Toll to Sheriffhall Road via BioQuarter

- 7.12 This section of the route provides an opportunity to serve key attractors directly. It is less constrained than within the city centre, so achieving attractive journey times would be feasible.

Beyond Sheriffhall Road

- 7.13 Beyond Sheriffhall Road, there is potential to extend the network towards Dalkeith. Here tram would be more suitable if demand is higher and focused on a linear corridor. Alternatively, BRT could potentially provide for more than one 'branch' feeding into core section. Options would need to be considered as a part of future option development.

Route / Spur to Craigmillar / P&R at Newcraighall

- 7.14 The Local Plan route included a spur to Craigmillar and onwards to the park & ride at Newcraighall. Our assessment is that a transit (tram or BRT) route would be circuitous and unlikely to offer journey time benefits over bus. This limits its demand potential and overall this routing is likely to perform less well than the more direct route from Cameron Toll to Sheriffhall.
- 7.15 While there is significant current and future demand on this section of the corridor, a transit route to the city centre via the BioQuarter is unlikely to be the most effective means of catering for this. Rather, a range of options for serving area should be considered including transit, but also potential of bus enhancement on more direct routes and Borders Rail.

Commentary on Strategic Active Travel Connections

- 7.16 Active travel provision on the corridor is generally poor. On the edge of the city, the proposed grade separation of Sheriffhall roundabout includes additional separation for cyclists. Improved active travel connectivity at the Straiton junction is aimed at targeting severance impacts created by the city bypass. There are also proposals being developed for a high-quality segregated cycling facility from Cameron Toll to the BioQuarter (public consultation was held on these designs during October 2019).
- 7.17 North of Cameron Toll, bus lanes, particularly those on North and South Bridge cater for the majority of current cycle traffic travelling North-South on the east side of the city. This is because this corridor provides both the most attractive gradient over Waverley valley for those using cycles and the most direct link towards Leith from the southside, as well as being a cobble-free route.
- 7.18 In line with the City's objectives around active travel and those of the City Centre transformation, any transit corridor options would need to be developed alongside consideration of active travel in seeking to enhance the quality of provision and provide capacity for growth for transit and active travel alike.
- 7.19 Nevertheless, feasibility work to-date highlights that it would not be possible to deliver both transit and a segregated cycle route on the same constrained corridor. Unless the gradient constraint at the Pleasance can be overcome, tram in this corridor would need to follow the existing protected alignment via North and South Bridge.
- 7.20 With tram, cycling would still be permitted on both North and South Bridge (though there would not be space to accommodate a segregated cycle-route) but a tram-based transit option may require consideration of enhanced active travel located on the parallel Pleasance

corridor. While the gradients over the Pleasance section are an issue, this could be mitigated to an extent through the delivery of a new direct active travel route across Waverley Station and valley. Linking Leith Street with St Mary's Street, this new connection, proposed as part of CCT, would need to be an integral element of an integrated tram / active travel corridor intervention.

- 7.21 For BRT-based transit there could be a different transit-active travel corridor strategy options, if BRT were to utilise the Pleasance corridor. Again, the core trade-offs between transit and active travel exist and an integrated corridor solution would need to be developed that catered for both.

Key Issues / Challenges

- 7.22 While both tram and BRT options are technically feasible, the key challenges is the need to secure journey times / reliability on inner section and into / across the city centre. Buildability of a transit route between North Bridge and Nicholson Square is a key concern with issues relating to utilities, impact on buses, general traffic residents' access and tram operational performance.
- 7.23 The key challenge in developing an integrated corridor solution is to develop transit and active travel options that provide enhanced provision for both and meet the overall objectives of the City and are consistent with the CCT. As discussed above, this will necessarily involve some key trade-offs and choices. As above options will need to include designs for a high-quality cycleway. Providing such a facility would be challenging given:
- space constraints on the Bridges corridor which prohibit both tram and segregated cycle facilities.
 - steep gradients on the Pleasance corridor (a particular challenge for cargo/ child-carrying bikes) and poor connectivity northwards to Leith Street from this route (without a major new structure).
- 7.24 More substantive work is required to develop combinations of route options for transit and active travel to identify options and, in due course, identify a likely preferred option.

Key Deliverability Issues

- 7.25 At this stage of scheme development, it is not possible to be definitive about the deliverability of transit in any particular corridor. However, through an appreciation of key deliverability risks and how these may apply in each corridor (and to a tram or bus based / BRT option) we have undertaken a high-level assessment of key deliverability risks.
- 7.26 This is presented in Table 7-3.

Table 7-3: Deliverability Risks – South East Corridor

Deliverability risk	Tram	BRT	Comment
Engineering feasibility risk	M	M	• Challenges in inner and city centre sections.
Ability to secure desired transport outputs	M / H	M / H	• Key challenge for both options.
Technology risk	L	L	• Both options would use proven technology

Environmental & property impacts risk	M	M	Townscape impacts in inner / central area.
Acceptability risk	M	M	Uncertain, as acceptability issues likely to be identified through design and consultation stages.
Project complexity / interdependency risk	M	M	- The development of both tram and BRT options are dependent, in part, on whether other tram / transit extensions are planned (or planned for through design) - Options would need to integrate with city centre transport (CCT) and other initiatives.
Value for Money risk	M	M	Uncertain, but will be a key challenge for both options.
Planning risk – Powers & consents	M	M	Powers would be required for tram, and likely to be required for BRT.
Legal / regulatory risk	L	L / M	Operation of BRT would require consideration of operational model in conjunction with Lothian Buses and Edinburgh Tram.
Overall deliverability risk	M	M	No showstopper risk, but a number of uncertainties at this stage.

7.27 The key findings are that although there are no showstopper risks identified at this stage, there are a number of areas that represent medium risks. These mostly relate to the issues which will need to be addressed in securing an attractive transit alignment on the inner section of route to, and within / across, the city centre and the need to accommodate enhanced provision for transit and active travel. Though the nature of these risks will differ between tram and BRT, the level of risk at this stage is similar for both modes.

7.28 The development of a transit option, particularly for the inner section of the corridor, would need to be considered in conjunction with the broader principles and range of measures that form part of the City Centre Transformation Strategy.

Indicative Timeframe

7.29 Substantial early-stage work is required to develop and assess transit options, to identify a preferred option which can then be taken forward through planning, powers and delivery. However, there is also an imperative given the strategic nature of the corridor and its constraints to identify and develop options to support planned and potential growth. Given this imperative, a realistic target date would be delivery of transit towards the end of the City Plan 2030 period (i.e. late 2020s).

8 Corridor 7: Towards Newbridge Transit Options

Rationale for Transit in Corridor

- 8.1 The Newbridge Corridor runs to the west of the existing tram route from Ingliston P&R towards Newbridge, along the A8 corridor. The land north of the A8 is a major development opportunity and part of the wider West Edinburgh Strategic Development Area, and there is therefore the opportunity to support development by improving public transport accessibility through transit provision.
- 8.2 The route would then serve Newbridge, where strategic P&R provision would also be possible. There is also opportunity for new sites to be developed south of the A8 and to the northeast of Newbridge, though these are subject to ongoing assessment by CEC through the City Plan process.
- 8.3 The corridor presents an opportunity to support the sustainable development of key sites, and at relatively low cost through the extension of the exiting tram network, or through bus-based solutions.

How transit contributes to wider objectives?

- 8.4 The development of transit in the Newbridge Corridor has the potential to support the objectives and related outcomes outlined in Table 8-1.

Transit Options – Modes and Routing

- 8.5 For this Phase of the study we have identified potential route options as shown in Figure 8-1.
- 8.6 An indicative tram route was developed in the early 2000s, and has been safeguarded through the Local Development Plan 1. The Local Plan Route runs immediately west from Ingliston towards the A8 and then runs to the south of the A8 to run along the southern side of Newbridge before crossing the M9 and then routing back in an easterly direction to serve central Newbridge, where the Local Plan Route terminated.

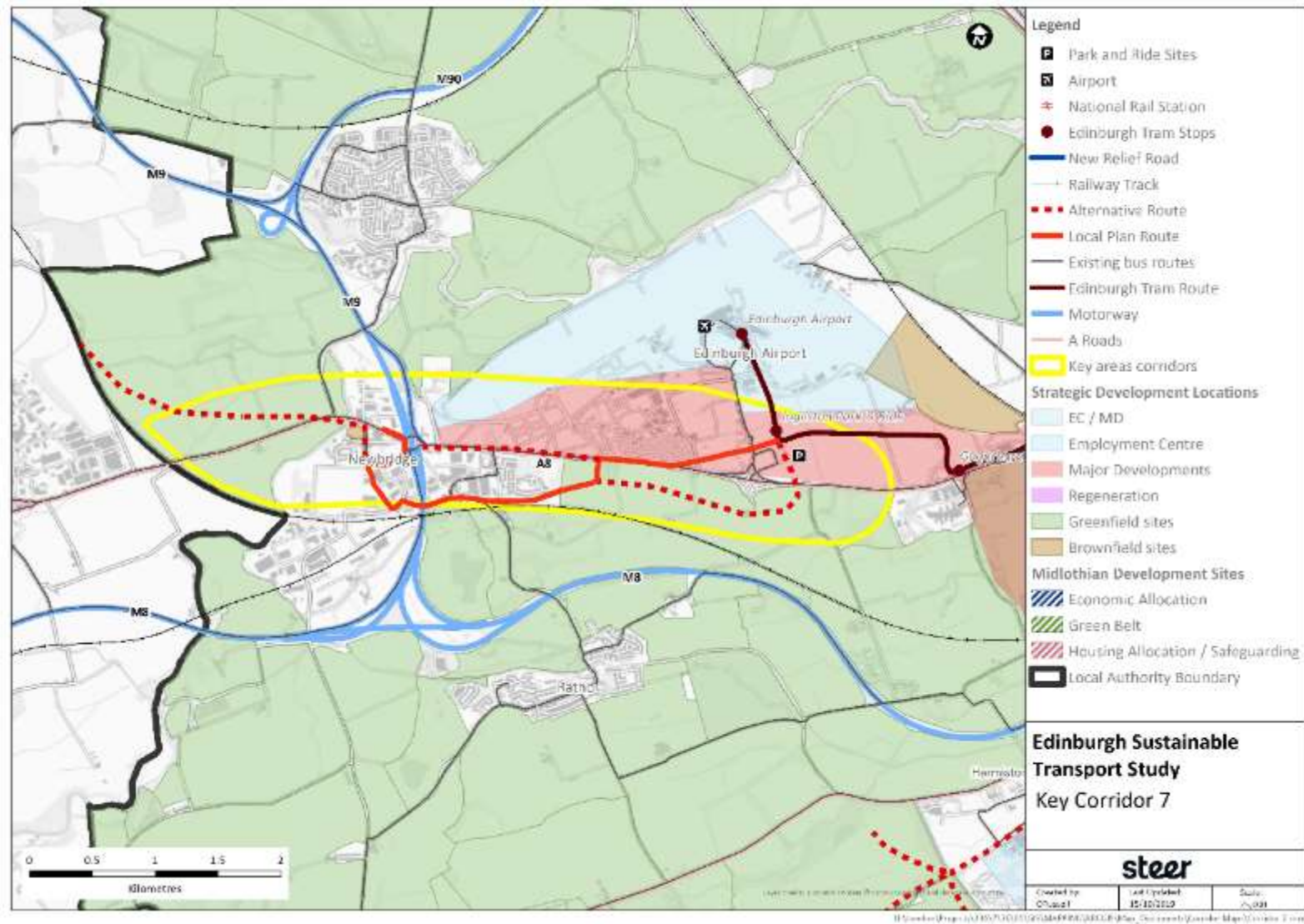
Modal Options

- 8.7 Both tram and BRT options would be potentially feasible for this corridor. A factor in the consideration of tram is that a tram extension connecting from the existing network to the west could only be implemented in either Corridor 7 or Corridor 8, but not both.

