



A944/A9119 Transport Corridor Study – STAG-Based Appraisal

Preliminary Appraisal

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Contents

1	Introduction.....	1	5	Transport Planning Objectives (TPOs).....	45
1.1	Overview.....	1	5.1	Initial Appraisal: Case for Change TPOs.....	45
1.2	Approach to the study.....	1	5.2	Transport Planning Objectives – RTS2040.....	45
1.3	This report.....	1	5.3	Study TPOs vs RTS2040 TPOs.....	46
2	Case for Change – Revisited.....	2	5.4	SMART-ening of Study TPOs.....	46
2.1	Overview.....	2	5.5	Appraisal Packages against TPOs.....	50
2.2	Appraisal Framework.....	2	6	Option Appraisal (Preliminary Appraisal).....	51
2.3	Study Area.....	3	6.1	Overview.....	51
2.4	Identified Transport Problems and Opportunities.....	5	6.2	Low Delivery Package.....	52
2.5	Case for Change Consultation.....	6	6.3	Medium Delivery Package.....	57
2.6	Evidencing the Transport Problems.....	6	6.4	High Delivery Package.....	63
2.7	Transport Opportunities.....	7	6.5	Gold Delivery Package.....	70
2.8	Setting Transport Planning Objectives.....	7	6.6	Appraisal Summary.....	77
2.9	Option Generation, Sifting and Development.....	8	7	Risk and Uncertainty.....	79
2.10	Option Generation.....	8	7.1	Overview.....	79
2.11	Option Sifting.....	8	7.2	Quantified Risk Assessment.....	79
2.12	Option Development.....	8	7.3	Uncertainty.....	80
3	Option Appraisal Context.....	10	8	Prioritisation and Delivery Programme.....	82
3.1	Overview.....	10	8.1	Overview.....	82
3.2	The Corridors.....	10	8.2	Prioritisation of Options.....	82
3.3	COVID19 Pandemic.....	10	8.3	Recommendations and Delivery Programme.....	82
3.4	Pedestrian Appraisal Context.....	10	8.4	Option Delivery Prioritisation.....	84
3.5	Cycling Appraisal Context.....	11	APPENDICES.....	85	
3.6	Bus Appraisal Context.....	13			
3.7	Carriageway Physical Constraints.....	14			
3.8	Case for Change – Public Engagement.....	16			
4	Preliminary Appraisal Option Development.....	19			
4.1	Overview.....	19			
4.2	Active Travel Options.....	19			
4.3	Public Transport Options.....	31			
4.4	General Transport Options.....	39			
4.5	Option Cost and Timescale Summary.....	40			
4.6	Packaging of Options.....	41			
4.7	The Packages.....	41			
4.8	Low Delivery Package.....	42			
4.9	Medium Delivery Packages.....	42			
4.10	High Delivery Package.....	42			
4.11	Gold Delivery Package.....	43			
4.12	Package Summary.....	44			

Figures

Figure 2-1: Stantec's Appraisal Framework.....	2
Figure 2-2: Map of the Study Corridors and Sections.....	4
Figure 3-1: Walking / Wheeling Site Audit scoring recap.....	11
Figure 3-2: Cycling Site Audit recap.....	12
Figure 3-3: Bus Site Audit recap.....	14
Figure 3-4: Carriageway Physical Constraints.....	16
Figure 3-5: Active Travel Options, Public Preference.....	17
Figure 3-6: Public Transport Options, Public Preference.....	18
Figure 4-1: Examples of full Green Corridors.....	21
Figure 4-2: Example of Avenues Project Glasgow.....	21
Figure 4-3: Glasgow City Cycle Network, Glasgow City Council.....	22
Figure 4-4: Hutcheon Street Currently including parked cars and on-street bins, (Sketch-up Design).....	24
Figure 4-5: Hutcheon Street with Option 5a and the removal of on-street parking and bins reallocated to cycle lanes, (Sketch-up Design).....	24
Figure 4-6: Segregated route South Side Way, Glasgow.....	25
Figure 4-7: Potential Queen's Road segregated route (Sketch-up Design).....	26
Figure 4-8: Light Segregation - Orcas.....	29
Figure 4-9: Light Segregation – Armadillos.....	29
Figure 4-10: Light Segregation - Wands.....	29
Figure 4-11: Glider Belfast, Bus Rapid Transit.....	32

Figure 4-12: Bus Lane with coloured surface.....	33
Figure 4-13: Bus Lane Operation Hours	34
Figure 4-14: RTPI	34
Figure 4-15: Local Authority operated Cycle Shed	37
Figure 4-16: Cantilever VMS sign	37
Figure 4-17: Cycle Hire at Bus Interchange	38
Figure 5-1: Example of utilising 4 Evaluation Periods for monitoring Objectives success.....	47
Figure 6-1: Low Delivery Package Logic Map.....	53
Figure 6-2: Medium Delivery Package Logic Map	58
Figure 6-3: High Delivery Package Logic Map	64
Figure 6-4: Gold Delivery Package Logic Map.....	71
Figure 8-1: Map of Options within Medium+ Delivery Package	83

Tables

Table 3-1: Active Travel Options in order of preference	17
Table 3-2: Public Transport Options in order of preference	18
Table 4-1: ACTO1 Definition	19
Table 4-2: ACTO2 Definition	20
Table 4-3: ACTO3 Definition	20
Table 4-4: ACTO4 Definition	22
Table 4-5: ACTO5a Definition	23
Table 4-6: ACTO5b Definition	25
Table 4-7: ACTO6 Definition	26
Table 4-8: ACTO7a Definition	27
Table 4-9: ACTO7b Definition	27
Table 4-10: ACTO7c Definition.....	28
Table 4-11: ACTO8 Definition	30
Table 4-12: ACTO9 Definition	30
Table 4-13: PTO1 Definition.....	31
Table 4-14: PTO2 Definition.....	31
Table 4-15: PTO3 Definition.....	32
Table 4-16: PTO4 Definition.....	33
Table 4-17: PTO5 Definition.....	33

Table 4-18: PTO6 Definition	34
Table 4-19: PTO7 Definition	35
Table 4-20: PTO8 Definition	35
Table 4-21: PTO9a Definition	36
Table 4-22: PTO9b Definition	36
Table 4-23: PTO10 Definition	36
Table 4-24: PTO11 Definition	37
Table 4-25: PTO12 Definition	38
Table 4-26: PTO13 Definition	38
Table 4-27: PTO14 Definition	39
Table 4-28: GTO1 Definition	39
Table 4-29: GTO2: Definition	40
Table 4-30: Summary of Option Cost Range and Timescale	40
Table 5-1: RTS 2040 Principles and Objectives	45
Table 5-2: TPOs vs RTS Objectives 2040.....	46
Table 5-3: SMART-ening of TPOs	48
Table 5-4: Appraisal Packages vs TPOs	50
Table 6-1: Low Delivery Package Appraisal Table	54
Table 6-2: Medium Delivery Package Appraisal Table.....	59
Table 6-3: High Delivery Package Appraisal Table	65
Table 6-4: Gold Delivery Package Appraisal Table	72
Table 6-5: Matrix of Packages vs Options vs RTS 2040	77
Table 6-6: Package STAG scoring summary	78
Table 7-1: Risk Mitigation Table	79
Table 7-2: Quantified Risk Assessment.....	79

Appendices

Appendix A	Initial Appraisal: Case for Change Public Engagement
Appendix B	Outline High Level Option Costings

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1 Introduction

1.1 Overview

1.1.1 Stantec was appointed by Aberdeen City Council, Aberdeenshire Council and Nestrans, the Regional Transport Partnership for North-East Scotland, to undertake a Scottish Transport Appraisal Guidance (STAG) based study to identify and appraise options for improving transport connections (particularly active travel and public transport connections), in line with the *Sustainable Travel & Investment Hierarchies*, between Westhill and Aberdeen City Centre. The study is focused on the key western approaches to the city, the A944 and A9119 (*formerly B9119*) corridors, and other roads used by public transport services serving the west of the city, reflecting the status of these corridors within the North East Scotland Roads Hierarchy.

1.1.2 The study considers the western approach corridors in a holistic manner, looking at both eastbound and westbound movements recognising development aspirations and pressures in both Aberdeen and Aberdeenshire.

1.1.3 The study is independent of the Westhill to Kingswells Cycle Connectivity study undertaken simultaneously by AECOM, although options identified by that study are integrated within any options further developed as part of this study.

1.2 Approach to the study

1.2.1 This study does not require a traditional four-stage STAG Appraisal, but rather a focussed and proportionate appraisal underpinned by STAG principles to guide the development of business cases for any emerging interventions. As such our approach to the study consists of two main deliverables; (i) an *Initial Appraisal: Case for Change*, outlining the need for intervention, completed in July 2020, and (ii) a 'hybrid' *Preliminary Options Appraisal*, supported by Appraisal Summary Tables (ASTs).

1.2.2 Transport Scotland has published guidance with respect to the development of business cases in Transport Scotland. This guidance provides a framework for the delivery of transport projects and sets out a 3-stage process comprising Strategic, Outline and Final Business Cases (SBC, OBC and FBC respectively). This STAG-based appraisal is broadly the equivalent of the SBC, whilst also providing pertinent information and analysis to develop the OBC to determine a preferred option.

1.3 This report

1.3.1 This report forms the hybrid Preliminary Appraisal consisting of elements of both a STAG Part 1 and Part 2 Appraisal and commences from where the Case for Change left off.

1.3.2 The report will consider:

- Further development and refinement of the options from the Case for Change;
- 'SMART-ening' of the Transport Planning Objectives and their associated level of ambition;
- Assessment of the options against the TPOs to identify the anticipated level of impact and subsequent scope for sifting or packaging of options to provide the greatest benefit;
- Appraisal of options against the five STAG criteria, comprising of Environment, Safety, Economy, Integration and Accessibility & Social Inclusion; and
- High-level appraisal of the options against the deliverability criteria including; Cost to Government, Feasibility, Affordability and Public Acceptability.

1.3.3 The findings from this high-level appraisal contribute to developing outline costings and a prioritised programme of effective, feasible and deliverable interventions, for business case consideration and detailed design.

2 Case for Change – Revisited

2.1 Overview

2.1.1 The **Initial Appraisal: Case for Change** is a crucial stage in the STAG process, as it provides the evidence base for the transport problems and opportunities that the study should seek to address and forms the basis for objective setting and subsequent option development.

2.1.2 Transport Scotland increasingly views the Case for Change as a key part of STAG, as a robust evidence base is essential to ensuring that the problems and opportunities are accurately defined, objectives truly reflect corridor needs and options appropriately focused. In short, without a well evidenced Case for Change, there is little prospect of securing Transport Scotland funding for future projects.

2.1.3 The Case for Change for this study is heavily influenced by the recently published National Transport Strategy 2 (NTS2) which at its core establishes a refreshed approach to assessing the transport network in Scotland and viewing transport as a means by which to reduce social inequalities. A key premise of the NTS2 is that the transport investment decisions should align with the:

- Sustainable Travel Hierarchy to ensure projects which support green and inclusive travel are appropriately prioritised; and the
- Sustainable Investment Hierarchy, which focuses on promoting behavioural change and making best use of existing assets before investment in new infrastructure.

2.1.4 Options developed in this study will align with these two hierarchies but will be packaged and subject to detailed design and business case development, to select a preferred option package. This study is the equivalent to the Strategic Business Case (SBC) and will provide the information required to develop a business case for any preferred option package.

2.2 Appraisal Framework

2.2.1 To develop a robust and clearly auditable evidence base, we employed our Appraisal Framework approach to the study to formulate our Case for Change for the A944 and A9119 Transport Corridors. The diagram below illustrates the steps within this framework which were followed to develop the Case for Change.

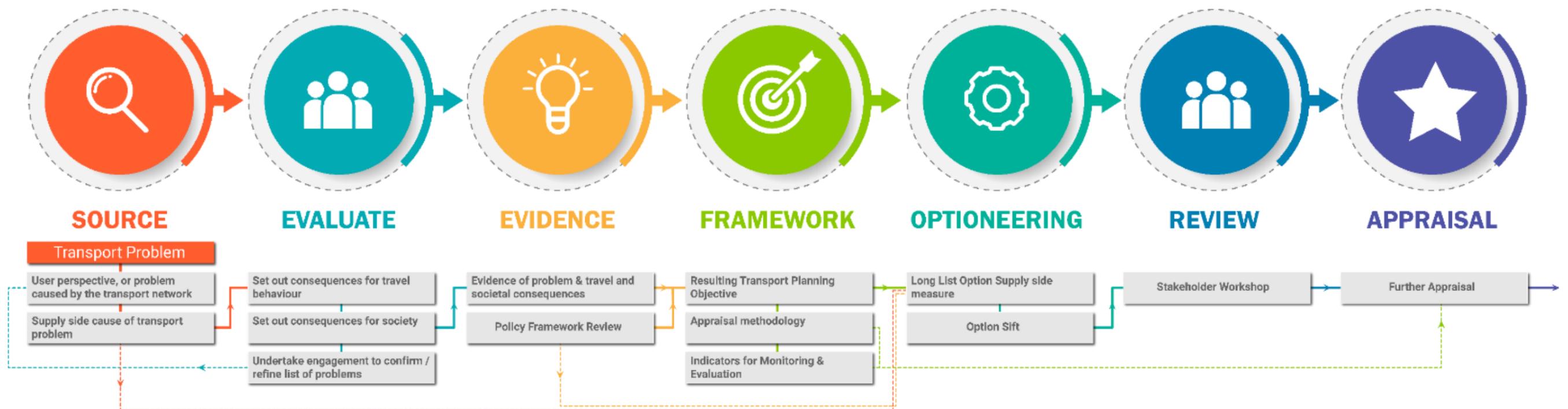


Figure 2-1: Stantec's Appraisal Framework

2.3 Study Area

2.3.1 The study area extends from the A944/Westhill Drive roundabout in Westhill eastwards along the A944, beneath the Aberdeen Western Peripheral Route (AWPR) and onwards to Switchback Roundabout. From Switchback roundabout it continues east along both the A944 and A9119 corridors as follows:

- The A944 section crosses the A92 North Anderson Drive and runs past the Aberdeen Royal Infirmary to Mounthooly Roundabout, from which point the study corridor extends along A96 West North Street, King Street and Castle Street to its junction with Union Street.
- The A9119 section travels south east along Skene Road, across the A92 and onwards to the Queens Cross Roundabout. From Queen's Cross, the corridor extends east along Albyn Place to join Union Street as far as its junction with Castle Street.

2.3.2 For the purpose of analysis and to help focus interventions, the study corridor was split into 17 sections which were considered similar in nature and bounded by natural breaks such as major junctions. These sections are as illustrated in the map below and can be described as:

- **Section A:** Westhill Roundabout to A944 AWPR Junction
- **Section B:** A944 AWPR Junction
- **Section C:** A944 AWPR Junction to Kingswells Roundabout
- **Section D:** Kingswells Roundabout to Switchback Roundabout
- **Section E:** Switchback Roundabout to A944 Lang Stracht / Maidencraig Drive
- **Section F:** A944 Lang Stracht / Maidencraig Drive to North Anderson Drive
- **Section G:** North Anderson Drive to A944 Westburn Road / Westburn Drive
- **Section H:** A944 Westburn Road / Westburn Drive to A944 Westburn Road / Berryden Road
- **Section I:** A944 Westburn Road / Berryden Road to Mounthooly Roundabout
- **Section J:** Mounthooly Roundabout
- **Section K:** Mounthooly Roundabout to West North Street / Castle Street
- **Section L:** Castle Street / Union Street to Union Street / Alford Place
- **Section M:** Alford Place / Union Street to Albyn Place / A9119 Queen's Road
- **Section N:** Albyn Place / A9119 Queen's Road to A9119 Queen's Road / North Anderson Drive
- **Section O:** A9119 Queen's Road / North Anderson Drive to King's Gate Roundabout
- **Section P:** King's Gate Roundabout to A9119 Queen's Road / Groats Road
- **Section Q:** A9119 Queen's Road / Groats Road to Switchback Roundabout

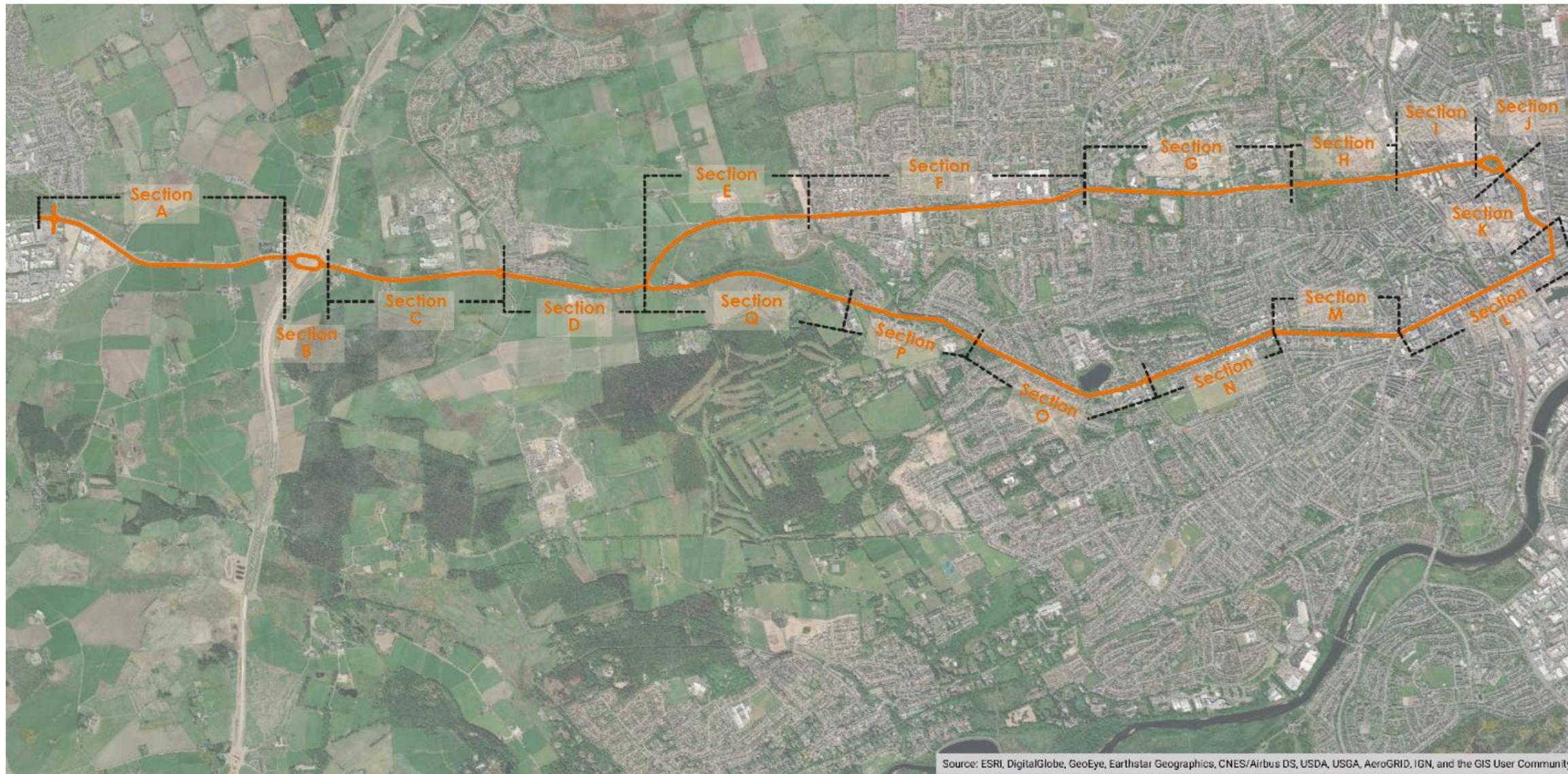


Figure 2-2: Map of the Study Corridors and Sections

2.3.3 Both the A944 and A9119 have been assigned as **Priority** route corridors, within the recently revised Roads Hierarchy. The characteristics of a priority route within the Roads Hierarchy are:

- These are generally radial routes connecting with the AWPR to facilitate movement around Aberdeen without using the City Centre as a through-route;
- They are primary movement corridors linking the AWPR to principal destinations and secondary routes;
- They connect with at least one secondary route and terminate at a secondary route or principal destination;
- They are significant carriers of at least two key modes of transport;
- They should be considered for the provision of bus lanes (if a bus route) and segregated cycle lanes where there is scope to do so, with public transport and cycle priority through junctions; and
- Speed limits should be reflective of the environment but are generally expected to be 30-40mph.

2.3.4 As highlighted above, the fact that these corridors (as priority routes) should provide for both bus and cycle lanes where possible is key to this study and sets the context to which baseline conditions should be considered. It is also important to take cognisance of the role of these corridors within the Roads Hierarchy and to make sure any options that are identified as part of this study are not detrimental to the ability of the corridors to facilitate their role in the Roads Hierarchy and to avoid diverting traffic onto inappropriate routes.

2.4 Identified Transport Problems and Opportunities

2.4.1 To identify problems and opportunities with the transport network from both the supply-side and from the point of view of a user, two approaches to sourcing the problems and opportunities were adopted:

- site visit and audit; and
- desktop review of ongoing and completed key studies within the area.

Site Visit and Audit

2.4.2 A two-day site visit was undertaken in early February 2020. The corridors were traversed on bike and by car to identify mode specific problems and opportunities with the supply-side of the transport system.

2.4.3 The team were equipped with mobile tablets and access to our Enterprise ArcGIS licence enabling them to capture information spatially while on site, instantly mapping observations and geo-locating photographs. Additionally, the tablets were preloaded with mode specific *pro formas*, developed combing metrics and indicators from best practice guidance, to assess the network.

2.4.4 The development of the *pro formas* including the elements considered per mode can be found in further detail in the Case for Change report. Points to note from the audits include:

- **8 of the 17** sections of the corridor passed the Walking and Wheeling Audit
- **4 of the 17** sections of the corridor passed the Cycling Audit
- **4 of the 17** sections of the corridor passed the Bus Audit.

2.4.5 These audits identified a significant number of problems, issues and constraints across the network including inconsistent and incoherent cycling infrastructure, poor surface conditions for pedestrians and cyclists, vehicles parking in advisory cycle & bus lanes and all-round poor level of service for sustainable 'active travel' transport users.

Desktop Review of Key Studies

2.4.6 From our initial review of the documentation, we uncovered **76** problems, **26** issues, **15** constraints and **16** opportunities considered across the range of studies. Many of these observations were consistent or similar in nature so we undertook a process of rationalisation, sifting each of the categories down to a more manageable list.

2.4.7 This process provided us with sifted lists under each element. Overarching themes were then created containing a list of sub-problems, opportunities, constraints and issues from the sifted lists.

2.4.8 The resulting list of identified **13 problem themes** from the document review and associated problems is as follows:

- **Problem 1:** Inconsistent pedestrian infrastructure
- **Problem 2:** Cycle route infrastructure is disjointed
- **Problem 3:** Cycle infrastructure is inconsistent in form and quality
- **Problem 4:** Travel by public bus is not seen as an attractive option
- **Problem 5:** Bus priority infrastructure is sporadic, and buses are caught in traffic congestion
- **Problem 6:** Bus stop design and placement
- **Problem 7:** Kingswells Park and Ride infrastructure is underutilised
- **Problem 8:** Car travel is perceived as being cheaper than travel by public transport
- **Problem 9:** Bus network and service frequency are threatened by high car mode share
- **Problem 10:** Vehicular traffic dominates the city centre
- **Problem 11:** Poor driver behaviour and misuse of active/bus travel infrastructure
- **Problem 12:** Significant traffic delays are seen during peak periods
- **Problem 13:** Extensive development is planned to the western end of the corridor

2.4.9 12 opportunities were also identified at this stage and these consist of:

- **Opportunity 1:** Existing active travel promotional schemes
- **Opportunity 2:** Policy supports active travel improvements along the A944 and B9119
- **Opportunity 3:** Existing active travel and bus priority infrastructure on the corridors
- **Opportunity 4:** Aberdeen has an existing Smart Ticketing System
- **Opportunity 7:** Availability of External Funding Sources
- **Opportunity 8:** Kingswells Park and Ride has significant spare capacity
- **Opportunity 9:** Business Improvement Districts Scheme
- **Opportunity 10:** Improvements to active travel and reduce congestion already planned

- **Opportunity 5:** The Transport (Scotland) Act provides Local Authorities with new powers, including enforcement of pavement parking and bus franchising
- **Opportunity 6:** National Transport Strategy 2 requires investment is in line with the Sustainable Transport Hierarchy
- **Opportunity 11:** Trip generators and attractors are present along the length of the corridor
- **Opportunity 12:** New developments may support delivery of transport improvements

2.4.10 There was a high level of consistency between the problems and opportunities identified during the site audit and the review of the previous studies and documents. As such, it was considered that the lists were both appropriate and proportionate and taken forward to stakeholder consultation.

2.5 Case for Change Consultation

2.5.1 The original planned approach to engagement comprised: (i) stakeholder engagement which would have likely taken the form of a half-day workshop event at a location on the corridor and (ii) views of the public which would have been derived from previous consultation undertaken as part of overlapping studies, to be followed up at the conclusion of the Case for Change with a public drop-in event for feedback on the study outcomes.

2.5.2 Due to the Covid19 Pandemic, however, it was necessary to adapt this approach following the lockdown introduced in mid-March and subsequent social/physical distancing policy. Due to the inability to hold face-to-face stakeholder events, it was necessary to develop an alternative approach to engagement to ensure that views were captured which: (i) validate the work undertaken as part of the identification of problems and opportunities; and (ii) achieve stakeholder buy-in to ensure the study progresses on the right footing.

2.5.3 To this end, interactive stakeholder briefing notes were developed. These notes provided a summary of the purpose of the study and key headline statistics uncovered as part of the data analysis and site visits, partly informed by stakeholder and public engagement from previous studies. The note then set out the identified problems and opportunities, as outlined above, before asking the stakeholders a series of questions to capture their views. Four versions of the note were produced for the different stakeholders' groups identified through discussions with the client group as follows:

- General Stakeholders;
- Emergency Services;
- Community Councils and Elected Members; and
- Public Transport Operators.

2.5.4 Responses were received from 14 consultees, with the response rate likely impacted by consultees having other priority tasks in response to the *COVID19* pandemic during this period. However, responses were received from a variety of stakeholders, providing views across the spectrum of disciplines and organisations.

2.5.5 Overall, there was a strong level of validation of the identified problems and opportunities from the stakeholders who responded and thus both sets of lists were taken forward for consideration as part of the objective setting and option generation stages.

2.5.6 As previously indicated, the intention was not to undertake public engagement during this stage of the study, but to undertake this task upon conclusion of the Case for Change to avoid consultation fatigue. As such, to inform and validate the identification of the problems and opportunities, public opinion was sourced from: (i) responses to consultations from other reports and studies interacting with the corridors; and (ii) from responses to the Aberdeen City Commonplace page in support of *COVID19* related *Spaces for People* response.

2.5.7 In a similar vein to the stakeholder consultation, the public consultation elements also highlighted several of the same problems with the transport network, which added further validation and emphasis to the problems uncovered during both the site audit and key document review. As such it was agreed that these transport problem themes would be taken forward to the evidence stage within the Appraisal Framework before setting transport planning objectives and subsequent option identification.

2.6 Evidencing the Transport Problems

2.6.1 For brevity, this section will touch on the key points from the Case for Change, with full details available within the document itself. For each problem theme identified previously, the implied transport problem is derived, and this is the problem that objectives and subsequent option generation will address.

2.6.2 As such the resulting process identified the following transport problems from the evidence:

Transport Problem Theme	The Transport Problem
Problem Theme 1: Inconsistent Pedestrian Infrastructure	In some places, facilities for pedestrians make getting around frustrating and inconvenient.
Problem Theme 2: Disjointed Cycle Route Provision	Journeys by bike on designated routes are fragmented and inconvenient.
Problem Theme 3: Inconsistent Cycle routes and infrastructure	In some places facilities for cyclists make getting around frustrating and inconvenient.
Problem Theme 4: Low uptake of Public Transport	Bus Services in the corridors are perceived to be of poor quality.
Problem Theme 5: Lack of Bus Priority Infrastructure	Bus journey times can be long and unreliable.
Problem Theme 6: Issues with Planning / Provision of Bus Stop Infrastructure	Bus operations are hampered by the location of bus stops and facilities at some bus stops are poor.
Problem Theme 7: Kingswells Park and Ride is underutilised	Established park and ride assets are perceived to unattractive and inconvenient.
Problem Theme 8: Car travel is perceived as being cheaper than public transport	Public transport is viewed as too expensive by some.
Problem Theme 9: Extent of bus network threatened by high car mode share	The bus network in the corridors omits areas leading to connectivity gaps.
Problem Theme 10: City Centre is car dominated	The city centre network prioritises vehicular traffic over all other modes.
Problem Theme 11: Poor Driver Behaviour	Intimidation of non-motorised road users.
Problem Theme 12: Traffic Delays	Vehicle based journey times are extended during peak periods in the A944 and A9119 corridors
Problem Theme 13: Land use development	Future growth along the corridors may exacerbate existing problems

2.7 Transport Opportunities

2.7.1 Opportunities with the transport network identified through the study prior to the consultation remained unadjusted for the remainder of the study and thus were simply carried forward through the appraisal.

2.8 Setting Transport Planning Objectives

2.8.1 TPOs were produced for each of the 13 transport problems identified above, with the objectives effectively becoming the inverse of the problems. There was a degree of overlap amongst several of the TPOs, which resulted in several of these TPOs becoming amalgamated. As prescribed by STAG, objective setting is an iterative process and should be refined as the study progresses and they become 'SMART-ened'. Following this guidance, the TPOs were refined and developed to produce a set of eight TPOs, each of which was developed with the ability to make them SMART as the study progresses.

2.8.2 The TPOs for this study are as follows:

- **TPO1:** Improve the quality of the pedestrian experience for all, and address the barriers which affect some groups moving around as a pedestrian
- **TPO2:** Improve cycle routes to ensure they are sufficiently direct and connected, while improving journey quality, times, and safety for cyclists on the corridor
- **TPO3:** Rebalance the city centre environment in favour of more sustainable modes
- **TPO4:** Reduce journey times by bus and improve service punctuality
- **TPO5:** Improve the quality of bus services and bus stop infrastructure in the corridor, enhancing the experience for current bus users and attracting new passengers
- **TPO6:** Address the cost of public transport and reduce gaps in bus connectivity along the corridor
- **TPO7:** Provide improved integration between sustainable travel modes
- **TPO8:** Increase the mode share for sustainable travel modes along the A944 and A9119 transport corridors

2.9 Option Generation, Sifting and Development

2.9.1 The final stages in the Case for Change process is to identify and appraise a range of transport options and interventions to address the identified current and future transport problems and assist in realising potential opportunities. This process consists of three steps:

- **Option Generation**, whereby an unconstrained initial long list of options is identified across the range of transport modes to address the identified transport problems and root causes.
- **Option Sifting**, where options that fail to deliver against the TPOs set or are unrealistic or subject to possible delivery via alternative mechanisms are sifted from the process.
- **Option Development**, where those options that remain after sifting are further developed, and where applicable, packaged to be assessed further at the Preliminary Appraisal stage of STAG.

2.10 Option Generation

2.10.1 The initial long list of options was derived through: (i) options identified through previous and ongoing studies; (ii) options identified via the stakeholder consultation process; and (iii) those identified via internal team optioneering workshops.

2.10.2 An unconstrained initial long list of options was generated against each of the identified transport problems and associated TPO to complete the appraisal framework logic.

2.11 Option Sifting

2.11.1 The convention within STAG is that all options should be retained until unequivocal evidence is provided that the option will not deliver against the TPOs and STAG criteria, thus not addressing the root causes behind the transport problems. At the Case for Change stage, it is recommended that during the sifting stage, any options that will not deliver the intended outcomes of the study should be eliminated from further consideration. Furthermore, those options which may be more appropriately implemented as part of a wider study, should also be routed away at this stage of the appraisal process.

2.11.2 Following this guidance, several options were sifted from the appraisal process, as they: (i) involved wider options that are beyond the scope of this study, (ii) options that are already being delivered via another mechanism, and (iii) involved policy and legislative change.

2.12 Option Development

2.12.1 This task develops the remaining options prior to the Preliminary Appraisal stage. This ensures that the options for appraisal are broadly feasible, defined such that they can be appraised independently of other options, and are sufficiently developed for meaningful appraisal. As such, the options that were identified to progress to the Preliminary Appraisal are set out below.

Active Travel Options

- **ACTO1:** Programme of pavement maintenance and decluttering.
- **ACTO2:** Review of pedestrian desire lines and installation of pedestrian friendly crossing facilities to suit.
- **ACTO3:** Development of Green Corridors within the city centre and between development sites on the corridors
- **ACTO4:** Identify and formalise a city centre cycle network
- **ACTO5a:** Provision of a segregated 2-way cycle lane from PrimeFour to Aberdeen City Centre along the A944 connecting into AECOM study options
- **ACTO5b:** Provision of a segregated 2-way cycle lane from PrimeFour to ARI along the A944 connecting into AECOM study options
- **ACTO6:** Provision of a segregated 2-way cycle lane from Union Street / Holburn junction to PrimeFour via A9119
- **ACTO7:** Replace and extend all existing advisory cycle routes to provide a connected network.
- **ACTO8:** Create cycle route on Old Lang Stracht.
- **ACTO9:** Provide advance stop lines or cycle by-passes at all signalised junctions.

Public Transport Options

- **PTO1:** Reconfigure roundabout junctions to signalised junctions, complete with bus and cycle pre-signals
- **PTO2:** Bus Rapid Transit on the A944 Westhill – Aberdeen City Centre, via Kingswells Park and Ride.
- **PTO3:** Continuous Bus Lane from Westhill to Aberdeen via A944.
- **PTO4:** Continuous Bus Lane from Westhill to Aberdeen City Centre via A9119.
- **PTO5:** Changes to bus lane operational hours and enforcement.
- **PTO6:** Bus Stop upgrade programme and stop rationalisation.
- **PTO7:** Bus Prioritisation / Pre-Signals at all signalised junctions on the corridors.
- **PTO8:** Reallocate all lay-by bus stops to on-street bus stops.
- **PTO9a:** Make Castle Street to Union terrace, bus, cycle and walk only.
- **PTO9b:** Make Castle Street to Holburn Street Junction, bus, cycle and walk only.
- **PTO10:** Rebrand of Kingswells Park and Ride.
- **PTO11:** Advanced VMS on AWPR.
- **PTO12:** Establish a Bus Service Improvement Programme (BSIP).
- **PTO13:** Develop Sustainable Transport Hubs/Interchanges.
- **PTO14:** North West Street to Castle Street Right Turn – Bus Only.

General Transport Options

- **GTO1:** Reclaiming Streets Programme.
- **GTO2:** Improve Wayfinding and Signage.

3 Option Appraisal Context

3.1 Overview

3.1.1 Having completed the Case for Change and in advance of appraising each of the options, some further work and thoughts have been generated on the appraisal context. This helps to focus the appraisal and guides the subsequent assessment of the option packages to ensure they are proportionate and appropriately developed to address the identified transport problems. Establishing this context follows the sustainable transport hierarchy and sets the prioritisation framework for delivery of any range of options to emerge from the appraisal.

3.2 The Corridors

3.2.1 The A944 and A9119 function as key priority routes between Aberdeen City Centre, Kingswells and Westhill. Along their length they have key trip generators and attractors, making them unique in that they serve a function for two-way movements along their full length. Large scale employment opportunities exist in Westhill, Kingswells (PrimeFour), the Aberdeen Royal Infirmary, and other health campuses in addition to Aberdeen City Centre itself.

3.2.2 Analysis of Census Travel to Work (2011) data indicates that approximately 59% of people in employment in the city centre area out to Sheddocksley work within 5km of their home and a further 20% travel between 5km and 10km. For Kingswells, these figures sit at 22% and 73%, while for Westhill this sits at 17% and 25%.

3.2.3 Although this data is slightly dated, it does point towards a significant number of localised trips along these key corridors. However, when considering modes used, out with the city centre area, active travel modes are significantly lower, while bus mode share also drops off. Trips within 5km are those which are most likely to be converted to active travel-based trips and thus, option development should seek to target these initial catchment areas, before expanding further.

