Midlothian Orbital Bus STAG

Executive Summary

Case for Change, Preliminary Appraisal and Detailed Appraisal

Midlothian Council

June 2023

Delivering a better world

Executive Summary

Introduction

In May 2022 AECOM was commissioned by Midlothian Council, in partnership with the regional transport partnership for South East Scotland, SEStran, to conduct a study based on Scottish Transport Appraisal Guidance (STAG) for four bus corridors within Midlothian:

- Corridor 1: A6094 Whitecraig to A6094 Eskbank;
- Corridor 2: B6392 Eskbank to A772 Gilmerton Junction;
- Corridor 3: A7 Gorebridge to A7 Danderhall; and
- Corridor 4: A6094 Eskbank to A701 Straiton.

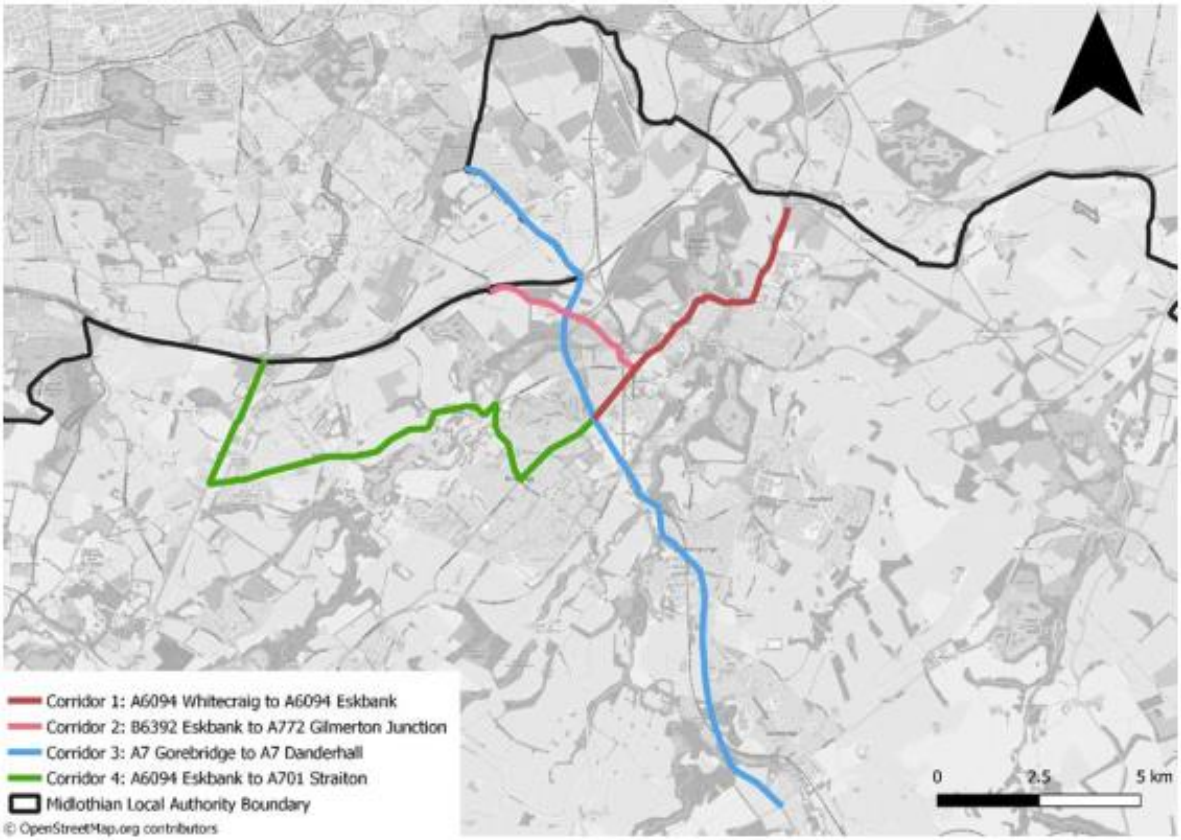

Figure E-1: Study Corridors

The corridors traverse many of Midlothian's largest settlements, including Loanhead, Lasswade, Bonnyrigg, Eskbank, Dalkeith, Newtongrange and Gorebridge. The routes operate through several key junctions, including Eskbank Road Roundabout, Sheriffhall Roundabout, Eskbank Toll and Gilmerton Road Roundabout.

The principal objective of the study, which is being funded through Transport Scotland's Bus Partnership Fund (BPF), is to develop and appraise options to enhance bus priority on each of the corridors to reduce bus journey times and improve bus journey time variability for trips within Midlothian and to neighbouring local authorities.

The study has been undertaken by means of a focussed and proportionate STAG appraisal (comprising Initial Appraisal: Case for Change, Preliminary Options Appraisal and Detailed Options Appraisal), building on the existing body of work from the initial funding application submitted by the Midlothian Bus Alliance to the BPF in 2021.

Policy Context

The study has taken cognisance of the latest transport and planning policy landscape. At the national level, there is a strong focus on promoting sustainable travel, including bus, as captured in the Second Strategic Transport

Projects Review (STPR2), the Fourth National Planning Framework (NPF4), the Infrastructure Investment Plan, and the Second National Transport Strategy (NTS2) with its emphasis on prioritising transport improvements based on application of the Sustainable Travel and Sustainable Investment Hierarchies. The Climate Change (Scotland) Act 2019 emphasises the use of sustainable travel through set targets such as: reductions in all greenhouse gases of 75% by 2030 and 90% by 2040, as well as a reduction in car kilometres of 20% by 2030. The bus network has an important role in helping to meet net zero targets and to lower emissions across the transport sector, which also supports the vision of the Cleaner Air for Scotland Strategy.