Table 8-1: Newbridge Corridor compliance with objectives

ESSTS objective	Commentary	Assessment
Sustainable Economic Growth and Development	- Supporting the sustainable development of planned / potential development areas at the Showground site. - Improving public transport connectivity between the Strategic Development Area, the rest of West Edinburgh and the city centre. - Improving business efficiency for firms in the corridor.	✓✓✓
Improved equity & social inclusion	- Improved public transport accessibility to jobs, education, healthcare and leisure for residents of Newbridge. - Supporting regeneration of place through supporting more higher-density sustainable development within the corridor, and by reducing traffic.	✓✓
Reduce transport-related carbon emissions	- Provision of direct high-quality public transport access to key housing / mixed use / employment sites could encourage fewer / shorter trips overall through the sustainable development of brownfield sites. - Significant modal shift potential via P&R. - Mode shift potential through the improving public transport provision for movements currently poorly catered for by public transport (e.g. cross-city centre trips) – dependent upon the extent of a future transit network.	✓✓✓
Improved built & natural environment	- Transit can support development of high-quality place in brownfield sites, and opportunities to enhance streetscape along the corridor. - Opportunity to enhance quality and density of development through good design, and traffic reduction measures.	✓✓
Improved health, wellbeing & safety	- Health enhanced through provision of maintenance of active travel corridor and enhanced public transport, leading to healthier lifestyles and fewer emissions. - Modal shift and scope to reduce traffic volumes / speed would reduce accidents and emissions.	✓✓

Figure 8-1: Newbridge Corridor Transit Options



Transit Route Options

Ingliston to Newbridge

- 8.8 The overall recommendation for routing options in this corridor is that the identified Local Plan route is overly-circuitous and its routing does not materially open up areas for development that would not be served equally well from an alternative and more direct route running along the A8. This recommendation would hold for either tram or BRT options.
- 8.9 The A8 Corridor has the width to be able to accommodate a combination of transit and enhanced active travel links and could therefore support existing and planned development in a sustainable manner. A faster and more direct routing would also be key to making any future strategic P&R attractive to potential users.

Route within Newbridge

- 8.10 The Local Plan spur is circuitous and less attractive than a more direct route to Newbridge. The accessibility benefit of the spur into Newbridge is limited given the close proximity of the build-up areas to the Local Plan route terminus. The low-density development, shared running and circuitous routing all combine to support the case for a more direct routing option.
- 8.11 Should the route extend beyond Newbridge the case for a more direct route would be further reinforced (as it would reduce journey times compared to more circuitous options).

Beyond Newbridge

- 8.12 There is the option to serve potential development areas to north-west of Newbridge, should these be identified through the City Plan site options process. To the south, Hillwood Quarry, rail lines and M8 all act to constrain the serving of wider development areas.
- 8.13 Beyond Newbridge potential exists to develop a Park and Ride public transport interchange aside the A89 corridor that serves West Lothian and North Lanarkshire. Such an interchange would strongly support Corridor 7, and modal split.

Commentary on Strategic Active Travel Connections

- 8.14 The A8 could form a sustainable active travel corridor providing improved opportunities for cycling from Newbridge to the city and for commuting to employment at Edinburgh Airport/the forthcoming IBG. It would also support cycling at a regional level from settlements in West Lothian along the A89 and A899 such as Broxburn, Uphall and Bathgate.

Emerging Conclusions – Mode and Route

- 8.15 The emerging conclusions are that a bus-based or BRT transit option may be the more appropriate solution for this corridor, given the following:
- An A8 alignment would allow existing highway infrastructure to be upgraded to support the development of bus-transit and active travel, providing segregation and priority for both.
 - The timescale of implementation would be quicker than that of tram, allowing planned development to come forward in a more sustainable manner and providing opportunities to serve additional development areas.
 - The A8 Corridor into central Edinburgh is among the more direct and less congested radial corridors, meaning that bus-based options would be competitive with car, hence encouraging modal shift.

- There is a strong emphasis on strategic bus priority from the Scottish Government, whose Programme for Government published in September which includes a commitment to investing over £500 million in bus priority. The A8 Corridor has the characteristics that should support a strong bid for funding support.
- There is a strong case for the consideration of tram in Corridor 8. As tram could not be developed as a solution for both Corridors 7 and 8, our recommendation is that bus should be considered in the shorter-term. Should tram not be developed for Corridor 8, a tram extension to Newbridge could be developed at a later date utilising the A8 Corridor (i.e. migrating from bus-based transit to tram).

Key Issues / Challenges

- 8.16 The key challenge for a route on the A8 is around the acceptability of re-orientating the corridor to provide high-quality transit and active mode provision.
- 8.17 The other key issues, should this be developed as a bus-based option, are to consider how an attractive 'end to end' service could best be secured, maximising the benefits on enhanced transit infrastructure on the section of the A8 between Edinburgh Park and Newbridge. Securing reliable access in and out of any future P&R site will also be key to achieving the modal shift potential of the corridor.

Deliverability Issues

- 8.18 The deliverability risks are summarised in Table 8-2.

Table 8-2: Deliverability Risks – Newbridge Corridor

Deliverability risk	Tram	BRT	Comment
Engineering feasibility risk	L / M	L / M	• Options likely to be feasible.
Ability to secure desired transport outputs	L / M	L / M	• Tram option would deliver quality, largely-segregated, route in the corridor and into city centre. BRT option would offer a largely segregated / priority route on the extension, but overall attractiveness also determined by quality of 'end to end' route to city centre.
Technology risk	L	L	• Both options would use proven technology.
Environmental & property impacts risk	L / M	L / M	• Impacts are planning-related; scheme would be developed under a new area planning framework.
Acceptability risk	L / M	L / M	• Uncertain, though environmental and townscape character of corridor mean acceptability issues unlikely to represent high risk.
Project complexity / interdependency risk	L / M	L / M	• Key interdependency is the need to integrate land use planning and transport proposals. However, serves corridor containing existing land use designations and established demand, so not fully reliant on new land use proposals.
Value for Money risk	M	L / M	• Uncertain, but will be a key challenge for both options.
Planning risk - Powers & consents	M	L / M	• Powers required for tram. Bus-based option could have simpler consents process, though utilising existing infrastructure.

Legal / regulatory risk	L	L	Likely that a bus-based option would be integrated into existing bus operations, rather than as a separate entity.
Overall deliverability risk	M	L / M	No showstopper risk.

- 8.19 The key findings, at this stage, a bus-based option would be more deliverable, though there are no showstopper risks for either modal option.

Indicative Timeframe

- 8.20 If progressed as a bus-based option, there could be a phased implementation of measures and delivery of an integrated transit / active mode corridor around the mid-2020s. For a tram option delivery in the late 2020s would be a realistic timeframe.

9 Corridor 8: West of Hermiston Transit Options

Rationale for Transit in Corridor

- 9.1 The focus of the City Plan 2030 will be on delivering housing and employment growth at existing brownfield sites, and housing / mixed-use development in locations that have good public transport acceptability.
- 9.2 The long-term growth of Edinburgh and its city-region is likely, at some point (i.e. potentially beyond the City Plan to 2030), to require consideration of an extension of the existing urban area which, in line with policy, would need deliver sustainable communities supported by the provision of high-quality public transport and active modes.
- 9.3 The consideration of transit options in the Hermiston Corridor provides the opportunity to enable the sustainable development of new sites which, taken together, could form a major development area.
- 9.4 The corridor also benefits from a strong existing attractor in Heriot Watt University, an existing community at Currie and the opportunity for interchange at Curriehill Station. A P&R site is also located at Hermiston Gate.

How transit contributes to wider objectives?

- 9.5 The development of transit in the Newbridge Corridor has the potential to support the objectives and related outcomes outlined in Table 9-1.

Transit Options – Modes and Routing

- 9.6 For this Phase of the study we have identified potential route options as shown in Figure 9-1.

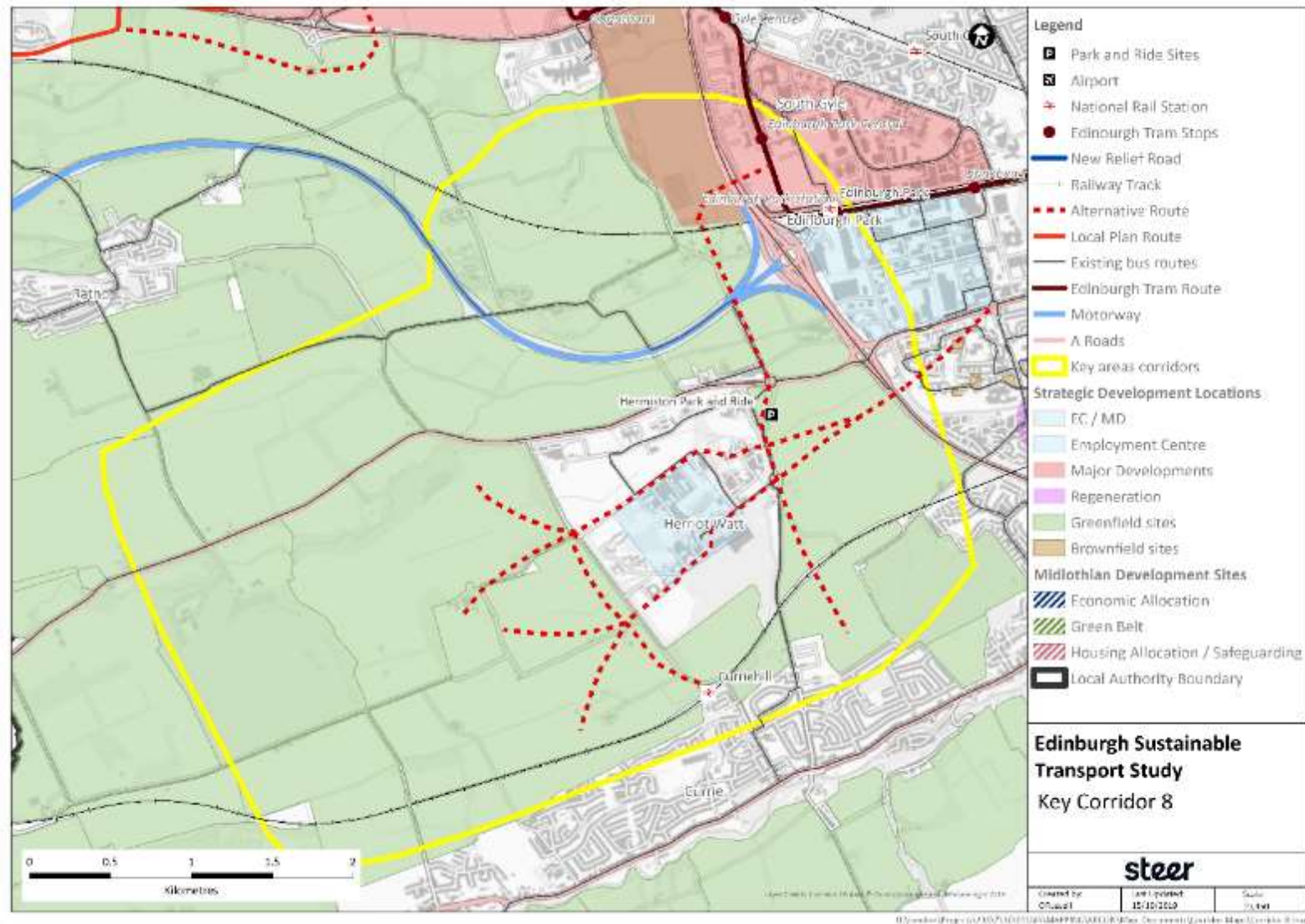
Modal Options

- 9.7 Both tram and BRT options would be potentially feasible for this corridor. A factor in the consideration of tram is that a tram extension connecting from the existing network to the west could only be implemented in either Corridor 7 or Corridor 8, but not both.