3.3 COVID19 Pandemic

3.3.1 The COVID19 pandemic has had significant and detrimental impacts on communities and businesses. However, the pandemic has also afforded an opportunity. Over the past six months of lockdown and subsequent physical distancing policy, there has been a significant upsurge in demand for bicycles, with many retailers selling out across the UK. The cycle-to-work scheme has witnessed a 200% increase in applications over the past three months, whilst Forbes has documented that the results of an ICM poll indicated 17% of commuters are more likely to cycle post COVID19, which when extrapolated across the 32 million commuters in the UK, would result in an additional 5.5 million cyclists commuting. In a report published in June by Cycling Scotland, they have noted a 77% increase in cycle traffic across all their automated cycle counters through May. With these statistics in mind, there is the credible argument that investment should be weighted more towards active travel infrastructure, with the recently increased budget for the *Spaces for People* fund leading the way. In a further behavioural shift, there has been a big increase in interest in electric bikes, opening cycling up to those who would not have previously considered cycling or indeed allowing longer cycling journeys to be considered.

3.3.2 Conversely, in a recent consultant's report, it was found that 61% of those surveyed were nervous of using public transport in the future, post-COVID19. As such, investment may be necessary to reduce these fears and encourage patronage, likely requiring investment in on-street infrastructure, and changes in vehicle fleet design to facilitate social distancing measures, such as reduced capacity and internal kit out. These measures may cost operators, and combined with potentially reduced farebox revenue, measures must be considered to avoid future service cuts with the associated risks of isolating elements of society. This study can help by developing options to make buses services more attractive thus potentially reversing some of this decline in revenue.

3.3.3 It is crucial, therefore, that investment is well targeted and focussed to ensure that it (i) maximises the potential benefits and current captured market with cycling and walking, (ii) improves the attractiveness of the public transport network and reassures the public about the use of bus services to minimise any negative connotations of health fears using public transport to avoid future service cuts, and (iii) ensures that travel by car does not become the first choice again undoing investment and achievements thus far in achieving modal shift or the risk of widening equality gaps between those that have access to a car and those who don't.

3.4 Pedestrian Appraisal Context

3.4.1 The *Initial Appraisal: Case for Change* highlighted several problems with the current pedestrian environment including:

- Poor surface quality
- Poor maintenance of surface
- Constrained pavement widths
- Street furniture and on pavement parking further constraining pavement widths
- Lack of footway / footpath provision
- Lack of adequate crossing locations and excessive wait times at crossings.

3.4.3 As part of the appraisal and the development of a prioritisation programme the site visit audit indicated those sections of the corridor which are in immediate need of investment and this should help frame the focus. Those sections highlighted in red indicate those that scored below the 70% pass mark from the site audit. In particular, key sections of the pedestrian environment in and around the ARI on section G below should be prioritised and options should look to tackle the apparent issues along sections F-H upon which constituent land uses are a mix of residential, commercial and health which are likely to benefit from improved pedestrian network coherence and connectivity. There appears to be imbalance between then northern and southern sections of the corridor, thus initial focus should concentrate in reducing this gap in provision before enhancing the rest of the network.

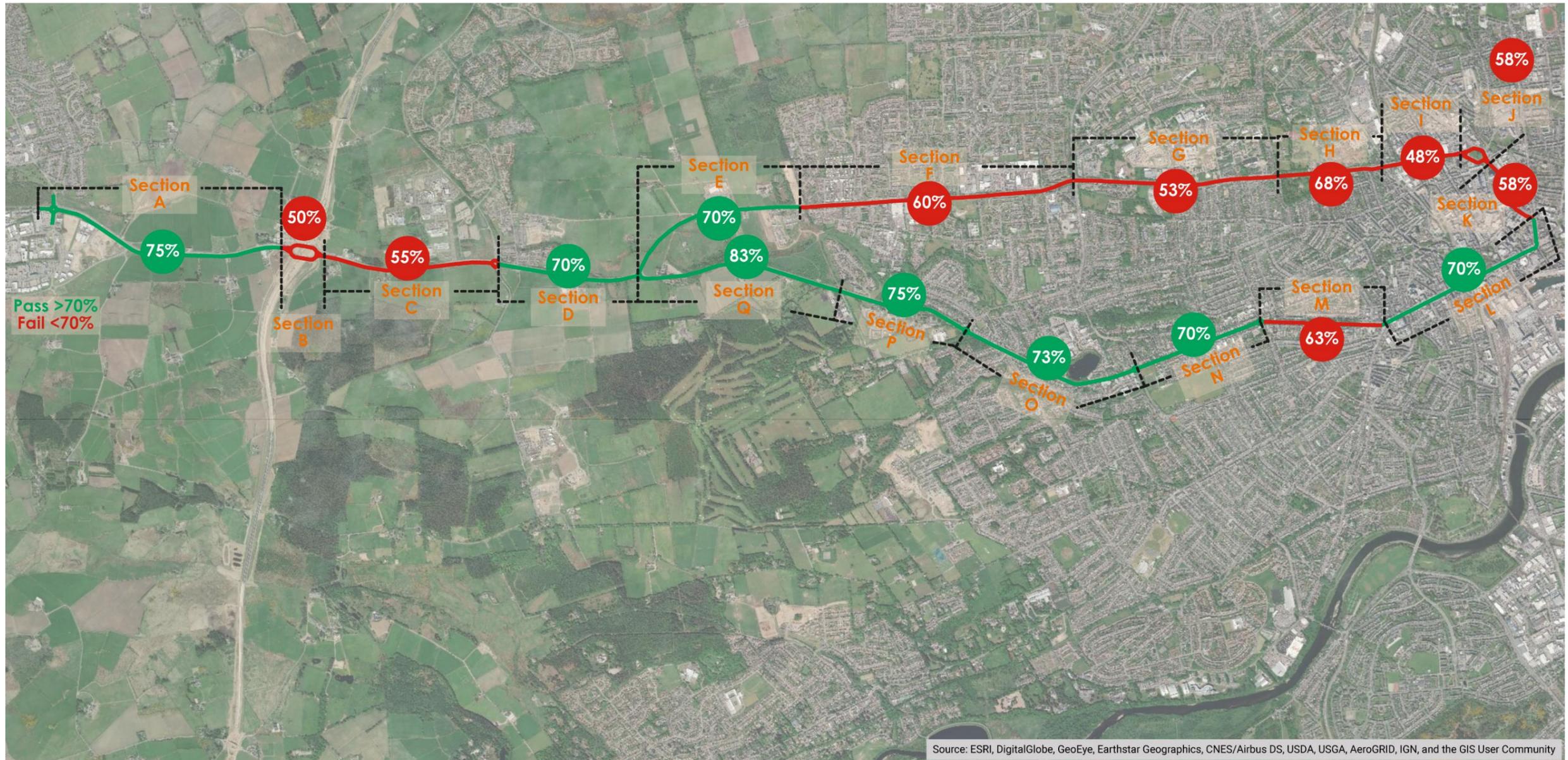


Figure 3-1: Walking / Wheeling Site Audit scoring recap

3.5 Cycling Appraisal Context

3.5.1 The Case for Change also highlighted several similar issues with the cycling network along the corridors, which are summarised below:

- Disjointed cycling infrastructure
- Existing cycling infrastructure in poor condition and not well maintained
- Safety concerns with cycling on the network, including intimidation by drivers
- Lack of adequate provision on heavy traffic roads

3.5.2 With both corridors providing direct links between Aberdeen city centre, Kingswells and Westhill, in addition to being within an acceptable commuting distance by bike, options should look to address the problems highlighted and provide an efficient and effective link between these key centres. As the AECOM study is looking to provide interventions along sections A-C, the appraisal and identification of interventions as part of a prioritised delivery plan should focus primarily on the sections in red below (sections which scored below the 70% during the site audit), which is almost entirely within the city centre catchment area. There are obvious feasibility issues uncovered within this study to cycle based intervention on sections of the corridor on the eastern end, and as such focus should be applied in the first instance on sections F-G and L-P to provide an integrated and coherent cycling network.

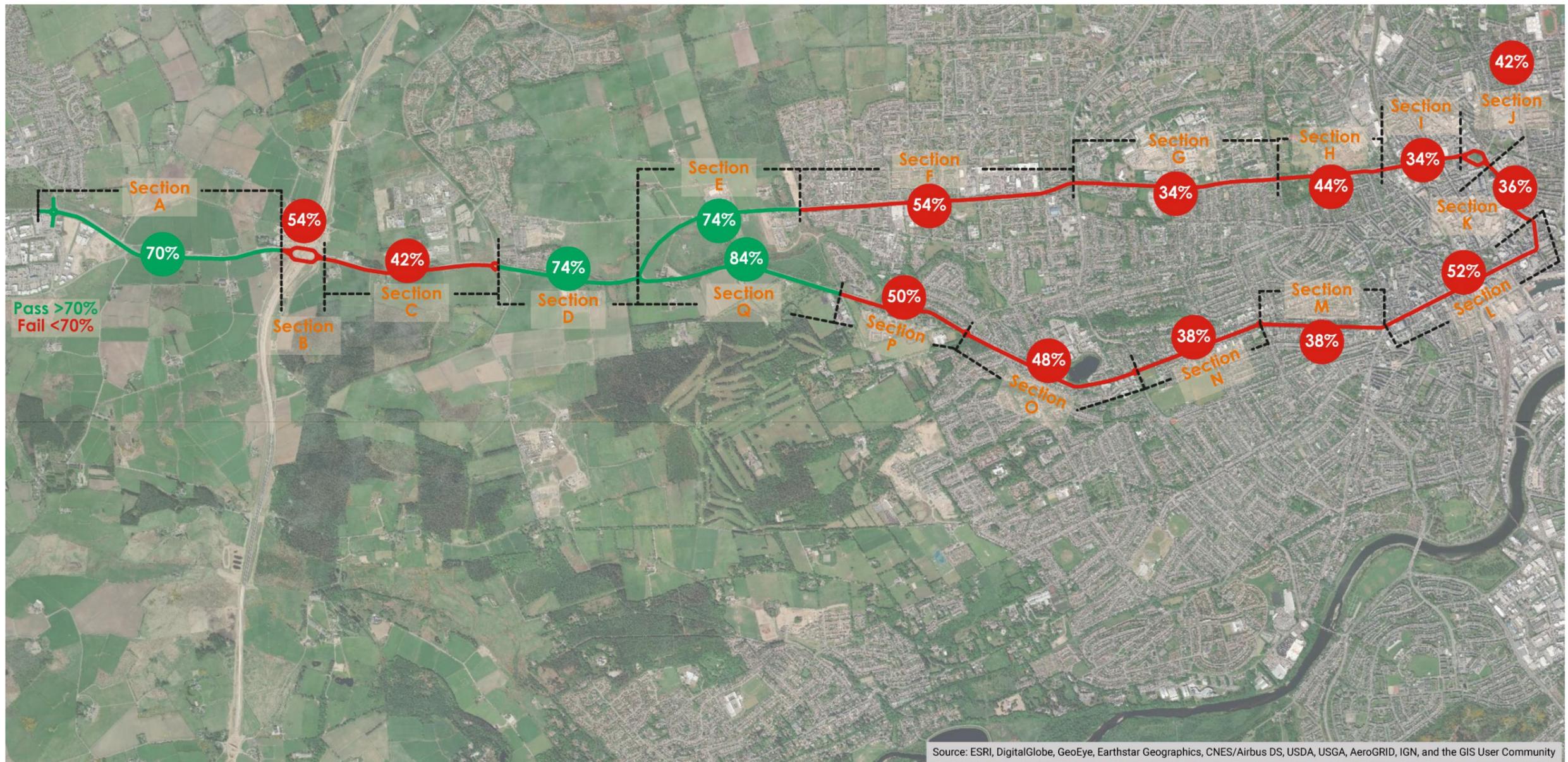


Figure 3-2: Cycling Site Audit recap

3.6 Bus Appraisal Context

3.6.1 From the Case for Change problems with the bus network were quickly ascertained, as many are historically well known. These included:

- Long journey times
- Journey time unreliability
- Poor frequency of services
- Poor bus priority infrastructure provision
- Poor bus stop infrastructure provision

3.6.2 Bus transit time analysis, bus-based accessibility analysis, in addition to the site audit all highlighted and validated these issues with the bus network. It will be evermore important currently to provide infrastructure to assist in reducing the instances and occurrences of these trends, while at the same time further promoting the bus services available to arrest the worrying trends in declining bus patronage, especially as elements of normality begin to be reinstated and the concerns people may have about using public transport. Again there are obvious feasibility issues surrounding many of the identified options, but consideration must be given within the appraisal for interventions that can initially address the issues along sections E-G and M-Q, all marked in red, to provide efficient and effective transit in and out of the city and connections between both corridors.

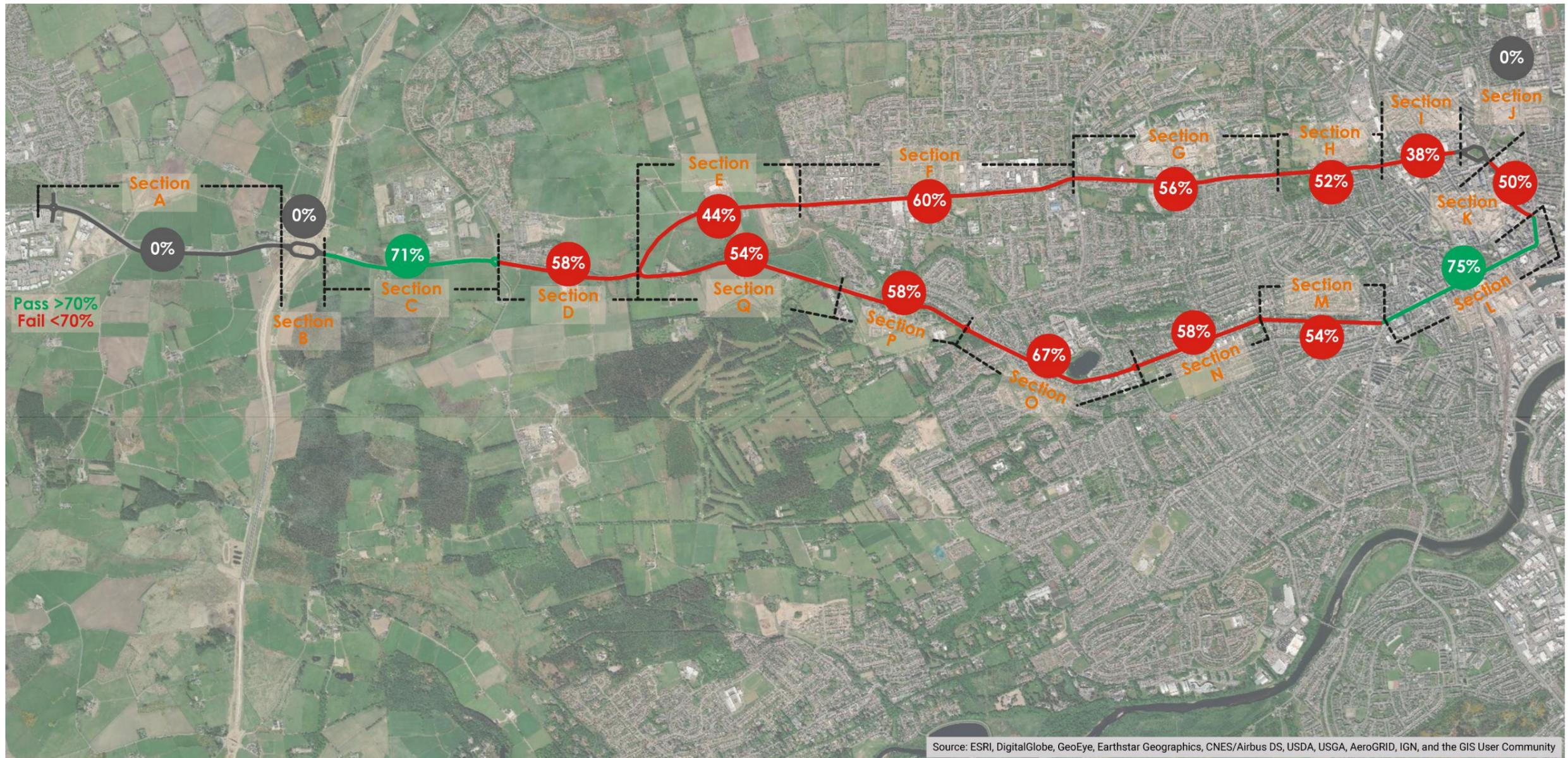


Figure 3-3: Bus Site Audit recap

3.7 Carriageway Physical Constraints

3.7.1 In addition to the site audit, further commentary and observations were noted highlighting several sections of the network which would have some form of constraint on the options which would be feasible along both corridors. These are noted below:

- **Section A:** No obvious physical constraint
- **Section B:** No obvious physical constraint
- **Section C:** 5-mile garage constraint (options for cycling are being considered within AECOM study)
- **Section D:** No obvious physical constraint
- **Section E:** Narrow carriageway, which would require some form of realignment and potential acquisition of land to widen the carriageway for bus and cycle-based interventions.

- **Section F:** Main constraint is between Rousay Drive and Fernhill Drive. Carriageway narrows particularly after Springhill Road, which may require carriageway widening to facilitate both cycle and bus-based interventions.
- **Section G:** Constrained width between Cairnfield Place and Argyll Crescent/Place. Carriageway narrows considerably.
- **Section H:** Full length of this section poses several constraints. Cycle based options may require offline interventions using the parks on both north and south sides of the carriageway.
- **Section I:** Hutcheon Street is particularly constrained and would require the removal of both on-street parking and on-street bins.
- **Section J:** No obvious physical constraint.
- **Section K:** No obvious physical constraint
- **Section L:** No obvious physical constraint
- **Section M:** Requirement to remove on-street parking to reallocate road space
- **Section N:** Requirement to remove on-street parking to reallocate road space
- **Section O:** Requirement to remove on-street parking to reallocate road space. On-pavement trees restrict ability to define pavement and carriageway widths.
- **Section P:** Carriageway width constraints, limited opportunities
- **Section Q:** Narrow carriageway but an offline cycleway does exist.

3.7.2 The figure below highlights those locations that impose the main risks to the feasibility / deliverability of options as commented on above.



Figure 3-4: Carriageway Physical Constraints

3.8 Case for Change – Public Engagement

- 3.8.1 As a requirement within STAG guidance public engagement plays a key role in achieving buy-in to the study and to assist in the development of the evidence case and subsequent option development. As previously noted in the Case for Change document, it was agreed that this public engagement would take place at the end of the Case for Change process to obtain public opinion on the options, as opposed to during the problems identification stage to avoid undertaking duplicated work from other studies and consultation fatigue from the numerous consultation events in process in the Aberdeen City Region.
- 3.8.2 Due to the COVID19 pandemic and associated Government guidance, it was not viable to hold a public drop-in day as was first anticipated. Subsequently an alternative solution was sought and Stantec applied the use of ArcGIS StoryMaps to undertake the engagement process.
- 3.8.3 The ArcGIS StoryMaps platform provides the framework to publish an interactive and visual story, complete with mapping integration, imagery and supporting text. With Survey123 integration, Stantec included a survey as part of the StoryMap to capture the feedback of the public on the outcomes of the study thus far and the options identified. A short summary note of the Initial Appraisal: Case for Change is provided in [Appendix A](#), with a summary of the feedback provided below.

Active Travel Options

3.8.4 To determine the level of preference behind each of the 10 options identified for the active travel network, viewers of the StoryMap were asked to distribute 100 points across the options. Respondents had the ability to spread these points freely across as many of the options or as little of the options they were attracted too. The application of this methodology was adopted to draw out the level of support behind each of the options instead of traditional methods asking for levels of satisfaction with options or simple ranking, as these methods can often be misconstrued or skewed.

3.8.5 The chart below illustrates the total distribution of points across the 10 active travel options, with the table below then listing the options in order of this level of public preference.

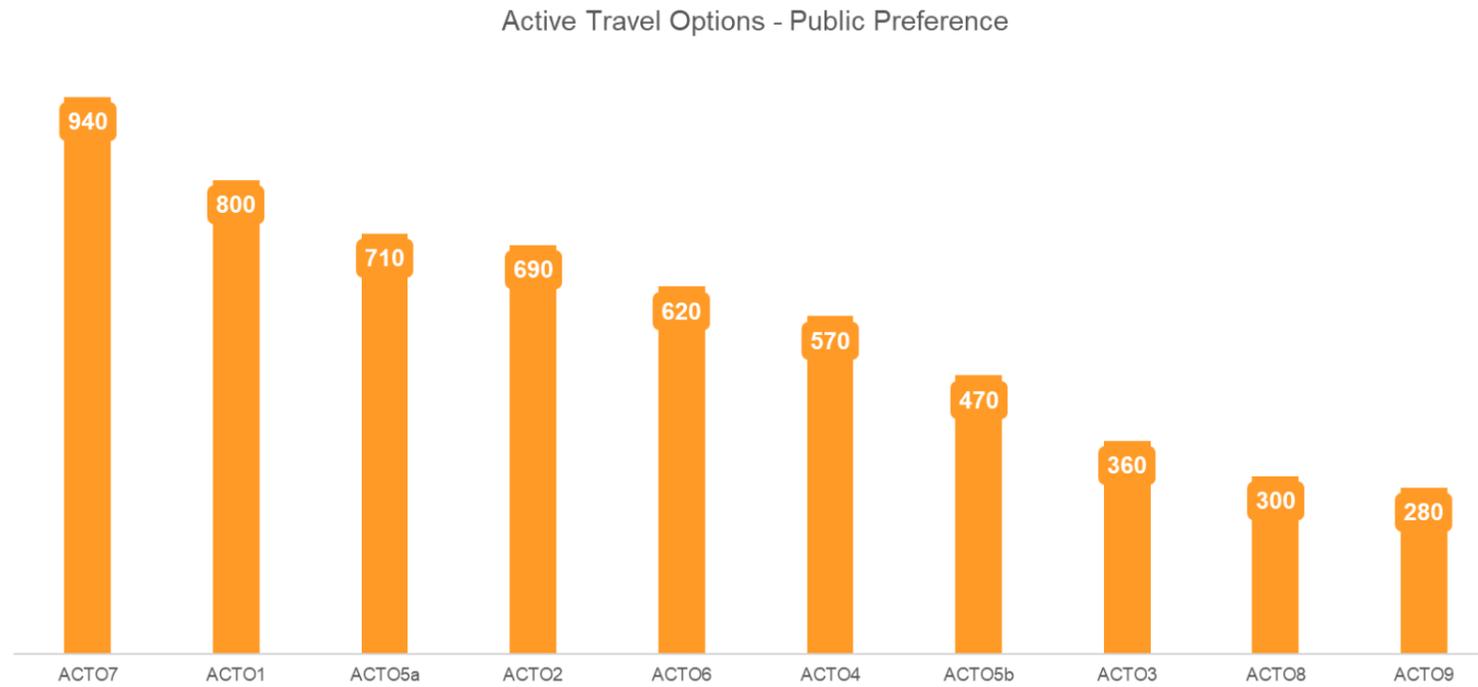


Figure 3-5: Active Travel Options, Public Preference

Table 3-1: Active Travel Options in order of preference

Options in order of Preference
ACTO7: Replace and extend all existing advisory cycle routes to provide a connected network.
ACTO1: Programme of pavement maintenance and decluttering.
ACTO5a: Provision of a segregated 2-way cycle lane from PrimeFour to Aberdeen City Centre along the A944
ACTO2: Review of pedestrian desire lines and installation of pedestrian friendly crossing facilities to suit.
ACTO6: Provision of a segregated 2-way cycle lane from Union Street / Holburn junction to PrimeFour via B9119
ACTO4: Identify and formalise a city centre cycle network
ACTO5b: Provision of a segregated 2-way cycle lane from PrimeFour to ARI along the A944
ACTO3: Development of Green Corridors within the city centre and between development sites on the corridors
ACTO8: Create cycle route on Old Lang Stracht.
ACTO9: Provide advance stop lines or cycle by-passes at all signalised junctions.

3.8.6 From the responses there appears to be two options that come out ahead of the others in terms of public support. **ACTO7** which concerns replacing and extending all existing advisory cycle routes to provide a connected and coherent network comes out on top, **140** points ahead of the next best supported option. That option is **ACTO1** a programme of pavement maintenance and decluttering to improve the pedestrian environment.

3.8.7 Interestingly the large investment and infrastructure package **ACTO5a** Provision of a segregated 2-way cycle lane from PrimeFour to Aberdeen City Centre along the A944 only came third in the list, **230** points behind the preferred option.

Public Transport Options (39 Responses – 3,900 Points)

3.8.8 As with the active travel options, respondents to the public transport options survey were asked to distribute 100 points across the 15 public transport options. The chart and table below highlight the level of public preference across the 15 options.

Public Transport Options - Public Preference

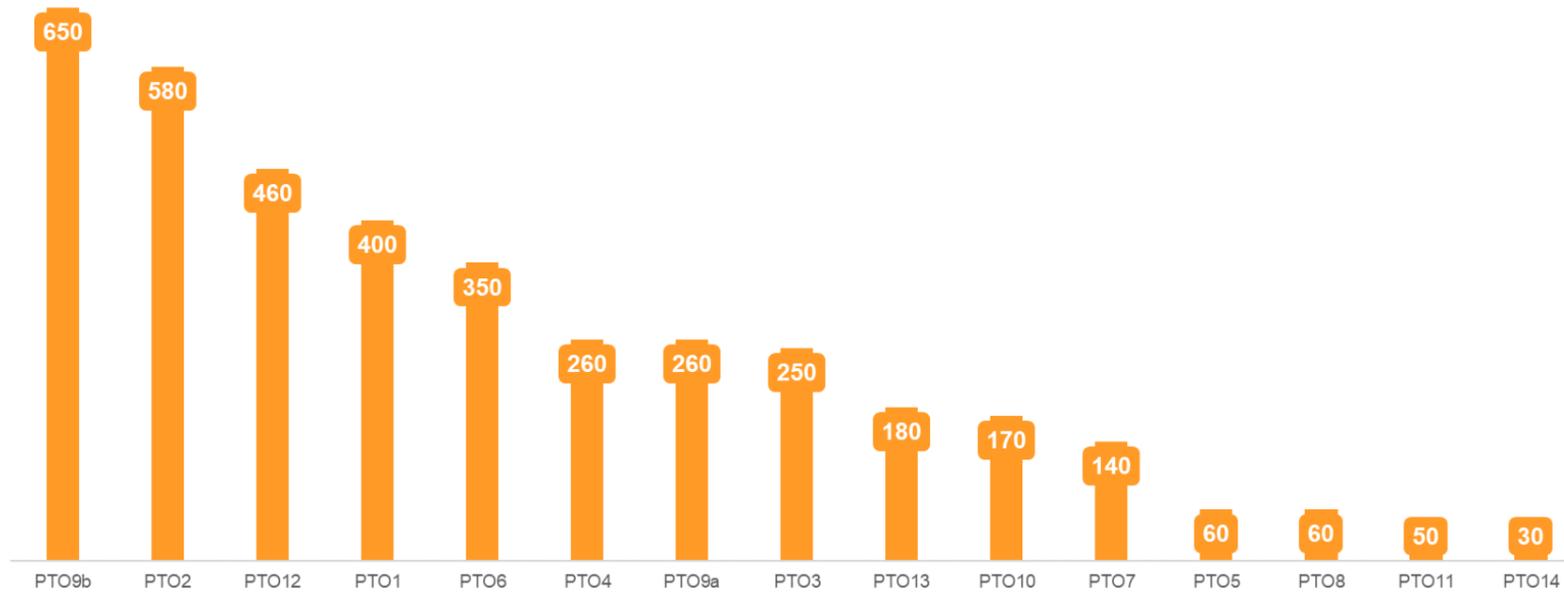


Figure 3-6: Public Transport Options, Public Preference

Table 3-2: Public Transport Options in order of preference

Options in order of Preference
PTO9b: Make Castle Street to Holburn Street Junction, bus, cycle and walk only
PTO2: Bus Rapid Transit on the A944 Westhill – Aberdeen City Centre, via Kingswells Park and Ride.
PTO12: Establish a Bus Service Improvement Programme (BSIP).
PTO1: Reconfigure roundabout junctions to signalised junctions, complete with bus and cycle pre-signals
PTO6: Bus Stop upgrade programme and stop rationalisation.
PTO4: Continuous Bus Lane from Westhill to Aberdeen City Centre via A9119.
PTO9a: Make Castle Street to Union terrace, bus, cycle and walk only.
PTO3: Continuous Bus Lane from Westhill to Aberdeen via A944.
PTO13: Develop Sustainable Transport Hubs.
PTO10: Rebrand of Kingswells Park and Ride.
PTO7: Bus Prioritisation / Pre-Signals at all signalised junctions on the corridors.
PTO5: Changes to bus lane operational hours and enforcement.
PTO8: Reallocate all lay-by bus stops to on-street bus stops.
PTO11: Advanced VMS on AWPR.
PTO14: North West Street to Castle Street Right Turn – Bus Only

3.8.9 Akin to the responses for the active travel options, two options received further support over all others. **PTO9b** concerning making Castle Street to Holburn Street junction, bus, cycle and walk only, i.e. the full length of Union Street received the most support, **70** points more than the second-best option. The second most popular option was the big-ticket option within the public transport option package, **PTO2** Bus Rapid Transit on the A944 Westhill – Aberdeen City Centre via Kingswells Park and Ride. This option was **120** points ahead of the third placed option. The remainder of the points distribution establishes a step like distribution with two or three options closely aligned before a gap of approximately 80-100 points to the next level of options.

3.8.10 The responses from the survey will be integrated into the option appraisal stage of this report to develop the public acceptability rationale behind the options in **Chapter 6**.

4 Preliminary Appraisal Option Development

4.1 Overview

4.1.1 This section of the report focuses on further development and refinement of the identified options from the **Initial Appraisal: Case for Change**. Each option is considered individually and the narrative behind each developed. In a slight departure from normal STAG guidance at this stage, additional high-level information with regards to feasibility, costs and indicative delivery timeframes have also been indicated, steps, which are normally considered in more detail until the **Detailed Appraisal** stage. Costs have been considered within three bandings; **Low** - <£5m, **Medium** - £5m to £10m and **High** >£10m, while timeframes are defined as **short-term (0-2 years)**, **medium-term (2-5 years)** and **long-term (more than 5 years)**.

4.1.2 The costs presented below reflect undiscounted 2019 prices and have been informed where possible, from likewise projects, or prepared using approximate estimating rates extracted from SPON's Civil Engineering and Highway Works Price Book 2019. Additionally, an optimism bias (OB) rate of 44% has been factored into these calculations as prescribed by STAG. OB reflects a tendency for appraisers to be overly optimistic with regards to costs and expected benefits returned. To redress this tendency, practitioners should make explicit adjustments for this bias when appraising projects. Currently, within STAG, this is only considered for cost risk adjustment and has thus been applied to the indicative costings presented within this section. More information on the costs calculated can be found in **Appendix B**.

4.2 Active Travel Options

4.2.1 From the submission of the **Initial Appraisal: Case for Change**, the options have been considered further and where applicable have been separated to create further sub-options. This is commensurate with STAG guidance.

ACTO1: Programme of pavement maintenance and decluttering

Table 4-1: ACTO1 Definition

Option Narrative:	<p>This option has two focus areas; (i) repairing and improving current pavement provision, and (ii) provision of new footway in areas where there is inadequate or no provision. The longevity and future resilience of the pavement network is key to the successful delivery of this option. Within the city centre boundary, most pavements are stone flagged (paving stones) whilst outwith the Anderson Drive boundary the preferred surface is asphalt. Future City Masterplan programmes have highlighted areas of the city centre to undergo future public realm works, which have a focus on delivering surfaces that are attractive and will most likely be paving slabs as opposed to more resilient and easier to maintain 'bound' asphalt surfaces.</p> <p>Outwith the core city centre areas, specifically Union Street, it is recommended under this option that surfaces are transformed to being asphalt based with limestone chips to increase the resilience of the future network, especially if both foot and cycle traffic were to increase through complementary option delivery. The option would also look to address the issues with width constrained pavements along the corridor, specifically, along the A944 Lang Stracht where a significant proportion of the pavements provided are 2 metres or less wide.</p> <p>The final aspect of this option would be the decluttering where possible of pavement surfaces to provide an unobstructed surface. This should look to remove current on pavement residential and commercial bins, which are both unattractive and damage the current paving slab surfaces. Further enforcement of on pavement parking should also fall under the purview of this option to reduce further and future damage to the pavement network and to reduce the number of pavement obstacles for easier navigation of pedestrians. Where not already installed, streetlight column lanterns should be converted to LED, which provide an improved standard of lighting which increases the feeling of safety and security for all users.</p>
High-Level Feasibility:	<p>The site audit completed as part of the Case for Change identified several sections of the network which fell below the 70% pass threshold. These areas should be prioritised under this option to be brought up to standard. Overall, the repair and resurfacing of existing pavements is viewed as feasible. A significant length of section of the A944 Lang Stracht provides pavements which are under 2 metres in width and would therefore require to be widened. Based on the current width constraints of this section of the network and a high-level assessment of the dimensions and space required, it is feasible that widened pavements can be provided along the 2km stretch, maintaining the current road lane provision (shared bus lane and single carriageway eastbound and single carriageway westbound). Works may be required to establish a level surface area as in areas of the network along this stretch there is a dip between pavement and carriageway. Drainage works would also need to be assessed to restrict the build-up of surface water where new pavements are constructed or widened.</p>
Indicative Cost Range¹:	<ul style="list-style-type: none"> - Resurfacing along Albyn Place, Queen's Road and West North Street from paving slabs to more durable asphalt - with 44% OB = £713,000 - £952,000 - Widening of pavements along A944 Lang Stracht - with 44% OB = £1,480,000 - £1,670,000 - Total Cost Range with OB = £2.2m - £2.6m - Low Cost
Indicative Timescale:	<p>It is expected that the delivery of this option can be achieved in a short-term timescale</p>

¹ As the proposed options are at the conceptual design stage, only high-level construction cost estimates can be provided. The cost estimate has been prepared using approximate estimating rates extracted from 'SPON's Civil Engineering and Highway Works Price Book 2019'. No formal assessment of risk has been undertaken in preparing the cost estimates due to the limited information available at present. As the project is at the concept stage, an estimate including Optimism Bias of 44%, as per Table 13.4 – Stage 1: Programme Entry, 'The Scottish Transport Appraisal Guidance (STAG) Technical Database, 2014', has been provided to reflect the uncertainties. The cost estimates do not include allowances for:

- (i) Costs associated with land/property acquisition;
- (ii) Statutory approvals/ consents;
- (iii) Adjustments to existing public utility apparatus;
- (iv) Surveys and investigations;
- (v) Design and works supervision fees; and
- (vi) Value Added Tax (VAT) and Inflation, as the date of construction is yet to be established.

It should be noted that costs could increase or decrease once more information becomes available and the design process advances. Consequently, the estimates provided should only be used as a broad indication of construction costs for the proposed works.