Similar policies are reflected at the regional and local level, which promote the important role bus must play in achieving net zero targets, particularly given forecasted population growth across the region, particularly in Midlothian. The SEStran Regional Transport Strategy supports the transition to a sustainable, post-carbon transport system; facilitate healthier travel options; widen public transport connectivity and access across the region; and support safe, sustainable efficient movement of people, all of which align with the STPR2 Case for Change for Edinburgh and South East Scotland. The promotion and delivery of options that increase the use of sustainable transport options, including bus, would support the aspirations of a range of local policies, including the Midlothian Local Development Plan, Midlothian Active Travel Strategy, Midlothian Council Travel Plan, and the Single Midlothian Plan.

Socio-Economic Context

Midlothian is forecast to be the fastest growing local authority in Scotland based on population growth, which will bring associated challenges for the transport network. The key socio-economic trends in the area can be summarised as follows:

- Between 2011 and 2020, the population of Midlothian increased by 12.0%. Over the same period, Scotland's population rose by 3.2%[1].
- Midlothian is projected to have the highest percentage change in terms of population out of all the 32 council areas in Scotland between 2018 to 2028 (13.8%)[2].
- Within Midlothian 57.6% of the population are aged between 16 and 59, which is lower than the Scotland-wide proportion (59.6%)[3].
- Midlothian has a slightly higher than Scotland average Economically Active Population (EAP) at 71% compared to 69%. Around 56% of the population in Midlothian work full- or part-time.[4]
- Car / Van availability in Midlothian is higher than the Scottish average (75.2% compared to 69.5% across Scotland)[5].
- Mode of travel to work in Midlothian is car-dominated, with 63.5% of trips made by car, which is slightly higher than the Scotland average of 62.4%. Travel by car is particularly dominant in Gorebridge, where it represents 67.6% of journeys to work[6].
- Distance travelled to work varies across the study area with most people residing in Danderhall and Loanhead (86% and 81% respectively) working within 10km of their home, compared to Gorebridge where only 50% work within 10km[7].
- The Scottish Index of Multiple Deprivation (SIMD) shows areas of high deprivation in parts of Dalkeith, Mayfield, Bonnyrigg and Gorebridge.
- General Health across the study area is in line with the Scottish average. Bonnyrigg has the highest levels of good health (84%) compared with the lowest of Danderhall (80%)[8].

[1] Scotland Census 2011 and Mid-2020 Estimate Population, National Records of Scotland
[2] National Records of Scotland, available in Profile of Midlothian 2021, Midlothian Council at
[3] 2011 Scottish Government Census, https://www.scotlandscensus.gov.uk
[4] 2011 Scottish Government Census, https://www.scotlandscensus.gov.uk
[5] 2011 Scottish Government Census, https://www.scotlandscensus.gov.uk
[6] 2011 Scottish Government Census, https://www.scotlandscensus.gov.uk
[7] 2011 Scottish Government Census, https://www.scotlandscensus.gov.uk
[8] 2011 Scottish Government Census, https://www.scotlandscensus.gov.uk

Key Problems and Opportunities

Problems and opportunities have been identified through a review of the initial BPF application and consideration of the extent to which problems and opportunities remain valid through updated data analysis; a review of available up-to-date information to identify any other problems and opportunities for consideration; and engagement with the public and key stakeholders, including Midlothian Council, SEStran and local bus operators. The following problem themes were identified in the study area; the relevant corridor is noted in brackets.

- **Congestion and delays, leading to longer journey times for buses and journey time variability issues (all corridors):** The identification of sections of corridors experiencing congestion has been supported by Automatic Vehicle Location (AVL) data provided by bus operators. This demonstrated that buses experience congestion in the following areas: Dalkeith Town Centre; Eskbank Road Roundabout; Eskbank Toll; Bonnyrigg Toll; Lasswade Road / Wadingburn Road junction; and A701 at Straiton. This is not an extensive list and further locations have been reported through stakeholder and public engagement.

- **Right turn movement causing bus congestion (Corridor 1)**, including at Buccleuch Street / High Street in Dalkeith town centre.

- **Uncontrolled on-street parking causing longer bus journey times (Corridors 1 and 4):** This leads to buses frequently having to stop when there is oncoming traffic before overtaking stationary vehicles. This has been identified as a problem at the A6094 Bonnyrigg Road in Eskbank, A6094 Lothian Street and A768 The Loan.

- **Constrained movements at Eskbank Toll due to roundabout geometry, making it difficult for buses to manoeuvre (Corridors 1 and 2):** The constrained geometry of the six-armed roundabout can be difficult for large vehicles such as buses to manoeuvre as they typically require a larger portion of roundabout to be clear before manoeuvring, thus reducing gaps in traffic for buses to enter the roundabout.

- **Rapid growth and development in Midlothian adding pressure to the transport network (all corridors):** Midlothian is forecast to be the fastest growing local authority in all of Scotland in terms of population percentage growth because of new development, particularly large-scale residential development, including on or close to the four corridors.

- **High proportion of travel to work by car, contributing to congestion and medium and high risk of transport poverty (all corridors):** A higher than average proportion of people in Midlothian travel to their place of work by car compared to the national average. This contributes to a high number of vehicles on the road, leading to greater levels of congestion experienced by all vehicles, including buses. Transport Poverty is also an issue identified in Midlothian. This is based on a tool developed by Sustrans which defines transport poverty by car availability, household income and access to services by public transport. Risk associated with transport poverty can impact people's ability to travel around and to access key services.