Table 9-1: West of Hermiston Corridor compliance with objectives

ESSTS objective	Commentary	Assessment
Sustainable Economic Growth and Development	- Potential for transit to support the development of large-scale development and sustainable communities, supporting the long-term growth needs of the city. - Improving public transport connectivity between Heriot Watt, Edinburgh Park, the city centre and beyond. - Improving business efficiency for firms in the corridor.	✓✓✓
Improved equity & social inclusion	- Improved public transport accessibility to jobs, education, healthcare and leisure for existing residents of Currie. - Improved access to education (Heriot Watt) from across the city. - Opportunity to foster equity and social inclusion through the development of new communities.	✓✓
Reduce transport-related carbon emissions	Provision of direct high-quality public transport access to key housing / mixed use / employment sites could encourage fewer / shorter trips overall through the sustainable development of a major new development area.	✓✓✓
Improved built & natural environment	- Transit can support development of high-quality place by supporting high-density and quality developments. - Transit and active travel provision can support high-quality streetscape.	✓✓✓
Improved health, wellbeing & safety	- Health enhanced through provision of maintenance of active travel corridor and enhanced public transport, leading to healthier lifestyles and fewer emissions. - Modal shift and scope to reduce traffic volumes / speed would reduce accidents and emissions.	✓✓

Figure 9-1: West of Hermiston Corridor Transit Options



Transit Route Options

Connection towards West Edinburgh / City Centre

- 9.8 For a tram-based solution there would essentially be two main options for connecting into the existing tram network. First, a route connecting onto Edinburgh park north of the M8. A connection into Edinburgh park from the south would not be viable due to the constraints imposed by the M8 / Bypass multi-level junction / railway / canal. The second option would be to provide a tram alignment along Calder Road which could connect with the exiting alignment at Bankhead. The former would provide a direct connection into Edinburgh Park (and its major employment sites), whereas the latter would extend the accessibility of tram to a wider residential catchment.
- 9.9 For a BRT / bus-based option the most likely routing would be the Calder Way route currently used by the Route 25 from Hermiston P&R.

Heriot Watt Westwards to Development Site Opportunities

- 9.10 Given the greenfield nature of much of the corridor there are myriad routing options for both bus and tram. The relative merits of routes and modes would fundamentally depend on the location, scale, density and form of development within the corridor. Key consideration would be that:
- From a transit demand perspective, a routing serving Hermiston P&R and offering the best accessibility to and within the Heriot Watt campus should be the aim of option development in this section.
 - Beyond this section, tram would be better suited to:
 - Higher demand and 'linear' corridor development, preferably with key 'anchors' along and at the end of the route.
 - The development of the area as to attract employment uses, where developers and businesses (potential occupiers) are more likely to be attracted to a tram-based corridor.
 - BRT would be suited to:
 - development patterns more dispersed or along more than one corridor e.g. earlier to serve development corridor west of Heriot Watt and Curriehill station.
 - BRT can also be more easily phased i.e. transit infrastructure provided as part of development build-out, and extendable
- 9.11 The implication of the above is also that a tram-based options would need to be developed as part of an integrated masterplan which considered, and its success would be predicated on the development of a complementary and mutually reinforcing masterplanning framework. This would need to consider the type of development, development phasing, transit network development and to provide access to tram stops (or hubs) via walking and cycling.

Commentary on Strategic Active Travel Connections

- 9.12 As a new extension to the city, the corridor provides an excellent opportunity for strategic active travel infrastructure to be developed alongside transit infrastructure. Active travel infrastructure would need to link with all local destinations of significance, the West Edinburgh Link and national cycle network routes 754 and 75.
- 9.13 Whilst developing greenfield land offers the opportunity to provide high quality active travel linkages within the corridor and wider site, developing a sustainable community in this

location would require high quality active travel permeability into the rest of the existing city from this location. This will need a very significant investment in order to overcome the major barrier to active travel movement imposed by the city bypass. This barrier extends over a wide area and creates severance of communities on either side of the bypass. To provide a really effective connection, one or more substantial 'green bridges' or similar over the bypass would be required.

Key Issues / Challenges

- 9.14 The key deliverability challenge for this corridor relates to the need to develop transit proposals as part of an integrated development masterplan. Within this, there will be a number of challenges to ensure the necessary form, type, scale and density of development required to support transit. These risks include development viability and phasing, and how this informs the phasing and funding / financing of potential transit solutions. An essential prerequisite for a successful transit-based development will be a masterplan framework setting out clear standards for development density that ensure sufficient populations living within walking distance of the stops.

Deliverability Issues

- 9.15 The deliverability risks for the West of Hermiston Corridor are summarised in Table 9-2.

Table 9-2: Deliverability Risks – West of Hermiston Corridor

Deliverability risk	Tram	BRT	Comment
Engineering feasibility risk	L / M	L / M	Options likely to be feasible.
Ability to secure desired transport outputs	L / M	L / M	Tram option would deliver quality, largely-segregated, route into city centre. BRT option would need to consider how 'end to end' service could be delivered, or as 'feeder' into tram stop.
Technology risk	L	L	Both options would use proven technology.
Environmental & property impacts risk	M	M	Impacts are planning-related; scheme would be developed under a new area planning framework.
Acceptability risk	M	M	Uncertain. Greenfield nature of parts of corridor may represent greater risk from a planning perspective. Case to transit intertwined with land-use options.
Project complexity / interdependency risk	M	M	Key interdependency is the need to integrate land use planning and transport proposals. This would be through a Spatial Planning Framework.
Value for Money risk	M	M	Uncertain, but will be a key challenge for both options.

Planning risk - Powers & consents	M	M	Powers required for both options.
Legal / regulatory risk	L	L	Likely that a bus-based option would be integrated into existing bus operations, rather than as a separate entity.
Overall deliverability risk	M	M	No showstopper risk.

- 9.16 The key risks are planning-related rather than directly transit-related at this stage, reflecting the planning and development-led nature of transit in this corridor.

Indicative Timeframe

- 9.17 Given there would be a requirement to establish a masterplan framework in order to inform the development of transit options, is it unlikely that transit could be developed within the timeframe of the City Plan 2030 period.

10 A Future Transit Network

An Illustrative Network Vision

- 10.1 The preceding sections of this report identify the potential for transit at an individual corridor level. This study suggests that the further consideration and potential development of transit should be considered for a number of these corridors.
- 10.2 There are potential benefits of developing transit solutions across corridors. These include making best use of shared infrastructure (lowering incremental costs), operational efficiencies and the ability to provide significant passenger benefits by providing connectivity and accessibility across corridors.
- 10.3 However, there is also a level of network development where the constraints imposed by core infrastructure – such as tram capacity through Princes Street – would require consideration of how additional core area capacity can be delivered. Indeed, the City Centre Transformation work identified the potential requirement for a new city centre tram axis to accommodate the requirements of a future potential tram network in conjunction with the placemaking aims of the CCT.

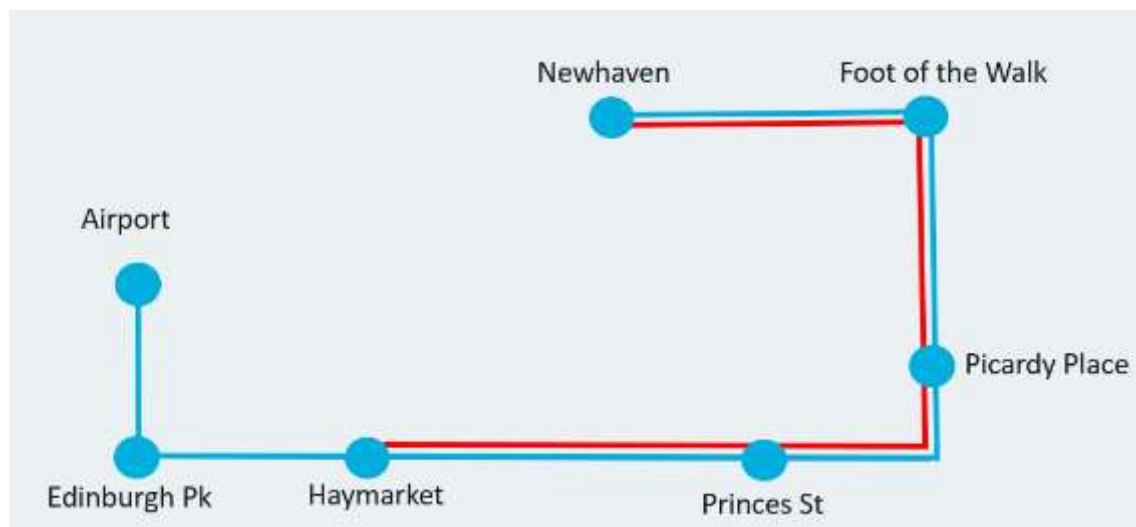
A Future Network - Tram

- 10.4 There would need to be further work to examine the case for transit solutions and the most appropriate mode in the priority corridors identified in this report. However, the development of a tram network has been a long-established ambition, reflected by current CEC policy, so we have considered what a future network, should tram be developed in key corridors, could look like from a route and operational perspective.

Do Minimum Network – Airport to Newhaven

- 10.5 The Tram Completion Project (Trams to Newhaven) was approved by CEC in March 2019, and is anticipated to open in 2023.
- 10.6 This will provide for an extension of the existing service to Newhaven, complemented by an additional service operating between Haymarket and Newhaven. The current assumptions (as per the Tram Completion Full Business Case) is that by 2030 there would be 16 trams per hour on the Newhaven section.
- 10.7 This is illustrated in Figure 10-1.

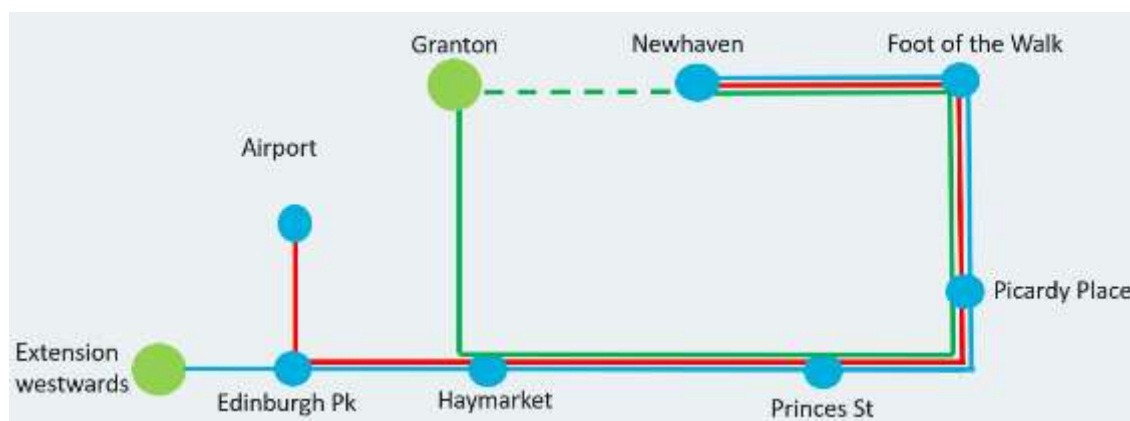
Figure 10-1 Do Minimum Tram Routing and Service Pattern



- 10.8 Over time it is likely that a tram frequency of 16tph to Edinburgh Park would be required to accommodate planned growth.

Extension to West (West of Hermiston or Newbridge) and Extension to Granton

- 10.9 An illustrative service pattern, should the tram network be extended westwards (towards either Newbridge or West of Hermiston), is presented in Figure 10-2.
- 10.10 The existing infrastructure on Princes Street could accommodate further extension to west within the above (though there would be limits on frequency for spurs to the P&R & Airport) to around current level. As an illustrative scenario an extension only to the west could imply a service pattern of 8tph from the Airport to Newhaven and 8tph from a western extension to Newhaven. This would retain the current service frequency to the Airport (and Ingliston P&R) and 16tph between Edinburgh Park and Newhaven.
- 10.11 An extension to Granton (assuming 8 trams per hour) would imply a frequency of around 24 trams per hour through the city centre and to Newhaven.
- 10.12 There would need to be more detailed work to assess whether and how a frequency of 24tph could be accommodated through Princes Street. Our preliminary view is that a service level of 24 tph could be achievable, but would need to be enabled by supporting measures (in particular a significant reduction of buses) on Princes Street, which would be consistent with principles of the City Centre Transformation Programme.
- 10.13 There is the option to continue a Granton extension through to Newhaven (denoted by dashed line) which could then support either a 'loop' service or an extension of some services via Leith to Newhaven to serve an interchange at Granton.