ACTO2: Review of pedestrian desire lines and installation of pedestrian friendly crossing facilities to suit

Table 4-2: ACTO2 Definition

Option Narrative:	<p>A review of pedestrian movements would be undertaken along the length of Union Street and along A944 Lang Stracht. Temporary HD cameras could be installed with the main purpose being to monitor and count pedestrian and cyclist activity along these sections of the corridors. The track and trace system can monitor the interactions between pedestrians and the network and using heat mapping can identify potential hotspots where pedestrians are crossing the carriageway outside of a designated and controlled crossing. A correlation between existing crossings and desired crossings can then be identified and a decision taken at that point with regards to consideration of controlled crossing provision.</p> <p>As part of this review, there would also be a requirement to monitor pedestrian wait times at existing crossing locations and the accumulation of pedestrians waiting to cross. Action can then be taken to set minimum wait times at the signals along the corridor to rebalance towards active travel users.</p> <p>Additionally, locations along the corridor which are currently missing essential infrastructure such as dropped kerbs and tactile paving will be installed as part of this option. This includes sections of A944 Lang Stracht where a few crossings are missing tactile paving.</p>
High-Level Feasibility:	<p>There are no immediate feasibility concerns with this option. Road safety reviews would need to be undertaken to measure the appropriateness of any new additional crossing along the corridor. Realisation of the City Centre Masterplan will remove a significant volume of traffic from sections of Union Street which should address many of the concerns identified through the Case for Change.</p> <p>The installation of appropriate kerbing, either dropped or raised and installation of tactile paving are all feasible throughout the corridor.</p>
Indicative Cost Range:	<ul style="list-style-type: none"> - Assuming the installation of two controlled crossings (toucan crossing) on the A944 with 44% OB = £167,000 - £202,000 - Installation of kerbing and tactile pavement with 44% OB = £6,000 - Total Cost Range with OB = £0.1m - £0.2m - Low Cost
Indicative Timescale:	<p>It is expected that the delivery of this option can be achieved in a short-term timescale</p>

ACTO3: Development of Green Corridors within the city centre and between development sites on the corridors

Table 4-3: ACTO3 Definition

Option Narrative:	<p>Green corridors in cities can be defined as links between other green and open spaces often bordered by trees and plants to form a green urban network for the movement of pedestrians and cyclists. These networks provide safe and clean mobility networks and access to green spaces through the provision of sustainable and active transport routes that link transport with mixed land-use; residential, commercial, education, leisure, and open spaces.</p> <p>Research has found that green networks in cities can deliver numerous benefits to the operation of the city and to the wider population including:</p> <ul style="list-style-type: none"> ■ increases in levels of walking, cycling and public transport within the city; ■ increases and promotes physical activity, reducing negative health impacts of inactivity; ■ reduces the impact of air pollution on pedestrians and cyclists; ■ reduces concerns over safety, security, conflicts, and intimidation of non-motorised users; ■ if tree lined and planted, these routes can reduce both air pollution and urban heat island effect; ■ increase mental wellbeing and the interaction of the urban population; and ■ support and promote public realm projects and improving the aesthetics of the urban environment for all. <p>Research and implementation of these networks in Germany by the German Agency for Nature Conservation state that “<i>Green infrastructure in the form of green corridors and paths designed with a view to the needs of pedestrians and cyclists can form the backbone of sustainable mobility</i>”. As such, this option would sit well within the overall aim and objectives of this study. Aberdeen is currently implementing both the City Centre Masterplan (CCMP) and Sustainable Urban Mobility Plan (SUMP) and this option has many synergies with those proposals and can help achieve the maximum benefits.</p> <p>Within the city centre, a review of the role of streets should be considered alongside both the CCMP and SUMP to identify those streets which should be considered for transforming into green corridors linking sections of the city centre together, providing safe and clean passage for pedestrians and cyclists to navigate the city. These links should afford direct connectivity and consist of both east-west and north-south provision linking Union Street in the south with the A944 in the north. These streets should be similar to Broad Street with the removal of cars but maintaining access for buses.</p> <p>This option should also be considered for delivery between areas of development, especially between Maidencraig and Countesswells and onwards to Kingswells, providing attractive linkages between these residential development areas and existing residential communities and business locations.</p>
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Figure 4-1: Examples of full Green Corridors

A softer approach to Green Corridors can also be adopted along more strategic routes based on an ‘avenues’ style approach, with wider footways, specific cycle lanes and narrowed carriageways with reduced speeds – 20mph. This option would retain access for private vehicles but would also enhance the local environment making it more "people-friendly", more attractive, greener, and more sustainable. Albyn Place and Queen’s Road to its junction with Anderson Drive could potentially be candidates for this type of approach providing a more sustainably balanced environment on the west side of the city.



Figure 4-2: Example of Avenues Project Glasgow

High-Level Feasibility:	Would require reallocation of road space for sustainable transport modes. Development based links can be delivered through site masterplans and developer contributions. No immediate feasibility concerns, as these corridors will reallocate existing roads to both active mode users and vegetation. Drainage works and surfacing required to level out the surfaces.
Indicative Cost Range:	<ul style="list-style-type: none"> - It is expected that this option will be low cost and will further expand on similar public realm work being delivered as part of the City Centre Masterplan. There may be implied costs associated with resurfacing and repurposing roads to facilitate this new function. - To adopt an Avenues style approach to Albyn Place and Queen’s Road with 44% OB = £1.7m - Low Cost
Indicative Timescale:	It is expected that the delivery of this option can be achieved in a short-term timescale as part of new developments. City Centre green corridors can be delivered in line with the City Centre Masterplan programme, with some potential corridors arriving within the short-term and others coming online as the CCMP is delivered.

ACTO5a: Provision of a segregated 2-way cycle lane from PrimeFour to Aberdeen City Centre along the A944 connecting into AECOM study options

Table 4-5: ACTO5a Definition

Option Narrative:	<p>As mentioned previously, safety is a key element in encouraging and maintaining the uptake in cycling. Designing to provide segregated cycle infrastructure is regarded as the highest level of design. Segregated cycle lanes often include providing a continuous physical barrier, often concrete, between cyclists and other traffic on the carriageway. These cycle lanes are often designed to be either: (i) at the carriageway level; (ii) stepped to provide an intermediate level between the road carriageway and pedestrian footway; or (iii) at pavement level. Recent guidance released by the DfT insists that cyclists should be considered vehicles capable of travelling at speed and, therefore, should be designed for under this consideration, separately from other non-motorised users.</p> <p>Cycle lanes can be either two-way (bi-directional) or one way. In practice, two-way cycle lanes are provided on just one side of the carriageway whereas one-way cycle lanes are provided on both sides of the carriageway with cyclists travelling with traffic. There are several issues with two-way cycle lanes, many of which relate to the design and function of this corridor, which makes it difficult for certain movements to be made at some of the busiest junctions on the corridor and the number of entry and exit points for commercial and residential properties along the length of the corridor and sections of the corridor where space is heavily constrained. As such, for feasibility purposes, this option will be considered during this appraisal as the provision of a segregated one-way cycle lane on each side of the carriageway – with traffic.</p> <p>This option would be designed to provide a segregated cycle lane between PrimeFour Business Park (and integration into the preferred option from the Westhill to Kingswells study) and Aberdeen City Centre along the A944 corridor. The lane would look to provide 1.5m width (minimum recommended) with a 0.5m buffer, providing a 2m segregated route on both sides of the carriageway, where possible.</p>
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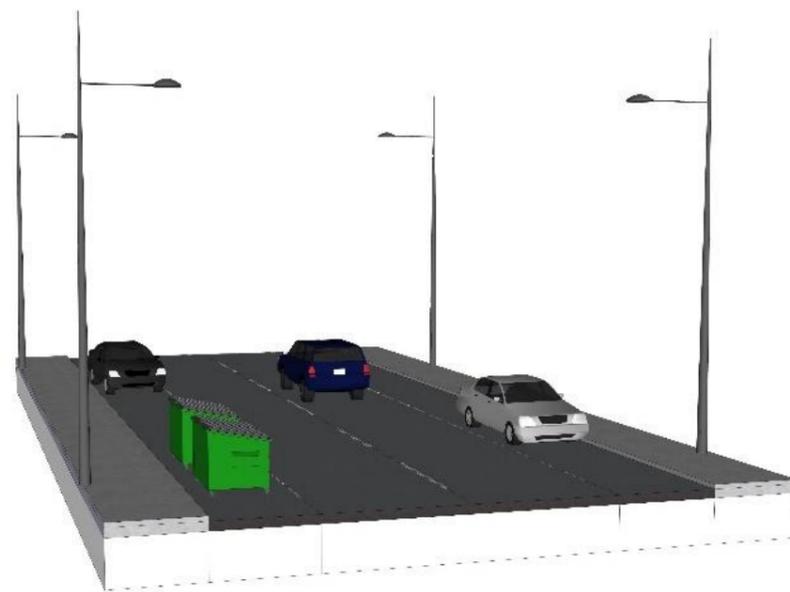


Figure 4-4: Hutcheon Street Currently including parked cars and on-street bins, (Sketch-up Design)



Figure 4-5: Hutcheon Street with Option 5a and the removal of on-street parking and bins reallocated to cycle lanes, (Sketch-up Design)

High-Level Feasibility:

There are several feasibility concerns with the deliverability of this option, and it would require the reallocation of road space and land purchase where carriageway widths are heavily constrained (see section 3.7). Overall, there may be a need to consider carriageway realignment and narrowing of the central reservation in places. To facilitate the integration of the cycle lane, on street parking would be required to be removed along the length of the corridor, in addition to residential and commercial bins on Hutcheon Street. Bus stop positions would also need to be considered as part of this option, with those that are currently presented as laybys transformed into floating bus stops and for others, consideration of adaptation of the position of the bus stop to provide bypasses for cyclists. Additionally, raised tables would need to be provided across many side streets and entry/exit points to commercial properties.

There are also several key pinch-points along the corridor where the carriageway narrows to single carriageway. This provides several engineering feasibility issues, specifically along:

- Westburn Road on the approach to the junction with Argyll Place
- Westburn Road / Hutcheon Street between the junction with Argyll Place and George Street

	Therefore, there may be a requirement to take more land and overspill the current carriageway confines. There may be a requirement at this section to make use of both Westburn Park and Victoria Park to provide alternative routes to bypass this particular constraint.
Indicative Cost Range:	<ul style="list-style-type: none"> - Costs for this option have been derived from those used in the AECOM A944 Cycle Route Feasibility Study - The costs of the section linking Westhill to Kingswells have been removed as this will be delivered separately through the AECOM study, leaving a cost with 44% OB = £16.5m - High Cost
Indicative Timescale:	It is expected that the delivery of this option can be achieved in a long-term timescale due to the design work required, TRO creation and approval, land acquisition and engineering works. Some sections may be able to be delivered quicker than others and can be considered during the prioritisation and delivery plan.

ACTO5b: Provision of a segregated 2-way cycle lane from PrimeFour to Aberdeen Royal Infirmary (ARI) along the A944 connecting into AECOM study options

Table 4-6: ACTO5b Definition

Option Narrative:	<p>This option would be delivered as ACTO5a, however, would end at the ARI, where the A944 becomes single carriageway. At this point, a series of internal city streets would be recommended for routing cyclists, enabling them to permeate the city to arrive at their desired destination. Terminating at this point would reduce the infrastructure related works required post the ARI location, due of the narrowing of the road carriageway. This would also reduce the need to reallocate road space beyond this point and removal of on-street parking and the need to find alternative locations for residential and commercial bins on Hutcheon Street.</p> <p>This option would be designed to provide a segregated cycle lane between PrimeFour (and integration into the preferred option from the Westhill to Kingswells study) and Aberdeen Royal Infirmary along the A944 corridor. The lane would look to provide 1.5m width (minimum recommended) with a 0.5m buffer, providing a 2m segregated route on both sides of the carriageway.</p>  <p>Figure 4-6: Segregated route South Side Way, Glasgow</p>
High-Level Feasibility:	<p>There are several feasibility concerns with the deliverability of this option and would require the reallocation of road space and land purchase where carriageway widths are heavily constrained (see section 3.7). Overall, there may be a need to consider carriageway realignment and narrowing of the central reservation in places. To facilitate the integration of the cycle lane, on-street parking would be required to be removed along the length of the corridor, in addition to residential and commercial bins on Hutcheon Street. Bus stop positions would also need to be considered as part of this option, with those that are currently presented as laybys transformed into floating bus stops and for others, consideration of adaptation of the position of the bus stop to provide bypasses for cyclists. Additionally, raised tables would need to be provided across many side streets and entry/exit points to commercial properties.</p> <p>As mentioned above, as the route would terminate as the carriageway narrows to single carriageway it would negate the specific sections of the corridor which pose the most significant constraints for facilitating this option.</p>
Indicative Cost Range:	<ul style="list-style-type: none"> - Costs for this option have been derived from those used in the AECOM A944 Cycle Route Feasibility Study The costs of the sections linking Westhill to Kingswells, Westburn Park to Berryden Road and City Centre Option 1/2 have been removed, leaving a cost with 44% OB = £8.9m - Medium Cost
Indicative Timescale:	It is expected that the delivery of this option can be achieved in a long-term timescale due to the design work required, consultation, TRO creation and approval, land acquisition and engineering works. Some sections may be able to be delivered more quickly than others and can be considered during the prioritisation and delivery plan.

ACTO6: Provision of a segregated 2-way cycle lane from Union Street / Holburn Junction to PrimeFour via A9119

Table 4-7: ACTO6 Definition

<p>Option Narrative:</p>	<p>This option is as option 5a and 5b above, however, focuses on delivering a route along the A9119 instead. As with the options above, there would be a requirement to remove on-street parking in locations, in addition to working around bus stop provision.</p> <p>This option would be designed to provide a segregated cycle lane between PrimeFour (and integration into the preferred option from the Westhill to Kingswells study) and Aberdeen City Centre along the A9119 corridor. The lane would look to provide 1.5m width (minimum recommended) with a 0.5m buffer, providing a 2m segregated route on both sides of the carriageway.</p> <p>The image below provides an example of how a route would look on Queen's Road.</p>  <p>Figure 4-7: Potential Queen's Road segregated route (Sketch-up Design)</p>
<p>High-Level Feasibility:</p>	<p>There are several feasibility concerns with the deliverability of this option and would require the reallocation of road space where carriageway widths are heavily constrained (see section 3.7). To facilitate the integration of the cycle lane, on-street parking would be required to be removed along the length of the corridor. Bus stop positions would also need to be considered as part of this option, with those that are currently presented as laybys transformed into floating bus stops and for others, consideration of adaptation of the position of the bus stop to provide bypasses for cyclists.</p> <p>Due to the nature of the A9119 and the number of access and egress points to both commercial and residential properties along Queen's Road specifically, the segregation barrier will need to include numerous breaks to keep this access available for these properties unless alternative parking solutions can be found. Alternatively, the buffer can be removed, and light segregation provided along this section of the corridor to maintain access for vehicles to these properties, with the buffer reinstated in areas where the number of entry and exit points reduce.</p> <p>Additionally, there are width constraints along Skene Road which has an impact on the feasibility of this option. At this point, northbound provision may have to remain on road, while southbound makes use of the off-road path adjacent to the Den of Maidencraig.</p> <p>The large roundabout junction with Anderson Drive would also pose some difficulty for cyclists, and options for delivering a safe crossing would need to be looked at further. Possibly a candidate for a Dutch style roundabout solution. Dutch-style roundabouts are narrower in carriageway width, which enforces slower approach and departure speeds. Larger/ longer vehicles are able to benefit from an overrun able strip in the centre of the road, whilst pedestrians are provided with zebra crossings and cyclists are given their own red tarmac cycle path to reduce risk of collisions for all potential highway users. The gradient and camber on this corridor would need to be explored further to avoid a buildup of surface water running through the cycle lane, thus there are likely to be options considered for providing drainage solutions between the carriageway and cycle lane.</p>
<p>Indicative Cost Range:</p>	<ul style="list-style-type: none"> - Costs for this option have been derived from the A944 Cycle Route Feasibility Study completed by AECOM who estimated high-level costings for the A944 option - The costs have been calculated using unit costs in Appendix D of the report and would estimate this options costs with 44% OB = £11m-£13.5m. - High Cost
<p>Indicative Timescale:</p>	<p>It is expected that the delivery of this option can be achieved in a long-term timescale due to the design work required, TRO creation and approval and engineering works. Some sections may be able to be delivered more quickly than others and can be considered during the prioritisation and delivery plan.</p>

ACTO7: Replace and extend all existing advisory cycle routes to provide a connected network

4.2.2 Since the *Initial Appraisal: Case for Change*, this option has been considered further and developed to provide three sub-options.

Table 4-8: ACTO7a Definition

Option Narrative:	<p>This variation would include extending and replacing/resurfacing the existing advisory cycle lanes. This would create a connected network of advisory cycle lanes throughout the corridor between PrimeFour and the city centre along both the A944 and A9119 carriageways.</p> <p>As part of the replacement of the existing advisory lanes, new and brightly coloured cycle lanes could be implemented to further highlight the presence of these lanes to drivers. This has become a more widely used practice across the globe to increase the awareness of cycle lanes to drivers and offer slightly more protection to cyclists. There are two methods of providing this coloured surface, either through coloured screed or asphalt with coloured limestone chips. The chipped based surface is more durable and resilient than paint-based surfaces which have a lifespan of approximately five years and can cause uncomfortable riding when in deteriorating. A lane would be provided on both sides of the carriageway – with traffic - and would require the removal of on-street parking to reallocate road space on certain sections of the corridor to provide a 1.5m wide cycle lane.</p>
High-Level Feasibility:	<p>Like the previous options, this option would require the removal of on-street parking and relocation of road space to facilitate the cycle lane along the length of the corridor. Advisory cycle lanes already exist along several sections of the corridor combined with shared bus lanes. The most notable gaps in this current provision exists on:</p> <ul style="list-style-type: none"> - Westburn Road on approach to the ARI, which may require narrowing of the central reservation - Hutcheon Street eastbound which will require the removal of on-street parking and bins - Queen’s Road between Albyn Place and Anderson Drive which would require the removal of on-street parking. <p>At this stage there appears to be no ‘showstoppers’ preventing advisory cycle lanes being replaced and extended along the corridors. If the surfaces are being replaced with brightly coloured chips, there will be costs associated with these works and works to implement new drainage and kerbing.</p>
Indicative Cost Range:	<ul style="list-style-type: none"> - Replacing the existing cycle lanes with coloured screed and extending along the corridor from Switchback roundabout along A944 and A9119 is estimated with 44% OB = £1.1M - As above but resurfacing of the carriageway to integrate brightly coloured asphalt chips to indicate the presence of advisory lanes more prominently is estimated to cost with 44% OB = £3.9m - Low Cost
Indicative Timescale:	It is expected that the delivery of this option can be achieved in a short-term timescale once TROs have been approved to remove on-street parking.

Table 4-9: ACTO7b Definition

Option Narrative:	<p>This variation would include converting existing advisory lanes to mandatory lanes and extending these along the corridor in much the same fashion as option ACTO7a. Mandatory cycle lanes are considered as providing further protection to cyclists as legally, vehicles are prevented from entering these spaces. As with option ACTO7a, these lanes would be provided on both sides of the carriageway and could involve using bright coloured screed to increase visibility to drivers and define the road space. Again, on-street parking would be required to be removed to implement this option, and a TRO would be required to prevent vehicles from parking within the cycle lane, including delivery vehicles loading and unloading.</p>
High-Level Feasibility:	<p>Like the previous options, this option would require the removal of on-street parking and relocation of road space to facilitate the cycle lane along the length of the corridor. Advisory cycle lanes already exist along several sections of the corridor combined with shared bus lanes. The most notable gaps in this current provision exists on:</p> <ul style="list-style-type: none"> - Westburn Road on approach to the ARI, which may require narrowing of the central reservation - Hutcheon Street eastbound which will require the removal of on-street parking and bins - Queen’s Road between Albyn Place and Anderson Drive which would require the removal of on-street parking. <p>At this stage there appears to be no ‘showstoppers’ preventing advisory cycle lanes being replaced by mandatory cycle lanes and extended.</p>

Indicative Cost Range:	<ul style="list-style-type: none"> - Replacing the existing cycle lanes with coloured screed and extending along the corridor from Switchback roundabout along A944 and A9119 is estimated with 44% OB = £1.1M - As above but resurfacing of the carriageway to integrate brightly coloured asphalt chips to indicate the presence of mandatory lanes more prominently is estimated to cost with 44% OB = £3.9m - Low Cost
Indicative Timescale:	It is expected that the delivery of this option can be achieved in a short-term timescale once TROs have been approved to remove on-street parking.

Table 4-10: ACTO7c Definition

Option Narrative:	This variation is as ACTO7b but would also include the provision of light segregation to provide a further level of separation for cyclists. Light segregation includes using intermittent physical features placed along the inside edge of a mandatory cycle lane. The relatively low cost of light segregation means it can be considered as a beneficial addition to mandatory cycle lanes in appropriate locations. There are several examples of light segregation already in use across the UK, including Wands, Orcas, Armadillos, and the use of planters. They can act as a cheaper deliverable option to providing fully segregated and kerbed cycle lanes.
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Figure 4-8: Light Segregation - Orcas



Figure 4-9: Light Segregation - Armadillos



Figure 4-10: Light Segregation - Wands

High-Level Feasibility:	<p>Like the previous options, this option would require the removal of on-street parking and relocation road space to facilitate the cycle lane along the length of the corridor. Advisory cycle lanes already exist along several sections of the corridor combined with shared bus lanes. The most notable gaps in this current provision exists on:</p> <ul style="list-style-type: none"> - Westburn Road on approach to the ARI, which may require narrowing of the central reservation - Hutcheon Street eastbound which will require the removal of on-street parking and bins - Queen's Road between Albyn Place and Anderson Drive which would require the removal of on-street parking. <p>At this stage, there appears to be no 'showstoppers' preventing advisory cycle lanes being replaced by mandatory cycle lanes and extended. The implementation of light segregation is relatively easy, with solutions such as Orcas and Armadillos being screwed into the carriageway surface meaning they can be easily moved and replaced. They are also less obtrusive on views/outlooks from residential properties along the corridors than wands. Additionally, both Orcas and Armadillos, will still enable vehicles to cross the cycle lane and enter properties along the corridor.</p>
Indicative Cost Range:	<ul style="list-style-type: none"> - Replacing the existing cycle lanes with coloured screed and extending along the corridor from Switchback roundabout along A944 and A9119 is estimated with 44% OB = £1.1M - As above but resurfacing of the carriageway to integrate brightly coloured asphalt chips to indicate the presence of mandatory lanes more prominently is estimated to cost with 44% OB = £3.9m - Light segregation in the form of Orcas, every 3m, along the corridor from Switchback roundabout along A944 and A9119 is estimated with 44% OB = £830,000 - Total Cost Range = £1.9m - £4.8m - Low Cost
Indicative Timescale:	It is expected that the delivery of this option can be achieved in a short-term timescale once TROs have been approved to remove on-street parking.

ACTO8: Create a cycle route on Old Lang Stracht

Table 4-11: ACTO8 Definition

Option Narrative:	<p>This option would include improving the surface of Old Lang Stracht and taking advantage of the low levels of traffic on this road to provide a direct cycle link from Kingswells to the A944 Lang Stracht and to A9119 Skene Road via the unnamed road that currently links the two corridors.</p> <p>By providing a cycle route along this road, direct access is provided for cyclists reducing the need to navigate Switchback Roundabout. This link would also provide efficient access to Kingswells Park and Ride.</p> <p>To deliver the option, the road surface would need to be improved to provide a smooth and comfortable cycle lane, which would be shared with the current Stagecoach bus service. Signage would also be required to highlight the option of using this route to access Kingswells. A crossing phase at the bus gate may be required to enable cyclists to cross the carriageway and join the unnamed road to the south onto the A9119 or to use the cycle lane on the south side of the carriageway. Approximately 1km of the road would need to be resurfaced up to the entrance to the new housing estate access.</p>
High-Level Feasibility:	There are no feasibility issues with this option.
Indicative Cost Range:	<ul style="list-style-type: none"> - Based on cost estimates this option would cost with 44% OB = £550,000 - Low Cost
Indicative Timescale:	It is expected that the delivery of this option can be achieved in a short-term timescale.

ACTO9: Provide advance stop lines or cycle by-passes at all signalised junctions

Table 4-12: ACTO9 Definition

Option Narrative:	<p>Also known as bike boxes or cycle reservoir, Advanced Stop Lines (ASLs) are stop lines for cyclists at traffic signals, which are marked beyond the stop line for general traffic. They are designed to help cyclists pull away in front of traffic. The benefit of ASLs are only realised during red stages of signals, allowing cyclists to take-up a position to complete their next movement.</p> <p>Cycle bypasses is when there is a provision of a slip off in advance of a signalised junction, leading to a short section of cycle lane that enables the cyclist to bypass the red signal phase. This is used commonly to allow cyclists to turn left and / or to continue straight ahead at the top of a T-junction.</p> <p>ASLs in particular can also benefit from the addition of early start phases for cyclists, which can improve safety and comfort for cyclists. It enables them to clear locations of potential conflict before motor traffic starts moving.</p> <p>Within the context of this appraisal, this option would involve refreshing ASLs where they currently exist on the corridors and providing ASLs where they are currently missing but would be beneficial to cyclists. Where possible, cycle bypasses would also be considered to provide left turn and straight-ahead movements for cyclists. The option would be completed by the addition of early start times for cyclists.</p>
High-Level Feasibility:	There are no feasibility issues with this option.
Indicative Cost Range:	<ul style="list-style-type: none"> - Based on cost estimates this option would cost with 44% OB = £2.5m - Low Cost
Indicative Timescale:	It is expected that the delivery of this option can be achieved in a medium-term timescale.

4.3 Public Transport Options

4.3.1 From the submission of the **Initial Appraisal: Case for Change**, the options have been considered further and where applicable have been separated to create further sub-options. This is commensurate with STAG guidance at this stage:

PTO1: Reconfigure roundabout junctions to signalised junctions, complete with bus and cycle pre-signals

Table 4-13: PTO1 Definition

Option Narrative:	<p>This option is focused on reconfiguring the roundabouts at Queen’s Gate, Queen’s Cross, Anderson Drive and King’s Gate, all on the A9119. Evidence from various studies states that larger roundabouts are difficult and dangerous to manoeuvre for cyclists, while in urban contexts smaller roundabouts can be helpful. However, STATS19 data and observations during the site visit highlighted these roundabout junctions as being problematic to navigate due to driver behaviour and the distance of pedestrian crossing points from the junction. Bus journey time information has also highlighted significant variance in journey times along this route.</p> <p>As such, this option would include reconfiguring these junctions into signalised junctions complete with ASLs for cyclists and pre-signals for both cyclists and buses to help maintain journey time reliability. A signalised crossing will also enable the pedestrian crossings to be relocated closer to the junction and provide direct crossing links for pedestrians to cross the carriageway.</p> <p>Signalised crossings provide many benefits over roundabouts when implementing cycling and bus lanes, which has posed several issues in the case of roundabouts as movements particularly for cyclists to can be made difficult to cross lanes for right turns.</p>
High-Level Feasibility:	<p>There are significant engineering requirements to develop this option:</p> <ul style="list-style-type: none"> • Surfaces would need to be levelled and resurfaced. • New signals would need to be purchased, implemented and potentially new controllers would be required. • There may be a requirement to realign and reduce the radii of entry exit points at Queen’s Cross roundabout in particular due to the tight turn from Carden Place to Albyn Place. • The monument at Queen’s Cross would also require to be relocated. • The Anderson Drive roundabout footprint could be reduced to facilitate the signals thus reallocating some of the existing carriageway to pedestrians and cycling facilities.
Indicative Cost Range:	<ul style="list-style-type: none"> - Based on cost estimates this option would cost with 44% OB = £1.5m-£1.8m per junction - Total Cost = £6- £7m - Medium Cost
Indicative Timescale:	It is expected that the delivery of this option can be achieved in a medium-term timescale.

PTO2: Bus Rapid Transit on the A944 Westhill – Aberdeen City Centre, via Kingswells Park and Ride

Table 4-14: PTO2 Definition

Option Narrative:	<p>Bus Rapid Transit (BRT) is a bus-based system designed to improve capacity and reliability of services over conventional bus networks. The system normally includes bus priority measures along the route, such as specific bus lanes, bus priority at signals where appropriate and improved ticketing system to increase the reliability of services and reduce journey times.</p> <p>This option would involve introducing a BRT system similar to the Glider system in Belfast which provides fast and reliable services connecting key destinations along Glider corridors. Extensive bus priority is provided along the route to facilitate these fast and reliable journeys. The services operate with a modern eco-hybrid fleet and can carry more passengers than traditional bus services. Within Belfast this system has helped reduce public transport journey times by 25%. The system also caters for online and mobile ticketing and on-street ticket machines to reduce boarding related delay.</p> <p>Within the Aberdeen context, consideration of this system has been considered as part of wider studies, however, could be implemented along the A944 corridor between Westhill and Aberdeen city centre with stops at key destinations such as Kingswells P&R and the ARI to create local and multi-modal interchanges. This option will require the removal of on-street parking along the corridor to reallocate road space for bus priority measures and will likely also require reconfiguration of traffic signals where appropriate to provide service priority.</p>
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Figure 4-11: Glider Belfast, Bus Rapid Transit

High-Level Feasibility:	There would be several feasibility issues with developing a BRT system similar to the Glider service in Belfast. Although existing bus lanes are already provided along sections of the A944, there would need to be an extension of these and rescoping of junction designs. There is quite likely a requirement to realign the carriageway at different sections along the corridor, which may also require narrowing of lanes, reduction of the central reservation and purchase of land. The most difficult section to implement this system would be beyond the ARI, where the carriageway reduces to single lane at Cairnfield Place (see section 3.7). Beyond this point the carriageway reduces significantly and is bounded by properties and boundary walls. It may be necessary to remove these walls and expand the carriageway into the parks (Westburn + Victoria). Alternatively, it may be necessary to assess the road network and create alternative routes, one-way systems and gyratories to facilitate this option beyond the ARI or look to reroute the system through the residential streets and internal street system to Union Street as opposed to continuing along the A944. Land may also be required to fit new high standard bus stops and ticket machines plus required utilities.
Indicative Cost Range:	<ul style="list-style-type: none"> - High level feasibility costs were calculated as part of the <i>Aberdeen City Region Deal Strategic Transport Appraisal: Preliminary Appraisal</i> which estimated costs at £64m-£76m for a route from Westhill to Bridge of Don via Kingswells P&R and Union Street. - High Cost
Indicative Timescale:	It is expected that the delivery of this option can be achieved in a long-term timescale. There would be significant time for planning, engineering works and potential TROs for altering the road system.

PTO3: Continuous Bus Lane from Westhill to Aberdeen via A944.

Table 4-15: PTO3 Definition

Option Narrative:	<p>Bus lanes are lanes restricted to buses on certain days and times, and generally used to increase the punctuality of bus services that otherwise would be held in heavy traffic flows or congestion. Bus lanes often make allowances for other vehicles to use the lanes such as taxis, motorbikes, and cyclists.</p> <p>This option would introduce a continuous bus lane from Westhill to Aberdeen city centre via the A944. The lanes would be operational for a minimum of between 7am and 7pm, if not 24 hours. To facilitate the introduction of the end-to-end bus lane, on-street parking will be required to be removed along various sections of the corridor. Additionally, those bus stops that are currently formatted as laybys can be built out providing additional footway width. The lanes can be indicated by brightly coloured asphalt and allow cyclists to use them for their length. A lane would be provided on both sides of the carriageway as the evidence of bus transit times highlighted issues with journey time reliability in both directions.</p>
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Figure 4-12: Bus Lane with coloured surface

High-Level Feasibility:	This option would encounter many of the same issues as PTO2 in terms of allocating road space for end-to-end bus lanes. The carriageway narrows in several locations and would make it very difficult to be feasible towards the eastern extent of the corridor without significant changes to the operation of the current road network. It would also make feasibility of complementary segregated cycle lanes unlikely (see section 3.7), such that there may be a need to consider a shared bus/cycle lane along the corridor so as not to permit one or the other. It would likely be feasible to create bus lanes on both sides of the carriageway to the ARI before routing services via surface streets between the A944 and A9119 as is the current routing pattern of the main stagecoach services running between Westhill, Kingswells and the City Centre. Again consideration could be given to altering the system of residential streets to provide bus priority or removal of private vehicles from some streets (in conjunction with green corridors) to maximise the benefit of bus lane infrastructure along other sections of the corridor.
Indicative Cost Range:	<ul style="list-style-type: none"> - The estimated cost for replacing the existing bus lanes on the A944 with resurfaced lanes including coloured limestone chips with OB = £5.9M - This provides a bus lane the full length of the A944 from Westhill to and including Union Street - Medium Cost
Indicative Timescale:	It is expected that the delivery of this option can be achieved in a medium-term timescale. There would be time for planning, engineering works and potential TROs for altering the road system.

PTO4: Continuous Bus Lane from Westhill to Aberdeen City Centre via A9119.

Table 4-16: PTO4 Definition

Option Narrative:	This option would introduce a continuous bus lane from Westhill to Aberdeen city centre via the A9119. The lanes would be operational for a minimum of between 7am and 7pm, if not 24 hours. To facilitate the introduction of the end-to-end bus lane, on-street parking would need to be removed along various sections of the corridor, especially Queen's Road. Additionally, those bus stops that are currently designed as laybys can be built out providing additional footway width. The lanes can be indicated by brightly coloured asphalt and allow cyclists to use them for their length. A lane would be provided on both sides of the carriageway as the evidence of bus transit times highlighted issues with journey time reliability in both directions.
High-Level Feasibility:	As with PTO3, there would some feasibility issues with introducing bus lanes on both sides of the carriageway along certain sections of the corridor (section 3.7), in particular Skene Road to King's Cross Roundabout. There would also be a requirement for the carriageway to potentially be realigned and a requirement to narrow the current lanes to accommodate bus lanes in both directions. Again, this constraint is likely to require the sharing of the bus lane between buses and cyclists. There would also be a requirement to realign some of the current junctions. On-street parking would need to be removed along the entire length of Queen's Road.
Indicative Cost Range:	<ul style="list-style-type: none"> - The estimated cost for replacing the existing bus lanes on the A9119 with resurfaced lanes including coloured limestone chips with OB = £5.4M - This provides a bus lane the full length of the A9119 from Westhill to and including Union Street - Medium Cost
Indicative Timescale:	It is expected that the delivery of this option can be achieved in a medium-term timescale. There would be time for planning, engineering works and potential TROs for altering the road system.

PTO5: Changes to bus lane operational hours and enforcement.

Table 4-17: PTO5 Definition

Option Narrative:	<p>There are a number of pre-existing bus lanes along the A944 corridor which are currently operating during restricted hours 7.30-9.30am and 4-6pm. These bus lanes are also impacted upon by parked vehicles and delivery/service vehicles loading and unloading.</p> <p>This option would, therefore, seek to increase the operational hours to 24-hour operation, ensuring bus priority throughout the day. The option would also require the introduction of a TRO to prevent parking within the bus lane and either a relaxation for loading/unloading between set hours or require a look at finding an alternative servicing arrangement for commercial units along the corridor.</p>
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Figure 4-13: Bus Lane Operation Hours

High-Level Feasibility:	No specific feasibility issues with this option. TRO required.
Indicative Cost Range:	- Low Cost
Indicative Timescale:	It is expected that the delivery of this option can be achieved in a short-term timescale.

PTO6: Bus Stop upgrade programme and stop rationalisation.

Table 4-18: PTO6 Definition

Evidence from the site audit and other reports / surveys indicated that many bus stops, and shelters where present, are in need of repair or lacking many features. Additionally, there were a few locations where there seemed to be a series of bus stops within close proximity to each other and a few located in areas which hampered bus movement and interaction with mainline traffic flow. Historic bus shelter provision appears to be in favour of those travelling towards Aberdeen. However, in recent years with development in PrimeFour and Westhill, there should be a rebalance in the provision to provide facilities for both directions of travel.

This option would therefore seek to determine and agree an expected level of service at bus stops in terms of infrastructure provision; shelters, seats, timetables, RTPI etc and then subsequently upgrade bus stops where appropriate to this agreed level of service. As part of this, programme analysis would be undertaken to calculate the distance and catchment of bus stops and seek to rationalise the number of stops, which should then assist with bus journey times, both length and reliability. This should also assist in determining the correct placement of bus stops to facilitate the efficient transit of bus services.

Option Narrative:



Figure 4-14: RTPI

High-Level Feasibility:	Overall, this option is feasible. There may be some issues at certain locations where footway widths are too narrow and may need surface works to widen the space to enable a shelter to be provided. Additionally, there may be feasibility issues with regards to land ownership, utilities to connect the shelters to provide internal lighting or RTPI.
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Indicative Cost Range:	<ul style="list-style-type: none"> - Assuming a programme of upgrading 50% of the shelters (connected to mains) on the corridors and bus routes within Kingswells and Westhill, estimated cost with OB = £750,000 - Assuming provision of RTPI at 20% of bus shelters along the route, estimated costs with OB = £360,000 - Total Cost estimate = £1.5-£1.6m - It should also be noted that many of the shelter providers often offer reduced rates in return for the advertising space on shelters, therefore, there is the possibility for these costs to be reduced. - Low Cost
Indicative Timescale:	It is expected that the delivery of this option can be achieved in a short-term timescale.

PTO7: Bus Prioritisation / Pre-Signals at all signalised junctions on the corridors.

Table 4-19: PTO7 Definition

Option Narrative:	As discussed across other options, bus pre-signals at all signalised junctions along the corridor will be considered as part of this option. These pre-signals will enable bus services to be prioritised and assist in achieving bus journey time reliability. Where possible, this will look to make best use of existing bus lane infrastructure to provide bus gates through busy intersections.
High-Level Feasibility:	There is likely to be significant feasibility issues at certain junctions to provide bus priority if these were to include bus bypass lanes to get to the front of traffic or to get ahead of queues. There would be a requirement to widen the junction heads at several of the junctions along the corridor. Additional works may be necessary to provide stacking capacity for private vehicles due to reallocate space for buses.
Indicative Cost Range:	<ul style="list-style-type: none"> - At this moment, it is uncertain how many signals currently have the capability of running bus priority and how many would need to be upgraded. - Estimated cost to upgrade each set of signals is £25,000-£30,000 - There would also be a requirement to update transponders on each bus vehicle that would use this system. Estimated costs for this are £70 per vehicle - These costs do not include any infrastructure related works at the signals at this time. - Low Cost
Indicative Timescale:	It is expected that the delivery of this option can be achieved in a short-term timescale.