- **Bus access to A7 from Stobhill Road causing longer bus journey times (Corridor 3):** Bus services can experience delay when turning right from Stobhill Road onto the A7. This junction is not signalised and difficulties arise as a result of the dominant flow of traffic on the A7.

The key opportunities in the study area can be summarised as follows:

- **Improve east-west connectivity** in Midlothian by public transport and encourage development of new bus services and **increase public transport accessibility** through improved punctuality and reduced journey time variability of bus services. Linked to this is an opportunity to install more bus stops, for example on the A7 and A772 / B6392 as new development is built out.

- **Contribute to National Transport Strategy objectives:** The NTS2 sets out the Scottish Government's vision for transport over the next twenty years, which is supported by four priorities to Reduce Inequalities, Take Climate Action, Help deliver Inclusive Economic Growth and Improve our Health and Wellbeing. BPF and options promoted through this study provides an opportunity to positively contribute towards delivering on these priorities in Midlothian.

- **Greater partnership working:** The BPF and establishment of the Midlothian Bus Alliance to guide and inform the development of this study has enabled greater partnership working between bus operators and local authorities, which in turn should deliver bus priority improvements for the benefit of bus passengers and residents in Midlothian.

- **Opportunities associated with other schemes / projects:** As well as opportunities around encouraging modal shift, there are opportunities to ensure that any bus priority measures either form part of or are complementary to ongoing transport schemes being progressed in Midlothian. This includes: A701 Relief Road, part of the rationale for the new road is to relieve pressure from the existing A701 corridor and thus support road space reallocation; A7 Urbanisation Scheme, which proposes to implement segregated walking and cycling facilities along the A7 between Gilmerton Road Roundabout in the north and Newtongrange in the south; Sheriffhall Grade Separation, where there are proposals to upgrade the roundabout to be grade separated; and Dalkeith town centre regeneration, where Midlothian Council is updating the regeneration masterplan for Dalkeith, including the potential for pedestrianisation. Midlothian Council is also currently undertaking a review of current speed limits in the local authority area which may have benefits in creating safer environments for pedestrians and cyclists, including potential bus users.
- **Encourage modal shift,** including targeting increased uptake of bus use in areas of Midlothian where significant new development is planned.
- **Quick Wins:** There are opportunities to build on the benefits of Quick Win sites identified as part of the Edinburgh Corridors Bus Partnership Fund workstream.
- **Bus Priority Technology:** Innovations have been made in bus priority at traffic signals, allowing buses to operate more efficiently. Technology is available which permits buses which are behind schedule to be given priority, providing an opportunity for a reduction in journey time variability.
- **Match in Kind:** Through the BPF there is an expectation to leverage other bus service improvements as part of the wider partnership offer. Match in kind proposals will be developed as options continue to progress, through dialogue with partners, including local authorities, SEStran and bus operators.

Transport Planning Objectives

Based on the problems and opportunities identified across the study area, the aspirations of stakeholders, and taking cognisance of the latest transport policy landscape, Transport Planning Objectives (TPOs) have been developed to guide the development and assessment of options emerging from this study. An initial set of TPOs were developed at the Case for Change stage, which have subsequently been refined and modified at preliminary and detailed appraisal stages following discussions with stakeholders including Transport Scotland.

For this study, the following TPO has been developed which focuses on journey time reduction, with sub-TPOs developed for each of the four corridors with specific targets as below:

- TPO 1: Reduce bus journey times in the AM and PM peak periods across each study corridor on sections where interventions are proposed between 2022 and 2030.
    - TPO 1.1: Reduce bus journey times in the AM and PM peak periods by 30% on sections of Corridor 1 where interventions are proposed between 2022 and 2030.
    - TPO 1.2: Reduce bus journey times in the AM and PM peak periods by 40% on sections of Corridor 2 where interventions are proposed between 2022 and 2030.
    - TPO 1.3: Reduce bus journey times in the AM and PM peak periods by 50% on sections of Corridor 3 where interventions are proposed between 2022 and 2030.
    - TPO 1.4: Reduce bus journey times in the AM and PM peak periods by 30% on sections of Corridor 4 where interventions are proposed between 2022 and 2030.

Options

In line with STAG, a long list of options was generated ahead of the Preliminary Options Appraisal stage, based on a range of sources including a review of existing strategy / policy documents, study team option identification following site visits, and a review of options generated from stakeholder and public engagement. The latter included stakeholder workshops, a Study Tour, 1-2-1 calls with key stakeholders and use of the Placecheck Tool, which allowed members of the public to provide comments and thoughts on potential options. This process generated **111 options**.

The long list of options was then cleaned to remove duplicate options and options which were located outside of a study corridor and therefore not in scope for this study. Following the cleaning process **97 options** remained across the four corridors.

Options were then sifted based on their performance against:

- Study TPOs;
- Deliverability criteria – feasibility, affordability and public acceptability;
- Scope / eligibility for BPF funding; and
- Position in the Sustainable Investment Hierarchy and Sustainable Transport Hierarchy.

Following the sifting process **31 options** remained across the four corridors. In addition to those options that were 'sifted in' for further appraisal, **40 options** were identified for consideration as complementary measures. Sifted in options were subsequently grouped into four Option Packages, one for each study corridor.

The four Option Packages contain a range of individual options, hereafter referred to as option measures. These measures consist of different categories, which have been developed for the purpose of presenting concise Option Package titles. Examples of the type of measures which sit under each category are presented in Table E-1 below, followed by the Option Package titles.