Figure 10-2 Illustrative Tram Network with Extensions to Granton and West of Edinburgh Park

Extension to South East

- 10.14 The south east corridor is a high-demand corridor and, as such, a reasonable planning assumption is that it would require a tram service level of 16tph.
- 10.15 Based on the local plan route (there a route would turn from South Bridge to connect with the exiting tram route in Princes Street) this would imply service levels of around 32 trams per hour though the centre (if these were overlaid on the 16tph from Newhaven).
- 10.16 This is likely to be unachievable unless, for example, all buses were re-routed away from Princes Street, which is likely to be unacceptable. Moreover, a future network where all services funnel through Princes Street make operational reliability harder to achieve and also compromises the resilience of the network.
- 10.17 Our assessment is therefore that, in considering a wider network and in particular a route to the south, the case for additional city centre infrastructure should be assessed.

City Centre Infrastructure Options

There are two sections where we suggest consideration of additional central area infrastructure could improve the journey opportunities, operational reliability and resilience of the network. These are:

- A link from North Bridge to Picardy Place, allowing for a direct connection between Newhaven and the South East corridor, and reducing the throughput of trams through Princes Street.
- A new cross-city axis running between Nicholson Square to Haymarket via Potterrow, Lauriston Place, Bread Street and Morrison Street. This route would serve a strong catchment including the University of Edinburgh's central campus, the Edinburgh International Conference Centre and adjacent Exchange office district. The route would also provide new routing opportunities with a more direct connections, avoiding Princes Street, from any potential South East Corridor to important employment opportunities in the west. This route was identified as a potential option in the CCT report.

These routes are both shown in Figure 10-3.

Development of the cross-city route does present some challenges however. These include:

- Shared running on a congested road network would require extensive traffic re-routing and management to keep delays to an acceptable level;

- There would be contentious changes to parking / loading / servicing arrangements to provide tram priority;
- There are some feasibility issues at pinch points. This includes land take at Nicolson Square and property demolition or single-track section at Bread Street / West Port triangle.

- 10.18 New city centre infrastructure as described above could facilitate a range of service options and increase the overall capacity, reliability and resilience of a future network.
- 10.19 Illustrative service patterns are presented below for a network with a new link between North Bridge and Picardy Place (Figure 10-4), and then the further addition of a new cross-city axis (Figure 10-5).
- 10.20 Again, it should be noted that these are illustrative service patterns only, and that in practice a range of variant options could be considered.

A Future Network – with BRT

- 10.21 There would be a number of further service options and variants that would be possible with bus-based transit / BRT options. It is difficult to speculate on how these could develop at a detailed level, but any future BRT network would need to be developed to maximise the opportunity for seamless cross-city connections, either through cross-city services or interchange between BRT and tram, supported by multi-operator off-vehicle ticketing.



Figure 10-4 Full Network (link for North Bridge to Picardy Place)

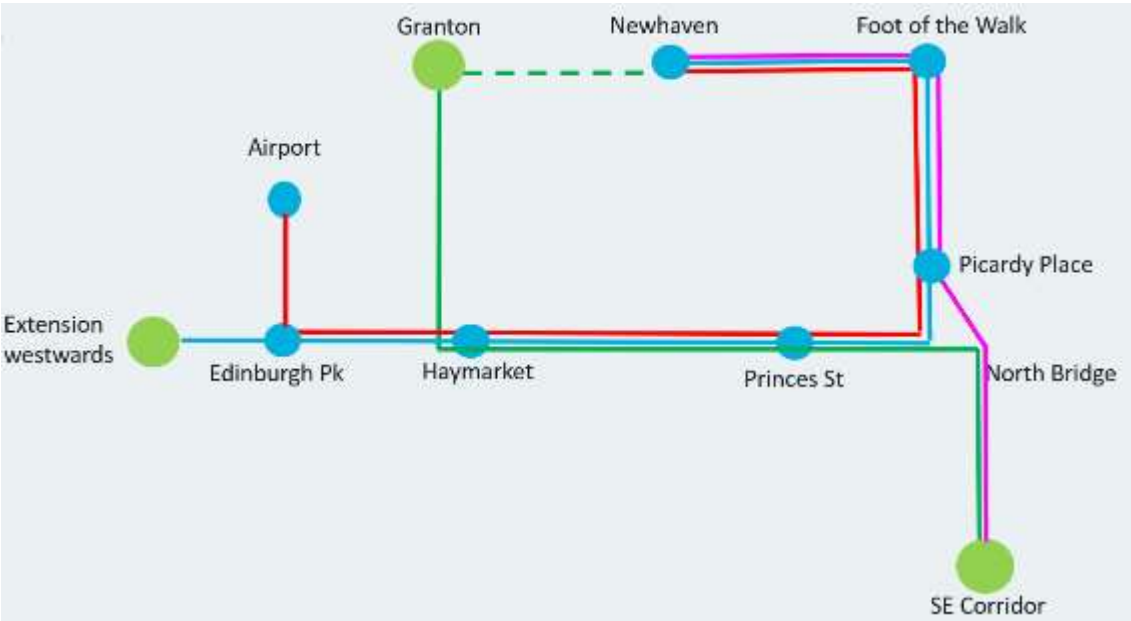
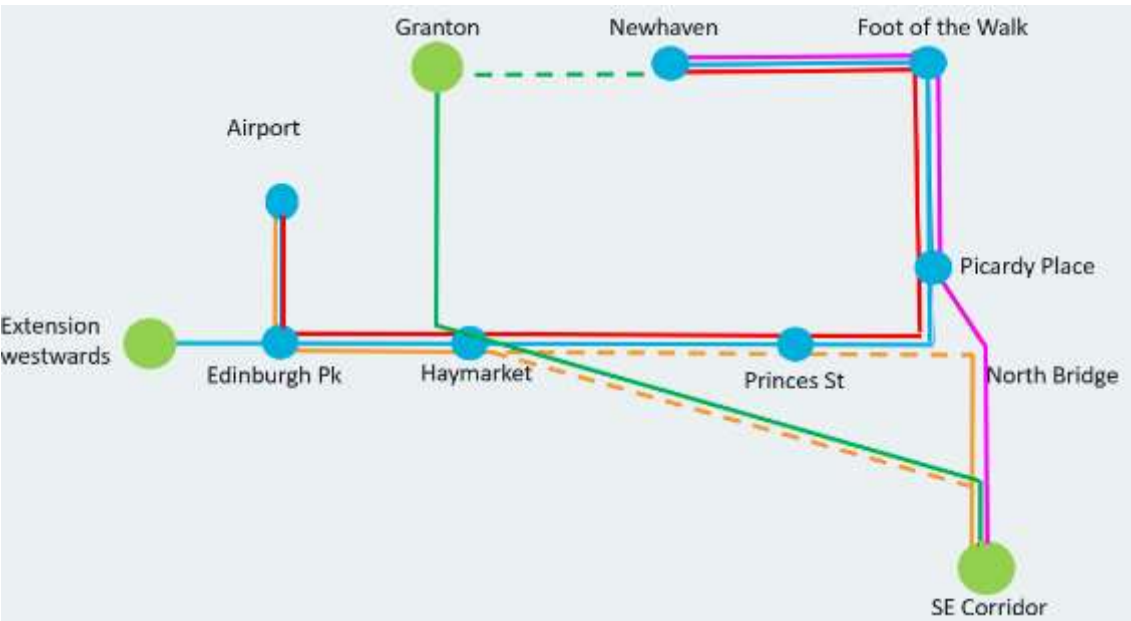


Figure 10-5 Full Network (link for North Bridge to Picardy Place, and new cross-city axis)



11 Conclusions and Next Steps

- 11.1 The case for a step-change in public transport provision, though the development of transit corridors, is compelling given the City's policy imperatives around sustainable growth and development, equity, climate change and health and wellbeing.
- 11.2 This study has considered the case for the development of transit across ten key corridors. Our analysis suggests that there are four corridors for which transit-based options should be considered further. These are Corridor 6 – Granton, Corridor 3 – South East via BioQuarter, Corridor 7 – Newbridge and Corridor 8 – West of Hermiston.
- 11.3 This Phase 1 study is relatively high-level and, while we provide an initial view and commentary on modal and routing options that we consider may be more suitable, these will be subject to more detailed work as part of further corridor and scheme development, and in-line with project development processes set out in Scottish Transport Appraisal Guidance.
- 11.4 The study concludes that the Local Plan tram alignments on the inner sections of the Granton and South East corridors remain the most viable and attractive routes *from a tram perspective*, and that no clear tram route alternatives exist in these corridors. The study recommends that bus-based / BRT options should be considered further on several corridors, and that this could provide for a 'quick-win' opportunity for Corridor 7 in particular.
- 11.5 The further development of options in in each corridor will also need to consider:
 - **The development of transit as part of an integrated corridor strategy combining transit, active travel and other modes.** While passenger transport and active modes are both priorities for the City, there are issues and trade-offs that exist in each corridor in developing an overall strategy that provides an attractive route and caters for the long-term demand for both.
 - **The need for integrated transit and spatial planning.** Transit can help support an increased density, rate and value of development and therefore support sustainable land use development. To fully realise these benefits, land use and transport need to be planned in an integrated and mutually reinforcing manner. This is particularly the case for Corridor 8, where the development of transit is predicated on the development of a Masterplan Framework that includes development patterns and densities that will be enabled by, and supportive of, transit-led development.
 - **The regional dimension.** While transit infrastructure is likely to be largely focused within the City, it can deliver transport benefits and address issues that are regional in nature through, for example, strategic Park & Ride and interchange with rail services. Transit solutions should therefore be considered in a city-region and sub-regional context.

Appendices

A Information on Non-Transit Corridors

Corridor 2: Leith to Portobello – Context, Problems & Opportunities

Corridor Overview

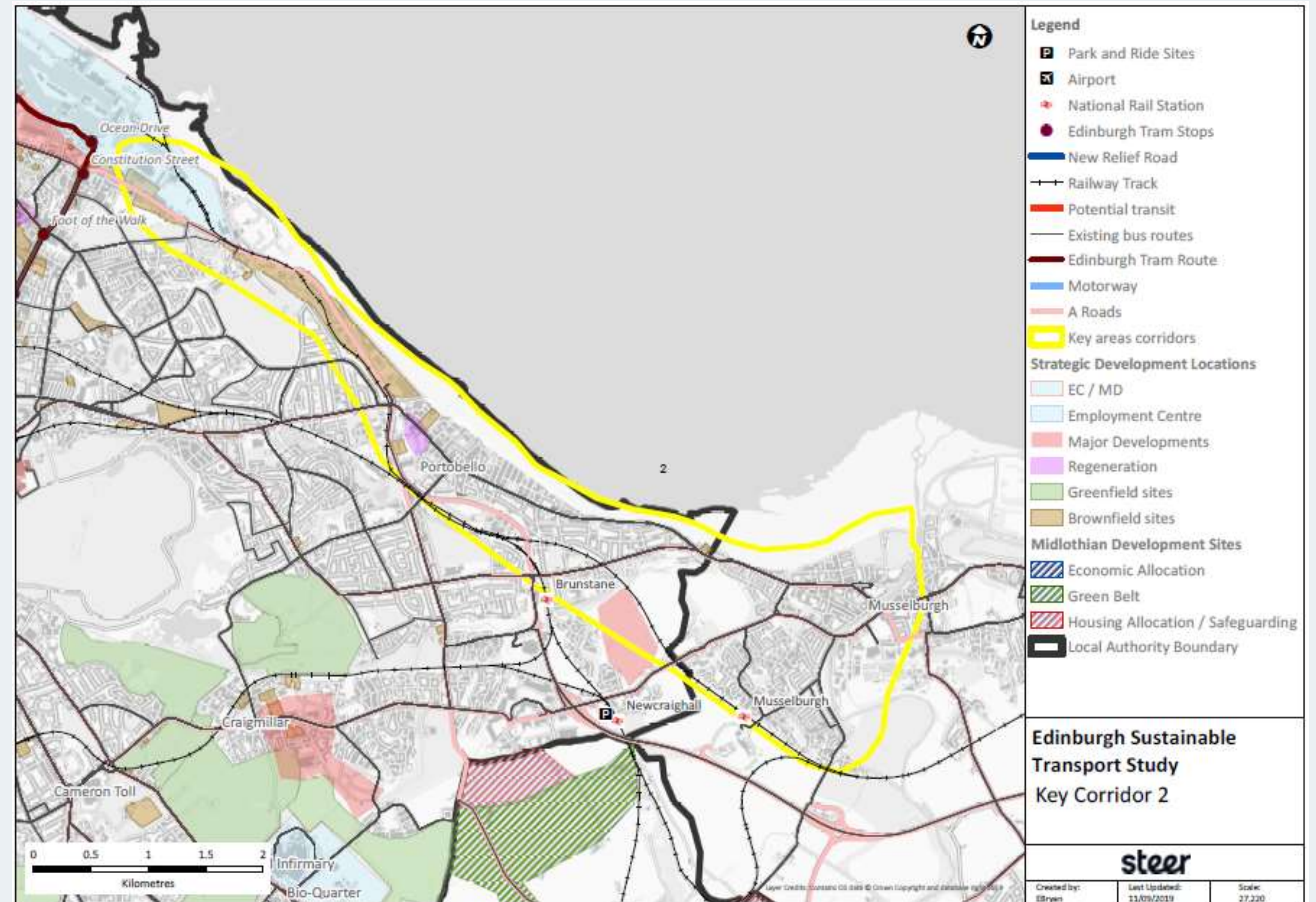
- A corridor that extends the Leith development areas along the coast