PTO8: Reallocate all lay-by bus stops to on-street bus stops.

Table 4-20: PTO8 Definition

Option Narrative:	<p>It was noted that a contributing factor in the unreliability of bus journey times along the corridor is, due to buses finding it difficult to re-enter the mainline traffic flow on exit of bus laybys. This hampers the ability for the services to travel efficiently along the corridor.</p> <p>This option would seek to fill-in bus stop laybys and convert this style of bus stop into on-street kerbside stops as is already evident in some of the urban roads and quieter streets. The benefits of on-street bus stops are that they not only allow buses to maintain their positions in traffic, but also act as a natural speed reduction technique requiring cars to slow and queue behind buses while passengers board and alight. This type of bus stop delivery would also enable the retrofitting of cycle bypasses at a later date to facilitate the installation of a cycle lane.</p>
High-Level Feasibility:	There are no showstopper feasibility issues behind this option. Carriageway works would be required to ensure levelling of surface and adequate drainage. Option would offer widening of pavement space. Road Safety audit would be required to ensure on-street bus stop can be safely accommodated.
Indicative Cost Range:	<ul style="list-style-type: none"> - Estimated cost to infill and convert bus stop to on-street with OB = £225,000 - Fitting on new shelters to replace existing ones at these nine stops with OB = £130,000 - Total Cost = £355,000 - Low Cost
Indicative Timescale:	It is expected that the delivery of this option can be achieved in a short-term timescale.

PTO9a: Make Castle Street to Union terrace, bus, cycle and walk only.

Table 4-21: PTO9a Definition

Option Narrative:	This option would be designed to maximise the benefit of the City Centre Masterplan which has identified a removal of private cars from Union Street between Union Terrace/Bridge Street and Castle Street. This option would extend this current option within the Masterplan to include Castle Street to its junction with King Street. Commerce Street and Virginia Street already provide a routing alternative for private cars and by extending the current plan to include Castle Street will rebalance Aberdeen city centre in favour of sustainable transport modes and provide a clean and attractive destination for pedestrians and cyclists. As part of this option there would need to be an alternative solution found for the location of commercial and residential property bins which currently line Castle Street and alternative solutions found for servicing of commercial properties.
High-Level Feasibility:	There are no feasibility issues to prevent this option. There would be a requirement for TROs to ban private vehicles from accessing Castle Street and likely an agreement on loading / unloading times for delivery and service vehicles to access commercial and residential properties along this section of road. Ideally these times would be outwith the peak travel windows.
Indicative Cost Range:	- Low Cost
Indicative Timescale:	It is expected that the delivery of this option can be achieved in a medium-term timescale. This option would require a period of consultation with local businesses and creation of TROs.

PTO9b: Make Castle Street to Holburn Street Junction, bus, cycle and walk only.

Table 4-22: PTO9b Definition

Option Narrative:	This option further extends upon the above option and looks to extend the removal of private cars from the entirety of Union Street from the junction of Castle Street and King Street to the junction of Albyn Place and Holburn Street. Again, this would rebalance the city centre in favour of sustainable transport modes and provide an attractive destination in the heart of the city.
High-Level Feasibility:	Again, there are no feasibility issues with this option as private cars can be catered for on other roads, and ultimately the aim is to reduce travel by private car. This option could also allow for the removal of traffic signals along Union Street allowing for more efficient travel along Union Street for buses and cyclists and easier crossings for pedestrians.
Indicative Cost Range:	- Low Cost
Indicative Timescale:	It is expected that the delivery of this option can be achieved in a medium-term timescale. This option would require a period of consultation with local businesses and creation of TROs.

PTO10: Rebrand of Kingswells Park and Ride.

Table 4-23: PTO10 Definition

Option Narrative:	Evidence has demonstrated that Kingswells Park and Ride is currently underutilised. As such this option would include rebranding the site to a Park and Choose, recognising the ability to use the site to park and cycle and for car sharing in addition to using bus services. Additionally, as part of this rebranding, there would be an upgrade to existing facilities to include more cycle lockers or local authority operated cycle sheds and changing/showering facilities to take advantage of the recent uptake in cycling. There is also potential to adapt the park and ride site into a local interchange facility. Further marketing of the site could be expanded to increase awareness including potential marketing billboards along the AWPR to highlight the site.
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Figure 4-15: Local Authority operated Cycle Shed

High-Level Feasibility:	There are no immediate feasibility issues with this option. Construction of cycle shed and changing facilities block would require utilities work and planning approval.
Indicative Cost Range:	- Low Cost
Indicative Timescale:	It is expected that the delivery of this option can be achieved in a short-term timescale.

PTO11: Advanced VMS on AWPR.

Table 4-24: PTO11 Definition

Option Narrative:

A further option to potentially increase the use of Kingswells Park and Ride site would be to install Advanced Variable Message Signs on the AWPR to alert drivers to the site. The signs could be used to display messages including the number of spaces still available and estimated travel times by bus to the city centre. This is pertinent information which could alert drivers to the potential benefits of using the site instead of continuing the journey solely by car.



Figure 4-16: Cantilever VMS sign

High-Level Feasibility:	There are no specific feasibility issues with delivering this option. Appropriate locations would need to be identified on both north and southbound carriageways. The signs would require access to utilities to power the units. New models are controlled by apps on mobile phones, tablets and laptops and can be updated regularly. It would also be necessary to install counters at the P&R site to get live parking information and also a direct link to bus operators to be provided with current running times of services and any other important information such as service amendments etc. As the AWPR is a trunk road the final opinion on deliverability and feasibility would lie with Transport Scotland.
Indicative Cost Range:	- Low Cost
Indicative Timescale:	It is expected that the delivery of this option can be achieved in a short-term timescale.

PTO12: Establish a Bus Service Improvement Programme (BSIP)

Table 4-25: PTO12 Definition

Option Narrative:	<p>The Transport (Scotland) Bill 2019 set out the abolition of statutory bus quality partnerships and replaced them with BSIPs. A BSIP involves two key elements, a plan and a scheme.</p> <p>A BSIP plan should set out; the area and timeframe to which it relates, analysis and policies related to local services, the service quality and effectiveness objectives to be met, detail on how the scheme will assist in meeting these objectives, set out how views from consultation will be gathered and finally how the plan will be monitored.</p> <p>The BSIP scheme should then set out the service standards applicable to local bus services, the facilities to be provided or measures taken to support and details on how and when the scheme will be reviewed, varied or revoked.</p> <p>A BSIP scheme can only be made if the local transport authority are satisfied it will help implement the BSIP plan or its more general policies, and will improve the quality of local bus services or reduce or limit traffic congestion, noise or air pollution.</p> <p>As an option within this study, a BSIP could be introduced with the plan to improve the journey time reliability of services along the corridor and associated improvements in quality of those services. The BSIP could assist in overcoming the problems identified during the Case for Change with regards to journey times and perception of poor quality of service. An agreement would need to be reached between the local authorities and the operators in terms of what each needs to deliver. It would also help in terms of performance against emission targets by establishing types of vehicles able to operate along routes and the promotion of green vehicles.</p> <p>There is an inability for the Council to use the new powers within the Transport (Scotland) Act 2019 to introduce local authority operated services along this corridor as it is currently a commercially operated route.</p>
High-Level Feasibility:	<p>In terms of implementing BSIPs, there are two hurdles to be overcome, however: the need for the authority to provide investment as its part of the agreement and the effective veto held by operators if sufficient for them to object to the proposals. Nevertheless, if funding can be identified, BSIPs look to be an effective way in which authorities can advance their public transport policies and agenda.</p> <p>The bus operators in the region are key contributors to this project through their involvement in the North East Bus Alliance, therefore, it is likely that they would work with the local authorities to discuss, plan and implement a BSIP. The requirements of the BSIP may then bring further feasibility issues in terms of infrastructure required, investment in green vehicles etc.</p>
Indicative Cost Range:	<ul style="list-style-type: none"> - There is likely to be a low cost to creating a BSIP, however, there will be costs associated with delivering the BSIP, which is likely to consist of other options within this study - Low Cost
Indicative Timescale:	<p>It is expected that the delivery of this option can be achieved in a short-term timescale.</p>

PTO13: Develop Sustainable Transport Hubs

Table 4-26: PTO13 Definition

Option Narrative:	<p>The city of Aberdeen has a railway station, bus station and ferry terminal all within 700 metres of each other. They are all centred around the Union Square shopping centre and their proximity makes it possible to switch between rail, bus and ferry with relative ease. The objective of a sustainable transport hub is to enable the smooth transition between sustainable transport modes effectively and efficiently. This should include providing the facilities to enable the transition between cycling and public transport modes and where possible linked to local multi-modal interchanges.</p> <p>An audit report of this sustainable transport hub in Aberdeen identified that there were certain issues such as cycle parking not located in desired locations, poorly signed and poorly maintained. The report also identified inadequate provision of secure parking including cycle lockers.</p> <p>This option would seek to improve the provision of cycling infrastructure in this main sustainable transport hub to enable efficient integration between public transport modes, in addition to providing further sustainable transport hubs / local multi-modal interchanges at key locations along the corridor such as at Kingswells Park and Ride site and at future development sites such as at Maidencraig. The option would include provision of key bus interchange facilities in addition to secure cycle parking facilities such as lockers and bike sheds to enable the easy transition between modes. Cycle hire schemes could also be located at these locations reducing forced bike ownership and making bikes available to all.</p>
	
	<p>Figure 4-17: Cycle Hire at Bus Interchange</p>

High-Level Feasibility:	For the city centre hub, there would be a requirement to install better and more secure parking facilities, such as local authority bike sheds, as is the practice in other cities within the UK. These sheds allow for secure parking, changing facilities and are charged. Price mechanisms are set based on the amount of use of the shed and thus allow the purchase of discounted monthly and annual passes. Work would need to be undertaken to assess the most efficient location for these bike sheds to make the transition between modes as efficient as possible. At Kingswells Park and Ride, this would be a similar delivery plan as option PTO10 above, allowing for easy transition between bus, bike and car. A further location on the corridor where a hub could be possible is at Maidencraig or Countesswells developments. It is essential that these new communities are provided with adequate bus services and sustainable transport links. Therefore, a centralised hub in either one of these locations, could provide a good interchange point to allow residents to cycle to a central bus hub in the development and leave their bike for onward travel and vice versa.
Indicative Cost Range:	- This option would be relatively low cost to deliver for the city centre and Kingswells locations. Developer contributions could pay towards hubs at Maidencraig and/or Countesswells. - Low Cost
Indicative Timescale:	It is expected that the delivery of this option can be achieved in a short-term timescale for the city centre and Kingswells locations and towards a medium-term timescale for the development sites as they come online.

PTO14: North West Street to Castle Street Right Turn – Bus Only

Table 4-27: PTO14 Definition

Option Narrative:	A number of comments were identified during the Case for Change that pointed out this specific movement as causing significant issues to the operation of the network. As such, this option would look to relieve these issues by banning the right turn into Castle Street for all vehicles with exception of buses. This option would further benefit plans within the City Masterplan for removing private vehicles from Union Street between Castle Street and Union Terrace / Bridge Street.
High-Level Feasibility:	There are no feasibility issues with this option. A TRO would be required to ban vehicles from using that link other than buses and cyclists (bus gate).
Indicative Cost Range:	- Low Cost
Indicative Timescale:	It is expected that the delivery of this option can be achieved in a short-term timescale, although the consultation period could push this into a medium-term timescale .

4.4 General Transport Options

4.4.1 From the submission of the **Initial Appraisal: Case for Change**, the options have been considered further and where applicable have been separated to create further sub-options. This is commensurate with STAG guidance at this stage:

GTO1: Reclaiming Streets Programme

Table 4-28: GTO1 Definition

Option Narrative:	A reclaiming the streets programme is an option that has grown on trend in recent years where cities across the world have rebalanced their city streets in favour of sustainable transport modes, in particular walking and cycling. Different models of this programme have been implemented across the world from removing on-street parking spaces, to out and out banning of private vehicles in city centres. Both Madrid and Oslo for instance have banned vehicles from a vast majority of their city streets including replacing on-street parking spaces with cycle lanes and widened pavements. Other cities take actions such as banning vehicles on certain days of the week and altering the function of the streets to provide civic spaces for markets, street events and cycling events. This option would be shaped and influenced by best practice and experience from other cities throughout Europe, in particular the Scandinavian cities of Oslo and Helsinki. As such, this option would assist in the facilitation of the City Masterplan in removing private vehicles from Union Street. It would also include removal of on-street parking along Albyn Place and Queen's Road and reallocating this space to sustainable transport modes. The option would also include the ability of holding public space events throughout the year in areas throughout the city centre opening up the space and rebalancing the environment. Schemes such as these across various cities have supported economic benefits for the local economy with increased footfall and a return to the high streets for many businesses.
High-Level Feasibility:	There are no specific showstoppers for this option. TROs will be required to ban on-street parking, and alternative solutions to the locating of some residential and commercial bins would need assessed. Overall, the option should assist the city in reducing harmful emissions from private cars in the city centre, whilst rebalancing the city centre environment in favour of sustainable modes aligning with national policy and carbon neutral targets.
Indicative Cost Range:	- Low Cost
Indicative Timescale:	It is expected that the delivery of this option can be achieved in a short-term timescale, although the consultation period could push this into a medium-term timescale .

GTO2: Improve Wayfinding and Signage

Table 4-29: GTO2: Definition

Option Narrative:	A common concern raised throughout public engagement in various studies is a lack of appropriate signing and the ability to navigate the current network for cyclists and pedestrians. This option would involve a corridor wide review of current signage and removal of conflicting and inappropriate signs. Additionally, a new signing strategy can be created, with colour coded signs indicating specific areas of the city centre and appropriate safe routes to Kingswells and Westhill. This option would help increase the coherence of the network and potentially reduce accident rates on certain routes by diverting active travel modes onto quieter and more appropriate routes through the city centre. Signing at Switchback Roundabout would provide early wayfinding information for pedestrians and cyclists as this is the first route choice decision along the corridor.
High-Level Feasibility:	There are no significant feasibility issues with implementing this option. An initial review of signage and origin/destination-based analysis would be required to assess where people are travelling from and to. This will allow for the appropriate allocation of routes to be used and signed appropriately. This option would work alongside the establishing of a city centre cycle network to maximise the benefits of both options. Other signs would be removed to reduce the levels of confusion when travelling around the network. A new signing strategy could be created with areas of the city centre colour coded on maps and signs appropriately coloured to match to make it easier to travel to specific sections of the city to reach key destinations.
Indicative Cost Range:	- Low Cost
Indicative Timescale:	It is expected that the delivery of this option can be achieved in a short-term timescale.

4.5 Option Cost and Timescale Summary

4.5.1 The table below provides a key summarising the cost and timescale indications from the previous section.

Table 4-30: Summary of Option Cost Range and Timescale

Options	Cost	Timescale
ACTO1: Programme of pavement maintenance and decluttering.	LOW	SHORT
ACTO2: Review of pedestrian desire lines and installation of pedestrian friendly crossing facilities to suit.	LOW	SHORT
ACTO3: Development of Green Corridors within the city centre and between development sites on the corridors	LOW	SHORT
ACTO4: Identify and formalise a city centre cycle network	LOW	SHORT
ACTO5a: Provision of a segregated 2-way cycle lane from PrimeFour to Aberdeen City Centre along the A944 connecting into AECOM study options	HIGH	LONG
ACTO5b: Provision of a segregated 2-way cycle lane from PrimeFour to ARI along the A944 connecting into AECOM study options	MEDIUM	LONG
ACTO6: Provision of a segregated 2-way cycle lane from Union Street / Holburn junction to PrimeFour via A9119	HIGH	LONG
ACTO7a: Replace and extend all existing advisory cycle routes to provide a connected network.	LOW	SHORT
ACTO7b: Replace and extend all existing advisory cycle routes with mandatory lanes to provide a connected network	LOW	SHORT
ACTO7c: Replace and extend all existing advisory cycle routes with mandatory lanes and light segregation to provide a connected network	LOW	SHORT
ACTO8: Create cycle route on Old Lang Stracht.	LOW	SHORT
ACTO9: Provide advance stop lines or cycle by-passes at all signalised junctions.	LOW	MEDIUM
PTO1: Reconfigure roundabout junctions to signalised junctions, complete with bus and cycle pre-signals	MEDIUM	MEDIUM
PTO2: Bus Rapid Transit on the A944 Westhill – Aberdeen City Centre, via Kingswells Park and Ride.	HIGH	LONG
PTO3: Continuous Bus Lane from Westhill to Aberdeen via A944.	MEDIUM	MEDIUM
PTO4: Continuous Bus Lane from Westhill to Aberdeen City Centre via A9119.	MEDIUM	MEDIUM
PTO5: Changes to bus lane operational hours and enforcement.	LOW	SHORT
PTO6: Bus Stop upgrade programme and stop rationalisation.	LOW	SHORT
PTO7: Bus Prioritisation / Pre-Signals at all signalised junctions on the corridors.	LOW	SHORT
PTO8: Reallocate all lay-by bus stops to on-street bus stops.	LOW	SHORT
PTO9a: Make Castle Street to Union terrace, bus, cycle and walk only.	LOW	MEDIUM

PTO9b: Make Castle Street to Holburn Street Junction, bus, cycle and walk only.	LOW	MEDIUM
PTO10: Rebrand of Kingswells Park and Ride.	LOW	SHORT
PTO11: Advanced VMS on AWPR.	LOW	SHORT
PTO12: Establish a Bus Service Improvement Programme (BSIP).	LOW	SHORT
PTO13: Develop Sustainable Transport Hubs.	LOW	SHORT
PTO14: North West Street to Castle Street Right Turn – Bus Only	LOW	SHORT
GT01: Reclaiming Streets Programme.	LOW	SHORT
GT02: Improve Wayfinding and Signage	LOW	SHORT

4.6 Packaging of Options

- 4.6.1 Having refined the narrative around the options that have progressed from the **Initial Appraisal: Case for Change**, it is apparent that each can deliver a positive impact against the previously defined study TPOs. Although all the options can improve travel by sustainable modes, it is unlikely that they will be able to deliver a **significant step change** if delivered in isolation, which is a key requirement of this study's purpose.
- 4.6.2 There is evidence to support the likelihood that these options will deliver benefits aligned to increased levels of physical activity and thus improved health outcomes, increased local and wider connectivity, reductions in carbon and wider environmental benefits. These are all benefits that support society and reduce social inequalities and are fully supported by the directive of the **National Transport Strategy 2** and subsequently the **RTS 2040** via the **sustainable transport hierarchy** and **sustainable transport investment hierarchy**.
- 4.6.3 In completing the narrative behind the options, it became obvious that many of the options provide synergies, and on occasion overlap with other individual options, and indeed some options would only witness sufficient benefits through subsequent delivery of other complementary options. Thus, many are intertwined, or all encompassed within a more detailed option. As such, during this option development phase, it was decided that in order to best deliver this required step change in sustainable transport mode share, it would be beneficial to consolidate options into deliverable packages based on similar levels of required infrastructure works and level of investment, thus removing standalone options that deliver little through tweaking around the edges of the network, while identifying those that will deliver and facilitate wider societal benefits - reflective of the ambition behind this study and NTS2.
- 4.6.4 Examination of the options has highlighted that many naturally sit within distinct hierarchical levels when considered in conjunction with best practice design guidance, for example, advisory cycle lanes (minimum) to segregated cycle lanes (best practice). This has subsequently influenced and shaped these packages to represent the natural hierarchy, deliverability and scalability of the options following a logic map-based approach and expected level of impact of each against the study TPOs and STAG criteria. Additionally, this approach helps establish the potential prioritisation of the options, and subsequent development of business cases.
- 4.6.5 To this end, the emphasis of the appraisal will adjust to focus on the performance of these packages as opposed to addressing each individual option. The packages that have been developed consist of four hierarchical levels, each a reflection on the level of ambition that can be achieved through related investment and infrastructure works:

- **Low Delivery Package** – which requires the minimum level of works and investment and represents the minimum acceptable level of option delivery
- **Medium Delivery Package** – which requires a higher level of works and investment and will provide more options beyond the minimum in line with existing levels of work
- **High Delivery Package** – this involves a high level of infrastructure works alongside a significant investment in this infrastructure and other policy / regulatory changes to facilitate the delivery of these options
- **Gold Delivery Package** – this package represents the highest level of infrastructure works in line with best practice guidance and will require substantial financial investment to support the delivery of this package of options.

4.7 The Packages

- 4.7.1 The following section outlines the options which have been included within each of the defined packages described above. These form the constituent elements of each of these packages as each is appraised further. As described above, many of the options have synergies, overlap or are hierarchical versions of an option. As such, as the packages are developed from the minimum package to the gold package, not all options will be considered within each package as some replace others and others are already accounted for within another option, so these packages are **additive not cumulative**, as you progress through the hierarchy.
- 4.7.2 Additionally, at this stage it is worth taking cognisance of the fact that some options may not be feasible along the full length of the corridor or indeed in addition to a further option within the same package due to some of the physical carriageway constraints described previously. As such, variations of options may need to be considered in terms of deliverability, i.e. some sections may have the ability to deliver options of the Gold package, whereas in areas of constraint, it may be necessary to reduce the ambition to an option from the medium or high delivery packages. The induced risk from this approach is that levels of safety and coherence for users between standards may reduce the attractiveness of the options. Furthermore, it is also worth noting that circumstances may also arise where trade-offs will exist between modes (bus or cycle in particular) where carriageway constraints limit the ability to deliver options for each on certain sections. In which case, as the appraisal proceeds, it may become evident that one corridor is preferred for greater focus on one mode over the other and vice versa on the other corridor. These issues will be considered at a high-level within this appraisal, with further detailed analysis undertaken through business case development to determine the most appropriate design solution.

4.8 Low Delivery Package

4.8.1 The low delivery package consists of the following options:

- **ACTO2:** Review of pedestrian desire lines and installation of pedestrian friendly crossing facilities to suit
- **ACTO3:** Development of Green Corridors within the city centre and between development sites on the corridors
- **ACTO4:** Identify and formalise a city centre cycle network
- **ACTO7a:** Replace and extend all existing advisory cycle routes to provide a connected network
- **ACTO8:** Create cycle route on Old Lang Stracht.
- **PTO5:** Changes to bus lane operational hours and enforcement
- **PTO10:** Rebrand of Kingswells Park and Ride
- **PTO11:** Advanced VMS on AWPR
- **PTO14:** North West Street to Castle Street Right Turn – Bus Only
- **GTO2:** Improve Wayfinding and Signage

4.9 Medium Delivery Packages

4.9.1 The medium delivery package consists of the following options:

- **ACTO1:** Programme of pavement maintenance and decluttering
- **ACTO2:** Review of pedestrian desire lines and installation of pedestrian friendly crossing facilities to suit
- **ACTO3:** Development of Green Corridors within the city centre and between development sites on the corridors
- **ACTO4:** Identify and formalise a city centre cycle network
- **ACTO7b/c:** Replace and extend all existing advisory cycle routes with mandatory cycle lanes to provide a connected network, with the option of including light segregation
- **ACTO8:** Create cycle route on Old Lang Stracht
- **ACTO9:** Provide advance stop lines or cycle by-passes at all signalised junctions
- **PTO5:** Changes to bus lane operational hours and enforcement
- **PTO6:** Bus Stop upgrade programme and stop rationalisation
- **PTO7:** Bus Prioritisation / Pre-Signals at all signalised junctions on the corridors
- **PTO8:** Reallocate all lay-by bus stops to on-street bus stops.
- **PTO9a:** Make Castle Street to Union terrace, bus, cycle and walk only
- **PTO10:** Rebrand of Kingswells Park and Ride
- **PTO11:** Advanced VMS on AWPR
- **PTO12:** Establish a Bus Service Improvement Programme (BSIP)
- **PTO13:** Develop Sustainable Transport Hubs
- **GTO2:** Improve Wayfinding and Signage

4.10 High Delivery Package

4.10.1 The high delivery package consists of the following options:

- **ACTO1:** Programme of pavement maintenance and decluttering

- **ACTO2:** Review of pedestrian desire lines and installation of pedestrian friendly crossing facilities to suit
- **ACTO3:** Development of Green Corridors within the city centre and between development sites on the corridors
- **ACTO4:** Identify and formalise a city centre cycle network
- **ACTO5b:** Provision of a segregated 2-way cycle lane from PrimeFour to ARI along the A944 connecting into AECOM study options
- **ACTO8:** Create cycle route on Old Lang Stracht
- **ACTO9:** Provide advance stop lines or cycle by-passes at all signalised junctions
- **PTO3:** Continuous Bus Lane from Westhill to Aberdeen via A944
- **PTO4:** Continuous Bus Lane from Westhill to Aberdeen City Centre via A9119
- **PTO5:** Changes to bus lane operational hours and enforcement
- **PTO6:** Bus Stop upgrade programme and stop rationalisation
- **PTO7:** Bus Prioritisation / Pre-Signals at all signalised junctions on the corridors
- **PTO8:** Reallocate all lay-by bus stops to on-street bus stops.
- **PTO9b:** Make Castle Street to Holburn Street Junction, bus, cycle and walk only
- **PTO10:** Rebrand of Kingswells Park and Ride
- **PTO11:** Advanced VMS on AWPR
- **PTO12:** Establish a Bus Service Improvement Programme (BSIP)
- **PTO13:** Develop Sustainable Transport Hubs
- **GTO1:** Reclaiming Streets Programme
- **GTO2:** Improve Wayfinding and Signage

4.11 Gold Delivery Package

4.11.1 The gold delivery package consists of the following options:

- **ACTO1:** Programme of pavement maintenance and decluttering
- **ACTO2:** Review of pedestrian desire lines and installation of pedestrian friendly crossing facilities to suit
- **ACTO3:** Development of Green Corridors within the city centre and between development sites on the corridors
- **ACTO4:** Identify and formalise a city centre cycle network
- **ACTO5a:** Provision of a segregated 2-way cycle lane from PrimeFour to Aberdeen City Centre along the A944 connecting into AECOM study options
- **ACTO6:** Provision of a segregated 2-way cycle lane from Union Street / Holburn junction to PrimeFour via A9119
- **ACTO8:** Create cycle route on Old Lang Stracht
- **ACTO9:** Provide advance stop lines or cycle by-passes at all signalised junctions
- **PTO1:** Reconfigure roundabout junctions to signalised junctions, complete with bus and cycle pre-signals
- **PTO2:** Bus Rapid Transit on the A944 Westhill – Aberdeen City Centre, via Kingswells Park and Ride
- **PTO4:** Continuous Bus Lane from Westhill to Aberdeen City Centre via A9119
- **PTO5:** Changes to bus lane operational hours and enforcement
- **PTO6:** Bus Stop upgrade programme and stop rationalisation
- **PTO7:** Bus Prioritisation / Pre-Signals at all signalised junctions on the corridors
- **PTO8:** Reallocate all lay-by bus stops to on-street bus stops.
- **PTO9b:** Make Castle Street to Holburn Street Junction, bus, cycle and walk only
- **PTO10:** Rebrand of Kingswells Park and Ride

- **PTO11:** Advanced VMS on AWPR
- **PTO12:** Establish a Bus Service Improvement Programme (BSIP)
- **PTO13:** Develop Sustainable Transport Hubs
- **GTO1:** Reclaiming Streets Programme
- **GTO2:** Improve Wayfinding and Signage

4.12 Package Summary

4.12.1 These four packages will go forward and form the main part of the appraisal process. The impacts and benefits of delivering each and the inferred cost and works required, will be calculated cumulatively to provide an overall high-level package delivery feasibility. It should be recognised that the full delivery of each package may be feasible from an engineering perspective, but financial feasibility is bounded by budget constraints. As such, it is noted at this early stage, that it is likely that the final delivery packages highlighted within the Prioritisation and Delivery programme will be representative of a selection of options from the various packages to provide final deliverable interventions.

5 Transport Planning Objectives (TPOs)

5.1 Initial Appraisal: Case for Change TPOs

5.1.1 Eight Transport Planning Objectives (TPOs) for the study were developed during the earlier *Initial Appraisal: Case for Change* stage of this study:

- **TPO1:** Improve the quality of the pedestrian experience for all, and address the barriers which affect some groups moving around as a pedestrian
- **TPO2:** Improve cycle routes to ensure they are sufficiently direct and connected, while improving journey quality, times, and safety for cyclists in the corridor
- **TPO3:** Rebalance the city centre environment in favour of more sustainable modes
- **TPO4:** Reduce journey times by bus and improve service punctuality
- **TPO5:** Improve the quality of bus services and bus stop infrastructure in the corridor, enhancing the experience for current bus users and attracting new passengers
- **TPO6:** Address the cost of public transport and reduce gaps in bus connectivity along the corridor
- **TPO7:** Provide improved integration between sustainable travel modes
- **TPO8:** Increase the mode share for sustainable travel modes along the A944 and A9119 transport corridors

5.1.2 These TPOs were robustly and directly developed from the identified transport problems from the Case for Change. Although these TPOs were developed very recently, since then, the draft Aberdeen Regional Transport Strategy (RTS) 2040 has been released for general consultation. The RTS was previously studied and utilised in the shaping of this studies TPOs, however, in the recent publication, the original RTS objectives have been developed further.

5.2 Transport Planning Objectives – RTS2040

5.2.1 The emerging RTS2040 has been guided by the NTS2 vision and sets out six ‘principles’ under which sit a number of aspirational objectives. The RTS2040 principles and their sub-objectives have been developed to be SMART and offer a set of well-defined objectives.

Table 5-1: RTS 2040 Principles and Objectives

RTS 2040 Principles	RTS 2040 Objectives
Significantly reduced carbon emissions from transport to support net-zero nationally by 2045	Zero petrol or diesel cars in town and city centres 100% of buses across the region to be fuelled by Ultra Low Emission Vehicles Substantial public uptake of Ultra Low Emission Vehicles
No exceedances of World Health Organisation (WHO) safe levels of emissions from transport	Reduce nitrogen dioxide and particulates (PM10) emissions from transport below WHO safe levels
A 50:50 mode share split between car driver and sustainable modes	Increase the number and proportions travelling by bus, rail, cycling and walking Increased passenger kilometres travelled by rail to, from and within the region
Improved journey efficiencies	Reduce journey times by rail to the central belt by 20 minutes and Inverness by 15 minutes Improve journey efficiencies by road from Peterhead to the motorway network at Friarton Bridge Reduce delays on the region’s road network to less than 10% of driver journeys delayed due to congestion Improve bus punctuality to 95% of buses starting their route on time Improve average bus speeds
Zero fatalities on the road network	Reduce the number and severity of all casualties Reduce the proportion of vulnerable users involved in road traffic collisions
Accessibility for all	No areas at high risk of transport poverty across the region All railway stations to meet desired accessibility standards All buses, bus stops and interchanges to be fully accessible Accessibility to key destinations to include employment, health, education, and leisure

5.3 Study TPOs vs RTS2040 TPOs

5.3.1 The table below highlights the correlation between the TPOs set in this study and those from the emerging RTS 2040.

Table 5-2: TPOs vs RTS Objectives 2040

RTS 2040 Principles	TPO1	TPO2	TPO3	TPO4	TPO5	TPO6	TPO7	TPO8
Significantly reduced carbon emissions from transport to support net-zero nationally by 2045	✓	✓	✓		✓		✓	✓
No exceedances of World health Organisation (WHO) safe levels of emissions from transport					✓			
A 50:50 mode share split between car driver and sustainable modes	✓	✓	✓	✓	✓	✓	✓	✓
Improved journey efficiencies				✓	✓			
Zero fatalities on the road network	✓	✓	✓					
Accessibility for all					✓	✓	✓	✓

5.3.2 As is evident in the table above there is a strong correlation and synergy between the TPOs in this study and those developed through the RTS2040. We are confident, therefore, that there is no need to revisit or change the TPOs for this study and instead should progress to establishing how these objectives could become SMART.

5.4 SMART-ening of Study TPOs

5.4.1 In accordance with STAG guidance, study TPOs should become SMART as the study progresses so that they are:

- Specific:** It will say in precise terms what is sought
- Measurable:** There will exist means to establish to stakeholders' satisfaction whether or not the objective has been achieved
- Attainable:** There is general agreement that the objective set can be reached
- Relevant:** The objective is a sensible indicator or proxy for the change which is sought
- Timed:** The objective will be associated with an agreed point by which it will have been met

5.4.2 This study seeks to generate a significant step change in increasing the balance between sustainable transport modes and private car. Based on this premise and the objectives and principles established as part of the RTS2040, it is important that this level of ambition is reflected within this study's' TPOs.

5.4.3 Through consideration of the above elements, the table below establishes the position of the TPOs and the individual elements of the SMART process. With the RTS having a horizon year of 2040, it would be beneficial to set and raise the ambition of these objectives to be achieved in advance of this horizon period. Achieving these ambitious targets can be explored by incrementally adjusting the objectives within four evaluation periods of five years. Adopting this methodology, the TPOs can continually be revisited, evaluated and success monitored as options come online. For example, long-term targets for each of the TPOs can be proportioned into these four evaluation periods, thus by 2025 if these targets have been met, then more ambitious targets can be set for the next period of 2030 and so forth. If they have not been met, then any options delivered within this period would be evaluated to determine any limitations to achieving the target or other options can be brought forward in their planned delivery to assist. This will also provide sufficient time for options delivered during this time period to become fully operation and bedded into the network.

5.4.4 The figure below provides an example of what could be considered for TPO4 to improve bus punctuality. From the sample of bus data we analysed, 71% of services fall within the window of tolerance which is 24% below the 95% target. As such by 2025, the objective here could be to achieve 90% of services meeting the target, as it is unlikely options will have been integrated into the network by this period, but improvements may have been gained from some early delivery of other options within the selected package. By 2030, it is expected that this 95% target is met due to intervention delivery and thus evaluation periods 3 and 4 focus on maintaining this standard by monitoring the data closely. At any point during these five year intervals, targets have not been met, then evaluating the options will enable issues to be identified, improvements made, or decisions made to accelerate the delivery of a subsequent option to meet this target by the next evaluation period.

5.4.5 These evaluation periods can then assist in the monitoring of the RTS objectives, in this case the 50:50 mode share target, to see if gains have been achieved.

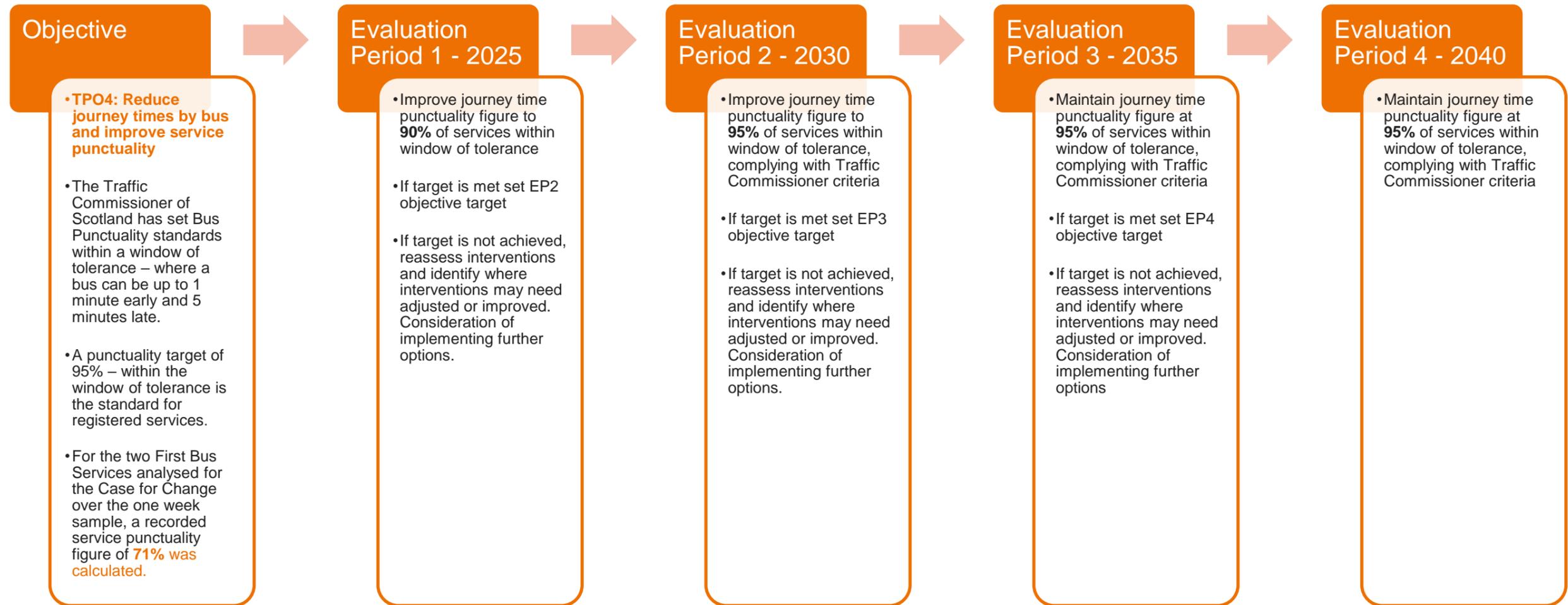


Figure 5-1: Example of utilising 4 Evaluation Periods for monitoring Objectives success

5.4.6 At this stage of the STAG process it is commensurate for the TPOs to be articulated in general terms indicating the desired direction of change, while during the Detailed Appraisal stage they should be finalised in more specific terms and where appropriate, include a target. In place of a Detailed Appraisal, these TPOs can become more specific as part of any business case development.