Table E-1: Summary of Categories and Examples of Measures

Category	Examples of Measures
New Infrastructure	Refers to bus lanes which require carriageway widening
Traffic Light Priority[9]	Refers to traffic light priority for buses at existing or new signals
Road Space Reallocation	Refers to bus gates or the reallocation of road space to support bus lanes
Signing and Lining	Refers to review of existing parking provision to address on-street parking; or modifying bus lanes operating times (new and existing bus lanes) to operate from 7am – 7pm as a minimum
Redesign of Bus Stops	Refers to removing laybys at bus stops, where appropriate, thus reducing time for buses to re-join the carriageway

The final Option Packages taken forward to appraisal were as follows:

- Option Package 1: Measures to improve bus priority on Corridor 1 A6094 Whitecraig to A6094 Eskbank, including Road Space Reallocation, Redesign of Bus Stops, Traffic Light Priority and Signing and Lining;
- Option Package 2: Measures to improve bus priority on Corridor 2 B6392 Eskbank to A772 Gilmerton, including New Infrastructure, Signing and Lining and Redesign of Bus Stops;
- Option Package 3: Measures to improve bus priority on Corridor 3 A7 Gorebridge to A7 Danderhall, including New Infrastructure, Traffic Light Priority, Signing and Lining and Redesign of Bus Stops;
- Option Package 4: Measures to improve bus priority on Corridor 4 A6094 Eskbank to A701 Straiton, including Road Space Reallocation, Traffic Light Priority, Signing and Lining and Redesign of Bus Stops.

Preliminary Options Appraisal

The four Option Packages made up of sifted in option measures were appraised in line with the guidance for Preliminary Options Appraisal. As noted above, in addition to sifted in options, a further 40 options were identified as potential complementary measures. These were not appraised but consideration was given to what benefit (if any) they would provide each of the Option Packages. Complementary measures include options such as enforcing parking measures and bus lanes, supporting electric vehicle (EV) charging facilities, improving access to bus stops, adding pedestrian crossings and reviewing bus timetables. There is potential for some of these complementary measures to be identified and funded as match in kind measures.

[9] Referred to as 'ITS' in early reporting. Reference to 'ITS' has been replaced with 'Traffic Light Priority' in the package titles, to allow more specificity.

Option Packages were appraised against the five STAG Criteria (Environment; Climate Change; Health, Safety & Wellbeing; Economy; and Equality & Accessibility) using a seven-point scoring scale (major benefit / moderate benefit / minor benefit / neutral / minor negative impact / moderate negative impact / major negative impact).

Option Packages were also assessed against TPOs and Deliverability Criteria[10]. In addition, consideration has been given to the extent to which the Option Packages align with established policy objectives, including those at the local, regional and national level, and performance against Transport Scotland's Policy Assessment Framework (PAF) objectives, which includes objectives related to health and wellbeing, climate change, inclusive economic growth and reducing inequalities. Interdependencies and potential alternatives between option measures (for example more than one option measure at the same location) and links with other schemes such as the A7 Urbanisation Scheme, Proposed Sheriffhall Upgrade, A701 Relief Road and Dalkeith Town Centre Regeneration, were also considered.

Overall, all four Option Packages performed positively against the assessment criteria, with Option Packages 1, 3 and 4 performing more strongly due to greater evidence of congestion on those corridors. Following the Preliminary Appraisal all four Option Packages were taken forward for further consideration at Detailed Appraisal stage.

Option Packages

Following further option development and assessment work undertaken prior to Detailed Appraisal stage, including the development of junction models to assess the impacts of interventions and consideration of where options sit in relation to the Sustainable Investment Hierarchy (particularly where more than one option remained at the same location), several measures were sifted out. The final list of "Retained" measures which form part of the four Option Packages at detailed appraisal stage are presented in Figure E-2.