Problems

- Relatively poor public transport accessibility in parts of corridor

Opportunities

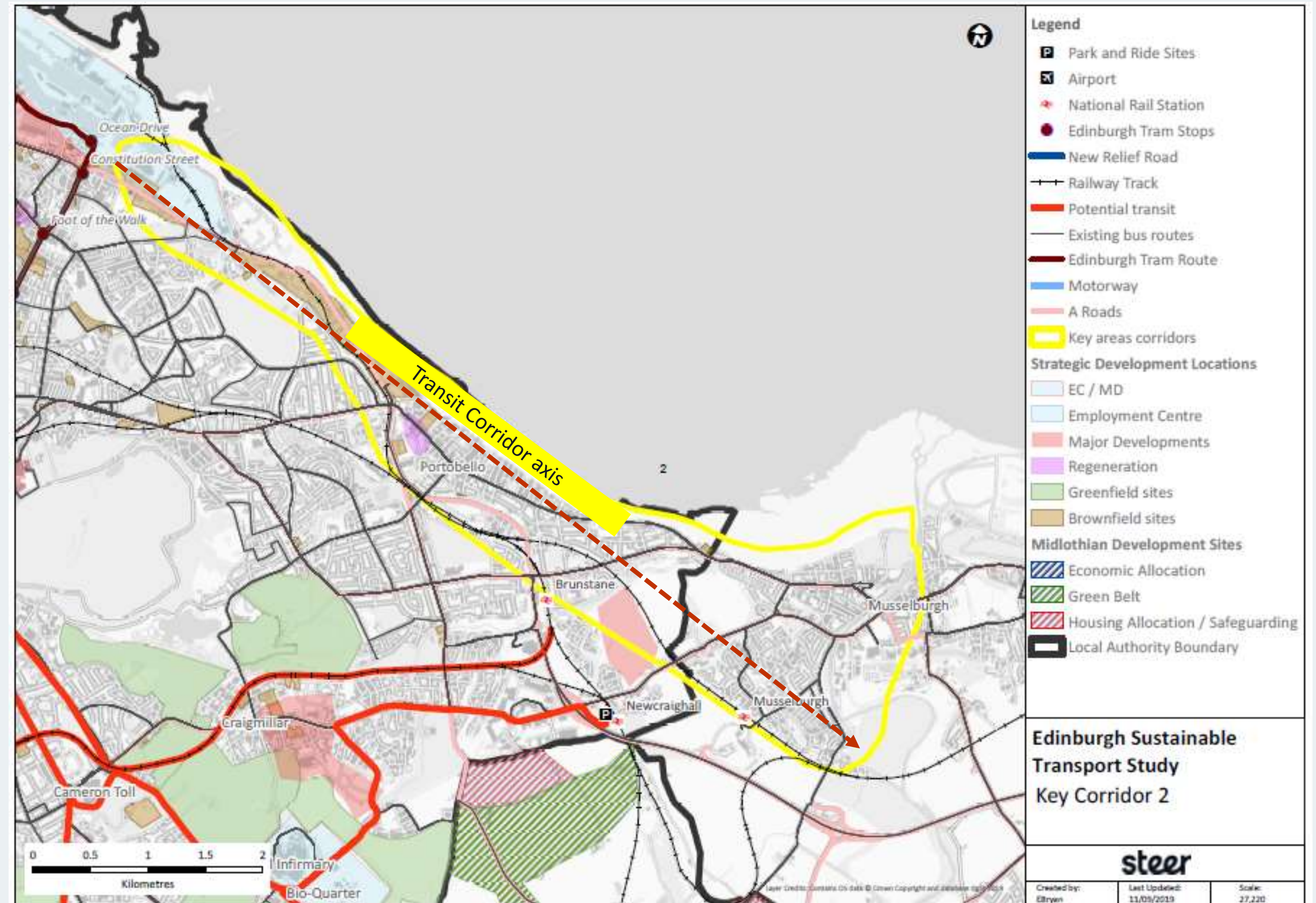
- Brownfield development west of Portobello
- Potential to link in to planned Newhaven tram route around Leith
- Attractive corridor for enhanced active travel links



Corridor 2: Leith to Portobello – Transit Options (*illustrative – not drawn*)

Issues in Developing Transit Option

- Transit route to Portobello High Street:
 - Shared running; high frontage activity; Numerous side roads
- Narrow linear corridor bounded by the coast and road and rail corridors
 - Limited catchment & serves limited amount of development
- Tram link to the Newhaven extension
 - journey time and reliability advantages eroded due to shared running / indirect routing
- Significant brownfield development could be served by the western end of the corridor
- No major greenfield sites would be served



Corridor 2: Leith to Portobello – Emerging Conclusions

Overall Conclusion

- The corridor is not a priority for consideration of major transit enhancement (i.e. tram), as it does not have the underlying demand (current or future) or to offer a competitive / attractive alternative (in terms of journey time) for key movements towards / via the city centre.
- The corridor does serve existing demand, has development potential and there is potential to improve the quality of provision for both bus and active modes.

Commentary on Transport Options

- The corridor does not have the fundamental requirements that support the development of a tram / transit corridor in terms of its demand catchment (current and potential), route constraints and indirect routing to the city centre and (by extension) other major destinations.

Transport priorities for the corridor should focus on:

- Provision of an attractive and coherent active travel / cycle route along the axis if Corridor 2.
- Enhanced bus provision along the axis if Corridor 2.
- Consideration of enhanced bus provision on the established (and faster and more direct) routes from the key centres in corridor 2 (Portobello and Musselburgh) and the city centre.
- Specific consideration of public transport enhancements that support the development of the major brownfield development opportunities to the north-eastern end of the corridor.

Corridor 2: Leith to Portobello – Emerging Conclusions

Commentary on Active Travel

- Strong potential corridor – attractive route serving destination and also leisure route. There is an existing CEC quiet route. Potential to create an active travel corridor, linking in with bus and tram at the Foot of the Walk.

Commentary on Development Implications

- The corridor includes major brownfield redevelopment opportunities in the north-western half of the corridor.
- Transport accessibility is relatively poor in this section as radial connectivity (bus) to the city centre is stronger around Leith and Portobello.
- The development area could be supported either through increase bus provision and / or, once Trams to Newhaven is complete, by bus feeders into Leith.

Corridor 4: City Centre to Easter Bush/Straiton – Context, Problems & Opportunities

Corridor Overview

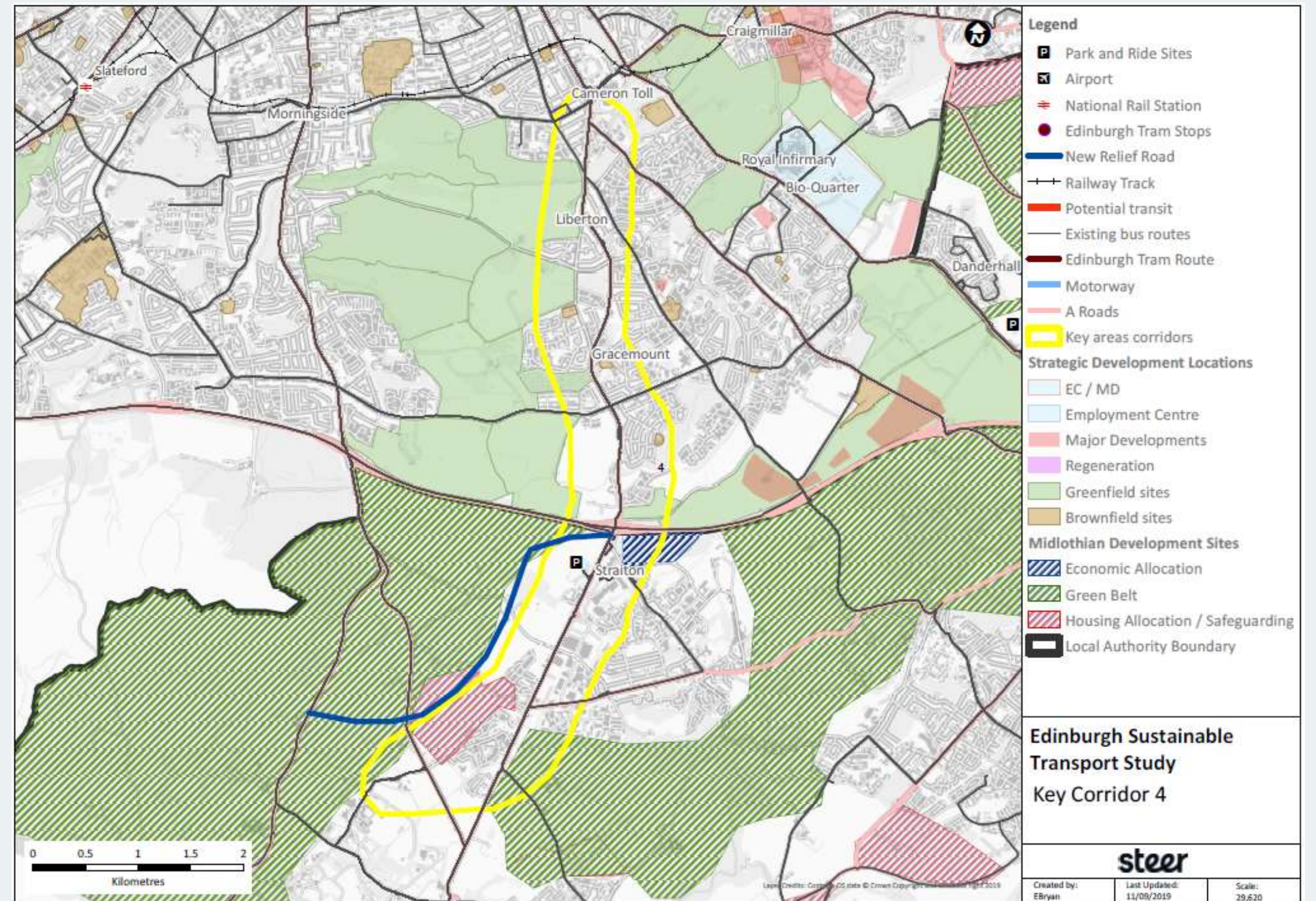
- A variant of Corridor 3 focused on growth corridor to the south towards Straiton and Penicuik

Problems

- Problems as per Corridor 3 for A7 City Centre to Cameron Toll

Opportunities

- Strong existing catchments
- Potential convenient ‘anchor’ at Straiton P&R
- Corridor sharing with new A701 Link Road (environmental and cost advantages)?
- Greenfield “wedge” opportunity for transit-led development (but note gradient constraint)



Corridor 4: City Centre to Easter Bush/Straiton – Transit Options)