Table 5-3: SMART-ening of TPOs

TPO	Specific	Measurable	Attainable	Relevant	Timed
<p>TPO1: Improve the quality of the pedestrian experience for all, and address the barriers which affect some groups moving around as a pedestrian</p>	<p>Objective is specific in that it seeks to address mode specific issues.</p> <p>Objective could be smartened to make specific reference to geographical areas or streets.</p>	<p>Annual surveys can be undertaken to assess changing perceptions of various pedestrian groups. Aberdeen Citizens Panel often undertaken surveys containing a question similar in nature. The responses to this question could be used to measure success of this objective.</p> <p>Could establish targets to achieve greater than 85% satisfaction with pedestrian environment.</p>	<p>Objective and measure are attainable.</p> <p>Attainment of the TPO is within the remit of the sponsoring bodies.</p> <p>100% satisfaction is unrealistic target and as such 85% representation is attainable through option delivery.</p>	<p>Addresses transport problem and root cause. Developed direct from transport problem as part of the Appraisal Framework within the Case for Change - In some places facilities for pedestrians make getting around frustrating and inconvenient</p>	<p>85% satisfaction target to be achieved by RTS 2040 horizon. Progress to be monitored and evaluated every 5 years, providing four control periods.</p>
<p>TPO2: Improve cycle routes to ensure they are sufficiently direct and connected, while improving journey quality, times and safety for cyclists in the corridor</p>	<p>Objective is specific in that it seeks to address mode specific issues within the geographic area</p>	<p>Annual surveys can be undertaken to assess changing perceptions of various cycling groups. Aberdeen Citizens Panel often undertaken surveys containing a question similar in nature. The responses to this question could be used to measure success of this objective.</p> <p>Could establish targets to achieve greater than 85% satisfaction with cycling environment.</p> <p>Census data can identify mode share change to act as an indicator to the uptake in cycling for journeys.</p> <p>Cycling counts along the corridor can monitor changes in cycling numbers.</p> <p>STATS19 data can be monitored to discern the change in the number of collisions involving cyclists.</p>	<p>Objective and measure are attainable.</p> <p>Attainment of the TPO is within the remit of the sponsoring bodies.</p> <p>100% satisfaction is unrealistic target and as such 85% representation is attainable through option delivery.</p> <p>Monitoring of stats can assist in determining the success of the TPO thus has the elements required to be attainable.</p>	<p>Addresses transport problem and root cause. Developed direct from transport problem as part of the Appraisal Framework within the Case for Change - Journeys by bike on designated routes are fragmented and inconvenient</p> <p>In some places facilities for cyclists make getting around frustrating and inconvenient</p>	<p>85% satisfaction target to be achieved by RTS 2040 horizon. Progress to be monitored and evaluated every 5 years, providing four control periods.</p>
<p>TPO3: Rebalance the city centre environment in favour of more sustainable modes</p>	<p>Objective is specific in that it seeks to address mode specific issues within the geographic area</p>	<p>Pedestrian and cycling counters in conjunction with road traffic counters can be used to measure mode share within city centre area.</p> <p>Change in road lengths banned to private vehicles can be measured in addition to the recording of removing on-street parking spaces.</p> <p>Air Quality Monitor readings will provide a proxy measurement of the change in road-based traffic.</p> <p>Change in pedestrian wait times at controlled signalised crossings can indicate rebalance towards pedestrians over road-based traffic.</p>	<p>Objective and measure are attainable.</p> <p>Attainment of the TPO is within the remit of the sponsoring bodies.</p> <p>Monitoring of stats can assist in determining the success of the TPO thus has the elements required to be attainable.</p>	<p>Addresses transport problem and root cause. Developed direct from transport problem as part of the Appraisal Framework within the Case for Change - The city centre network prioritises vehicular traffic over all other modes</p> <p>Intimidation of non-motorised road users</p>	<p>To be achieved by RTS 2040 horizon. Progress to be monitored and evaluated every 5 years, providing four control periods.</p>
<p>TPO4: Reduce journey times by bus and improve service punctuality</p>	<p>Objective is specific in that it seeks to address mode specific issues</p> <p>Objective could be smartened to reference specific journeys, i.e. Between Westhill and Aberdeen City Centre</p>	<p>Bus GPS data provides a reliable and wealthy data source. Punctuality and reliability indicators can be generated and monitored.</p> <p>Objective could be measured by setting a target of 95% of bus journeys to arrive within 1 minute early of scheduled time and within 5 minutes late. Within the sample data for the Case for Change, approximately 10-15% of services arrived within 1 minute of their scheduled time.</p>	<p>Objective and measure are attainable.</p> <p>Attainment of the TPO is within the remit of the sponsoring bodies.</p> <p>Monitoring of stats can assist in determining the success of the TPO thus has the elements required to be attainable.</p>	<p>Addresses transport problem and root cause. Developed direct from transport problem as part of the Appraisal Framework within the Case for Change - Bus journey times can be long and unreliable</p>	<p>To be achieved by RTS 2040 horizon. Progress to be monitored and evaluated every 5 years, providing four control periods.</p>
<p>TPO5: Improve the quality of bus services and bus stop infrastructure in the corridor, enhancing the experience for current bus users and attracting new passengers</p>	<p>Objective is specific in that it seeks to address mode specific issues</p> <p>Objective could be smartened to reference specific sections of the network or particular clusters of bus stops</p>	<p>Annual surveys can be undertaken to assess changing perceptions of bus users. Aberdeen Citizens Panel often undertaken surveys containing a question similar in nature. The responses to this question could be used to measure success of this objective.</p>	<p>Objective and measure are attainable.</p> <p>Study sponsors would need to work with bus operators to assist in service-related improvements. Bus operators are key stakeholders on</p>	<p>Addresses transport problem and root cause. Developed direct from transport problem as part of the Appraisal Framework within the Case for Change - Bus Services in the corridors are perceived to be of poor quality</p>	<p>To be achieved by RTS 2040 horizon. Progress to be monitored and evaluated every 5 years, providing four control periods.</p>

TPO	Specific	Measurable	Attainable	Relevant	Timed
		<p>Could establish targets to achieve greater than 85% satisfaction with bus services.</p> <p>Patronage numbers can be monitored along the corridor to identify changes in demand in response to option delivery.</p> <p>Visible measure in the number of bus stops upgraded and maintained.</p>	<p>this project and likely to achieve buy-in.</p> <p>Monitoring of stats can assist in determining the success of the TPO thus has the elements required to be attainable.</p>	<p>Bus operations are hampered by the location of bus stops and facilities at some bus stops are poor</p>	
<p>TPO6: Address the cost of public transport and reduce gaps in bus connectivity along the corridor</p>	<p>Objective is specific in that it seeks to address mode specific issues</p> <p>Objective could be smartened to reference specific sections of the corridor where these gaps exist, such as low frequency in Westhill and Kingswells</p>	<p>Scottish Access to Bus Index (SABI) can be monitored annually to assess changes in the accessibility to bus services.</p> <p>TRACC accessibility software can be used to measure levels of connectivity during each new timetable release and identify any widening or narrowing of gaps. Can measure changes in connectivity by journey time at the postcode level to key destinations.</p> <p>Costs for public transport tickets can be monitored in line with rates of inflation and real cost of living to monitor potential transport poverty.</p> <p>Benchmarking of fares against other areas and against travel by car costs (city centre parking)</p>	<p>Objective and measure are attainable.</p> <p>Study sponsors would need to work with bus operators to assist in service-related improvements such as fares and integrated ticketing. Bus operators are key stakeholders on this project and likely to achieve buy-in.</p> <p>Monitoring of stats can assist in determining the success of the TPO thus has the elements required to be attainable.</p>	<p>Addresses transport problem and root cause. Developed direct from transport problem as part of the Appraisal Framework within the Case for Change - Public transport is viewed as too expensive by some</p> <p>The bus network in the corridors omits areas leading to connectivity gaps</p>	<p>To be achieved by RTS 2040 horizon. Progress to be monitored and evaluated every 5 years, providing four control periods.</p>
<p>TPO7: Provide improved integration between sustainable travel modes</p>	<p>Objective is specific in that it seeks to address mode specific issues</p> <p>Objective could be smartened to reference specific areas in which to improve current integration or future integration, such as new development sites, Kingswells P&R</p>	<p>Monitor timetable information between bus and rail to assess alignment and measure wait times.</p> <p>Surveys of cycle parking to assess occupancy rates at key transport interchange hubs (bus station, Kingswells, rail station).</p> <p>Car park occupancy counts at Kingswells Park and Ride.</p>	<p>Objective and measure are attainable.</p> <p>Study sponsors would need to work with bus operators to assist in service-related improvements. Bus operators are key stakeholders on this project and likely to achieve buy-in.</p> <p>Monitoring of stats can assist in determining the success of the TPO thus has the elements required to be attainable.</p>	<p>Addresses transport problem and root cause. Developed direct from transport problem as part of the Appraisal Framework within the Case for Change - Established park and ride assets are perceived too unattractive and inconvenient</p>	<p>To be achieved by RTS 2040 horizon. Progress to be monitored and evaluated every 5 years, providing four control periods.</p>
<p>TPO8: Increase the mode share for sustainable travel modes along the A944 and A9119 transport corridors</p>	<p>Objective is specific in that it seeks to address mode specific issues</p> <p>Objective could be smartened to reference specific areas in which to improve mode share as a priority, such as areas with a distance travel to work under 5km</p>	<p>Census data provides statistics on mode share which can be monitored over larger timeframes.</p> <p>Scottish Household Survey results can be monitored annually to assess changes in mode share.</p> <p>Patronage, cycle and car counts at points on the corridors can monitor changes in demand by mode.</p>	<p>Objective and measure are attainable.</p> <p>Attainment of the TPO is within the remit of the sponsoring bodies.</p> <p>Monitoring of stats can assist in determining the success of the TPO thus has the elements required to be attainable.</p>	<p>Addresses the overall ambition and desire for the study as can be considered an outcome of achieving the preceding TPOs</p>	<p>To be achieved by RTS 2040 horizon. Progress to be monitored and evaluated every 5 years, providing four control periods.</p>

5.5 Appraisal Packages against TPOs

5.5.1 At this stage, an initial appraisal of the identified packages has been undertaken against the TPOs. The 7-point STAG scoring criteria has been used to inform this initial assessment, as highlighted below.

- ✓✓✓ - Major beneficial impacts
- ✓✓ - Moderate beneficial impacts
- ✓ - Minor beneficial impacts
- – Neutral / No impact
- ✗ - Minor detrimental impacts
- ✗✗ - Moderate detrimental impacts
- ✗✗✗ - Major detrimental impacts

Table 5-4: Appraisal Packages vs TPOs

Package	TPO1: Improve the quality of the pedestrian experience for all, and address the barriers which affect some groups moving around as a pedestrian	TPO2: Improve cycle routes to ensure they are sufficiently direct and connected, while improving journey quality, times, and safety for cyclists in the corridor	TPO3: Rebalance the city centre environment in favour of more sustainable modes	TPO4: Reduce journey times by bus and improve service punctuality	TPO5: Improve the quality of bus services and bus stop infrastructure in the corridor, enhancing the experience for current bus users and attracting new passengers	TPO6: Address the cost of public transport and reduce gaps in bus connectivity along the corridor	TPO7: Provide improved integration between sustainable travel modes	TPO8: Increase the mode share for sustainable travel modes along the A944 and A9119 transport corridors
Low	✓	✓	✓	✓	○	○	✓	✓
Medium	✓✓	✓✓	✓✓	✓	✓	✓	✓	✓
High	✓✓✓	✓✓✓	✓✓✓	✓✓	✓✓	✓✓	✓✓	✓✓
Gold	✓✓✓	✓✓✓	✓✓	✓✓✓	✓✓✓	✓✓	✓✓✓	✓✓✓

5.5.2 As expected, the packages which contain the highest level of investment deliver the largest benefits. However, this must be set against their deliverability, cost realism and delivery timescales. For example, you will be able to deliver against the TPOs for the low delivery package long before achieving the benefits for the gold package.

5.5.3 Reflecting on this point, the appraisal packages do display a good level of performance against the TPOs and as such should proceed to be appraised against the STAG criteria.

6 Option Appraisal (Preliminary Appraisal)

6.1 Overview

6.1.1 This section of the report establishes the appraisal of each of the four identified delivery packages. This is achieved through a two-stage process:

A **Logic Map**, setting out:

- The underlying transport problems – derived from the Initial Appraisal: Case for Change
- The transport related outcomes of delivery package implementation
- The wider societal impacts of delivery package implementation
- TPOs, the package contributes towards
- Which of the RTS2040 targets the delivery package helps towards

Developing a proportionate **Appraisal Table** covering the appraisal criteria:

- STAG Criteria – Environment, Safety, Economy, Integration and Accessibility and Social Inclusion
- Established Policy Directives
- Feasibility and Cost to Government / Affordability (using three band ranges for cumulative costs; **Low <£10m**, **Medium £10m - £20m**, **High >£20m**)
- Public Acceptability

6.1.2 The information contained within the Appraisal Tables has been developed through consideration of the Logic Mapping exercise and through consideration of:

- Existing studies – drawing on appraisals undertaken to date
- Benchmarking & case studies
- Professional knowledge and experience

6.1.3 In addition, work has been undertaken to develop high-level costs and engineering feasibility around each delivery package. This information has been derived from the further development of the individual options within **Chapter three**, and at this stage, reflecting a 'Preliminary Appraisal' approach are high level, based on previous cost estimates or from experience of similar projects elsewhere. This information will then be utilised alongside the appraisal performance to structure the prioritisation and delivery plan.

6.1.4 The 7-point STAG scoring criteria has been used to inform this initial assessment, as highlighted below.

✓✓✓ - Major beneficial impacts

✓✓ - Moderate beneficial impacts

✓ - Minor beneficial impacts

○ – Neutral / No impact

× - Minor detrimental impacts

×× - Moderate detrimental impacts

××× - Major detrimental impacts

6.2 Low Delivery Package

6.2.1 The low delivery package represents those options which require the minimum amount of infrastructure works and financial investment required to implement the options constituent within. Options exist within this package to provide benefits (although marginal) for each sustainable transport mode. These options are also designed to have the lowest impact on other users of the corridor, negating negative impacts likely to cause any inappropriate routing. In terms of each mode, the options would provide:

Walking

6.2.2 Improvements to city centre crossing locations, including altering wait times to rebalance in favour of pedestrians where appropriate. There would also include the provision of additional crossing points on the A944 which are controlled to provide easier access across a busy dual carriageway to align with desire lines. The beginning of the implementation of green corridors would start with this package with streets interacting with Union Street becoming incorporated in the City Centre Masterplan providing safe and attractive connections between city centre locations that are car free. Wayfinding and signage would be implemented to provide routing along quieter trafficked routes, including the employment of a coloured coded signing strategy.

Cycling

6.2.3 As part of this package, an initial development of an agreed city centre cycle network would be created. This will highlight those routes which are formally recognised as cycling routes and establish the precedence for implementing cycling infrastructure. This network will also extend out to Westhill and incorporate appropriate linkages into Kingswells, Maidencraig and Countesswells. From this position, extension of advisory cycle lanes can be facilitated with preference for resurfacing these lanes to provide brightly coloured asphalt to draw attention and awareness to the presence of these lanes to drivers. Resurfacing has been selected over painting the lanes, as the resurface is more durable and resilient with a longer lifespan compared to screed which has a lifespan of around 5 years and when it starts to disintegrate can account for uncomfortable riding. A direct route would also be provided along Old Lang Stracht to provide a link between Kingswells and the A944 Lang Stracht without the need to reroute down and along the A944 dual carriageway and interaction with Switchback Roundabout.

Bus

6.2.4 This package includes two main focuses as part of its delivery (i) make better use of existing infrastructure; and (ii) to increase the utilisation of Kingswells Park and Ride. The minimum level of action for altering the bus network includes increasing the operational hours of the existing bus lanes to increase the potential of reducing congestion induced delays to bus journey times. The addition of banning the right-turn onto Castle Street is based on feedback from bus operators who indicated that this turn is one of the largest contributors to the delay of bus services.

6.2.5 The rebranding and further advertising of Kingswells Park and Ride is aimed at encouraging an uptake in utilisation. Increasing the information available including live parking capacity information and potential travel times by bus on VMS signs on the AWPR on approach to the A944 junction is designed to capture drivers' notice and encourage a change in behaviour at a key decision point in their journey. This will be aided by more reliable running services based on the improved enforcement and operational hours of the existing bus lane network. The second aim of the rebranding is to provide an increase in secure cycle parking and changing facilities to encourage an uptake in Park and Choose, where people can decide to take the bus or cycle from the site in place of undertaking the journey by car. Provision of cycle sheds or increased cycle locations allows users to store their bike at the site overnight instead of travelling with their bike every day on a bike rack on their car.

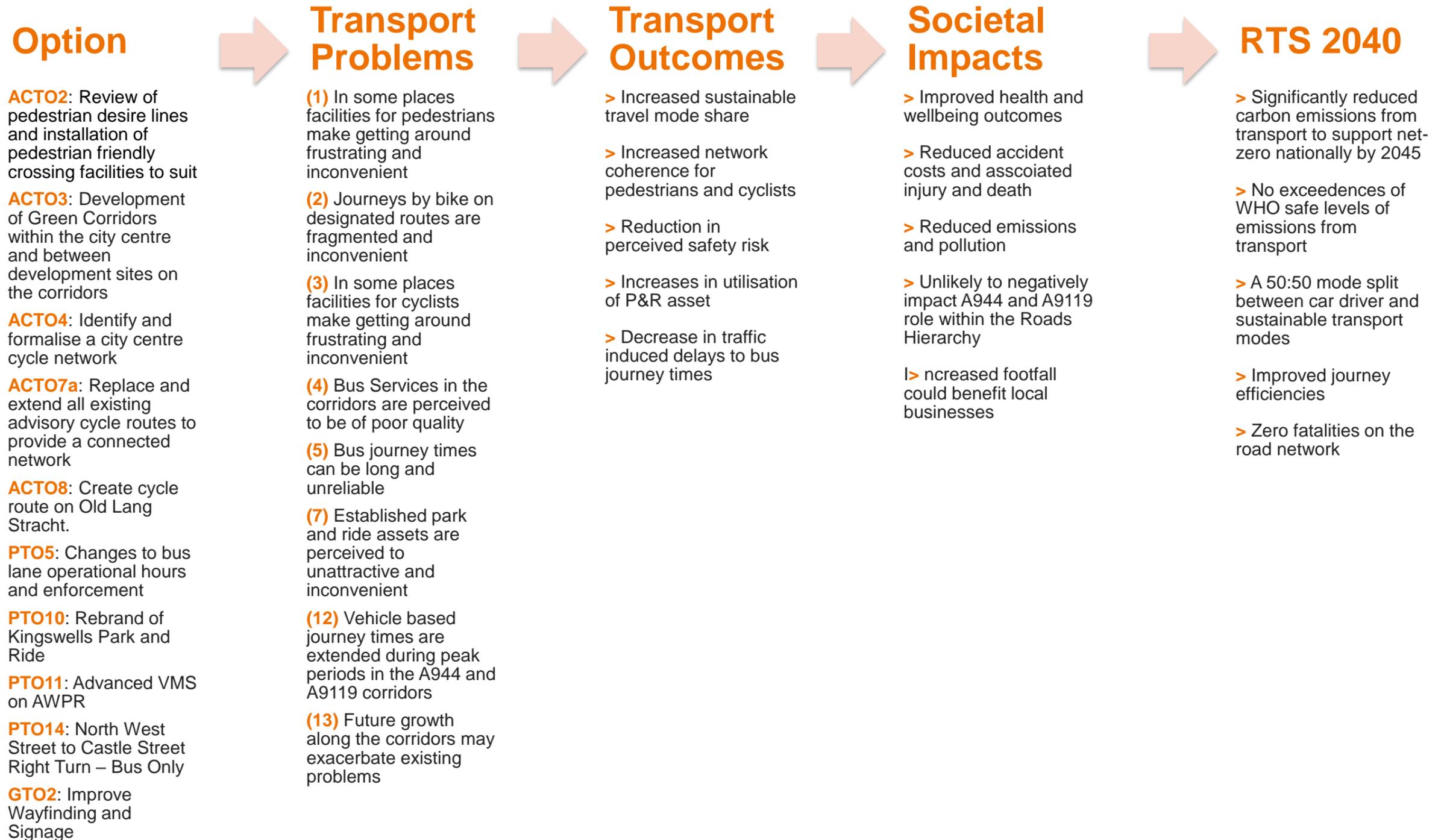


Figure 6-1: Low Delivery Package Logic Map

Table 6-1: Low Delivery Package Appraisal Table

Package: Low Delivery Package				
Package Description:	<ul style="list-style-type: none"> ■ ACTO2: Review of pedestrian desire lines and installation of pedestrian friendly crossing facilities to suit ■ ACTO3: Development of Green Corridors within the city centre and between development sites on the corridors ■ ACTO4: Identify and formalise a city centre cycle network ■ ACTO7a: Replace and extend all existing advisory cycle routes to provide a connected network ■ ACTO8: Create cycle route on Old Lang Stracht. ■ PTO5: Changes to bus lane operational hours and enforcement ■ PTO10: Rebrand of Kingswells Park and Ride ■ PTO11: Advanced VMS on AWPR ■ PTO14: North West Street to Castle Street Right Turn – Bus Only ■ GTO2: Improve Wayfinding and Signage 			
STAG Criteria	Key Appraisal Points	STAG Score	RTS Principles	RTS Score
Environment:	<ul style="list-style-type: none"> • Mode switch from car to active travel would reduce traffic related carbon emissions. This would support the Scottish Governments Climate Change Bill, RTS2040 Principles and Aberdeen’s ambition for being a Net-Zero city. • Mode switch from car to active travel would reduce traffic related levels of pollutants. This would have a greater impact in areas within the city centre where there are air quality issues and an existing Air Quality Management Area. • Mode switch from car to bus under this package is likely to result in a balancing out of emissions, or slight positive based on hybrid and green vehicle fleet already operating along the corridors. • Banning right turn onto Castle Street for cars would reduce traffic related carbon and pollutants on Union Street bringing health benefits to pedestrians and cyclists. • Active modes options can increase the number of shorter distance trips undertaken by these modes as opposed to travel by car or bus, reducing vehicle kms. • Resurfacing the carriageway to provide coloured asphalt for cycle lanes would cause noise and vibration during construction period. • Greater number of trips made by active travel modes would have a positive impact on users’ health and well-being. Such benefits include health benefits from increased physical activity and journey quality. 	✓	Reduce Carbon Emissions Safe levels of local pollutants 50:50 mode split	✓ ✓ ✓
Safety:	<ul style="list-style-type: none"> • Provision of crossing opportunities at desired points is likely to reduce pedestrians crossing outwith provided controlled crossing locations and reduce the chances of conflicts arising. • Mode switch to active travel and bus from car would provide minor reductions in car trips and associated road traffic collisions within the corridors. • Small all-round gains in perception of safety with increased provision of advisory lanes, with coloured surfaces bringing further awareness to drivers. • Safety and the perception of safety surrounding active travel schemes is likely to improve as a critical mass is established and such travel behaviour is ‘normalised’. • Old Lang Stracht option reduces the need for cyclists to interact with Switchback Roundabout. 	✓	Zero road fatalities	✓
Economy:	<ul style="list-style-type: none"> • Extended advisory lane provision and Old Lang Stracht route would generate journey time benefits for existing cyclists. • Increased physical activity with associated health improvements would lessen the economic burden on the NHS. • Greater number of trips made by active travel modes would have a positive impact on user’s health creating business savings from reduced absenteeism. 	✓	Improved journey efficiencies	✓

	<ul style="list-style-type: none"> Reduction in wider societal accident related costs from fewer accidents between active travel and car users. Increase in operational hours of bus lanes will limit the impact of 'outwith' peak time journey delays. Sections of the corridor where it may be necessary to reallocate road space to facilitate the addition of advisory cycle lanes could lead to longer journey times and hence economic disbenefits for motorists or bus users. 			
Integration:	<ul style="list-style-type: none"> Provides increased integration between walking, cycling and Public Transport use at the Park and Ride site at Kingwells (Multi-modal interchange) Improved integration between mixed land-uses through green corridors, supporting sustainable transport modes Provides improved integration with future development sites on the corridor by sustainable travel modes Supports the National Transport Strategy (NTS2) Sustainable Travel Hierarchy Any shift towards trips being made by sustainable modes will help work towards a 50:50 mode split target of the RTS2040 Sustainable travel options integrate well with the Scottish Government's Climate Change Bill and regional policy on providing for modal shift to greener more sustainable modes Aligns with the Roads Hierarchy Principles and supports the City Centre Masterplan 	✓		
Accessibility & Social Inclusion:	<ul style="list-style-type: none"> Community Accessibility: wayfinding and signage would create a more coherent and navigable network for pedestrians and cyclists. Green corridors between development sites would increase connectivity between these communities, especially for pedestrians and cyclists. Comparative Accessibility: Some potential benefits from extended advisory cycle lanes which may attract people to cycle who previously found barriers to do so. This package is less likely to have a material impact on inequalities associated with deprivation. 	○	Access for all	○
Implementability	Key Appraisal Points	STAG Score		
Feasibility:	<ul style="list-style-type: none"> Feasibility issues have been discussed more specifically for each option with Chapter 4. Except for resurfacing to integrate coloured asphalt as part of the advisory cycle lanes and resurfacing Old Lang Stracht, there are no other significant infrastructure works associated with this package. In summary there are no serious concerns regarding implementation of this low delivery package. TROs would be required for extending bus lane operating hours and banning the right turn onto Castle Street for general traffic. The consultation period could impact on the timescale to implement this package but overall it is expected that the majority of this package can be delivered in a short timeframe of 0-2 years, with the potential for one or two options extending into the medium-term delivery timeframe of between 2-5 years. 	✓✓✓		
Cost to Government / Affordability:	<ul style="list-style-type: none"> Initial high-level costings have been discussed in Chapter 3. These are highlighted below and are again indicative costings reflective of a Preliminary Appraisal approach: ACTO2: Review of pedestrian desire lines and installation of pedestrian friendly crossing facilities to suit (£0.2m) ACTO3: Development of Green Corridors within the city centre and between development sites on the corridors (£0.3m) ACTO4: Identify and formalise a city centre cycle network (£18,000 per 20mph zone) ACTO7a: Replace and extend all existing advisory cycle routes to provide a connected network (£3.9m) 	Low Cost	The low cost of this option would not rule it out, outright in terms of affordability, although the funding, procurement, delivery and management of preferred option(s) will be determined through the Commercial, Financial and Management Case of the business case(s).	

	<ul style="list-style-type: none"> • ACT08: Create cycle route on Old Lang Stracht. (£0.55m) • PTO5: Changes to bus lane operational hours and enforcement (unknown) • PTO10: Rebrand of Kingswells Park and Ride (unknown and depends on type of facilities) • PTO11: Advanced VMS on AWPR (unknown) • PTO14: North West Street to Castle Street Right Turn – Bus Only (unknown) • GTO2: Improve Wayfinding and Signage (unknown as would depend on number of signs to replace and install) • Total indicative package costs (including OB where costs are presented) = £4.95m 	
<p>Public Acceptability:</p>	<p>The active travel options within this package are likely to be well received with ACT07 receiving the strongest support across all options during the public engagement. The public transport options are less likely to be accepted by all with some of the options within this package receiving some of the lowest scores during public engagement, including PTO5 and PTO14.</p>	<p>✓</p>
<p>Other comments</p>		
<p>Overall delivery of this package would return limited additional benefits to the transport system along the corridors. It is expected that this may facilitate a marginal growth in active travel users on the network and increase in use of Kingswells Park and Ride. These marginal gains are a result of providing the minimum infrastructure upgrades and are unlikely to recognise the significant step change in mode share as hoped to be achieved through this study. It may be possible to achieve greater benefits if this package was selected to go forward for business case development if a complementary higher-grade option was supplemented to this package.</p>		

6.3 Medium Delivery Package

6.3.1 The medium delivery package represents those options which require a level of investment above that of the low delivery package while also increasing the amount of required infrastructure related works. This package increases the number of options to be delivered to 17 in total, again catering for each sustainable transport mode. Delivery of this package is likely to have a greater impact on other users of the corridor including car and freight vehicles as works look to rebalance the corridor in favour of sustainable transport modes and prioritise these movements where possible at junctions.

6.3.2 In terms of each mode, the options would provide:

Walking

6.3.3 In addition to the low delivery package, this package would include expanding on the pedestrianisation of Union Street to include Castle Street will make the city centre a more attractive and welcoming destination for pedestrians and cyclists.

6.3.4 The main investment would see a programme of surface maintenance and resurfacing where appropriate. It is understood that as part of the CCMP and associated public realm works, more attractive materials will be used to cover the city centre pedestrian environment such as block work and paving slabs. As such this option would instead look to focus on the pavement provision out with the CCMP coverage area. Both Albyn Place and Queen's Road would have their pavement surfaces upgraded to more durable and resilient asphalt materials replacing the current paving slabs. These current slabs are in various states of disrepair due to the number and frequency of vehicles crossing the pavements to enter and exit premises and parking on pavements. Replacing these surfaces will provide longevity to the pavements and makes them easier to maintain over time. This work will be extended to cover the pedestrian pavements along the A944 Westburn Drive to make access to and from the hospital easier – especially for people that are mobility impaired and to ensure compliance with the Equality Act.

Cycling

6.3.5 In addition to the low delivery package this option develops upon the cycle network and, from this position, a TRO would require to be processed to convert existing advisory cycle lanes into mandatory cycle lanes and extending these lanes further along both the A944 and A9119, with preference for resurfacing them to provide brightly coloured asphalt to draw attention and awareness to the presence of these lanes to drivers. Resurfacing has been selected over refurbishing the lane markings, as the resurface is more durable and resilient with a longer lifespan compared to screed which has a lifespan of around 5 years and when it starts to disintegrate can account for uncomfortable riding. Further protection for cyclists will be provided through the integration of light segregation along the inside edge of the mandatory cycle lane in the form of Orcas, which from trials of light segregation by Glasgow City Council in 2020, proved to be the most durable. These orcas will be placed every 3 metres along the corridor and provide an unobtrusive level of protection for cyclists, whilst also retaining the ability for vehicles to access properties off the corridors.

6.3.6 A direct route would also be provided along Old Lang Stracht to provide a link between Kingswells and the A944 Lang Stracht without the need to reroute down and along the A944 dual carriageway and interaction with Switchback Roundabout. Further journey time benefits for existing cyclists would be generated through the integration of cycle priority infrastructure at junctions including expanding on current ASL provision and where appropriate implementing cycle bypasses (e.g. at roundabouts). Advanced signals for cyclists would also be provided, enabling cyclists to have a head-start ahead of other motorised users.

Bus

6.3.7 This package expands on the low delivery package, increasing the focus to three main target areas (i) make better use of existing infrastructure; (ii) improve the quality of bus stop infrastructure provided; and (iii) to increase the utilisation of Kingswells Park and Ride.

6.3.8 Using the existing bus lanes, operational hours will be expanded to cover the entire operating day, while where appropriate bus priority at signals will be implemented. These options are targeted at reducing the impacts of heavy traffic flow on bus journey time reliability. This will be further supported by infilling those bus stops that are currently laybys to on-street roadside bus stops, to protect the buses' position in traffic and minimising the associated delays of boarding and alighting. The addition of banning the right-turn onto Castle Street is based on feedback from bus operators who indicated this turn as being one of the largest contributors to the delay of bus services.

6.3.9 An agreed standard of bus stops will be designed followed by a programme of upgrading bus stops to a consistent standard. This will include the provision of shelters, flags and poles and bus timetable information. Real Time Passenger Information will be provided at strategic stops that experience the largest levels of demand to keep passengers informed. Emphasis will also be on reducing the discrepancy between infrastructure provision between eastbound and westbound services to reemphasise the importance of the corridor as a facilitator of two-way demand and the levels of development and trip generation to destinations at Westhill and PrimeFour. Additionally, a BSIP plan and option would be identified with the local authorities working closely with the bus operators to agree a level of service along the corridor and the serving of key communities to ensure an increased level of accessibility to public transport. This BSIP will also agree on the vehicle fleet to provide a mix of cleaner and greener vehicles along the corridor to reduce the impact of emissions and local pollutants.

6.3.10 The rebranding and further advertising of Kingswells Park and Ride is aimed at sparking an uptake in utilisation. Increasing the information available including live parking capacity information and potential travel times by bus on VMS signs on the AWPR on approach to the A944 junction is designed to capture drivers notice and encourage a change in behaviour at a key decision point in their journey. This will hopefully be aided by more reliable running services based on the improved enforcement and operational hours of the existing bus lane network. The second aim of the rebranding is to provide an increase in secure cycle parking and changing facilities to encourage an uptake in park and choose, where people can decide to take the bus or cycle from the site in place of undertaking the journey by car. Provision of cycle sheds or increased cycle locations allows users to store their bike at the site overnight instead of travelling with their bike every day on a bike rack on their car. This would assist in this site being recognised as a multi-modal local interchange whereby all road users could use/benefit from a re-branding.