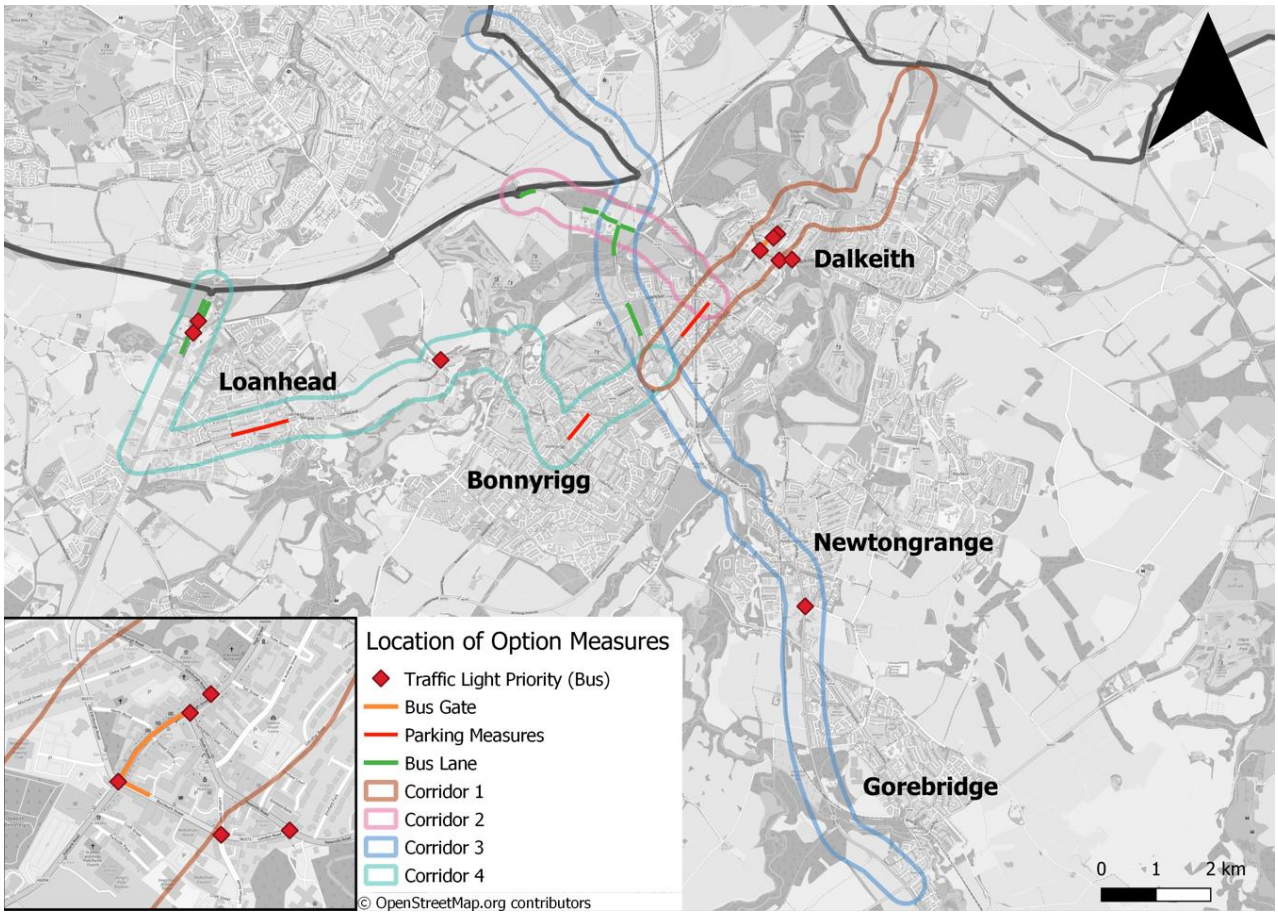

Figure E-2: Location of Option Measures by Corridor

[10] Deliverability criteria have been given a risk score (Low, Medium, High).

Detailed Options Appraisal

The Detailed Appraisal stage involved further development of Option Packages, including high-level design work to enable cost estimates to be prepared and further assessment of deliverability, risks and impacts to be undertaken. A qualitative appraisal was undertaken, supported by quantitative analysis where appropriate. Like the Preliminary Appraisal, each Option Package was appraised against TPOs (one TPO remained, with specific targets per corridor) and STAG criteria using the seven-point assessment scale, and deliverability criteria (feasibility, affordability and public acceptability) which were assessed based on risk. In addition, each Option Package was assessed from a public spending perspective to inform the anticipated Cost to Government. A summary of the performance of the Options Packages against the appraisal criteria is presented below.

Transport Planning Objective

The four Option Packages were appraised against their respective sub-TPO, which focuses on journey time reduction. Option Packages 1, 3 and 4 are considered to have a moderate benefit against the TPO through implementation of bus priority measures targeted at the most congested areas of the network. Option Package 2 has scored as having a minor benefit against the TPO. Median speed relative to speed limit outputs suggest that congestion is identified less on this corridor compared to other corridors; as such, although measures will provide bus journey time benefits these are considered to be more limited compared to other option packages.

Environment

The Option Packages were assessed according to the impacts they might have on Biodiversity and Habitats; Geology and Soils; Land Use; Water, Drainage and Flooding; Air Quality; Historic Environment; Landscape; and Noise and Vibration, using a largely map-based, qualitative approach.

None of the measures included as part of Option Package 1 would be anticipated to require additional land take. Whilst the introduction of bus gates would require road space reallocation this would be expected to involve redesigning the existing road carriageway and so would not take from natural areas. The overall impact of Option Package 1 on biodiversity and habitats; geology and soils; land use; water, drainage and flooding; landscape; historic environment would be expected to be neutral / negligible. Option Package 1 would be expected to have a minor benefit to air quality owing to provision of traffic light priority, which would improve the reliability of bus services, and through implementation of bus gates and measures to address on street parking. Option Package 1 would not involve any new infrastructure and it is considered the impact against noise and vibration during operation would be neutral / negligible.

Option Package 2 has the potential to have an overall minor negative impact against biodiversity and habitats given potential impacts of bus lane options. The overall impact of Option Package 2 on geology and soils; land use; water, drainage and flooding; and noise and vibration would be expected to be neutral. Whilst Option Package 2 would involve the introduction of new infrastructure to the landscape through new bus lanes, it is considered that the changes would be of such a scale and similar in characteristic to the existing road networks. Furthermore, at this stage, the overall impact on landscape would also be expected to be neutral / negligible. Similarly, given the requirement to widen the existing road network to accommodate the proposed bus lanes, there would be potential for both direct and indirect adverse effects on heritage assets in the study area, however at this stage the overall impact is assessed as neutral / negligible. Option Package 2 would be expected to encourage more people to travel by bus through provision of enhancements to reduce bus journey times and improved reliability, thus leading to fewer car trips, with an associated minor benefit on local air quality.

Option Package 3 would be anticipated to perform similar to Option Package 2, achieving a neutral / negligible impact across many of the Environmental sub-criteria. It has the potential for a minor negative impact on biodiversity and habitats because of measures to provide a bus lane on the A7 northbound approach to Gilmerton Road Roundabout and northbound approach to Melville Dykes Roundabout. It is possible that new signals at A7 / Stobhill Road may lead to more frequent sounds associated with vehicles stopping and starting at the signals on the A7 and thus lead to some localised minor negative impact against Noise and Vibration. Like Option Package 2, it would be expected that more people would be encouraged to travel by bus through provision of enhancements to reduce bus journey times and improve reliability, thus leading to fewer car trips, with an associated minor benefit on local air quality.