Corridor Options

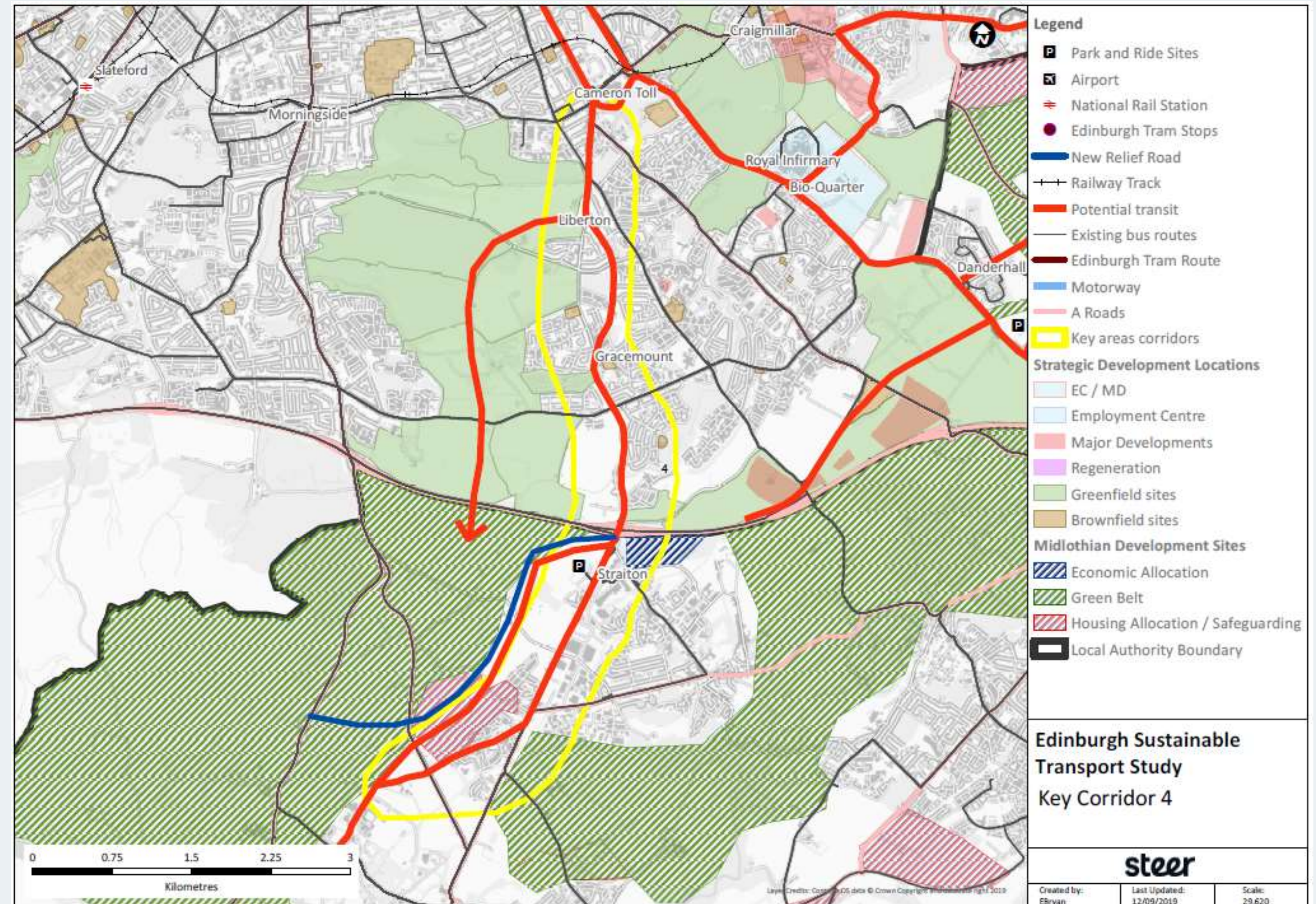
- Existing corridor Burdiehouse Rd to potential ‘anchor’ at Straiton P&R
- Greenfield “wedge” option
- South of by-pass, potential to utilise A701 Link Road (environmental and cost advantages)?

Constraints

- Gradients in the vicinity of Liberton at the limit of on-street tram operation
- Non-transport constraints preclude “Greenfield Wedge” option
- Crossing Edinburgh Bypass

Emerging thinking

- Effectively an either / or (or neither) choice for tram on Corridors 3 vs 4.
- Corridor 3 stronger on feasibility and demand
- Points towards bus based solutions?



Corridor 4: City Centre to Straiton – Emerging Conclusions

Overall Conclusion

- Transport enhancement options for Corridor 4 would be bus based.

Commentary on Transport Options

- The focus of transport options would be on enhancing the existing corridor to serve the established demand.
- Tram would not be considered for this corridor, given the stronger tram potential of Corridor 3.
- If Corridor 3 developed as BRT potential to integrate with Corridor 4.

Commentary on Active Travel

- Limited active travel provision. Liberton Brae is steep and the topography makes cycling less attractive.

Commentary on Development Implications

- The long-list of Greenfield sites form a ‘wedge’ which could be developed along a new transit (bus-based) spine.
- However, our understanding is that other Greenfield site assessment criteria limit the development potential of this as a ‘corridor’.
- Sites to the immediate west as of the corridor (i.e. build-out from the existing urban development) could readily be served by the existing route.
- Increased development within Corridor 4 would increase overall demand levels and therefore reinforce the need to consider how public transport capacity across corridors 3 and 4 can be increased to accommodate future growth.

Corridor 5: City Sub – Context, Problems and Opportunities

Overview

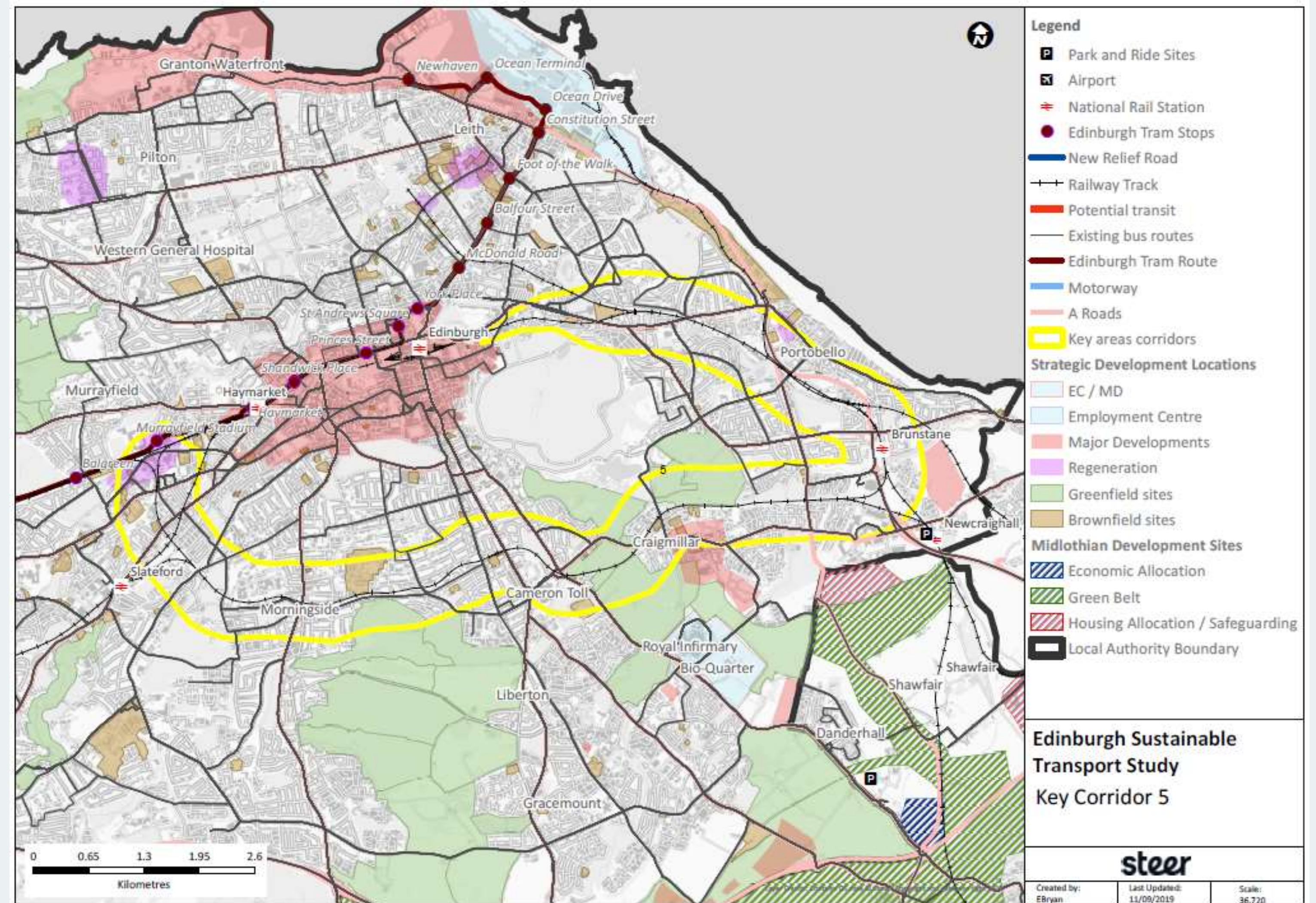
- South Suburban Railway Line
- Route once provided for ‘inner orbital’ passenger service

Problems

- Orbital public transport movements not well catered for, given radial nature of network.

Opportunities

- Corridor notionally attractive in that it could, if deliverable and viable, provide for orbital movements via a fully segregation rail / transit alignment.
- This could serve orbital movements better and relieve capacity on inner sections.



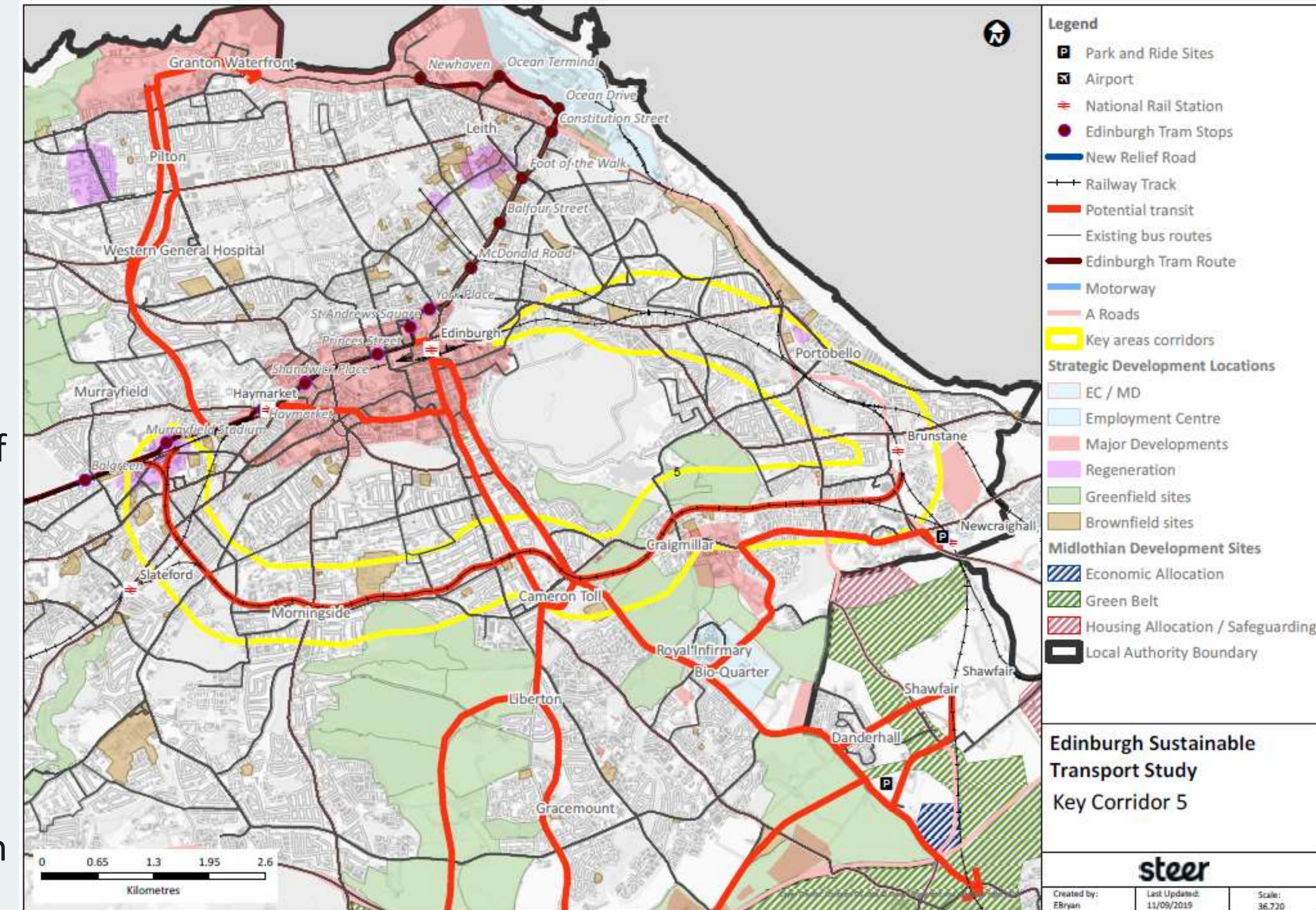
Corridor 5: City Sub – Transit Options

Corridor Options

- To reinstate passenger services on the south-sub.
- Rail and Tram-Train both suggested previously.