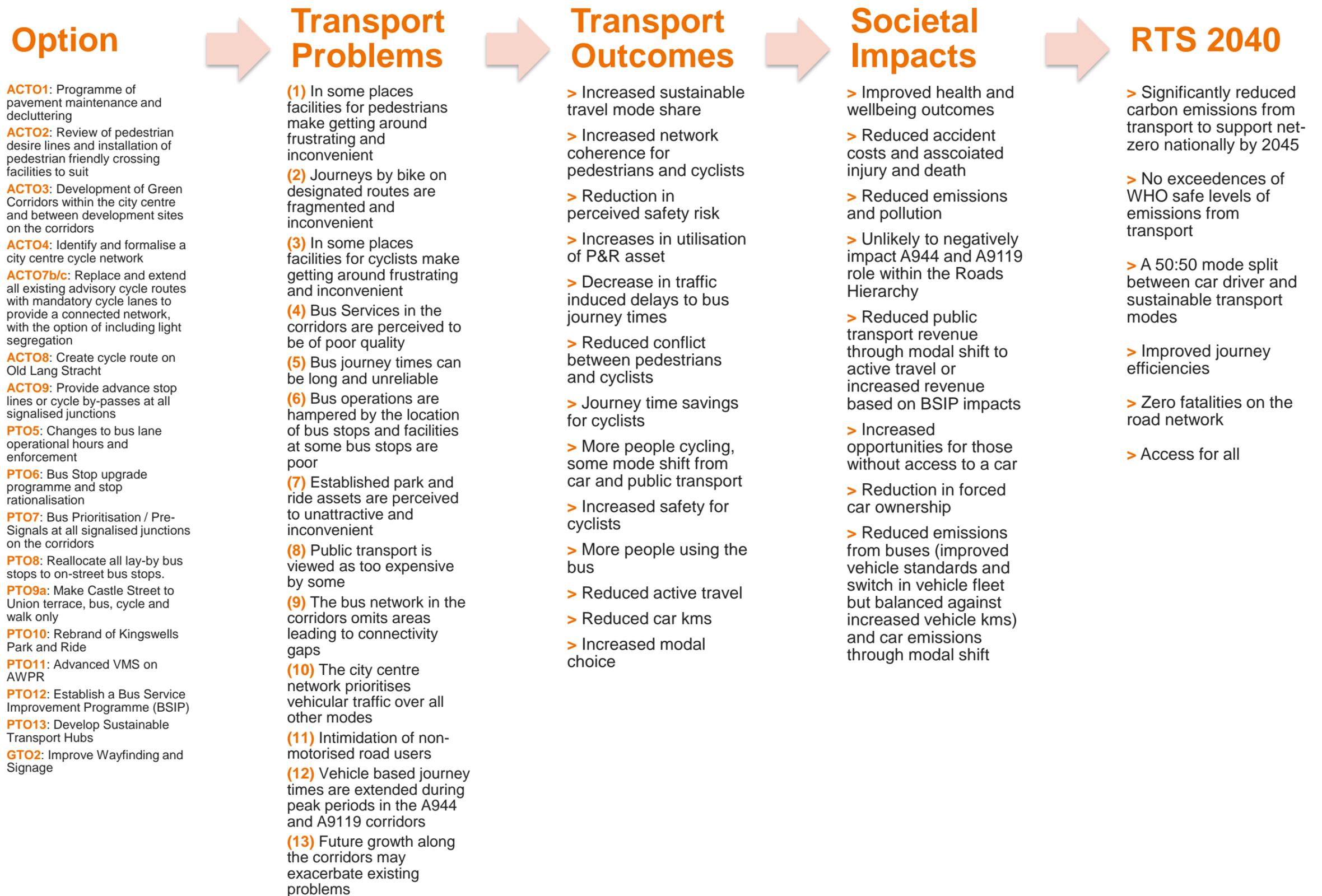


Figure 6-2: Medium Delivery Package Logic Map

Table 6-2: Medium Delivery Package Appraisal Table

Package: Medium Delivery Package				
Package Description:	<ul style="list-style-type: none"> ■ ACTO1: Programme of pavement maintenance and decluttering ■ ACTO2: Review of pedestrian desire lines and installation of pedestrian friendly crossing facilities to suit ■ ACTO3: Development of Green Corridors within the city centre and between development sites on the corridors ■ ACTO4: Identify and formalise a city centre cycle network ■ ACTO7b/c: Replace and extend all existing advisory cycle routes with mandatory cycle lanes to provide a connected network, with the option of including light segregation ■ ACTO8: Create cycle route on Old Lang Stracht ■ ACTO9: Provide advance stop lines or cycle by-passes at all signalised junctions ■ PTO5: Changes to bus lane operational hours and enforcement ■ PTO6: Bus Stop upgrade programme and stop rationalisation ■ PTO7: Bus Prioritisation / Pre-Signals at all signalised junctions on the corridors ■ PTO8: Reallocate all lay-by bus stops to on-street bus stops. ■ PTO9a: Make Castle Street to Union terrace, bus, cycle and walk only ■ PTO10: Rebrand of Kingswells Park and Ride ■ PTO11: Advanced VMS on AWPR ■ PTO12: Establish a Bus Service Improvement Programme (BSIP) ■ PTO13: Develop Sustainable Transport Hubs ■ GTO2: Improve Wayfinding and Signage 			
STAG Criteria	Key Appraisal Points	STAG Score	RTS Principles	RTS Score
Environment:	<ul style="list-style-type: none"> • Under a BSIP minimum contractual requirements for the bus fleet to operate on the corridor would reduce bus emissions, although this could potentially even out if there was a subsequent increase in number of buses operating across the day. • A well-integrated and comprehensive bus network delivered under a BSIP offering frequent and reliable services has the potential to alter perceptions of bus travel and in turn increase patronage. This could help reduce car mode share in favour of bus use, ultimately reducing vehicle kms and subsequent emissions and local pollutants. • Additional cycling infrastructure could increase modal shift towards active travel, further reducing car kms and associated emissions and local pollutants. • Active modes options can increase the number of shorter distance trips undertaken by these modes as opposed to travel by car or bus, reducing vehicle kms. • Banning right turn onto Castle Street for cars would reduce traffic related carbon and pollutants on Union Street bringing health benefits to pedestrians and cyclists. • Greater number of trips made by active travel modes would have a positive impact on user's health and well-being. Such benefits include health benefits from increased physical activity and journey quality. • There could also be corresponding health disbenefits if the bus becomes a more attractive option than cycling and leads to absorption of cyclists into bus patronage. • A well-presented and attractive pedestrian environment would encourage more people to undertake shorter journeys by foot. Well maintained surfaces reduce the barriers that makes it difficult for people to navigate the network. This is likely to bring further health benefits and small positive changes to mode shares. • Resurfacing the carriageway to provide coloured asphalt for cycle lanes would cause noise and vibration during construction period. • Resurfacing of the pedestrian environment and works to widen pavements are likely to cause noise and vibration impacts during construction. • Infrastructure works associated with infilling bus stops and installing new shelters will cause both noise and vibration during the construction phase. 	✓✓	<p>Reduce Carbon Emissions</p> <p>Safe levels of local pollutants</p> <p>50:50 mode split</p>	<p>✓✓</p> <p>✓✓</p> <p>✓✓</p>
Safety:	<ul style="list-style-type: none"> • Provision of crossing at desired points is likely to reduce pedestrians crossing out with provided controlled crossing locations and reduce the chances of vehicle / pedestrian conflicts arising. 	✓	Zero road fatalities	✓

	<ul style="list-style-type: none"> • A switch to bus travel from car would reduce traffic on the roads and the associated number of accidents. The scale of this change would depend on the extent of modal shift achieved through the implementation of the BSIP and other associated measures. Travel by bus is also safer than travel by car, bicycle and as a pedestrian on foot. • Upgraded bus shelter provision including internal lighting reduces the perception of danger and isolation, particularly during the winter months, poor weather and during hours of darkness. • Increased all-round gains in perception of safety with increased provision of mandatory cycle lanes with light segregation. The addition of brightly coloured / varied surfaces also raises further awareness to drivers. • Safety and the perception of safety surrounding active travel schemes is likely to improve as a critical mass is established and such travel behaviour is 'normalised'. • Old Lang Stracht option reduces the need for cyclists to interact with Switchback Roundabout. 			
<p>Economy:</p>	<ul style="list-style-type: none"> • Under a BSIP increased service frequency and integration between modes at sustainable transport hubs would generate Transport Economic Efficiency (TEE) benefits to bus users. Those making new journeys as a result of improved connectivity would also see TEE benefits. • These connectivity improvements could lead to more efficient labour markets, providing access to new or better jobs for people who could not previously access these jobs. This would feed wider economic impacts. • Mandatory and light segregated cycle lanes would provide journey time benefits to existing cyclists and provide additional benefits to new cyclists providing localised access to areas. • Improved pedestrian environments / placemaking could lead to increases in footfall along high streets and other areas with local businesses experiencing increased revenue from passing trade. • Increased physical activity with associated health improvements would lessen the economic burden on the NHS. • Greater number of trips made by active travel modes would have a positive impact on user's health creating business savings from reduced absenteeism. • Reduction in accident related costs from less accidents between active travel and car users. • Increase in operational hours of bus lanes will limit the impact of 'outwith' peak time journey delays. • Sections of the corridor where it may be necessary to reallocate road space to facilitate the addition of advisory cycle lanes could lead to longer journey times and hence economic disbenefits for car users. 	<p>✓✓</p>	<p>Improved journey efficiencies</p>	<p>✓✓</p>
<p>Integration:</p>	<ul style="list-style-type: none"> • Provides increased integration between cycling and Park and Ride site at Kingwells • Improved integration between mixed land-uses through green corridors, supporting sustainable transport modes • Provides improved integration with future development sites on the corridor by sustainable travel modes • Supports the National Transport Strategy (NTS2) Sustainable Travel Hierarchy • Any shift towards trips being made by sustainable modes will help work towards a 50:50 mode split target of the RTS2040 • Sustainable travel options integrate well with the Scottish Government's Climate Change Bill and regional policy on providing for modal shift to greener more sustainable modes • Aligns with the Roads Hierarchy Principles and supports the City Centre Masterplan 	<p>✓✓</p>		
<p>Accessibility & Social Inclusion:</p>	<ul style="list-style-type: none"> • Community Accessibility: wayfinding and signage would create a more coherent and navigable network for pedestrians and cyclists. Green corridors between development sites would increase connectivity between these communities especially for pedestrians and cyclists. Under a BSIP, greater regulatory control could improve connectivity across the corridor as well as across the day and week. Would 	<p>✓✓</p>	<p>Access for all</p>	<p>✓✓</p>

	<p>afford the opportunity to increase connections from Westhill and Kingswells, opening up access from the western extent of the corridor.</p> <ul style="list-style-type: none"> Comparative Accessibility: Also, a key benefit, greater regulation could be used to target the needs of areas and groups which are 'failed' by a commercially orientated bus service. Cheaper fares could also assist in tackling inequality and deprivation, through reduced transport costs and reduced 'forced' car ownership. Greater control over vehicle specification could ensure more accessible vehicles throughout the bus fleet. Could assist in arresting the reduction in bus-based accessibility in the communities of Kingswells and Westhill as highlighted through the analysis of the SABI indices. 			
Implementability	Key Appraisal Points	STAG Score		
Feasibility:	<ul style="list-style-type: none"> Feasibility issues have been discussed more specifically for each option with Chapter 4. In terms of implementing BSIPs, there are two hurdles to be overcome, however: the need for the authority to provide investment as its part of the agreement and the effective veto held by operators if sufficient for them to object to the proposals. Nevertheless, if funding can be identified, BSIPs look to be an effective way in which authorities can advance their public transport policies and agenda. The bus operators in the region are key contributors to this project through their involvement in the North East Bus Alliance, therefore, it is likely that they would work with the local authorities to discuss, plan and implement a BSIP. The requirements of the BSIP may then bring further feasibility issues in terms of infrastructure required, investment in green vehicles etc. Infrastructure works would be required to resurface the carriageways for the mandatory cycle lanes, including installing light segregation. However, it should be feasible to deliver these lanes across the network in the main, with some further detailed work and rerouting of the lanes at specific sections of the corridor. Infrastructure works will be required to infill layby bus stops and to install new bus shelters. This will require widening of pavements in some areas to accommodate new bus shelters and connections to the mains for power. Drainage issues may also arise for undertaking this work. In summary there are no showstoppers regarding the implementation of this medium delivery package. There will be a need for close working relationships with many key stakeholders to deliver this package. TROs would be required for extending bus lane operating hours and banning the right turn onto Castle Street for general traffic and removal of cars from Union Street. Additionally, TROs would be required for removing on-street parking provision and for preventing vehicles from parking in mandatory cycle lanes. The consultation period could impact on the timescale to implement this package but overall it is expected that the majority of this package can be delivered in a short timeframe of 0-2 years, with the potential for one or two options extending into the medium-term delivery timeframe of between 2-5 years. 	✓✓		
Cost to Government / Affordability:	<ul style="list-style-type: none"> Initial high-level costings have been discussed in Chapter 3. These are highlighted below and are again indicative costings reflective of a Preliminary Appraisal approach: ACTO1: Programme of pavement maintenance and decluttering (£2.2 - £2.5m) ACTO2: Review of pedestrian desire lines and installation of pedestrian friendly crossing facilities to suit (£0.2m) ACTO3: Development of Green Corridors within the city centre and between development sites on the corridors (£0.3m) ACTO4: Identify and formalise a city centre cycle network (£18,000 per 20mph zone) ACTO7c: Replace and extend all existing advisory cycle routes with mandatory cycle lanes and light segregation (orcas every 3m) to provide a connected network (£4.8m) ACTO8: Create cycle route on Old Lang Stracht. (£0.55m) ACTO9: Provide advance stop lines or cycle by-passes at all signalised junctions (£2.5m) 	Medium Cost	The indicative cost of this option would not rule it out, outright in terms of affordability, although the funding, procurement, delivery and management of preferred option(s) will be determined through the Commercial, Financial and Management Case of the business case(s).	

	<ul style="list-style-type: none"> • PTO5: Changes to bus lane operational hours and enforcement (unknown) • PTO6: Bus Stop upgrade programme and stop rationalisation (£1.5m) • PTO7: Bus Prioritisation / Pre-Signals at all signalised junctions on the corridors (£20,000 - £30,000 per signal head plus £70 per vehicle) • PTO8: Reallocate all lay-by bus stops to on-street bus stops (£0.4m) • PTO9a: Make Castle Street to Union terrace, bus, cycle and walk only (unknown) • PTO10: Rebrand of Kingswells Park and Ride (unknown and depends on type of facilities) • PTO11: Advanced VMS on AWPR (unknown) • PTO12: Establish a Bus Service Improvement Programme (BSIP) (unknown) • PTO13: Develop Sustainable Transport Hubs (unknown) • PTO14: North West Street to Castle Street Right Turn – Bus Only (unknown) • GTO2: Improve Wayfinding and Signage (unknown as would depend on number of signs to replace and install) • Total indicative package costs (including OB where costs are presented) = £12m - £13m 	
<p>Public Acceptability:</p>	<p>This package is likely to be well received by members of the public. Evidence from the public engagement highlighted strong support for option ACTO1, ACT07 and PTO12. These received some of the highest scores across all options and thus would suggest any options that look to improve currently provided services and infrastructure are likely to be supported.</p>	<p>✓✓</p>

Other comments

The addition of mandatory cycle lanes with light segregation is expected to deliver greater benefits to both existing and attracting new cyclists. This option is providing an additional level of service providing a connected and coherent network. Combined with the pedestrian-based options, there is an opportunity to encourage shorter based trips to be undertaken by active modes, bringing environmental and health benefits to the residents along the corridor.

The introduction of the BSIP magnifies the potential of this option. Delivering this option alongside the other options within the package could be expected to deliver a significant benefit to local communities along the corridor, increasing service frequency, levels of connectivity and accessibility to the network. This will assist in reducing social inequalities and potential transport poverty, especially along those sections of the corridor on the A944 Lang Stracht where pockets of deprivation exist. Increased service coverage and frequency here would open-up opportunities to connect into destinations to the western end of the corridor and potential better paid job opportunities.

6.4 High Delivery Package

6.4.1 As with the previous package the high delivery package again incrementally increases both the infrastructure works required and the level of investment needed to deliver the package. This package is also the first to identify potential conflicts in infrastructure provision between cycling infrastructure and bus lanes. There are several pinch-points along the corridor which reduces the capability and eventual capacity to deliver both a segregated cycle route and a bus lane along the A944 while ensuring the impacts of such infrastructure does not have a negative impact on other modes. Consideration may have to be given to the creation of a shared segregated bus/cycle lane, reallocating one lane on the duelled sections of the corridor.

6.4.2 In terms of each mode, the options would provide:

Walking

6.4.3 Pedestrian based infrastructure will be delivered as previously described. However, this package would look to expand on the pedestrianisation of Union Street along its entire length coupled with a wider programme of reclaiming the city centre streets. This will see city centre streets rebalanced in favour of sustainable transport modes, providing an environment that encourages walking and cycling and repurposing streets for outdoor events, such as markets, festivals and outdoor seating areas for local restaurants and bars. Albyn Place and sections of Queen's Road would also receive elements of this package to create car free days and a pedestrian and cycle friendly environment for users of the western side of the city centre. This would help in creating a better sense of place and would add destination value to existing central areas.

6.4.4 On-street parking would be removed from Albyn Place and Queen's Road and an alternative solution would need to be sought to relocate large commercial and residential bins present on Union Street, Castle Street and Albyn Place.

Cycling

6.4.5 Again, options for cycling build upon previous options as described via the aforementioned low and medium packages. In keeping with setting the level of investment within each package to differentiate between the level of investment required, there exists a decision over choosing the delivery of either Option 5b or Option 6 as part of this package, rather than both which is considered in the Gold package. For the purposes of this appraisal, Option 5b was considered for delivery within the High delivery package due to the number of trip generators along the A944 Lang Stracht to Westburn Drive. There are significantly higher employment numbers on this corridor, thus why only Option 5b was considered. However, as alluded to previously, there may also exist a trade-off and decision with regards to the deliverability of both Option 5b and bus related options on the same corridor, particularly as there are several carriageway width constraints present. In this case, there is the opportunity to instead define the High Delivery package to focus on bus options along the A944 due to this primarily being the main bus route corridor and Option 6 considered in place of Option 5b, establishing a focus of bus based interventions on the A944 and cycle based interventions on the A9119. These choices can be considered further during any subsequent development of a business case.

6.4.6 Based on the engineering feasibility and works required, the main cycling option considers a segregated cycle lane from the AECOM option at Kingswells to the ARI, before the road narrows to single carriageway. This option reduces the required works to deliver this route, while its feasibility remains. At this point, cyclists would be routed via city centre surface routes to permeate the city to their final destination. A physical concrete buffer between the cycle lane and carriageway may not be feasible along its entire length due to the number of access and egress points and thus the route is envisaged to either contain several sections of raised tables to allow cyclists to cross junctions and retain access for vehicles or a hybrid of continuous concrete buffer interspersed with light segregation in locations where there is increased access points across the cycle route. Cycle bypasses will be provided at bus stops, with these becoming floating bus stops.

Bus

6.4.7 Building on the medium delivery package, the high delivery package introduces end-to-end bus lanes along both the A944 and A9119. This will provide buses with a streamlined route between Westhill and Aberdeen city centre reducing the impacts of other traffic on journey times, allowing for services to become more reliable. As touched on above, potential conflicts for space arise between the delivery of a bus lane alongside a cycle lane while maintaining an appropriate road network and adequate capacity for car users to negate any inappropriate re-routing / displacement issues. Similarly, there are deliverability issues arising around the A9119 especially along sections of Skene Road as indicated in chapter 3. As such, a solution may need to be sought to deliver a lane along this route, which could include having a short section without bus lane provision. Other solutions would require acquiring land on either side of the carriageway, realigning the current carriageway, and narrowing of lanes to accommodate a bus lane.

6.4.8 All other bus-based options will be delivered as described within the medium delivery package.

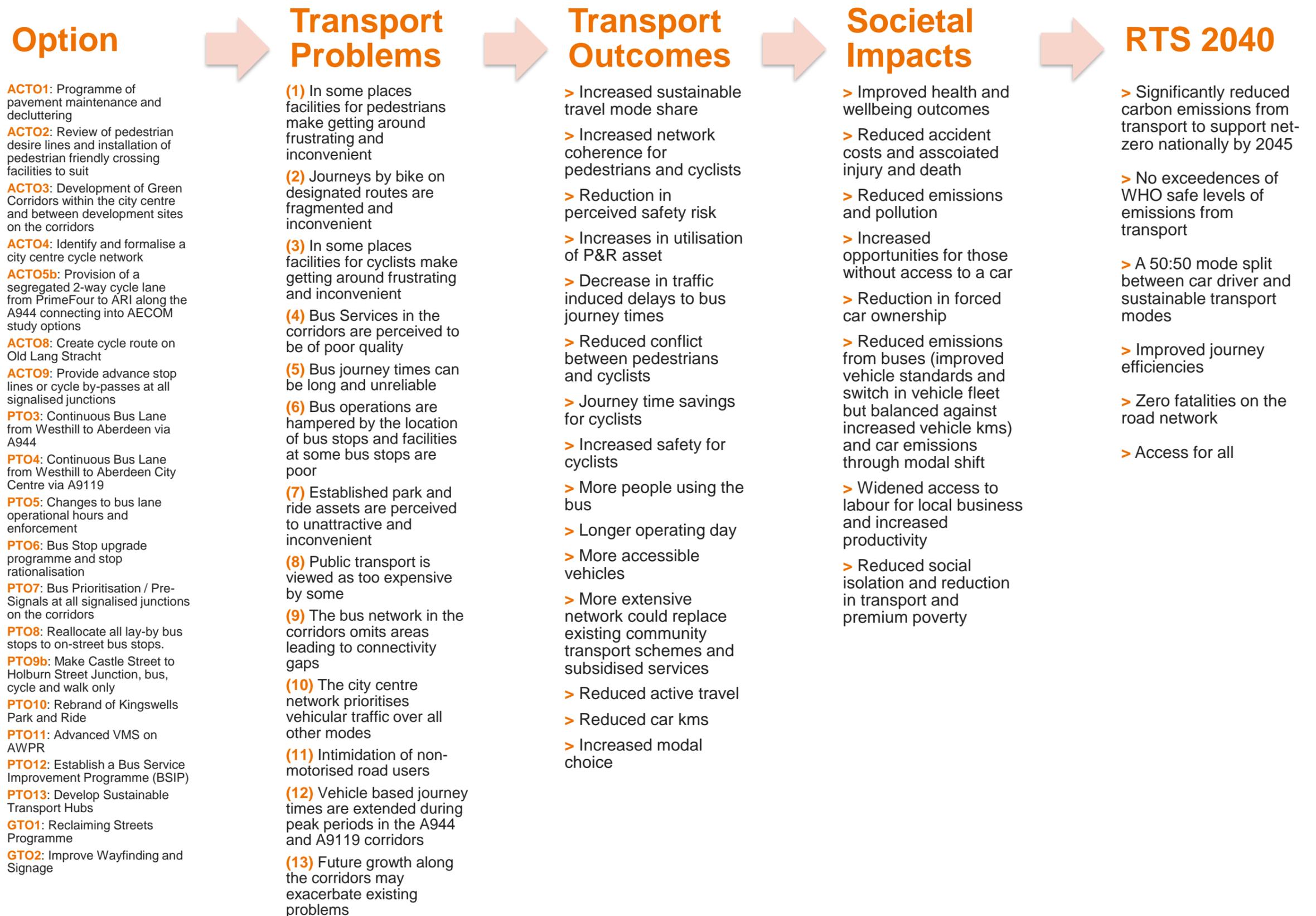


Figure 6-3: High Delivery Package Logic Map

Table 6-3: High Delivery Package Appraisal Table

Package: High Delivery Package				
Package Description:	<ul style="list-style-type: none"> ■ ACTO1: Programme of pavement maintenance and decluttering ■ ACTO2: Review of pedestrian desire lines and installation of pedestrian friendly crossing facilities to suit ■ ACTO3: Development of Green Corridors within the city centre and between development sites on the corridors ■ ACTO4: Identify and formalise a city centre cycle network ■ ACTO5b: Provision of a segregated 2-way cycle lane from PrimeFour to ARI along the A944 connecting into AECOM study options ■ ACTO8: Create cycle route on Old Lang Stracht ■ ACTO9: Provide advance stop lines or cycle by-passes at all signalised junctions ■ PTO3: Continuous Bus Lane from Westhill to Aberdeen via A944 ■ PTO4: Continuous Bus Lane from Westhill to Aberdeen City Centre via A9119 ■ PTO5: Changes to bus lane operational hours and enforcement ■ PTO6: Bus Stop upgrade programme and stop rationalisation ■ PTO7: Bus Prioritisation / Pre-Signals at all signalised junctions on the corridors ■ PTO8: Reallocate all lay-by bus stops to on-street bus stops. ■ PTO9b: Make Castle Street to Holburn Street Junction, bus, cycle and walk only ■ PTO10: Rebrand of Kingswells Park and Ride ■ PTO11: Advanced VMS on AWPR ■ PTO12: Establish a Bus Service Improvement Programme (BSIP) ■ PTO13: Develop Sustainable Transport Hubs ■ GTO1: Reclaiming Streets Programme ■ GTO2: Improve Wayfinding and Signage 			
STAG Criteria	Key Appraisal Points	STAG Score	RTS Principles	RTS Score
Environment:	<ul style="list-style-type: none"> • Under a BSIP minimum contractual requirements for the bus fleet to operate on the corridor would reduce bus emissions, although this could potentially even out if there was a subsequent increase in number of buses operating across the day. • End-to-end bus lanes along the corridor in conjunction with a well-integrated and comprehensive bus network delivered under a BSIP offering frequent and reliable services has the potential to alter perceptions of bus travel and in turn increase patronage. This could help reduce car mode share in favour of bus use, ultimately reducing vehicle kms and subsequent emissions and local pollutants. • Highly designed and segregated cycling infrastructure would increase modal shift towards active travel, further reducing car kms and associated emissions and local pollutants. • Segregated cycle routes would likely further increase the number of shorter distance trips undertaken by bike as opposed to travel by car or bus, reducing vehicle kms and associated emissions. • Banning right turn onto Castle Street for cars would reduce traffic related carbon and pollutants on Union Street bringing health benefits to pedestrians and cyclists. • Greater number of trips made by active travel modes would have a positive impact on user's health and well-being. Such benefits include health benefits from increased physical activity and journey quality. • There could also be corresponding health disbenefits if the bus becomes a more attractive option than cycling and leads to absorption of cyclists into bus patronage. • A well-presented and attractive pedestrian environment would encourage more people to undertake shorter trips on foot. Well maintained surfaces reduce the barriers that makes it difficult for people to navigate the network. This is likely to bring further health benefits and small changes to mode shares. • Removal of cars from sections of the network, including reclaiming on street parking spaces in favour of sustainable modes, plantings and open civic spaces can increase well-being and mental health. • Resurfacing the carriageway to provide coloured asphalt for cycle lanes and installing cycle lanes would cause noise and vibration during construction period. • Potential carriageway width constraints could result in the need to acquire land along sections of the corridor, reallocating green space to traffic. 	✓✓	<p>Reduce Carbon Emissions ✓✓</p> <p>Safe levels of local pollutants ✓✓</p> <p>50:50 mode split ✓✓</p>	

	<ul style="list-style-type: none"> • Resurfacing of the pedestrian environment and works to widen pavements are likely to cause noise and vibration impacts during construction. • Infrastructure works associated with infilling bus stops and installing new shelters will cause both noise and vibration during the construction phase. • Increased bus-based service provision can lead to increased levels of localised noise and vibration, especially around the frontages of residential properties along the corridor. 			
<p>Safety:</p>	<ul style="list-style-type: none"> • Provision of crossing at desired points is likely to reduce pedestrians crossing out with provided controlled crossing locations and reduce the chances of vehicle / pedestrian conflicts arising. • A switch to bus travel from car would reduce traffic on the roads and the associated number of road traffic collisions. The scale of this change would depend on the extent of modal shift achieved through the implementation of the BSIP and other associated measures. Travel by bus is also safer than travel by car, bicycle and as a pedestrian on foot. • Upgraded bus shelter provision including internal lighting reduces the perception of danger and isolation, particularly during the winter months, poor weather, and hours of darkness. • Segregated cycle lane provision would increase feelings of safety for cyclists, in addition to providing further safety from drivers and reduction in intimidation of non-motorised users. • Advanced stop lines at signals for cyclists are also likely to establish a safe distance between cyclists and cars when red to provide space to avoid / reduce conflict from a stop start. • Safety and the perception of safety surrounding active travel schemes is likely to improve as a critical mass is established and such travel behaviour is 'normalised'. • Old Lang Stracht option reduces the need for cyclists to interact with Switchback Roundabout. • Removal of traffic from Union Street will have a positive impact on reducing the number of collisions recorded on the street, especially around the Market Street junction. • Removal of parked cars also reduces potential accidents by increasing visibility of both drivers and pedestrians / cyclists. 	<p>✓✓</p>	<p>Zero road fatalities</p>	<p>✓✓</p>
<p>Economy:</p>	<ul style="list-style-type: none"> • Under a BSIP increased service frequency and integration between modes at sustainable transport hubs would generate TEE benefits to bus users. Those making new journeys as a result of improved connectivity would also see TEE benefits. • These connectivity improvements could lead to more efficient labour markets, providing access to new or better jobs for people who could not previously access these jobs. This would feed wider economic impacts. • Farebox revenue increases through increased patronage attracted by higher quality and reliable service. • End-to-end bus lane provision will increase journey time reliability and provide travel time benefits for passengers. • Segregated cycle lanes would provide journey time benefits to existing cyclists and provide additional benefits to new cyclists providing localised access to areas. • Improved pedestrian environments could lead to increases in footfall along high streets and other areas with local businesses experiencing increased revenue from passing trade. • Additionally, reallocating street space to local businesses such as restaurants and bars provides opportunity to increase revenues by creating placemaking opportunities. • Increased physical activity with associated health improvements would lessen the economic burden on the NHS. • Greater number of trips made by active travel modes would have a positive impact on user's health creating business savings from reduced absenteeism. 	<p>✓✓</p>	<p>Improved journey efficiencies</p>	<p>✓✓</p>

	<ul style="list-style-type: none"> • Reduction in road traffic collisions and related societal costs from less incidents between active travel and car users. • Increase in operational hours of bus lanes will limit the impact of 'out with' peak time journey delays. • Sections of the corridor where it may be necessary to reallocate road space to facilitate the addition of cycle lanes and bus lanes could lead to longer journey times and hence economic disbenefits for car users. • Bus and cycle priority at signals would also increase journey times for car users creating further economic disbenefits. • Any reduction in journey times to general road users through a reduction in road space would reduce TEE benefits. • Potential for some farebox reduction if passengers switch to cycling. • Reduced income from fuel tax as a result of more people using bus and active travel modes. 			
Integration:	<ul style="list-style-type: none"> • Provides increased integration between cycling and Park and Ride site at Kingwells as well as access to a more reliable bus service leading to increased occupancy at existing park and ride asset. • Improved integration between mixed land-uses through green corridors, supporting sustainable transport modes • Provides improved integration with future development sites on the corridor by sustainable travel modes. Affords the opportunity to influence travel behaviours at an early stage. • Would provide a faster and reliable bus service between key attractors and generators of trips and can reduce traffic implications from football match days by linking Aberdeen Rail/Bus station with the new stadium proposed for Kingsford. • Supports the National Transport Strategy (NTS2) Sustainable Travel Hierarchy • Any shift towards trips being made by sustainable modes will help work towards a 50:50 mode split target of the RTS2040 • Sustainable travel options integrate well with the Scottish Government's Climate Change Bill and regional policy on providing for modal shift to greener more sustainable modes • Aligns with the Roads Hierarchy Principles and supports the City Centre Masterplan 	✓✓		
Accessibility & Social Inclusion:	<ul style="list-style-type: none"> • Community Accessibility: wayfinding and signage would create a more coherent and navigable network for pedestrians and cyclists. Green corridors between development sites would increase connectivity between these communities especially for pedestrians and cyclists. Under a BSIP, greater regulatory control could improve connectivity across the corridor as well as across the day and week. Would afford the opportunity to increase connections from Westhill and Kingswells, opening up access from the western extent of the corridor. Increased modal choice with a combined reduction in the need for numerous interchanges to navigate the network and access communities. • Comparative Accessibility: Also, a key benefit, greater regulation could be used to target the needs of areas and groups which are 'failed' by a commercially orientated bus service. Cheaper fares could also assist in tackling inequality and deprivation, through reduced transport costs and reduced 'forced' car ownership. Greater control over vehicle specification could ensure more accessible vehicles throughout the bus fleet. Could assist in arresting the reduction in bus-based accessibility in the communities of Kingswells and Westhill as highlighted through the analysis of the SABI indices. Service improvements can increase access to public services and opportunities for those without access to a car. 	✓✓	Access for all	✓✓
Implementability	Key Appraisal Points	STAG Score		
Feasibility:	<ul style="list-style-type: none"> • Feasibility issues have been discussed more specifically for each option with Chapter 4. 	✓		

	<ul style="list-style-type: none"> • In terms of implementing BSIPs, there are two hurdles to be overcome, however: the need for the authority to provide investment as its part of the agreement and the effective veto held by operators if sufficient for them to object to the proposals. Nevertheless, if funding can be identified, BSIPs look to be an effective way in which authorities can advance their public transport policies and agenda. • The bus operators in the region are key contributors to this project through their involvement in the North East Bus Alliance, therefore, it is likely that they would work with the local authorities to discuss, plan and implement a BSIP. The requirements of the BSIP may then bring further feasibility issues in terms of infrastructure required, investment in green vehicles etc. • There will be deliverability issues around providing both a segregated cycle lane and end to end bus lane along the corridor. Serious width constraints on the eastern extent of the corridor limit ability to provide both options as a continuous measure. • Number and frequency of access and egress points to properties along the corridor may force feasibility issues with providing a continuous concrete barrier for segregation. This will either need further infrastructure works to either raise the cycle lane or provide raised tables at every junction and access point. • Infrastructure works will be required to infill layby bus stops and to install new bus shelters. This will require widening of footways in some areas to accommodate new bus shelters and connections to the mains for power. Drainage issues may also arise for undertaking this work. • At some locations there will be a requirement to convert bus stops to floating bus stops to provide a continuous cycle lane. This will involve infrastructure works and potential protection / diversion of utilities. • TROs would be required for extending bus lane operating hours and banning the right-turn onto Castle Street for general traffic and removal of cars from Union Street. Additionally, TROs would be required for removing on-street parking provision and for preventing vehicles from parking in mandatory cycle lanes. The consultation period could impact on the timescale to implement this package but overall it is expected that the majority of this package can be delivered in a medium-term delivery timeframe of between 2-5 years, with some extending into the long-term delivery due to the level of planning required and potential acquisition of land. 	
<p>Cost to Government / Affordability:</p>	<ul style="list-style-type: none"> • Initial high-level costings have been discussed in Chapter 3. These are highlighted below and are again indicative costings reflective of a Preliminary Appraisal approach: • ACTO1: Programme of pavement maintenance and decluttering (£2.2 - £2.5m) • ACTO2: Review of pedestrian desire lines and installation of pedestrian friendly crossing facilities to suit (£0.2m) • ACTO3: Development of Green Corridors within the city centre and between development sites on the corridors (£0.3m) • ACTO4: Identify and formalise a city centre cycle network (£18,000 per 20mph zone) • ACTO5b: Provision of a segregated 2-way cycle lane from PrimeFour to ARI along the A944 connecting into AECOM study options (£8.9m) • ACTO8: Create cycle route on Old Lang Stracht. (£0.55m) • ACTO9: Provide advance stop lines or cycle by-passes at all signalised junctions (£2.5m) • PTO3: Continuous Bus Lane from Westhill to Aberdeen via A944 (£5.9m) • PTO4: Continuous Bus Lane from Westhill to Aberdeen City Centre via A9119 (£5.4m) • PTO5: Changes to bus lane operational hours and enforcement (unknown) • PTO6: Bus Stop upgrade programme and stop rationalisation (£1.5m) • PTO7: Bus Prioritisation / Pre-Signals at all signalised junctions on the corridors (£20,000 - £30,000 per signal head plus £70 per vehicle) 	<p>High Cost</p> <p>The indicative cost of this option could present affordability challenges to deliver this package. Although the funding, procurement, delivery and management of preferred option(s) will be determined through the Commercial, Financial and Management Case of the business case(s).</p> <p>It is also worth noting that these costs do not include in potential land acquisition which could add significant further constraints / costs.</p>

	<ul style="list-style-type: none"> • PTO8: Reallocate all lay-by bus stops to on-street bus stops (£0.4m) • PTO9b: Make Castle Street to Holburn Street Junction, bus, cycle and walk only (unknown) • PTO10: Rebrand of Kingswells Park and Ride (unknown and depends on type of facilities) • PTO11: Advanced VMS on AWPR (unknown) • PTO12: Establish a Bus Service Improvement Programme (BSIP) (unknown) • PTO13: Develop Sustainable Transport Hubs (unknown) • PTO14: North West Street to Castle Street Right Turn – Bus Only (unknown) • GTO1: Reclaiming Streets Programme (unknown) • GTO2: Improve Wayfinding and Signage (unknown as would depend on number of signs to replace and install) • Total indicative package costs (including OB where costs are presented) = £28m - £32m 	
<p>Public Acceptability:</p>	<p>Pedestrian based options will again be highly supported in this package due to the evidence from the public engagement. The segregated cycle route would also be supported, but this version of the option was not as strongly supported as ACTO5a or for that matter ACTO7 which makes improvements to existing infrastructure. Bus options will again be supported by the public, with option PTO9b receiving the most support during the engagement.</p>	<p>✓✓</p>

Other comments

Segregated cycle lanes as the main deliverable for active travel modes is likely to attract further users of the network and capture the attention of new cyclists as an outcome of the COVID19 pandemic. This is the highest level of design available for cycling and corresponds with recently produced DfT guidance with regards to designing for cyclists as you would for a vehicle. There are several issues however, highlighted through the discussion of these delivery packages in terms of conflict of available road space between cyclist, bus, pedestrians, and car. It may be necessary to consider a shared approach going forward. A9119 provision was not included in the final development of this package as provision was assumed to be provided via the bus lanes, to reduce overall expected costs and level of works required.