Given that works are restricted to changes to the current road network and located within the existing carriageway, Option Package 4 would be anticipated to perform in a similar manner to Option Package 1, achieving a neutral / negligible impact across many of the Environmental sub-criteria. It would be expected that

more people would be encouraged to travel by bus through provision of enhancements to reduce bus journey times and improve reliability, thus leading to fewer car trips, with an associated minor benefit on local air quality.

Climate Change

Greenhouse Gas Emissions

In the short-term, greenhouse gas emissions would occur due to construction activities undertaken to deliver each of the Option Packages, including indirect emissions from the manufacture and transportation of materials and emissions from fuel combusted by construction plant and vehicles, where new infrastructure is required, for example carriageway widening.

As the measures do not promote car movements and are anticipated to reduce congestion experienced by buses, each of the option packages would be considered to have a moderate benefit against net zero targets and greenhouse gas emissions; with potential for Option Packages which include bus lanes (Option Packages 2, 3 and 4) to have a larger benefit. Further work would be required to understand what impact the reallocation of road space to provide bus lanes associated with Option Package 4 would have on non-bus traffic.

Vulnerability to the Effects of Climate Change

Measures included within the Option Packages have the potential more generally to be vulnerable to the effects of climate change impacting the road network. However, new infrastructure would be designed to adapt to the potential effects of climate change and reduce vulnerability. The overall impact would be expected to be neutral for all Option Packages.

Potential to Adapt to the Effects of Climate Change

Given the nature of the measures, each Option Package would be considered to have a neutral impact against the potential to adapt to the effects of climate change.

Economy

Each of the Option Packages would be anticipated to provide benefits against the Transport Economic Efficiency (TEE) criteria by introducing bus priority that would reduce bus journey times for users and improve bus journey time reliability. Option Packages 1, 3 and 4 are considered to have a moderate benefit against this criterion and Option Package 2 is considered to have a minor benefit. A cost-benefit analysis based on the potential minimum journey time savings estimated for each Option Package is captured under Section 3.8 Cost to Government in the Detailed Appraisal report.

Wider Economic Impacts refer to any economic impacts which are additional to transport user benefits; a qualitative appraisal against the criteria has been undertaken. Each of the Option Packages provide bus priority, helping to reduce bus journey times and reduce the journey time variability of services. By reducing congestion, the Option Packages provide economic benefits by reducing journey times and journey time variability, allowing bus users to better plan journeys. Journey times to a range of opportunities and services, including employment, education, healthcare and leisure would be reduced, thus supporting the local economy. Access to employment is particularly important and there are employment sites across the study area, such as Dalkeith town centre and Straiton Retail Park, as well as locations close to the study corridors such as at Easter Bush. There are also large employment sites in City of Edinburgh. There is potential for areas with higher levels of unemployment to benefit from the proposed measures, particularly if access to employment sites is improved.

Overall, Option Packages 1, 3 and 4 are considered to have a moderate positive impact against this criterion, with Option Package 2 considered to provide a minor benefit owing to less congestion identified on the corridor, thus reducing the benefit.

Health, Safety and Wellbeing

Accidents

Option Packages 2, 3 and 4 propose dedicated lanes for buses, which may encourage increased bus service levels along the corridors and therefore attract more users to travel by bus, owing to the potential for reduced journey times and reduced journey time variability. Bus lanes remove potential conflict between buses and other road users; which would be expected to have a positive impact on road safety and reduce the number of accidents occurring, including on approaches to junctions and through junctions. The overall benefit is considered to be moderate against these Option Packages.

Option Package 1 includes provision of traffic light priority at existing signals in Dalkeith town centre. This has the potential to deliver reduced journey times and reduced journey time variability, which in turn would be anticipated to encourage people to use bus services along this route and therefore have a minor beneficial impact on road safety and accidents. Bus gates would also be considered to have a benefit against this criterion by reducing the likelihood of collision between pedestrians / cyclists and motorised traffic.

Security

The bus priority measures for each of the four Option Packages include the redesign of bus stops, potentially including better lighting, which may improve the security of passengers waiting for buses, while measures which attract increased bus use could also increase passive surveillance. It should be noted however that such measures would likely be delivered through match in kind investment. Overall, the impacts of the Option Packages against the criterion have been assessed to be neutral.

Health Outcomes

Although none of the specific measures captured under the Option Packages promote improved health, they would be likely to provide indirect benefits, largely as a result of modal shift to sustainable modes of transport and the potential to make communities more attractive, providing benefits against Health Outcomes. For each Option Package it is considered that the overall benefit would be neutral.

Access to Health and Wellbeing Infrastructure

The provision of bus gates, traffic light priority and new bus lanes is anticipated to provide improved journey times and reduced bus journey time variability and thus each of the Option Packages would provide a minor benefit with regards to improving Access to Health and Wellbeing Infrastructure such as GP surgeries and health centres.

Visual Amenity

Overall, it is considered that each of the Option Packages would have a neutral impact against Visual Amenity. None of the Option Packages require significant new infrastructure, thus limiting their impact on visual amenity. New lanes / carriageway widening for bus lanes (Option Packages 2 and 3) have the potential to have the greatest impact, albeit adverse impacts would be minimal given they would be located next to existing carriageways.

Equality and Accessibility

Public Transport Network Coverage

The Option Packages would not directly impact on Public Transport Network Coverage, and therefore overall impacts of each of the options against this criterion has been assessed to be neutral.

Active Travel Network Coverage

It is anticipated that the four Option Packages would have a neutral impact against the criteria to increase Active Travel Network Coverage, given the focus of measures in each of the Option Packages is on delivering enhanced bus priority.

Comparative Access by People Group

All four Option Packages would be likely to have minor positive impacts in terms of Comparative Access by People Group by improving transport inclusivity for commonly disadvantaged groups and those in more restricted user groups in particular, for example, those without access to a private vehicle for travel.