Constraints

- Inter-running with strategic freight route means that ‘metro’ level of service could not be provided
- Inability to access city centre limits demand potential. Rail option unfeasible due to constraints at Waverley / Haymarket. Tram-train mooted as alternative to overcome this – but city centre tram network similarly constrained.
- In either case, relief of city centre constraints better utilised supporting service enhancements in other corridors (e.g. other tram extensions or rail service enhancement on capacity constrained corridors).
- Tram-train cost and deliverability very uncertain. Myriad issues re overhead line, signaling, track compatibility, platforms, level access.
- Previous studies have suggested business case is weak



Discussion

- No clear option that is both attractive (demand perspective) and feasible.

Corridors 5: City-Sub - Emerging Conclusions

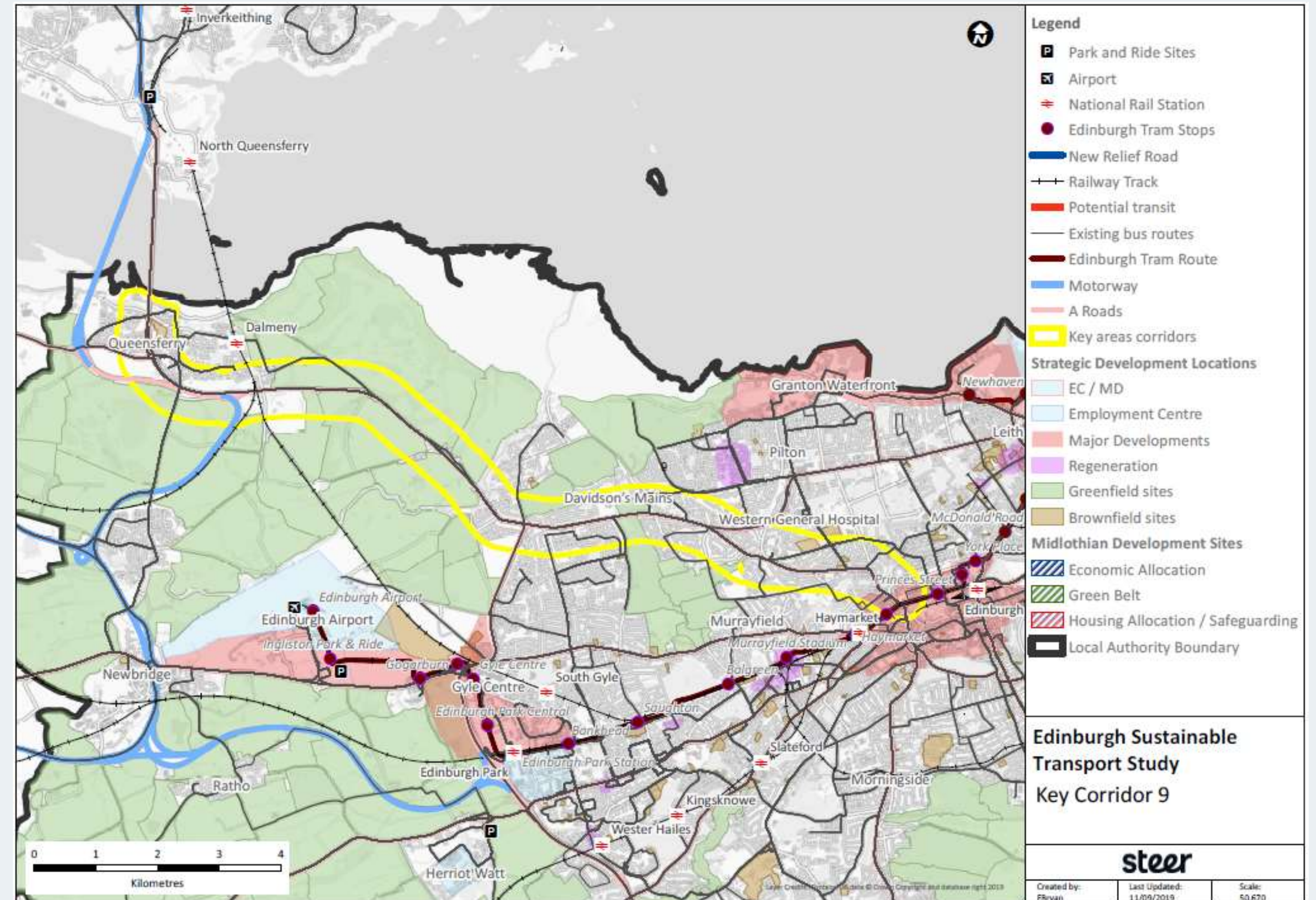
Overall Conclusion

- There are fundamental feasibility issues that mean that the use of south-sub for a transit / metro type service is likely to be undeliverable and unviable.
- Given the above, the recommendation is that this should not be a priority for further consideration.

Corridor 9: City Centre to Queensferry – Context

Corridor Overview

- Major strategic route to Fife and the north of Scotland
- A90 is busiest arterial route in Edinburgh (in terms of general traffic) carrying twice the volume of the A8
- Poor journey time reliability - corridor susceptible to major delays as a result of accidents and roadworks
- Major growth in South Fife with many residents travelling to Edinburgh for work
- Development sites already allocated in Queensferry and Kirkliston



Corridor 9: City Centre to Queensferry – Problems and Opportunities

Problems

- High traffic levels and congestion result in poor bus reliability
- Focus on A90 capacity results in adjacent communities (Barnton, Blackhall, etc) having poor access to the road network with long side road delays
- Relatively poor service by Lothian Buses, strong Stagecoach service but connectivity focused on city centre; very poor links from Fife to north and west Edinburgh
- A90 bus lanes would reduce general traffic capacity to a point where approach queues would be so long as to negate any benefit
- Queensferry St bus stop capacity limits service expansion

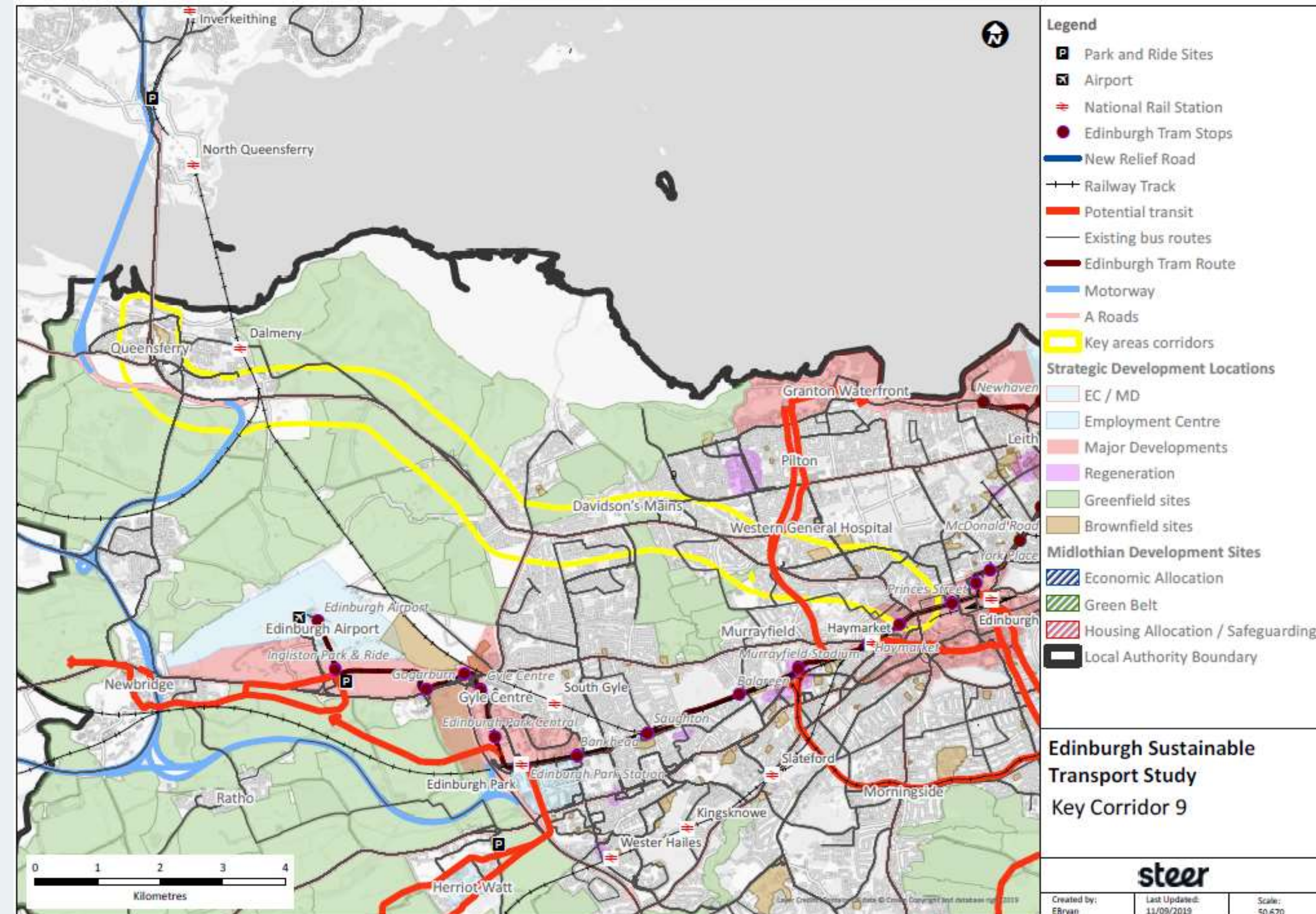
Opportunities

- Opportunity to increase rail capacity from Fife limited – STPR2 focus on bus and even ferry
- Existing P&R sites at Ferrytoll and Halbeath perform extremely well and could / need to be expanded
- Targeted bus priority improvements at Blackhall junction and other locations

Corridor 9: City Centre to Queensferry – Transit Options

Corridor Options

- Bus based solution rather than tram or BRT
- Needs buy-in from operators, including improved connectivity between Fife and North Edinburgh and better local service provision (strengthening of Route 41 and new services to support greenfield expansion)



Corridor 9: City Centre to Bio Queensferry - Emerging Conclusions

Overall Conclusion

- Major strategic route to Fife and the north of Scotland
- Major intervention required to improve public transport capacity and reliability
- Consider through STPR2

Commentary on Transport Options

- Public transport will remain bus focused
- Existing inbound bus priority on A90 towards Barnton junction but no further bus priority inside city
- Major delays, particularly outbound in evening period
- Key arterial route to the north. Significant delays are made even worse during the summer months and festival periods.
- Local residents split on the benefits of improved bus priority on Queensferry Road. Existing local service provision is poor (Lothian 41 and Lothian Country 43).
- Bus lanes are likely to increase bus delays on the approaches to the lanes, negating any reliability benefit

- Bus lanes will significantly reduce general traffic capacity. Local connectivity may be therefore reduced rather than improved if bus lanes are implemented
- Any bus priority should be implemented with an operator commitment to improve services.