Operating a BSIP in addition to delivering end-to-end bus lanes and bus priority measures has the potential to deliver significant benefits for current bus users and attract new users, arresting the declining trends witnessed in recent years. If implemented correctly and provided services are well integrated into the network, providing a variety of express and stopper services, the significant potential of this corridor as a public transport focused route orientated corridor can be realised, especially in light of predicted future development on the corridor, although there is both risk and uncertainty around further development in light of both the economic and travel contexts due to the pandemic and related behavioural changes over time.

6.5 Gold Delivery Package

6.5.1 The gold delivery package represents the maximum required infrastructure works and investment needed to deliver the vast majority of options to significantly change the current sustainable transport system and provide a “gold” level of service representing the very best (best practice / guidance) options across the modes. This package would deliver the full aspirations of Aberdeen City Council, Aberdeenshire Council and Nestrans in terms of delivering the infrastructure required to achieve the maximum modal switch to generate a significant step change. Although this package represents the very best and thus is expected to deliver positively across all the criteria, it does come with several feasibility issues. Constrained carriageway widths and cost realism are the main issues, resulting in significant carriageway works to accommodate fully segregated bus and cycle provision, or alternatively a need to explore options around integrating both modes into a single piece of infrastructure delivery.

6.5.2 Segregated routes along Queen’s Road also raise some issues with the number of access points to properties along this route. This can make it difficult to accommodate a continuous concrete buffer while retaining access to these properties.

6.5.3 In terms of each mode, the options would provide:

Walking

6.5.4 Pedestrian based infrastructure will be delivered as previously described. However, this package would look to expand on the pedestrianisation of Union Street along its entire length coupled with a programme of reclaiming the streets. This will see city centre streets rebalanced in favour of sustainable transport modes, providing an environment that encourages walking and cycling and repurposing streets for outdoor events, such as markets, festivals and outdoor seating areas for local restaurants and bars. Albyn Place and sections of Queen’s Road would also receive elements of this package to create car free days and a pedestrian and cycle friendly environment for users of the western side of the city centre.

6.5.5 On-street parking would be removed from Albyn Place and Queen’s Road and an alternative solution would need to be sought to relocate large commercial and residential bins present on Union Street, Castle Street and Albyn Place.

Cycling

6.5.6 This package introduces the concept of delivering fully segregated cycle lanes along both the A944 and A9119, building upon the delivery of other options through each of the previous packages. As discussed within the high delivery package, there are significant issues with delivering a cycle route along the full length of the A944. Option 5b looked at constraining the route to the ARI before routing cyclists through city streets, whereas option 5a as considered in this option would look to explore provision past the ARI and to Mounthooly roundabout. However, what has become apparent is that there is not enough capacity available to deliver both a segregated cycle lane and bus lane along the entire corridor. Thus, a decision would be required to propose which options should proceed past the ARI. From a high-level feasibility view, this may favour cycle provision over bus provision along this section, especially as a number of bus services also divert from the corridor at various points post the ARI.

6.5.7 The A9119 also presents many of the same issues, but mainly the number of entrance and exit points along the corridor and then carriageway width constraints that limit the possibility to have a cycle, bus and other traffic lane. Again, options would need to consider the delivery of a joint segregated lane for bus and cyclists, with cycle bypass provision at bus stops to enable cyclists to continue when buses stop.

6.5.8 The remaining cycling based options will be delivered as described previously.

Bus

6.5.9 The main deliverable as part of the gold delivery package for bus-based options is the introduction of Bus Rapid Transit along the A944 from Westhill to Aberdeen city centre. The routing of the BRT along the A944 was selected due the higher number of trip generators along the corridor, specifically the ARI, which would provide many journey time benefits for commuters and visitors to the hospital and other destinations along the A944 via a local interchange point at the ARI. This option would require the delivery of bus-based infrastructure to provide priority measures including segregated lanes, bus priority signals or bypasses where appropriate and the installation of on street ticket machines and waiting facilities. This option will require significant engineering works to accommodate the delivery of the option along this corridor. Carriageway constraints and the ability to deliver this option and a segregated cycle route are limited. Additional land will need to be acquired at specific sections of the corridor and where this proves too difficult, bus lanes may need to be dropped for short sections, such as the section between Victoria and Westburn Parks.

6.5.10 It is likely that the delivery of this BRT option will have a negative impact on other road users as this service will be provided priority over other motorised users. However, it would be hoped that through the delivery of this option that the use of car along the corridor would reduce in favour of an uptake in both cycling and using public transport.

6.5.11 All other bus-based options will be delivered as described within the high delivery package.

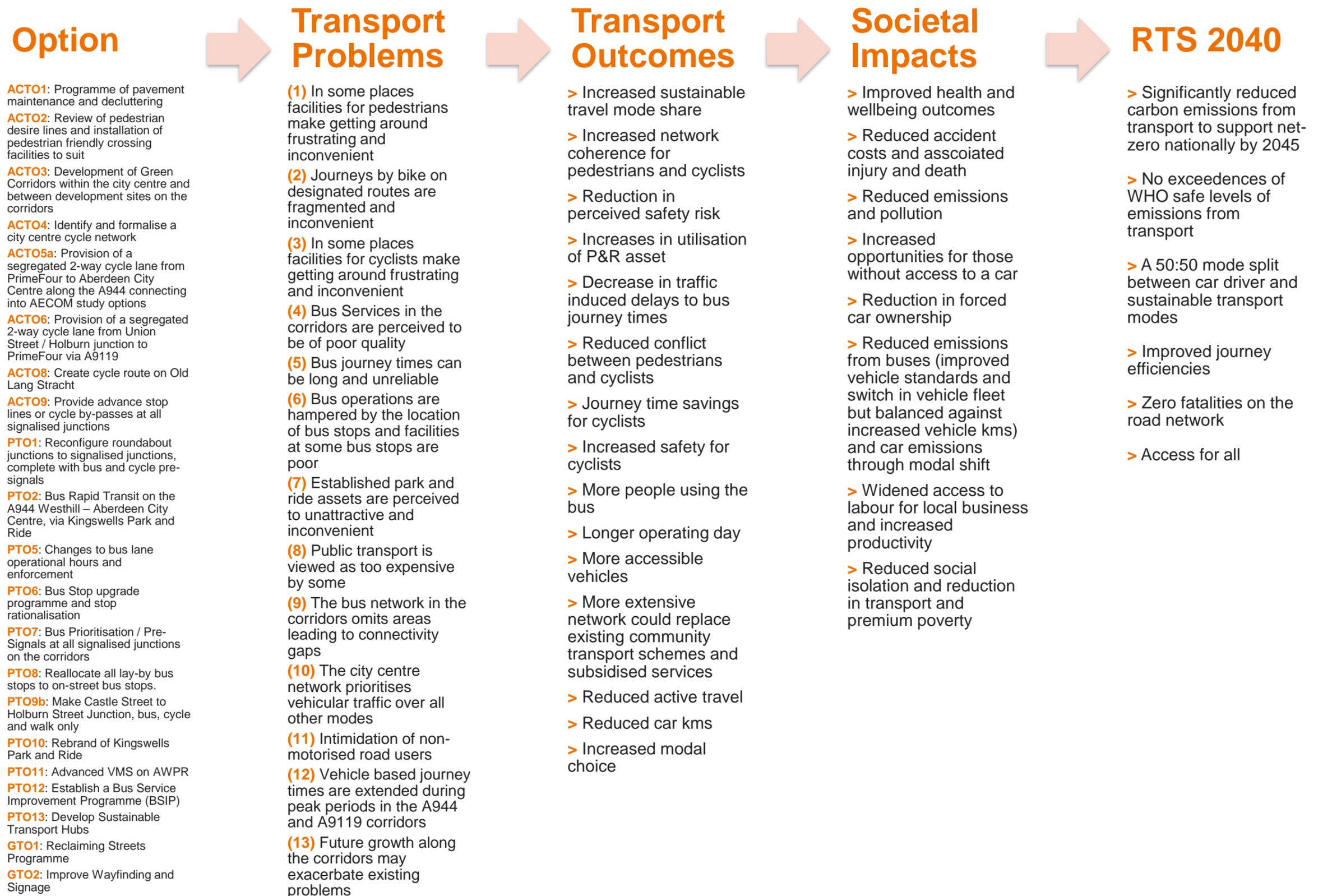


Figure 6-4: Gold Delivery Package Logic Map

Table 6-4: Gold Delivery Package Appraisal Table

Package: Gold Delivery Package				
Package Description:	<ul style="list-style-type: none"> ■ ACTO1: Programme of pavement maintenance and decluttering ■ ACTO2: Review of pedestrian desire lines and installation of pedestrian friendly crossing facilities to suit ■ ACTO3: Development of Green Corridors within the city centre and between development sites on the corridors ■ ACTO4: Identify and formalise a city centre cycle network ■ ACTO5a: Provision of a segregated 2-way cycle lane from PrimeFour to Aberdeen City Centre along the A944 connecting into AECOM study options ■ ACTO6: Provision of a segregated 2-way cycle lane from Union Street / Holburn junction to PrimeFour via A9119 ■ ACTO8: Create cycle route on Old Lang Stracht ■ ACTO9: Provide advance stop lines or cycle by-passes at all signalised junctions ■ PTO1: Reconfigure roundabout junctions to signalised junctions, complete with bus and cycle pre-signals ■ PTO2: Bus Rapid Transit on the A944 Westhill – Aberdeen City Centre, via Kingswells Park and Ride ■ PTO4: Continuous Bus Lane from Westhill to Aberdeen City Centre via A9119 ■ PTO5: Changes to bus lane operational hours and enforcement ■ PTO6: Bus Stop upgrade programme and stop rationalisation ■ PTO7: Bus Prioritisation / Pre-Signals at all signalised junctions on the corridors ■ PTO8: Reallocate all lay-by bus stops to on-street bus stops. ■ PTO9b: Make Castle Street to Holburn Street Junction, bus, cycle and walk only ■ PTO10: Rebrand of Kingswells Park and Ride ■ PTO11: Advanced VMS on AWPR ■ PTO12: Establish a Bus Service Improvement Programme (BSIP) ■ PTO13: Develop Sustainable Transport Hubs ■ GT01: Reclaiming Streets Programme ■ GT02: Improve Wayfinding and Signage 			
STAG Criteria	Key Appraisal Points	STAG Score	RTS Principles	RTS Score
Environment:	<ul style="list-style-type: none"> • Delivery of a Bus Rapid Transit system along the A944 corridor would attract a significant increase in patronage and reduction in trips made by car along the corridor. This will reduce car mode share in favour of bus use, ultimately reducing car based kms and subsequent emissions and local pollutants. • BRT vehicles are designed to be hybrid or green vehicles reducing the contributing emissions from buses along this corridor contributing to targets to become Net Zero. • Additionally, under a BSIP minimum contractual requirements for the remaining bus fleet to operate on the corridor would reduce bus emissions, although this could potentially even out if there was a subsequent increase in number of buses operating across the day. • Highly designed and segregated cycling infrastructure would increase modal shift towards active travel, further reducing car kms and associated emissions and local pollutants. • Segregated cycle routes would likely further increase the number of shorter distance trips undertaken by bike as opposed to travel by car or bus, reducing vehicle kms and associated emissions. • Banning right turn onto Castle Street for cars would reduce traffic related carbon and pollutants on Union Street bringing health benefits to pedestrians and cyclists. • Greater number of trips made by active travel modes would have a positive impact on user's health and well-being. Such benefits include health benefits from increased physical activity and journey quality. • There could also be corresponding health disbenefits if the bus becomes a more attractive option than cycling and leads to absorption of cyclists into bus patronage. • A well-presented and attractive pedestrian environment would encourage more people to undertake shorter trips on foot. Well maintained surfaces reduce the barriers that makes it difficult for people to navigate the network. This is likely to bring further health benefits and small changes to mode shares. • Removal of cars from sections of the network, including reclaiming on street parking spaces in favour of sustainable modes, plantings and open civic spaces can increase well-being and mental health. • Significant infrastructure works required to implement a BRT including land acquisition and reallocation of green space. Likely to be increased noise, vibration, and emissions during the construction phase. 	✓✓✓	<p>Reduce Carbon Emissions</p> <p>Safe levels of local pollutants</p> <p>50:50 mode split</p>	<p>✓✓✓</p> <p>✓✓✓</p> <p>✓✓✓</p>

	<ul style="list-style-type: none"> • Resurfacing the carriageway to provide coloured asphalt for cycle lanes and installing cycle lanes would cause noise and vibration during construction period. • Potential carriageway width constraints could result in the need to acquire land along sections of the corridor, reallocating green space to traffic. • Resurfacing of the pedestrian environment and works to widen pavements are likely to cause noise and vibration impacts during construction. • Infrastructure works associated with infilling bus stops and installing new shelters will cause both noise and vibration during the construction phase. • Significant works associated with replacing roundabouts will cause noise, vibration and emissions during construction. 			
<p>Safety:</p>	<ul style="list-style-type: none"> • Provision of crossing at desired points is likely to reduce pedestrians crossing out with provided controlled crossing locations and reduce the chances of conflicts arising. • BRT would be expected to significantly increase bus mode share thus reducing the number of cars on the network and consequently the opportunities for accidents decreases. This can be further supported through the BSIP with other services becoming more attractive through reliable journey times and better quality lower emission vehicles. • Travel by bus is also safer than travel by car, bicycle and as a pedestrian. • Upgraded bus shelter provision including internal lighting reduces the perception of danger and isolation, particularly during the winter months and early nights. • Segregated cycle lane provision would increase feelings of safety for cyclists, in addition to providing further safety from drivers and reduction in intimidation of non-motorised users. • Advanced signal stop lines for cyclists are also likely to establish a safe distance between cyclists and cars when red to provide space to avoid / reduce conflict from a stop start. • Safety and the perception of safety surrounding active travel schemes is likely to improve as a critical mass is established and such travel behaviour is 'normalised'. • Old Lang Stracht option reduces the need for cyclists to interact with Switchback Roundabout. • Removal of traffic from Union Street will have a positive impact on reducing the number of collisions recorded on the street, especially around the Market Street junction. • Removal of parked cars also reduces potential accidents by increasing visibility of both drivers and pedestrians / cyclists. • There is also a potential, however for rat-running during the construction phase to cause negative safety issues, displacing the problems elsewhere. 	<p>✓✓</p>	<p>Zero road fatalities</p>	<p>✓✓</p>
<p>Economy:</p>	<ul style="list-style-type: none"> • BRT and supporting infrastructure would reduce journey times and increase reliability and inspire confidence in using public transport. Increased frequency and fully integrated service will generate TEE benefits to bus users. • Those making new journeys as a result of improved connectivity would also see TEE benefits. • These connectivity improvements could lead to more efficient labour markets, providing access to new or better jobs for people who could not previously access these jobs. This would feed wider economic impacts. • Farebox revenue increases through increased patronage attracted by higher quality and reliable service. • Conversely, cost / subsidy requirements might be higher due to higher specifications of the level of service set. • Segregated cycle lanes would provide journey time benefits to existing cyclists and provide additional benefits to new cyclists providing localised access to areas. 	<p>✓✓</p>	<p>Improved journey efficiencies</p>	<p>✓✓</p>

	<ul style="list-style-type: none"> Improved pedestrian environments could lead to increases in footfall along high streets and other areas with local businesses experiencing increased revenue from passing trade. Additionally, reallocating street space to local businesses such as restaurants and bars provides opportunity to increase revenues. Increased physical activity with associated health improvements would lessen the economic burden on the NHS. Greater number of trips made by active travel modes would have a positive impact on user's health creating to business savings from reduced absenteeism. Reduction in road traffic collision related costs from less incidents between active travel and car users. Increase in operational hours of bus lanes will limit the impact of 'out with' peak time journey delays. Sections of the corridor where it may be necessary to reallocate road space to facilitate the addition of cycle lanes and bus lanes could lead to longer journey times and hence economic disbenefits for car users. Bus and cycle priority at signals would also increase journey times for car users creating further economic disbenefits. Any reduction in journey times to general road users through a reduction in road space would reduce TEE benefits. Potential for some farebox reduction if passengers switch to cycling. Reduced income from fuel tax as a result of more people using bus and active travel modes. 			
<p>Integration:</p>	<ul style="list-style-type: none"> Provides increased integration between cycling and Park and Ride site at Kingwells as well as access to a more reliable bus service leading to increased occupancy at existing park and ride asset. Improved integration between mixed land-uses through green corridors, supporting sustainable transport modes Provides improved integration with future development sites on the corridor by sustainable travel modes. Affords the opportunity to influence travel behaviours at an early stage. Would provide a faster and reliable bus service between key attractors and generators of trips and can reduce traffic implications from football match days by linking Aberdeen Rail/Bus station with the new stadium proposed for Kingsford. Supports the National Transport Strategy (NTS2) Sustainable Travel Hierarchy Any shift towards trips being made by sustainable modes will help work towards a 50:50 mode split target of the RTS2040 Sustainable travel options integrate well with the Scottish Government's Climate Change Bill and regional policy on providing for modal shift to greener more sustainable modes Aligns with the Roads Hierarchy Principles and supports the City Centre Masterplan 	<p>✓✓</p>		
<p>Accessibility & Social Inclusion:</p>	<ul style="list-style-type: none"> Community Accessibility: wayfinding and signage would create a more coherent and navigable network for pedestrians and cyclists. Green corridors between development sites would increase connectivity between these communities as pedestrians and cyclists. Under a BSIP, greater regulatory control could improve connectivity across the corridor as well as across the day and week. Would afford the opportunity to increase connections from Westhill and Kingwells, opening up access from the western extent of the corridor. Increased modal choice with a combined reduction in the need for numerous interchanges to navigate the network and access communities. Comparative Accessibility: Also, a key benefit, greater regulation could be used to target the needs of areas and groups which are 'failed' by a commercially orientated bus service. Cheaper fares could also assist in tackling inequality and deprivation, through reduced transport costs and reduced 'forced' car ownership. Greater control over vehicle specification could ensure more accessible vehicles throughout the bus fleet. Could assist in arresting the reduction in bus-based accessibility in the 	<p>✓✓✓</p>	<p>Access for all</p>	<p>✓✓✓</p>

	<p>communities of Kingswells and Westhill as highlighted through the analysis of the SABI indices. Service improvements can increase access to public services and opportunities for those without access to a car.</p>	
Implementability	Key Appraisal Points	STAG Score
Feasibility:	<ul style="list-style-type: none"> • Feasibility issues have been discussed more specifically for each option with Chapter 3. • Significant feasibility issues with providing a segregated cycle route alongside BRT route and normal traffic. Carriageway widths severely reduce capacity and capability to do so, may lead to a choice between modes and subsequent prioritisation. • Significant infrastructure works to replace existing roundabouts with signalised junctions. Potential for significant risks associated with this option and likely to see costs spiral (utilities related) • In terms of implementing BSIPs, there are two hurdles to be overcome, however: the need for the authority to provide investment as its part of the agreement and the effective veto held by operators if sufficient for them to object to the proposals. Nevertheless, if funding can be identified, BSIPs look to be an effective way in which authorities can advance their public transport policies and agenda. • The bus operators in the region are key contributors to this project through their involvement in the North East Bus Alliance, therefore, it is likely that they would work with the local authorities to discuss, plan and implement a BSIP. The requirements of the BSIP may then bring further feasibility issues in terms of infrastructure required, investment in green vehicles etc. • There will be deliverability issues around providing both a segregated cycle lane and end to end bus lane along the corridor. Serious width constraints on the eastern extent of the corridor limit ability to provide both options. • Number and frequency of access and egress points to properties along the corridor may force feasibility issues with providing a continuous concrete barrier for segregation. This will either need further infrastructure works to either raise the cycle lane or provide raised tables at every junction and access point. • Infrastructure works will be required to infill bus stops and to install new bus shelters. This will require widening of pavements in some areas to accommodate new bus shelters and installation to the mains for power. Drainage issues may also arise for undertaking this work. • At some locations there will be a requirement to convert bus stops to floating bus stops to provide a continuous cycle lane. This will involve infrastructure works and potential protection / diversion of utilities. • TROs would be required for extending bus lane operating hours and banning the right turn onto Castle Street for general traffic and removal of cars from Union Street. Additionally, TROs would be required for removing on street parking provision and for preventing vehicles from parking in mandatory cycle lanes. The consultation period could impact on the timescale to implement this package but overall it is expected that the majority of this package can be delivered in a medium-term delivery timeframe of between 2-5 years, with some extending into the long-term delivery due to the level of planning required and potential acquisition of land. 	✓
Cost to Government / Affordability:	<ul style="list-style-type: none"> • Initial high-level costings have been discussed in Chapter 3. These are highlighted below and are again indicative costings reflective of a Preliminary Appraisal approach: • ACTO1: Programme of pavement maintenance and decluttering (£2.2 - £2.5m) • ACTO2: Review of pedestrian desire lines and installation of pedestrian friendly crossing facilities to suit (£0.2m) • ACTO3: Development of Green Corridors within the city centre and between development sites on the corridors (£0.3m) • ACTO4: Identify and formalise a city centre cycle network (£18,000 per 20mph zone) 	<p>High Cost</p> <p>The indicative cost of this option could present affordability challenges to deliver this package. Although the funding, procurement, delivery and management of preferred option(s) will be determined through the Commercial, Financial and Management Case of the business case(s).</p> <p>It is also worth noting that these costs do not include in potential land acquisition which could add significant further costs.</p>

	<ul style="list-style-type: none"> • ACTO5a: Provision of a segregated 2-way cycle lane from PrimeFour to Aberdeen City Centre along the A944 connecting into AECOM study options (£16.5m) • ACTO6: Provision of a segregated 2-way cycle lane from Union Street / Holburn junction to PrimeFour via A9119 (£11m) • ACTO8: Create cycle route on Old Lang Stracht. (£0.55m) • ACTO9: Provide advance stop lines or cycle by-passes at all signalised junctions (£2.5m) • PTO1: Reconfigure roundabout junctions to signalised junctions, complete with bus and cycle pre-signals (£6m-£7m) • PTO2: Bus Rapid Transit on the A944 Westhill – Aberdeen City Centre, via Kingswells Park and Ride (£64m-£76m) • PTO4: Continuous Bus Lane from Westhill to Aberdeen City Centre via A9119 (£5.4m) • PTO5: Changes to bus lane operational hours and enforcement (unknown) • PTO6: Bus Stop upgrade programme and stop rationalisation (£1.5m) • PTO7: Bus Prioritisation / Pre-Signals at all signalised junctions on the corridors (£20,000 - £30,000 per signal head plus £70 per vehicle) • PTO8: Reallocate all lay-by bus stops to on-street bus stops (£0.4m) • PTO9b: Make Castle Street to Holburn Street Junction, bus, cycle and walk only (unknown) • PTO10: Rebrand of Kingswells Park and Ride (unknown and depends on type of facilities) • PTO11: Advanced VMS on AWPR (unknown) • PTO12: Establish a Bus Service Improvement Programme (BSIP) (unknown) • PTO13: Develop Sustainable Transport Hubs (unknown) • PTO14: North West Street to Castle Street Right Turn – Bus Only (unknown) • GTO1: Reclaiming Streets Programme (unknown) • GTO2: Improve Wayfinding and Signage (unknown as would depend on number of signs to replace and install) • Total indicative package costs (including OB where costs are presented) = £111m - £124m 	
<p>Public Acceptability:</p>	<p>Pedestrian based options will again be highly supported in this package due to the evidence from the public engagement. The segregated cycle route would also be supported, but this version of the option was not as strongly supported as ACTO7 which makes improvements to existing infrastructure. Bus options will again be supported by the public, with option PTO9b receiving the most support during the engagement closely followed by the BRT option.</p>	<p>✓✓</p>

Other comments

Segregated cycle lanes as the main deliverable for active travel modes is likely to attract further users of the network and capture the attention of new cyclists as an outcome of the COVID19 pandemic. This is the highest level of design available for cycling and corresponds with recently produced DfT guidance with regards to designing for cyclists as you would for a vehicle. There are several issues however, highlighted through the discussion of these delivery packages in terms of conflict of available road space between pedestrians, cyclists, bus, and car users. It may be necessary to consider a shared approach going forward.

A BRT in conjunction with a BSIP has the potential to deliver the significant step change in modal shift and the associated benefits for current bus users and attract new users, arresting the declining trends witnessed in recent years. If implemented correctly and provided services are well integrated into the network, providing a variety of express and stoppers services, the significant potential of this corridor as a public transport orientated corridor can be realised, especially in light of predicted future development on the corridor, although there is both risk and uncertainty around further development in light of both the economic and travel contexts due to the pandemic and related behavioural changes..

6.6 Appraisal Summary

6.6.1 The matrix below summarises the options within each package and the RTS objectives that each package contributes towards.

Table 6-5: Matrix of Packages vs Options vs RTS 2040

Options	Low	Medium	High	Gold
ACTO1		✓	✓	✓
ACTO2	✓	✓	✓	✓
ACTO3	✓	✓	✓	✓
ACTO4	✓	✓	✓	✓
ACTO5a				✓
ACTO5b			✓	
ACTO6				✓
ACTO7	✓	✓		
ACTO8	✓	✓	✓	✓
ACTO9		✓	✓	✓
PTO1				✓
PTO2				✓
PTO3			✓	
PTO4			✓	
PTO5	✓	✓	✓	✓
PTO6		✓	✓	✓
PTO7		✓	✓	✓
PTO8		✓	✓	✓
PTO9a		✓		
PTO9b			✓	✓
PTO10	✓	✓	✓	✓
PTO11	✓	✓	✓	✓
PTO12		✓	✓	✓
PTO13		✓	✓	✓
PTO14	✓	✓		
GTO1			✓	✓
GTO2	✓	✓	✓	✓
RTS Objectives				
Reduce Carbon Emissions	✓	✓	✓	✓
Safe levels of local pollutants	✓	✓	✓	✓
50:50 mode split	✓	✓	✓	✓
Zero road fatalities	✓	✓	✓	✓
Improved journey efficiencies	✓	✓	✓	✓
Access for all		✓	✓	✓

6.6.2 The table below summarises the STAG related scoring information captured in the appraisal summary tables discussed above.

Table 6-6: Package STAG scoring summary

Delivery Package	Environment	Safety	Economy	Integration	Accessibility & Social Inclusion	Feasibility	Affordability	Public Acceptability
Low	✓	✓	✓	○	✓	✓✓✓	Low Cost	✓
Medium	✓✓	✓	✓✓	✓✓	✓✓	✓✓	Medium Cost	✓✓
High	✓✓	✓	✓✓	✓✓	✓✓	×	High Cost	✓✓
Gold	✓✓✓	✓✓	✓✓	✓✓	✓✓✓	×	High Cost	✓✓

6.6.3 As would be anticipated, the most extensive package in terms of infrastructure works delivers the largest and widest range of benefits but is also the most expensive in terms of cost to government. As is common in STAG studies, there is not yet a clear funding envelope within which to work and thus it is not possible to rule options in or out on the basis of affordability. This will however be a key consideration in progressing towards a preferred option package in the context of a subsequent business case. The Outline Business Case requires initial development of the Financial, Commercial and Management Cases – these three cases determine how the preferred option / option package will be funded, procured, delivered and managed, with an iteration around the preferred option / option package to ensure a degree of cost realism before progressing to the Final Business Case.

7 Risk and Uncertainty

7.1 Overview

7.1.1 In appraisals, there is always some difference between what is expected and what eventually happens, because of biases unwittingly inherent in the appraisal and risks and uncertainties which materialise. This chapter considers the risks and uncertainties associated with the options presented in this appraisal.

7.2 Quantified Risk Assessment

7.2.1 The STAG Guidance requires the development of a Quantified Risk Assessment (QRA), which allows for the quantification and, where practical, valuation of risk factors.

7.2.2 Risks and opportunities are appraised using two criteria:

- **Significance:** What would be the impact and severity if the risk materialised?
- **Likelihood:** How likely is it that the risk will materialise within the period stated?

7.2.3 To produce a risk appraisal score, a risk is first judged for its significance (extreme, high, medium, low or negligible) and for its likelihood (almost certain, likely, possible, unlikely or rare) and scored from 1 to 5, where 1 is negligible / rare and 5 is extreme / almost certain.

7.2.4 The maximum score for a risk is 25 – i.e. an extreme significance and almost certain likelihood. The table below, developed by Liverpool John Moores University, indicates the status of risks coded in terms of a “traffic lights system”. A score of above 12 is regarded as needing full risk management.

7.2.5 It should be noted that all scoring is, by its nature subjective. Risk appraisal is not an exact science and best estimates and frequent reviews are required to make such appraisals robust.

Table 7-1: Risk Mitigation Table

Significance	Extreme	5	M	M	H	H	H
	High	4	L	M	M	H	H
	Medium	3	L	L	M	M	H
	Low	2	L	L	L	M	M
	Negligible	1	L	L	L	L	L
			1	2	3	4	5
		Rare	Unlikely	Possible	Likely	Almost Certain	
Likelihood							

7.2.6 It should again be noted that this study is strategic in nature and thus the identified risks could in most cases be worked through in more detail through the Outline Business Case Development. The risks identified for this study are therefore strategic rather than specific. The table below nonetheless provides an assessment of the wider project risks in terms of their significance, likelihood, potential mitigation measures and residual risk:

Table 7-2: Quantified Risk Assessment

Risk	Likelihood	Significance	Risk Score	Mitigation	Residual Likelihood	Residual Significance	Residual Risk Score
The costs of options are higher than that set out in this report. This is likely given the high-level approach to costing and no consideration of land acquisition costs and / or utility works.	5	4	20	Any option or package taken forward as part of this appraisal would be subject to more detailed assessment as part of business case development. This is entirely consistent with STAG appraisals of this nature.	5	2	10

Risk	Likelihood	Significance	Risk Score	Mitigation	Residual Likelihood	Residual Significance	Residual Risk Score
There is a low / no uptake in demand for public transport services in response to public perception around physical distancing.	3	4	12	As part of making the TPOs SMART, metrics were established for monitoring and evaluating the success of the objective. It recommended the monitoring of patronage figures to determine changes in levels of demand and to adjust targets accordingly.	3	3	9
The uptake and continued use of cycling begin to tail off as things return towards "normality" or the potential market is already capped.	3	4	12	As part of making the TPOs SMART, metrics were established for monitoring and evaluating the success of the objective. It recommended the monitoring of cycle count data to determine changes in levels of demand and to adjust targets accordingly. Additionally, surveys were also recommended to understand responses to option delivery.	3	3	9
There is a change in travel behaviours as an outcome of COVID19 and the flexibility and acceptance of working from home becomes a more permanently accepted practice.	4	5	20	In developing the TPOs it was recommended that metrics are reviewed and analysed every five years until the RTS horizon year of 2040, providing four control periods. As part of this review, data analysis and available census data will inform any changes to travel behaviours which affords the opportunity to make refinements to targets and objectives.	3	3	9
There is a change in travel demand due to the volatility of the oil and gas sector, one of the main drivers of the Aberdeen City Region economy.	4	4	16	In developing the TPOs it was recommended that metrics are reviewed and analysed every five years until the RTS horizon year of 2040, providing four control periods. As part of this review, data analysis and available census data will inform any changes to travel behaviours which affords the opportunity to make refinements to targets and objectives.	3	3	9
Future development opportunities along the corridor not being fully taken up in response to economic changes (further dip in the oil sector etc)	3	4	12	In developing the TPOs it was recommended that metrics are reviewed and analysed every five years until the RTS horizon year of 2040, providing four control periods. As part of this review, data analysis and available census data will inform any changes to travel behaviours which affords the opportunity to make refinements to targets and objectives.	3	3	9

7.2.7 It should be noted that this appraisal is strategic in nature. The identification, management and mitigation of risks attached to specific elements of the delivery of any package should be fully covered by subsequent business case development.

7.3 Uncertainty

7.3.1 The STAG Guidance notes that, no matter how well risks are defined, the future remains uncertain and thus a narrative on key future uncertainties which could impact on the study outcomes is required.

- Coronavirus impacts upon employment levels, demand for public transport and road traffic volumes. It is unclear if conditions will ever return to 'pre-covid normal' and if so, when. The uncertainties surrounding the long term, structural impacts of the virus are perhaps the greatest 'issue' for the study.
- A significant proportion of jobs in Aberdeen are supported directly or indirectly by the oil industry, and as such employment levels are sensitive to changes in oil prices. A recent study published by Aberdeen University forecasts that oil production activity in the UK Continental Shelf (UKCS) will sharply decrease in medium- and long-term from 2019–2050, resulting in substantial job losses. It is however recognised that there are plans to transform the local economy in response to this.
- Substantial development is planned along the study corridor including residential development at Countesswells, Maidencraig, Kingswells and Friarsfield as well as commercial development at Kingswells Prime 4. Much of the construction is already underway with some traffic impacts on the A944 already being generated, however, there is still uncertainty regarding the cumulative traffic impacts of the these developments on the A944 as they become fully online and also how development appetite will be affected by local economic circumstances.
- The development of the new Aberdeen Football Club Stadium at Kingsford to expand on the recently opened training centre.
- New major junctions are proposed on the A944 to support development at Maidencraig, Kingswells and Countesswells. The exact location and form of these junctions is yet to be confirmed.
- There is a danger of further worsening the divide in Westhill between business park and residential areas by continuing to develop based on the current north-south land use split.
- Additionally, continuing development could result in a deterioration in conditions on the A944 which in turn could threaten the vitality or Westhill and attractiveness of commercial premises in the area.
- New Stagecoach bus timetables were planned to be introduced in April 2020; changes included retiming of services to account for the AWPR, renumbering of the X17 and additional route variations. However, these changes were put on hold as a result of the coronavirus pandemic, and it remains unclear if proposed changes will be reconsidered and/or adjusted.
- First is reviewing its UK bus operations and has sold off individual depots in recent months and is one of the main operators within Aberdeen City Centre.
- There are concerns over the financial viability of some bus services related to their ability to recover from Covid19 and regaining lost patronage.

- Improved cycle connections are proposed between Kingswells Park & Ride and Westhill but not yet committed.

7.3.2 This chapter has considered risk & uncertainty in the context of A944 and A9119 corridors. The identified study risks are manageable and, in many cases, would be overcome by further detailed assessment / business cases for any options taken forward. However, the uncertainties are more fundamental and should be monitored, as these concern the key components of the corridor-based demand and key services that operate along these corridors. These uncertainties should be monitored, and progress updated as appropriate if further clarity becomes available on any issue.

8 Prioritisation and Delivery Programme

8.1 Overview

- 8.1.1 It is clear from the appraisal undertaken that each of the delivery packages considered has merit in being taken forward for further consideration for detailed design and business case development. Considering the appraisal outcomes and to provide context and a framework for delivery, this section focuses on the broad prioritisation of the delivery packages and the options contained within.
- 8.1.2 To support both the Climate Change (Scotland) Act (2020) and the NTS2, and deliver on the aims and aspirations of the City Centre Masterplan, Sustainable Urban Mobility Plan and Roads Hierarchy principles, it is clear that a step-change in public transport and active travel provision and use is needed. This requires an improved sustainable travel network to enable efficient access for existing users of the corridors and future users in line with the levels of prospective development.
- 8.1.3 As established through the appraisal, to obtain this significant level of step-change in modal shift, delivery of options in isolation will not be enough and thus why these options were packaged to provide differing levels of required works and investment. Recognising the fact that most options are both feasible and deliverable from an engineering perspective, they may not be feasible from a financial perspective as these are bounded by budgetary constraints. It may, therefore, be that the final delivery of packages is a spread of options across the four designed delivery packages, almost presenting a menu of options for consideration. The aim, however, is still to create a transformative sustainable transport network along the corridors. This is an issue which would be picked up through iterations of the preferred option in line with the Commercial, Financial and Management Cases of the Outline Business Case.

8.2 Prioritisation of Options

- 8.2.1 In considering both what and where to prioritise interventions, the site audit *pro formas* act as a useful indicator. Across the modes, they identify those sections of the corridor that are currently under provisioned for in terms of infrastructure, together with the degree of prioritisation. This analysis provides a clear basis for prioritisation, e.g. by tackling the 'worst' sections first. These then provide us the '**where**'. The '**what**' is prescribed by the sustainable transport hierarchy and positions both walking and cycling as priorities in terms of identifying and implementing interventions.
- 8.2.2 This stance is further promoted via current network-based conditions. The COVID19 pandemic has led to an increase in active travel users, as people are becoming more aware of health issues and many have concerns with using public transport. Both Aberdeen City and Aberdeenshire have been successful in receiving funding from the *Spaces for People* Fund and have installed temporary measures on key routes to facilitate physical distancing procedures. The success of these temporary measures can be assessed and used as trials for further roll out of future active travel interventions. This will ensure the success of any future active travel-based option through building upon the foundations and initial users on the network. The surge in bike sales is a positive indicator for investment in cycling infrastructure and with additional downturn in bus-based patronage makes this a credible argument in the short term.
- 8.2.3 Additionally, analysis of bus journey times indicated that although bus journeys are unreliable, they often run ahead of schedule in contrast to historical evidence which indicated long bus journey times due to congestion induced impacts. This would suggest that the AWPR is providing benefits to the road network, freeing up capacity and reducing running times of bus services.