Comparative Access by Geographical Location

Areas of deprivation have been identified in parts of Dalkeith, Bonnyrigg, Loanhead, Mayfield and Gorebridge, which includes parts of Corridors 1, 3 and 4. Bus priority measures proposed on these corridors have the potential to benefit people residing in the most deprived areas the most, particularly measures such as bus lanes which could provide the greatest benefits in terms of bus journey times and reliability owing to provision of near free flow conditions. Measures that are not located in or close to the most deprived data zones still have a potential to benefit people residing in these areas by reducing journey times and reducing bus journey time variability. All Option Packages therefore have potential to have a minor benefit in terms of Comparative Access by Geographical Location.

Affordability

As none of the Option Packages directly propose changes to the affordability of buses, the overall impact on Affordability has been assessed to be neutral.

Deliverability

Feasibility

All Option Packages are considered to be technically feasible as measures proposed represent 'tried and tested' approaches to delivering bus priority. It is noted however that specific measures would require further detailed investigation and feasibility assessment prior to implementation; for example, to identify any utilities or landowner issues which may impact option feasibility, undertaking a road safety audit to confirm suitability of proposed sites to remove bus laybys and to understand the impact of road space reallocation measures (i.e. bus lanes and bus gates) on wider traffic; reallocation measures in particular have the potential to impact the operational feasibility of options. Accordingly, at this stage of the appraisal, Option Packages 1 and 4 are considered to present a medium risk in terms of their feasibility rating and Option Packages 2 and 3 are considered to present a low risk.

It is also noted that ongoing projects in Midlothian have the potential to impact on the feasibility of the Option Packages considered in this study, including A7 Urbanisation, A701 Relief Road, Dalkeith Town Centre Regeneration and the proposed upgrade at Sheriffhall. These projects will continue to be taken into consideration going forward through continued engagement with relevant teams within Midlothian Council. Midlothian Council is also currently undertaking a review of speed limits throughout the local authority, which could lead to changes in speed limits on some roads.

Affordability

Option Packages 1 and 4 would be expected to present an overall low risk in terms of Affordability, although there are likely to also be costs associated with Traffic Regulation Orders (TROs) and consultation required for road space reallocation options. Option Packages 2 and 3 would be expected to have an overall medium risk in terms of Affordability, attributable to the bus lane measures requiring carriageway widening, and uncertainties related to utilities and land ownership, together with the requirement for new traffic signals at A7 / Stobhill Road and the higher number of bus stops for potential redesign / removal as part of Option Package 4.

Public Acceptability

Public Acceptability has primarily been informed by an online survey (which was live for a four week period in April / early May) and a drop in session held in Dalkeith in May 2023. In broad terms, each of the Option Packages are considered to present a low risk in terms of public acceptability noting that respondents supported the options presented owing to their positive impact on reducing bus journey times and journey time variability. There are however some specific measures within the packages which present a higher risk. This is primarily in relation to road space reallocation options (bus gates in Option Package 1 and bus lanes in Option Package 4), which could potentially have a negative impact on non-bus road users; impacts which would need further detailed assessment through modelling at a later stage.

A summary of scores against STAG Sub-Criteria at Detailed Appraisal stage is presented below.

Table E-2: Summary of STAG Scoring (Detailed Appraisal)

STAG Criteria	Option Package 1	Option Package 2	Option Package 3	Option Package 4
Environment				
Biodiversity and Habitats	0	-	-	0
Geology and Soils	0	0	0	0
Land Use (including Agriculture and Forestry)	0	0	0	0
Water, Drainage and Flooding	0	0	0	0
Air Quality	+	+	+	+
Historic Environment	0	0	0	0
Landscape	0	0	0	0
Noise and Vibration	0	0	0	0
Climate Change				
Greenhouse Gas Emissions	+ +	+ +	+ +	+ +
Vulnerability to the Effects of Climate Change	0	0	0	0
Potential to Adapt to the Effects of Climate Change	0	0	0	0
Economy				
Transport Economic Efficiency	++	+	++	++

Wider Economic Impacts	++	+	++	++
Health, Safety and Wellbeing				
Accidents	+	+ +	+ +	+ +
Security	0	0	0	0
Health Outcomes	0	0	0	0
Access to Health and Wellbeing Infrastructure	+	+	+	+
Visual Amenity	0	0	0	0
Equality and Accessibility				
Public Transport Network Coverage	0	0	0	0
Active Travel Network Coverage	0	0	0	0
Comparative Access by People Group	+	+	+	+
Comparative Access by Geographic Location	+	+	+	+
Affordability	0	0	0	0

Table E-3: Summary of Deliverability Criteria Scores (Detailed Appraisal)

STAG Criteria	Option Package 1	Option Package 2	Option Package 3	Option Package 4
Deliverability Criteria				
Feasibility	Medium	Low	Low	Medium
Affordability	Low	Medium	Medium	Low
Public Acceptability	Medium	Low	Low	Medium

Statutory Impact Assessments

Consideration has been given to the performance of each Option Package in terms of the Statutory Impact Assessment criteria, including completion of an EqIA, and all four Option Packages would be expected to have an overall positive impact. Bus priority measures could provide benefits for groups with protected characteristics who depend on public transport for their journeys and are less likely to have access to a car. This includes children, young people, women, disabled people and older people, people from ethnic minority groups and people at risk of deprivation. More reliable and quicker public transport options could help to improve connectivity to key services such as employment, education, healthcare and shopping for these groups.

Cost to Government

The estimated capital costs associated with each Option Package is presented within Table E-4.