Commentary on Active Travel

- Recently completed segregated cycle route between Queensferry and Roseburn
- Roseburn / CCWEL will complete direct largely segregated link to city centre

Corridor 9: City Centre to Bio Queensferry - Emerging Conclusions

Commentary on Development Implications

- Existing green belt with high landscape value
- Difficult to provide public transport connectivity to new development. Limited existing local services to extend. Regional routes will not wish to divert from A90
- Development pressure at Craigiehall (former Army HQ). Park & Ride site proposed at this location but:
 - site is located too close to the city, and
 - there are no obvious public transport routes which could serve the facility
- Major development will continue in south Fife – e.g. Dunfermline East and West increasing public transport demand

Next Steps

Additional work needed to help inform STPR2. This needs to consider:

- the need for additional Park & Ride capacity at existing and potential new sites
- how to make best use of the public transport capacity provided by the Forth Road Bridge
- how to increase public transport capacity and reliability along the A90 and Telford Road
- how to improve public transport access and capacity through Queensferry Street to and from the city centre
- how to improve public transport accessibility to north and west Edinburgh, both of which are poorly served from the A90 catchment

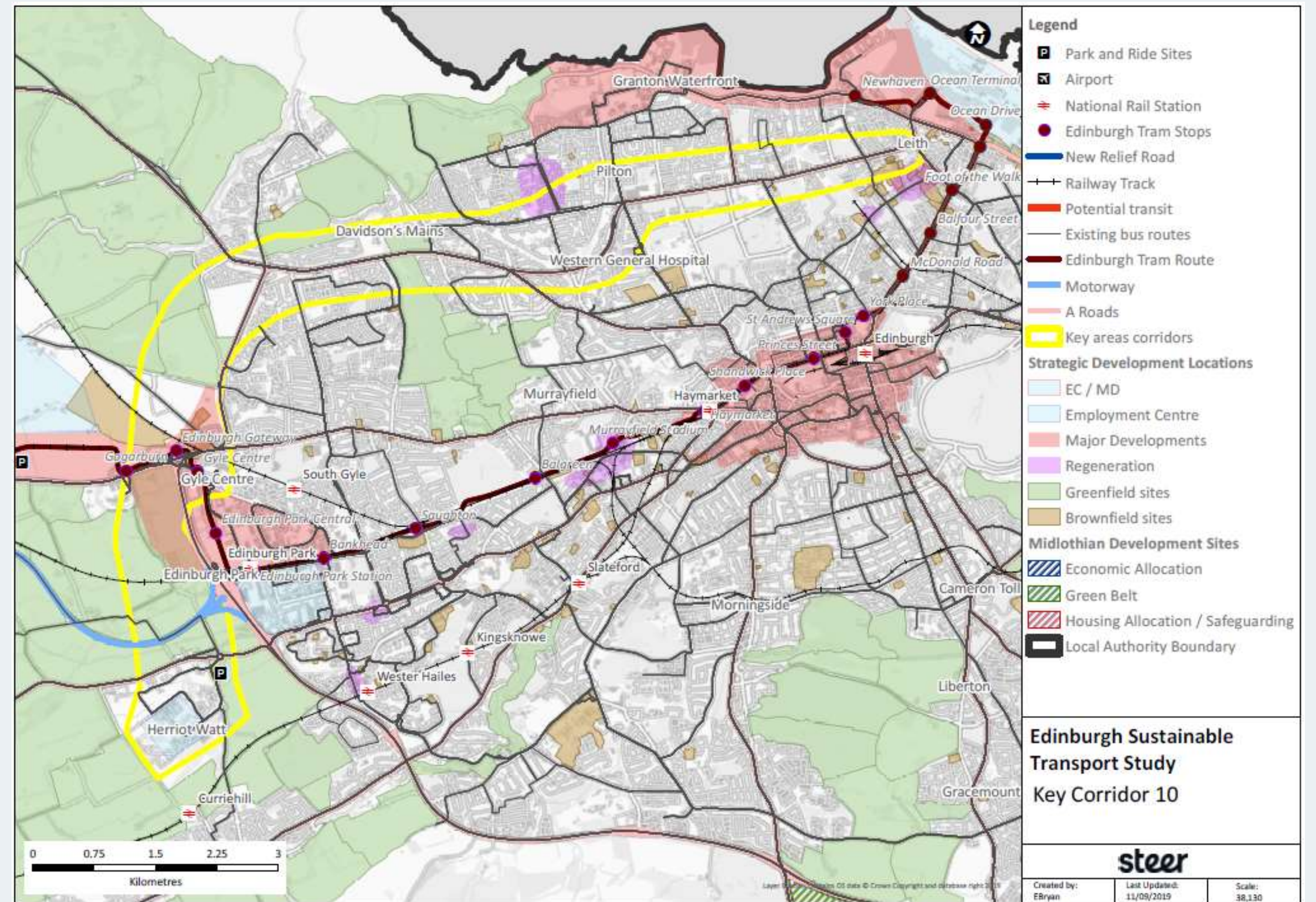
Corridor 10: West Edinburgh North/South Link - Context

Corridor Overview

- Major growth corridor currently poorly served by public transport
- High levels of general traffic congestion
- Investment in tram and Gateway station but benefits not fully realised

Planned and Potential Growth

- Edinburgh Park completion
- Cammo and West Craigs residential
- IBG
- Crosswinds



Corridor 10: West Edinburgh North/South Link – Problems & Opportunities

Problems

- Very high levels of congestion; Barnton, Maybury and Gogar are three of the busiest junctions in Edinburgh - significant peak period congestion
- Poor public transport access to Gateway Station
- Limited opportunity for further public transport priority on existing roads
- Unrestricted parking makes public transport provision difficult
- Crosswind runway a historic barrier but now removed

Opportunities

- Major development growth – largest opportunity for commercial (employment) development in Edinburgh
- High potential demand for public transport – with developers willing to limit parking capacity (supported by future CPZ)
- North / south bus corridor may need to be a green field route to provide competitive journey times
- New bridge over Fife railway line would enable improved interchange with rail and bus at Gateway Station
- Redevelopment of Gyle shopping centre could deliver improved interchange

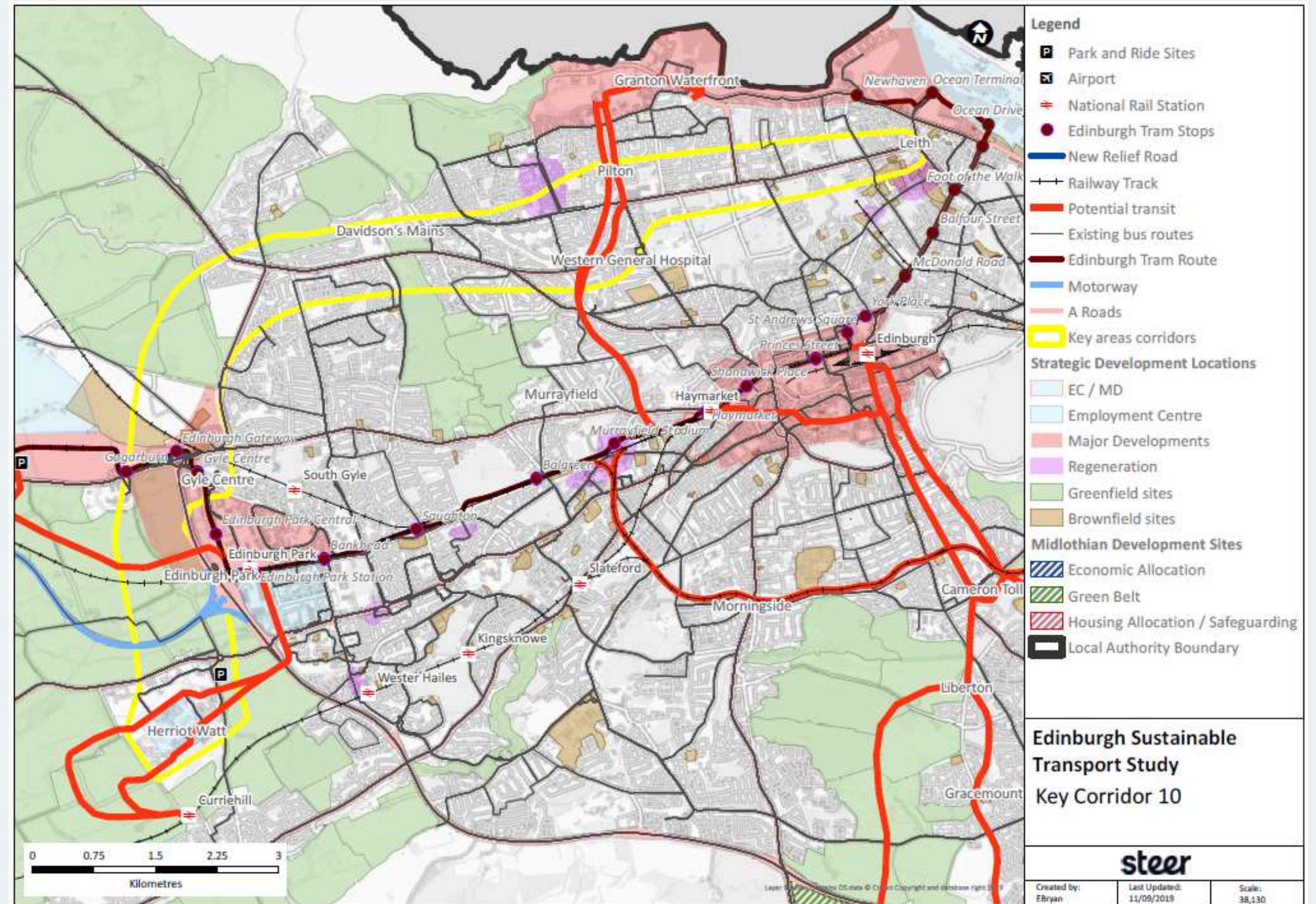
Corridor 10: West Edinburgh North/South Link – Transit Options

Corridor Options

- Bus based opportunity connecting with tram and heavy rail

Issues

- High levels of private sector investment - potentially transformational
- But existing road network a major constraint
- No existing bus service to strengthen – will require early support
- Major up-front investment in public transport infrastructure but no guarantee that it will be used?



Corridor 10: West Edinburgh North/South Link - Emerging Conclusions

Overall Conclusion

- West Edinburgh a key area for expansion. Includes nationally important sites, close to airport
- Major investment already made in tram and Gateway station
- Investment in bus and active travel can improve access to this infrastructure

Commentary on Transport Options

- Further public transport will be bus focused, improving north south connectivity between Granton and Heriot-Watt
- Bus access to Edinburgh Gateway station needs to be improved. Consideration of a new public transport bridge across the Fife railway line providing connectivity to West Craigs and Maybury road, and improved access from Gogar roundabout, in conjunction with a new airport link road

- Access to Edinburgh Park extremely congested at peak times, reducing the attractiveness of bus
- Further bus priority required in order to mitigate against high levels of general traffic congestion through Maybury / Gogar and at Barnton
- Major investment in bus infrastructure would need to be supported by a commitment from bus operators to use the facilities
- Potential to make Gyle or Gateway stops key bus / tram interchanges
- Existing bypass is a barrier to east / west movement, west of Edinburgh Park. Possibility to calm A720 north of Hermiston and make A8 a local distributor – but this would require major investment in the bypass
- Possible connection to new tram extension at Heriot-Watt and wider development associated with Corridor 8

Corridor 10: West Edinburgh North/South Link - Emerging Conclusions

Commentary on Active Travel

- Active travel improvements proposed on Maybury Road, also a new link across Fife railway to Edinburgh Gateway
- Existing facilities on A8 and Queensferry Road but major junctions at Barnton Maybury and Gogar a barrier
- Potential to improve quiet routes through Edinburgh Park and towards Heriot-Watt University

Commentary on Development Implications

- Major mixed use developments proposed, including: Edinburgh Park Phase 2, IBG1 & 2, Crosswinds
- Major residential sites in LDP include Cammo and West Craigs; East of Milburn Tower still not decided
- Airport growth and development in West Lothian will add further transport demand
- General developer acceptance that parking restraint will be required. A new CPZ is proposed which will help encourage bus, rail and active travel demand

Next Steps

Existing modelling indicates north to west movements are underserved by public transport

- Further work required to understand size of current and future market
- Public transport market served either by bus via Telford / Queensferry Road or tram via Haymarket
- Work with developers and bus operators to identify existing opportunities and network constraints
- Identify potential further mitigation on top of that already identified in WETA

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