8.3 Recommendations and Delivery Programme

- 8.3.1 From the evidence obtained through this study from the *Initial Appraisal Case for Change* to this *Preliminary Appraisal*, further detailed analysis is required on the engineering feasibility of providing any of the identified options, especially those involving segregated cycle and bus lanes due to clear and obvious carriageway constraints. The AECOM A944 Cycle Feasibility report indicated that it is feasible to establish a segregated cycle route along the corridor, however, when considered alongside bus-based infrastructure, this feasibility greatly reduces at these constrained points. Whilst the STAG guidance recommends against defining preferred options (this is typically undertaken during the Outline Business Case), we note that the council aspires to improve active and sustainable travel along this corridor in the short-term.
- 8.3.2 Recognising this and the deliverability of some options over others, there would be merit in working towards the progression of a **hybrid** of the **Medium Delivery Package** supplemented by options **PTO3** and **PTO4** (to provide where possible bus lanes, on both sides of the carriageway, along both corridors) from the High/Gold packages, through the development of an Outline Business Case. This would allow for further option development, greater cost certainty and consideration of funding, procurement, delivery, and management (through the Commercial, Financial and Management cases) ultimately emerging as a preferred package of options. This would be a first step towards creating a consistent coherent network standard along the corridors. Although this recommendation leads towards the medium package, it is worth noting that many of the options within this package are also present within the High and Gold packages, with the main omission being the high-priced ticket items.
- 8.3.3 In parallel to this however, longer-term option development via business case related works could be undertaken to assess the deliverability and viability of these high priced options from the **high** and **gold** packages within the current and future travel and economic context. In developing and delivering the medium package, a key principle would be to avoid sunk costs and undertake works to protect the deliverability of either the high or gold delivery packages. In fact, this **Medium+ Delivery Package** would provide much of the required infrastructure to facilitate and assist in the delivery of further options from the high and gold packages. This package can therefore be considered as a delivery mechanism for these options in time.
- 8.3.4 This medium delivery package would achieve benefits for sustainable transport users by segregating buses and cyclists from the main flow of traffic for large parts of the corridors, whilst enabling them to maintain their position in traffic at signals. Along wider sections of the corridors, bus lanes would be present alongside cycle lanes, separated by light segregation such as orcas. Where the carriageway widths become constrained, cycle provision will be prioritised over bus lanes in line with the sustainable transport hierarchy, with bus priority infrastructure instead provided via priority signals at junctions where appropriate. The provision of floating bus stops would also enable cyclists to continue without having to stop or manoeuvre around stationary buses, however, there is the potential for conflict between cyclists and bus users accessing the vehicles. The provision of light segregation as opposed to a continuous buffer has been selected so as not to act as a restriction to other users of the network who require access to both residential and commercial properties along both the A944 and A9119. The option therefore provides the foundations to increase future sustainable modes modal share and can provide further evidence for future business case development.



Figure 8-1: Map of Options within Medium+ Delivery Package

8.3.5 The figure above highlights those areas where options could be delivered. Public transport options are highlighted by blue icons, cycle options in white, pedestrian in yellow and sustainable options in green. The purple icons indicate those junctions where both cycle and bus-based priority options will be considered for delivery. Those sections of the corridor, where constraints are less of a barrier, both cycle and bus lanes would be considered as reflected by solid white and blue lines on the map. Those links indicated by a white dashed line, indicate those sections of the corridor, where the focus would move more towards delivering cycle lanes with light segregation due to the width constraints. Adopting this approach would facilitate the integration of both bus and cycle infrastructure where possible. However, there also exists the option, based on the graphic above, to move away from providing infrastructure for both modes along both corridors and instead focussing more on cycle infrastructure along the A9119 and bus-based infrastructure along the A944. The benefits and costs of each can be more fully considered during the more detailed design work undertaken as part of any business case development.

8.3.6 Combined, this **Medium+ Delivery Package** would cost approximately **£25m** to deliver over a timeframe of approximately **five to six years**. This would provide the opportunity to assess and monitor the success of the option package in addressing the evidenced problems up to the 2040 horizon period of the RTS, accounting for any COVID-19 related changes in travel behaviour. Within this period any emerging evidence of outcomes and/or impacts of the Medium Delivery Package can be fed back into the development of the business cases to support either **the high or gold packages**. This would afford the opportunity to bring forward or delay option implementation or identification of the need to increase the level of ambition and move to a high or gold delivery package, building upon the infrastructure already in place as part of the medium+ delivery package.

8.3.7 The options within this package have been re-ordered to reflect the prioritisation that should be given to implementing each of the options within the package, also considering the required construction and infrastructure works to deliver each, taking cognisance of the interdependencies between them. This would include the requirement to undertake further detailed assessment to ascertain the deliverability aspects from an engineering perspective of the bus lanes on sections of the corridor where carriageway widths are highly constrained.

8.4 Option Delivery Prioritisation

- **ACTO4:** Identify and formalise a city centre cycle network
- **PTO5:** Changes to bus lane operational hours and enforcement
- **PTO13:** Develop Sustainable Transport Hubs
- **ACTO8:** Create cycle route on Old Lang Stracht

This initial set of options establishes a series of quick win projects. Identifying and formalising a cycle network is key before any work commences to ensure the correct and appropriate routes are identified and connections assessed. Bus lane operating hours will produce small gains across the day, while additional provision of cycle parking at Kingswells and Union Square will assist in the development and refinement of the sustainable transport hubs. The cycle route along Old Lang Stracht will support the option identified by AECOM and provide direct links between Kingswells and A944 Lang Stracht and routing to A9119.

Timescale year 1 - 2

- **ACTO2:** Review of pedestrian desire lines and installation of pedestrian friendly crossing facilities to suit
- **ACTO1:** Programme of pavement maintenance and decluttering
- **GTO2:** Improve Wayfinding and Signage
- **PTO10:** Rebrand of Kingswells Park and Ride
- **PTO11:** Advanced VMS on AWPR
- **PTO12:** Establish a Bus Service Improvement Programme (BSIP) covering the A944 and A9119 corridors

These options provide a mix of quick wins and those which will take some time and complement the delivery of future options. The BSIP is crucial to the delivery of the investment required to deliver the infrastructure changes. Therefore, establishing this ahead of time then helps design and confirm the delivery of bus shelters and bus lanes, and subsequent cycle lanes.

Timescale year 2 - 4

- **PTO8:** Reallocate all lay-by bus stops to on-street bus stops.
- **PTO6:** Bus Stop upgrade programme and stop rationalisation
- **PTO3:** Continuous Bus Lane from Westhill to Aberdeen via A944
- **PTO4:** Continuous Bus Lane from Westhill to Aberdeen City Centre via A9119
- **ACTO7c:** Replace and extend all existing advisory cycle routes with mandatory cycle lanes to provide a connected network, with the option of including light segregation
- **PTO7:** Bus Prioritisation / Pre-Signals at all signalised junctions on the corridors
- **ACTO9:** Provide advance stop lines or cycle by-passes at all signalised junctions
- **ACTO3:** Development of Green Corridors within the city centre and between development sites on the corridors
- **PTO9a:** Make Castle Street to Union terrace, bus, cycle and walk only

These remaining options will be delivered once the first two phases are complete. Bus and cycling infrastructure will be delivered in conjunction to maximise efficiencies in the works and to reduce costs.

Development of green corridors and pedestrianisation of Castle Street will be programmed to coincide with the CCMP.

Timescale year 5+

APPENDICES

Appendix A Initial Appraisal: Case for Change Public Engagement

TECHNICAL NOTE

Job Name: A944 A9119 Corridors STAG-based Appraisal

Job No: 47700

Note No: 1

Date: 29/09/2020

Prepared By: Steven Reid

Subject: Initial Appraisal: Case for Change – Public Survey Feedback

1. Introduction

- 1.1. As part of the *Initial Appraisal: Case for Change* there is a requirement within STAG guidance to undertake public engagement to achieve buy-in to the study and to assist in the development of the evidence case and subsequent option development. Due to the COVID19 pandemic and associated Government guidance, it is not viable to hold a public drop-in day as was first anticipated. Subsequently an alternative solution was sought and Stantec applied the use of ArcGIS StoryMaps to undertake the engagement process.
- 1.2. The ArcGIS StoryMaps platform provides the framework to publish an interactive and visual story, complete with mapping integration, imagery and supporting text. With Survey123 integration, Stantec included a survey as part of the StoryMap to capture the feedback of the public on the outcomes of the study thus far and the options identified.

2. The StoryMap

- 2.1. The StoryMap was live for a period between the 7th of September and 28th of September 2020, with stakeholders previously consulted on the study receiving an email invitation to complete the survey and public awareness attained through the social media channels of Aberdeen City and Shire councils and Nestrans, in addition to a wider press release by Aberdeen City Council.
- 2.2. In total the StoryMap was viewed **1,068** times over this three-week period, with an average daily view count of **43**.

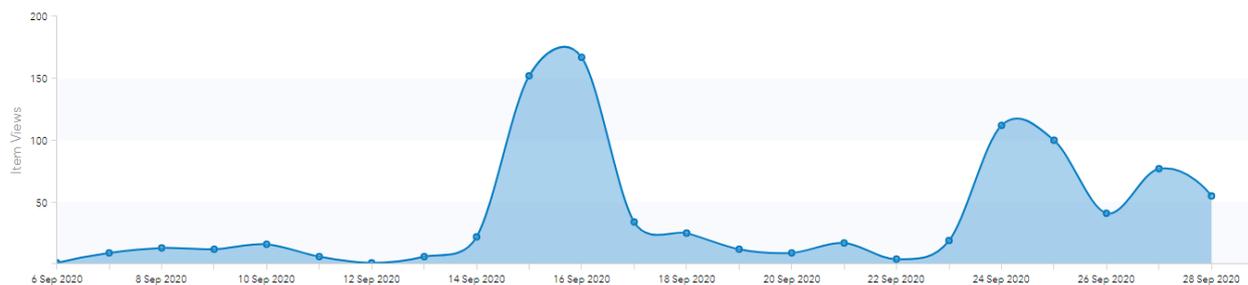


Figure-1: Profile of StoryMap Views

- 2.3. Figure 1 above, provides a trend graph outlining the number of views across the survey period. The increased spike in views around the 15th of September aligns with the press release advertising the StoryMap by Aberdeen City Council, and the second peak around the 24th of September aligns with a social media post by Nestrans with regards to the StoryMap. This graph demonstrates the power behind social media channels to communicate awareness of studies and surveys effectively.

TECHNICAL NOTE

2.4. The StoryMap contained three survey points requesting feedback from the public on the options derived for first, Active Travel and secondly Public Transport. The last point was to capture any other general feedback. The responses received to each of these elements were not as high as the number of views the StoryMap received. **57** responses were received on the Active Travel Options, **39** responses on the Public Transport Options and finally **30** responses to the any other comments section.

3. Active Travel Options – (57 Responses, 5,700 Points)

3.1. To determine the level of preference behind each of the 10 options identified for the active travel network, viewers of the StoryMap were asked to distribute 100 points across the options. Respondents had the ability to spread these points freely across as many of the options or as little of the options they were attracted too. The application of this methodology was adopted to draw out the level of support behind each of the options instead of traditional methods asking for levels of satisfaction with options or simple ranking, as these methods can often be misconstrued or skewed.

3.2. The chart below illustrates the total distribution of points across the 10 active travel options, with the table below then listing the options in order of this level of public preference.

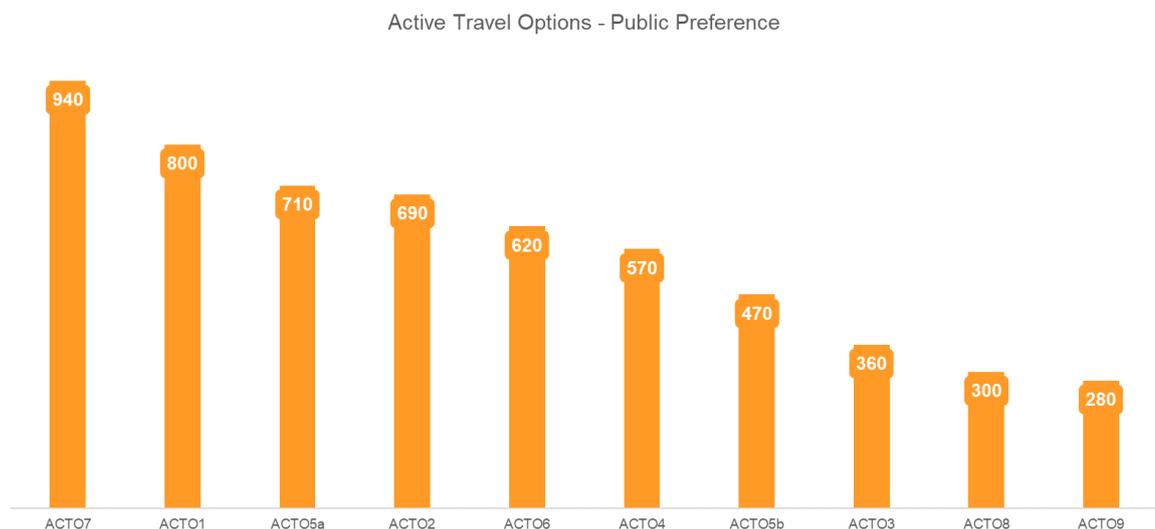


Figure-2: Active Travel Options, Public Preference

Options in order of Preference
ACTO7: Replace and extend all existing advisory cycle routes to provide a connected network.
ACTO1: Programme of pavement maintenance and decluttering.
ACTO5a: Provision of a segregated 2-way cycle lane from PrimeFour to Aberdeen City Centre along the A944
ACTO2: Review of pedestrian desire lines and installation of pedestrian friendly crossing facilities to suit.
ACTO6: Provision of a segregated 2-way cycle lane from Union Street / Holburn junction to PrimeFour via B9119
ACTO4: Identify and formalise a city centre cycle network
ACTO5b: Provision of a segregated 2-way cycle lane from PrimeFour to ARI along the A944
ACTO3: Development of Green Corridors within the city centre and between development sites on the corridors
ACTO8: Create cycle route on Old Lang Stracht.
ACTO9: Provide advance stop lines or cycle by-passes at all signalised junctions.

3.3. From the responses there appears to be two options that come out ahead of the others in terms of public support. **ACTO7** which concerns replacing and extending all existing advisory cycle routes to provide a connected and coherent network comes out on top, **140** points ahead of the next best supported option. That option is **ACTO1** a programme of pavement maintenance and decluttering to improve the pedestrian environment.

TECHNICAL NOTE

3.4. Interestingly the large investment and infrastructure package **ACTO5a** Provision of a segregated 2-way cycle lane from PrimeFour to Aberdeen City Centre along the A944 only came third in the list, **230** points behind the preferred option.

4. Public Transport Options (39 Responses – 3,900 Points)

4.1. As with the active travel options, respondents to the public transport options survey were asked to distribute 100 points across the 15 public transport options. The chart and table below highlight the level of public preference across the 15 options.

Public Transport Options - Public Preference

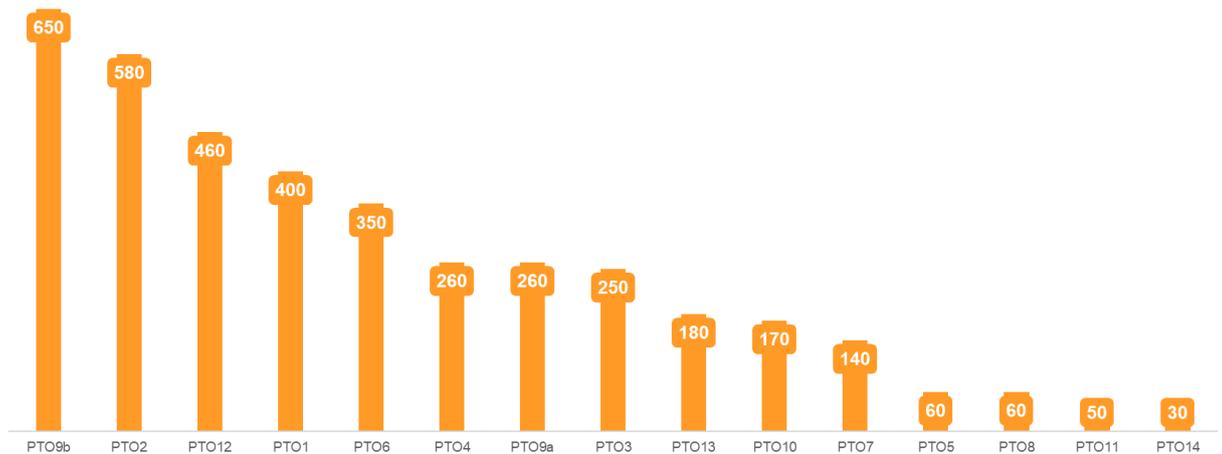


Figure-3: Public Transport Options, Public Preference

Options in order of Preference
PTO9b: Make Castle Street to Holburn Street Junction, bus, cycle and walk only
PTO2: Bus Rapid Transit on the A944 Westhill – Aberdeen City Centre, via Kingswells Park and Ride.
PTO12: Establish a Bus Service Improvement Programme (BSIP).
PTO1: Reconfigure roundabout junctions to signalised junctions, complete with bus and cycle pre-signals
PTO6: Bus Stop upgrade programme and stop rationalisation.
PTO4: Continuous Bus Lane from Westhill to Aberdeen City Centre via A9119.
PTO9a: Make Castle Street to Union terrace, bus, cycle and walk only.
PTO3: Continuous Bus Lane from Westhill to Aberdeen via A944.
PTO13: Develop Sustainable Transport Hubs.
PTO10: Rebrand of Kingswells Park and Ride.
PTO7: Bus Prioritisation / Pre-Signals at all signalised junctions on the corridors.
PTO5: Changes to bus lane operational hours and enforcement.
PTO8: Reallocate all lay-by bus stops to on-street bus stops.
PTO11: Advanced VMS on AWPR.
PTO14: North West Street to Castle Street Right Turn – Bus Only

4.2. Akin to the responses for the active travel options, two options received further support over all others. **PTO9b** concerning making Castle Street to Holburn Street junction, bus, cycle and walk only, i.e. the full length of Union Street received the most support, **70** points more than the second-best option. The second most popular option was the big-ticket option within the public transport option package, **PTO2** Bus Rapid Transit on the A944 Westhill – Aberdeen City Centre via Kingswells Park and Ride. This option was **120** points ahead of the third placed option.

4.3. The remainder of the points distribution establishes a step like distribution with two or three options closely aligned before a gap of approximately 80-100 points to the next level of options.

TECHNICAL NOTE

5. Any Other Comments

- 5.1. The final section of the StoryMap offered respondents the ability to provide further comments on both the active travel and public transport options, in addition to providing any other comments with regards to the study. The following tables contain the free text responses from this section for each of the questions.
- 5.2. In summary the key points to note are:

Active Travel Options:

- There were several comments made to support the addition of further pedestrian crossings and to adjust wait times at crossings for pedestrians.
- There are conflicting views on the provision of further cycling infrastructure, with some requesting mandatory or segregated cycle routes, while others feel there is already a sufficient provision of cycling infrastructure and focus should be applied elsewhere.

Public Transport Options:

- Several comments supported the view that an express service between Westhill and Aberdeen was required with less stops.
- There were views that new services are required providing connectivity between Westhill and the ARI, in addition to a change in the operating day to provide late night services for the ARI.

Any Other Comments:

- Overall, there was positive feedback over the consultation and the opportunity for engagement, although there is a desire for an end deliverable from the study.

TECHNICAL NOTE

Are there any other active travel options you thought were missing from the list above?

Smaller buses and more frequent service

Prioritise pedestrian crossings - everywhere. Nothing more infuriating than waiting in cold/wind/rain for lights to change as cars whizz by.

With the completion of AWPR the A944 is much busier. A crossing point is required between the Kingswells roundabout and the Green Hedges roundabout to allow walking access to Hazlehead park area

Fast trains from all suburbs

Dualling of A944 from woodend to current dual carriageway

Leaving thing as is

traffic lights at bypass roundabout should be part time. No need for lights at 8pm.

Fixing the connectivity onto the start of the cycle path at Kingswells around the "Tesco" roundabout on A944. Also, more foot traffic since McDonalds has opened.

Mandatory cycle lanes along Queen's Road

With improved cycling routes/network there needs to be multiple indoor cycling storage 'hubs'. They need to be secure, hold possible 100's bikes eg at ARI with same sized or smaller 'hubs' across the city

Safe cycle and pedestrian crossing on Lang stracht/A90 junction? Bridge here. ARI and Aberdeenshire council buildings are huge employers and will always need staff in face to face roles.

Integrated travel options: bike carriage on buses; secure bike storage at bus stops/terminus/P&R.

I feel that vehicle travel has very much been neglected in this study.

Money could be better spent in more needy parts of Aberdeen

Electric bikes?

Keep cyclists away from bus lanes.

I'd like to see both new and existing signalled crossings retimed in favour of pedestrians/cyclists. Skene Rd to Groats Rd for example makes pedestrians wait at least 2 minutes before they can cross, right beside a school.

Please can we ensure that we look to European countries who have been implementing effective cycleways for years - we can do the same in Aberdeen.

Do you have any other comments with regards to the active travel options?

Help and encourage people to purchase ebikes to use to commute into city centre

If the council is providing cycle lanes should cyclists not be charged road tax same as cars

Yes, stop trying to force cars off the road

There were no solutions listed for roundabouts (Hazelhead to city centre) - these are a real issue/dealbreaker for any cycle lane to be used.

keep cycle lanes completely separate from traffic lanes

Leave things as they are

cyclists need segregated lanes from foot and car traffic. It's possible going west from hazelhead academy all the way to westhill.

Aberdeen doesn't need any more cycle lanes, we should be spending money on repairing pavements and roads and ensuring safety for pedestrians, the elderly and disabled.

There is already a cycle path from Aberdeen out to Westhill. I'm not sure what is different with the proposals made here.

All points I had highlighted to ACC year's ago.

Something has to be done to achieve the so called lock in benefits of the AWPR

I understand the need to lower carbon emissions in the city, but the focus on cycle lanes is becoming a joke. Focus should move to improving the poor neglected walkways throughout the city.

Money could be better spent in more needy parts of Aberdeen

Will you be gritting these like roads? Who pays for the changes at 5 mile?

The Westhill roundabout badly needs pedestrian/cyclist crossings - the cycle path abandons cyclists to negotiate a busy roundabout exit at present.

TECHNICAL NOTE

Are there any other bus options you thought were missing from the list above?

Bus stop required on South side of A944 at Kingswells roundabout.

Direct, express, bus services Westhill to Aberdeen that do not call into the Westhill & PrimeFour Business Parks or Kingswells P&R. This express service should operate all day.

Discussion with bus drivers on their thoughts on routes, council to travel on several bus routes to experience the day to day challenges

Don't send every bus into prime four, have an express bus, with limited stops, that zooms along that road and rivals' cars.

I think we need to improve the quality of bus services and look at reasonable bus travel costs. More people would use public transport if it was reliable and affordable

Money could be better spent in more needy parts of Aberdeen

Multi-occupancy (car sharing) allowance in bus lanes

No - an express route is what is most needed from Westhill here to make using the bus a worthwhile consideration again.

Provision of a decent bus service to Kingswells which would get more people on it rather than running for the convenience of the bus company

Removing bus lane from Westhill to Hazelhead totally pointless

smaller buses and more frequent service

Some options are not clear to me, I did not understand what they meant to was unsure on voting. Needs to be easier to understand.

Something that makes it cheaper for a family to take bus than to drive into the city

Use of cars

Westhill town bus?

Do you have any other comments with regards to the bus options?

Bus lane timings should be consistent across the city

Bus requirements meet my current needs, so bus options are not so important to me

Can it get any worse? However, it does not make sense to make buses and cycles share - with taxis too!

Cars off union street so the area can act as a travel hub

Having worked in Westhill and lived in the city centre I can confirm that the X17 stagecoach service is excellent. Using the first bus services within the city centre is absolutely intolerable. Always late, sometimes do not arrive.

Horrible idea

I don't understand the bus gate on the Langstracht to Kingswells. Why does it need lights, the lighted roundabout provides a break in traffic every 3 minutes.

improve suspension on buses - I took one from P&R and felt every pothole, bump, and dip!

Improving or extending bus lanes won't improve the reliability if the service between WESTHILL and Aberdeen

Many bus services could be run less frequently if they were punctual. This needs a holistic approach of bus prioritisation combined with bus operators taking timekeeping seriously; synchronised clocks, driver discipline, central control, etc.

Money could be better spent in more needy parts of Aberdeen

Need to reintroduce bus service between Westhill and ARI.

Provide a better service

replace with light rail or tram

Run them after midnight especially to ARI, Health Village if people need to attend A&E or GMEDS. Or even to go to/from work at these health facilities

The buses from Westhill to the city centre became far too slow to be worth considering, so express routes are much needed, along with lower fares.

TECHNICAL NOTE

Do you have any other comments at all, with regards to the study?
Additional information on the different options (e.g. what is a "Green Corridor"?) would help inform responses.
both sides of the cartridge way need proper segregated cycle lanes. Cyclists don't want to share space with foot traffic or have to slow down at junctions to check for traffic turning into the road that they have to cycle across.
Good to see the community engagement
Great this is being looked at
Great to see this being carried out - hope to see improvements put in place soon.
Hopefully not just another study and action will be taken regards to active transport
I don't think there is a problem with the frequency of bus services between Westhill and Aberdeen. Problems with routes (non via ARI) and duration of travel.
I would like to see focus on pavements and a BSIP to go ahead ASAP. NO MORE CYCLE LANES!!!!!!!
introducing a feeder lane from Westhill Drive onto the A944 to enable Westhill traffic to flow freely onto the A944 as Westhill Drive backs up and becomes congested
It is a long overdue project and I very much like how the feedback is being gathered. Good survey strategy, thank you.
Many buses go to elrick never more than 1 or 2 people on them at best
Money could be better spent in more needy parts of Aberdeen
One-way system round union street for cars, biggest challenge is delivers to shops. On bridge street and market street car parking on double yellows is proving to be growing as an issue. Food delivery is growing, and they think they can park anywhere.
Thanks for the opportunity to review and comment
There is no need for these changes. Create a problem to ram a solution upon us due to Aberdeen City Councils green agenda! If they were really concerned sell marschial college building relocate to a small office and spend proceeds to improve the roads
Very one sided towards cyclists
Will you ignore this like you've done with others?

6. Summary

- 6.1. In summary, although the StoryMap recorded good levels of views, the translation to the number of survey responses was slightly disappointing. This could either be related to survey fatigue due to the number of other surveys recently within the Aberdeen Region or that the StoryMap did not contain anything too controversial to evoke high levels of responses.
- 6.2. Overall, from the survey responses that were received, the key points to note are:
 - **ACT07** received the most support from the list of active travel options. This option at its core, involves replacing and extending the current advisory cycle lanes to provide a connected and coherent cycle network without the need for large scale infrastructure works.
 - **ACT09b** was the most preferred option from the list of public transport options, which highlights public support behind the removal of private vehicles from the length of Union Street in favour of bus, cycle, and walking.
- 6.3. The feedback from this survey will now go to support the public acceptability element of the *Preliminary Appraisal* for each of the options taken forward for further appraisal as part of this study.

Appendix B Outline High Level Option Costings

B.1.1 The tables that follow present the calculations and sources behind the indicative costings for those options where previous costings have not been provided from other sources.

Option:	ACTO1: Programme of pavement maintenance and decluttering									
Source:	SPON's Civil Engineering and Highway Works Price Book 2019									
Optimism Bias:	44%									
Calculation:		Road	Length	Width	Sides	Area	Unit Cost	Cost	Cost + OB	If Kerbing required
		Albyn Place	800m	3m	2	4,800m ²	£34.83	£167,184	£240,744	+£80,000
		Queen's Road	970m	3m	2	5,820m ²	£34.83	£202,710	£291,903	+£97,000
		West North Street	600m	3m	2	3,600m ²	£34.83	£125,388	£180,558	+£60,000
		Lang Stracht	1,900m	3m	2	11,400m ²	£34.83	£1,026,000	£1,477,440	+£190,000

Option:	ACTO2: Review of pedestrian desire lines and installation of pedestrian friendly crossing facilities to suit									
Source:	https://www.wiltshire.gov.uk/highways-works-cost https://www.essexhighways.org/uploads/LHP/MG/15_ECCLHPmembersGuideAPPENDIX1a.pdf									
Optimism Bias:	44%									
Calculation:	<ul style="list-style-type: none"> Toucan Crossing - £58,000 - £70,000 Pair of Dropped Kerbs and Tactile Paving - £4,000 With OB £89,280 - £106,560 per Crossing 2 Crossings = £179,000 - £214,000 									

Option:	ACTO3: Development of Green Corridors within the city centre and between development sites on the corridors									
Source:	SPON's Civil Engineering and Highway Works Price Book 2019									
Optimism Bias:	44%									
Calculation:		Road	Length	Width	Sides	Area	Unit Cost	Cost	Cost + OB	
		Albyn Place – Footway	800m	3m	2	4,800m ²	£34.83	£167,184	£240,744	
		Albyn Place – Cycleway	800m	1.5m	2	2,400m ²	£68.88	£150,656	£216,944	
		Albyn Place – Road	800m	6m	1	4,800m ²	£53.56	£198,464	£285,788	
		Queen's Road – Footway	970m	3m	2	5,820m ²	£34.83	£202,710	£291,903.26	
		Queen's Road – Cycleway	970m	1.5m	2	2,910m ²	£68.88	£182,670	£263,045.38	
		Queen's Road – Road	970m	6m	2	5,820m ²	£53.56	£240,637	£346,518.14	

Option:	ACTO4: Identify and formalise a city centre cycle network
Source:	https://www.wiltshire.gov.uk/highways-works-cost
Optimism Bias:	44%
Calculation:	<ul style="list-style-type: none"> 20 mph zone, coloured entry treatment including signing, lining, and street lighting costs up to £18,000

Option:	ACTO7: Replace and extend all existing advisory cycle routes to provide a connected network													
Source:	SPON's Civil Engineering and Highway Works Price Book 2019													
Optimism Bias:	44%													
Calculation:		Corridor Segment	Length (m)	Width (m)	Sides	Area (m²)	Total Length	Unit Cost for Screed plus lining option	Unit Cost for Resurface, lining and coloured limestone	Light Segregation Unit Cost (3m Separation Orcas)	Cost of Screed Option + Light Segregation	Cost of Screed Option + Light Segregation + OB	Cost of Resurface Option + Light Segregation	Cost of Resurface Option + Light Segregation + OB
	E	1,385	1.5	2	4,155	2,770	£20	£62.98	£60	£130,190	£187,474	£313,619	£451,612	
	F	2,250	1.5	2	6,750	4,500	£20	£62.98	£60	£211,500	£304,560	£509,490	£733,666	
	G	1,500	1.5	2	4,500	3,000	£20	£62.98	£60	£141,000	£203,040	£339,660	£489,110	
	H	800	1.5	2	2,400	1,600	£20	£62.98	£60	£75,200	£108,288	£181,152	£260,859	
	I	500	1.5	2	1,500	1,000	£20	£62.98	£60	£47,000	£67,680	£113,220	£163,037	
	K	550	1.5	2	1,650	1,100	£20	£62.98	£60	£51,700	£74,448	£124,542	£179,340	
	L	1,500	1.5	2	4,500	3,000	£20	£62.98	£60	£141,000	£203,040	£339,660	£489,110	
	M	900	1.5	2	2,700	1,800	£20	£62.98	£60	£84,600	£121,824	£203,796	£293,466	
	N	1,000	1.5	2	3,000	2,000	£20	£62.98	£60	£94,000	£135,360	£226,440	£326,074	
	O	1,400	1.5	2	4,200	2,800	£20	£62.98	£60	£131,600	£189,504	£317,016	£456,503	
	P	1,100	1.5	2	3,300	2,200	£20	£62.98	£60	£103,400	£148,896	£249,084	£358,681	
Q	1,500	1.5	2	4,500	3,000	£20	£62.98	£60	£141,000	£203,040	£339,660	£489,110		

Option:	ACTO8: Create a cycle route on Old Lang Stracht							
Source:	SPON's Civil Engineering and Highway Works Price Book 2019							
Optimism Bias:	44%							
Calculation:	Road	Length	Width	Sides	Area	Unit Cost	Cost	Cost + OB
	Old Lang Stracht	1,000m	5.5m	2	11,000m ²	£35.08	£383,130	£551,700

Option:	PTO1: Reconfigure roundabout junctions to signalised junctions, complete with bus and cycle pre-signals									
Source:	SPON's Civil Engineering and Highway Works Price Book 2019									
Optimism Bias:	44%									
Calculation:	Road	Length (m)	Width (m)	Area (m²)	Crossings	Unit Cost for Works	Unit Cost for Dropped Kerbs, tactile and Rails	Utilities	Cost	Cost + OB
	Anderson Drive	40	40	1,600	4	£62.98	£4,140	£750,000	£860,568	£1,239,218
	Queen's Cross	40	40	1,600	4	£62.98	£4,140	£750,000	£860,568	£1,239,218
	Queen's Gate	30	25	750	4	£62.98	£4,140	£750,000	£807,348	£1,162,580
	King's Gate	50	50	2,500	4	£62.98	£4,140	£750,000	£916,450	£1,319,688

Option:	PTO3: Continuous Bus Lane from Westhill to Aberdeen via A944						
Source:	https://greenerjourneys.com/wp-content/uploads/2014/06/Bus-infrastructure-report-June-2014.pdf						
Optimism Bias:	44%						
Calculation:	Corridor Segment	Length (m)	Lanes	Total Length	Unit Cost P/M	Cost	Cost + OB
	A	2,150	2	4,300	£150	£645,000	£928,800
	B	350	2	700	£150	£105,000	£151,200
	C	1,400	2	2,800	£150	£420,000	£604,800
	D	1,100	2	2,200	£150	£330,000	£475,200
	E	1,385	2	2,770	£150	£415,500	£598,320
	F	2,250	2	4,500	£150	£675,000	£972,000
	G	1,500	2	3,000	£150	£450,000	£648,000
	H	800	2	1,600	£150	£240,000	£345,600
	I	500	2	1,000	£150	£150,000	£216,000
	K	550	2	1,100	£150	£165,000	£237,600

Option:	PTO4: Continuous Bus Lane from Westhill to Aberdeen City Centre via A9119						
Source:	https://greenerjourneys.com/wp-content/uploads/2014/06/Bus-infrastructure-report-June-2014.pdf						
Optimism Bias:	44%						
Calculation:	Corridor Segment	Length (m)	Lanes	Total Length	Unit Cost P/M	Cost	Cost + OB
	L	1,500	2	3,000	£150	£450,000	£648,000
	M	900	2	1,800	£150	£270,000	£388,800
	N	1,000	2	2,000	£150	£300,000	£432,000
	O	1,400	2	2,800	£150	£420,000	£604,800
	P	1,100	2	2,200	£150	£330,000	£475,200
	Q	1,500	2	3,000	£150	£450,000	£648,000

Option:	PTO6: Bus Stop upgrade programme and stop rationalisation						
Source:	https://www.essexhighways.org/uploads/LHP/MG/15_ECCLHPmembersGuideAPPENDIX1a.pdf						
Optimism Bias:	44%						
Calculation:	Bus Stops (Approx)	% of Bus Stops to upgrade	% of Bus Stops to add RTPI	2-bay metal framed passenger including mains lighting	RTPI	Cost	Cost + OB
	150	50%	20%	£10,000	£12,000	£1,110,000	£1,598,400

Option:	PTO8: Reallocate all lay-by bus stops to on-street bus stops				
Source:	SPON's Civil Engineering and Highway Works Price Book 2019				
Optimism Bias:	44%				
Calculation:	Bus Stops to infill	Bus Layby Infilling	Footway works	Cost	Cost + OB
	9	£11,539	£5,659	£154,700	£222,768