Table E-4: Indicative Cost to Government[11,12]

Cost Element	Option Package 1	Option Package 2	Option Package 3	Option Package 4
Construction Sub-Total	£130,700.00	£938,700.00	£676,400.00	£579,700.00
Optimism Bias (44%)	£57,500.00	£412,900.00	£297,700.00	£255,100.00
Construction Sub-Total (Inclusive of Optimism Bias)	£188,200.00	£1,351,600.00	£974,100.00	£834,800.00
Design (10%)	£18,900.00	£135,200.00	£127,700.00	£83,500.00

[11] Costs exclude further investigation / survey, land purchase, relocation of utilities, structures, retaining walls, enhanced drainage, path lighting etc.

[12] Note that cost estimates for signal options (bus priority at Dalkeith town centre; Lasswade Road / Wadingburn Road; A701 / Straiton Park & Ride; and A701 / Straiton Park Way signals) have been provided by Midlothian Council's signal maintenance contractor do not include a breakdown of costs. Similarly, a breakdown of costs has not been provided for new signals at A7 / Stobhill Road junction. Therefore, two sub-totals have been provided; one for non-signal options, which include a breakdown of costs (see row "Sub-Total (excluding signal options)" and sub-total for signal options (see row "Sub-Total (Signal options only)". Note that cost estimates have been rounded for the purpose of this exercise.

Cost Element	Option Package 1	Option Package 2	Option Package 3	Option Package 4
Placemaking and Landscaping (5%)	£9,400.00	£67,500.00	£48,700.00	£41,600.00
Site Supervision and Project Management (10%)	£18,900.00	£135,200.00	£97,400.00	£83,500.00
Traffic Management (10%)	£18,900.00	£135,200.00	£97,400.00	£83,500.00
Monitoring and Evaluation (5%)	£9,400.00	£67,500.00	£48,700.00	£41,700.00
Protection of existing utilities (10%)	£18,900.00	£135,200.00	£97,400.00	£83,500.00
Sub-Total (excluding signal options):	£282,600.00	£2,027,400.00	£1,491,400.00	£1,252,100.00
Sub-Total (Signal options only)	£160,000.00	N/A	£330,000.00	£120,000.00
TOTAL (all options, including signals)	**£442,600.00**	**£2,027,400.00**	**£1,821,400.00**	**£1,372,100.00**

The total cost estimate across the four Option Packages is **£5,663,500.00**.

A Cost Benefit Analysis has been undertaken focused on the monetised bus journey time benefits estimated for each Option Package. As part of this journey time impact, demand calculations and benefit cost ratio calculations have been undertaken. The following BCRs have been generated for each Option Package:

- Option Package 1: 15.60
- Option Package 2: 0.64
- Option Package 3: 2.33
- Option Package 4: 13.93

It is noted that Option Packages 1 and 4 generate very positive BCRs. This is in part due to disbenefits to other road users not being calculated. It is also in part owing to the lower cost estimate associated with the packages; this is due to measures included in these packages primarily relating to signing and lining, whereas Option Packages 2 and 3 include more costly options related to carriageway widening for bus priority lanes. Full details of the process undertaken to generate BCRs is summarised in the Detailed Options Appraisal report.

Risk and Uncertainty

Consideration of risk and uncertainty is essential throughout project development. The risk management process involves inputs from all appropriate stakeholders, and it is recommended that Transport Scotland, SEStran and Midlothian Council, together with bus operators and other key stakeholders as appropriate, are involved in discussions. At this stage it is uncertain what legal and planning issues may arise in relation to land ownership, specifically where planning approval or powers are required. This particularly applies to Option Packages 2 and 3 which include measures to widen the existing carriageway to provide bus lanes. It is noted that land ownership has not been investigated as part of this study. Detailed ground investigation would require to be undertaken to establish any specific risks prior to the preferred Option Package/s being progressed, particularly where land take / carriageway widening is required. Potential risks and uncertainties have also been identified in terms of levels of financial support and stakeholder support to progress interventions beyond this STAG stage.

Monitoring and Evaluation

For the purposes of this study, base case information would be developed and agreed with Midlothian Council, Transport Scotland, SEStran, bus operators and other partners, as appropriate, during the period immediately prior to completion / operation of the Option Package(s).

It is not possible at this stage to be specific about the nature of the process evaluation. It is likely that there would be a need to provide data which would measure changes in the baseline parameters, such as bus passenger

counts, mode choice surveys and importantly bus journey time data (available through AVL data), together with junction performance where these are impacted by the measures, and safety and environmental parameters.

Before the monitoring programme is agreed upon, consideration must be given to the actual availability of data, practicalities from collecting new data, its format, whether it will properly reflect the indicators proposed and cost of obtaining it. Indicators and targets should be subject to regular reviews to ensure that they continue to properly reflect the performance of the project against its objectives, throughout the monitoring period.

Conclusions and Recommendations

Following a process of option development, review and appraisal, four Option Packages were taken forward for detailed appraisal against the study TPO, STAG criteria and deliverability criteria. Overall, the assessment has identified that each of the four Option Packages would be anticipated to have positive impacts against the assessment criteria and address the study TPO by delivering bus priority measures that would reduce bus journey times, and in turn reduce bus journey time variability, particularly during the peak morning and evening travel periods.

While several the bus priority measures within the Option Packages would be suitable for early delivery, such as traffic signal priority measures, it should be noted that further assessment is required to confirm the feasibility of specific measures. For example, for those measures which include road space reallocation, modelling would be required to understand their impact on wider traffic, road safety audits would be required to confirm suitability of bus laybys for removal, while for measures to address on street parking, these will require TROs and further consultation.