

A947 Multi-Modal Corridor Study

Outline Business Case – Socio-Economic Case

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Quality information

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1. The Socio-Economic Case

1.1 Introduction

This chapter presents the Socio-Economic Case for the A947 Multi-Modal Corridor Study. It draws on the outcomes of the detailed appraisal, including an assessment of the individual schemes within the OBC package for both monetised and non-monetised impacts, in terms of economic, social and environmental benefit.

1.2 Methodologies, Assumptions and Data

Scottish Transport Appraisal Guidance (STAG) is the appraisal framework developed by the Scottish Government to aid transport planners and decision-makers in the development of transport policies, plans, programmes and projects in Scotland. It is a requirement that all transport projects are appraised in accordance with STAG where Scottish Government support or approval is required.

There are four parts to the STAG process as follows:

- Initial Appraisal (case for change) – an analysis of present and future problems, issues, constraints, and opportunities; the development of objectives; and option generation and sifting to establish the case for change – this is captured through the Strategic Case;
- Preliminary Appraisal – a largely qualitative appraisal of impacts, designed to decide whether a proposal should proceed, subject to meeting the planning objectives and fitting with relevant policies;
- Detailed Appraisal – a detailed appraisal of the options taken forward from the preliminary appraisal with specific consideration given to the transport planning objectives (TPOs), STAG criteria (environment; climate change; health, safety and wellbeing; economy; and equality and accessibility), cost to Government, implementability (deliverability), and risk and uncertainty; and
- Post-Appraisal – development of a monitoring and evaluation plan to set out how the preferred option(s) will be assessed against the original appraisal once investment is committed and following implementation.

The focus of this chapter is the reporting of the detailed appraisal. It includes a mix of qualitative and quantitative assessment, and uses the DfT's Active Mode Appraisal Toolkit (AMAT) to assess active travel options where this is deemed appropriate¹.

1.3 Detailed Appraisal

The A947 Multi-Modal Corridor Study is one of several corridor studies being progressed by Aberdeen City Council (ACC) in light of the changes to travel patterns associated with the opening of the Aberdeen Western Peripheral Route (AWPR), as well as other recent developments and changes to behaviour following the COVID-19 pandemic.

To prepare for the detailed appraisal stage, ACC undertook a review of the remaining individual options following the preliminary appraisal stage and grouped the options into four discrete categories as follows:

- Table 1 – options to be progressed directly to detailed design and included within the recommended package of interventions in the OBC (with no further appraisal required);
- Table 2 – options to be subject to further appraisal with a view to potential inclusion in the OBC at the end of this process;
- Table 3 – options to be reserved for internal appraisal by ACC (removed from the OBC corridor study and to be progressed separately); and

¹ The options selected for assessment using AMAT are those most likely to achieve modal shift, taking account of option route length and change in extent of physical infrastructure provision.

- Table 4 – options to be progressed by ACC as ‘quick wins’ (removed from the OBC corridor study and to be progressed separately).

This meant that whilst the final package of options, referred to as the OBC package, comprises of Table 1 and Table 2 options, only Table 2 options were subject to the detailed appraisal process. Furthermore, the detailed appraisal has been undertaken at an individual scheme level rather than at the package level, noting the differing pathways for certain schemes (i.e. schemes with no further appraisal identified etc.). Information regarding the overall option assessment process leading to the detailed appraisal stage, including the options included in each category is provided in the Strategic Case (Section 2.11).

1.3.1 Final Options for Detailed Appraisal

The final reviewed options that progressed to the detailed appraisal are presented in Table 1-1.

Table 1-1 Final Options for Detailed Appraisal (Table 2 options only)

Option	Description
AT26	Improve active travel connectivity between the A947 study area and TECA
AT31	Improve active travel links between the Riverside Path and housing within Dyce
AT33	Provide improved active travel links between Dyce Rail Station and the A947 and the eastern section of Dyce, particularly along Station Road
AT35a	Implement improvements to develop a mixed traffic street (which allows for safe, on-road cycling) on the local network west of the A947, incorporating Bankhead Road, Greenburn Road and Millhill Brae
AT41a/b	Improve active travel access to the retail park at the Bucksburn Roundabout
AT43	Improve active travel connection between the A947 and the B977, utilising a section of the old A947 (pre-AWPR)
AT48a	Implement active travel improvements to support highest practicable level of service on the A947 between the Bucksburn Roundabout and Riverview Drive Roundabout North
AT51	Implement with-flow segregated cycleway on Old Meldrum Road
AT52	Implement two-way segregated cycleway on Old Meldrum Road
AT58	Implement shared use path on Dyce Drive between the A947 and Kirkhill Industrial Estate to the north of Aberdeen International Airport
AT61a	Implement package of active travel measures on Victoria Street
AT65	Implement streetscape improvements and widened pavements along Mugiemoss Road
PT2	Conduct a traffic signal review to consider bus priority at all traffic signals along the A947 corridor
O2	Review the layout of the Victoria Street/Skene Place Junction
O3	Review the layout of the Riverview Drive/Balloch Way Junction
O4	Review the layout of the Riverview Drive/Todlaw Walk Junction
O5	Review the layout of the Riverview Drive/Netherview Avenue Junction
O7	Review the layout of the A947/Stoneywood Road Junction at Co-Op/Marks and Spencer
O8	Review the layout of the A947/Stoneywood Brae Junction
O10	Review layout of the A947/McDonalds access road junction
O16	Implement package of measures to support implementation of a 20-minute neighbourhood in Dyce
O25	Implement access only restrictions for general traffic on Victoria Street

Option	Description
O26	Implement one-way restrictions for general traffic on Victoria Street

The options presented in Table 1-1 were subject to a STAG-based detailed appraisal against the following:

- TPOs;
- STAG criteria (environment; climate change; health, safety and wellbeing; economy; and equality and accessibility);
- Deliverability criteria; and
- Cost to Government.

In addition, consideration was also given to Statutory Impact Assessment (SIA) criteria.

Each option was appraised using a seven-point assessment scale, scoring the options from major positive impact to major negative impact. The detailed appraisal enabled the performance of options to be understood in order to inform the final OBC package specification. The detailed appraisal recommendations are summarised in Table 1-2, with full details including individual scoring and rationale for each option provided in the Detailed Appraisal Report.

Table 1-2 OBC Package Finalisation (Table 2 Elements)

Option	Detailed Appraisal Outcome	OBC Package
AT26	While this option has minor positive impacts across a number of the appraisal criteria, the assessment determined that key components of the intervention could be considered by the ACC as 'quick wins' outside of the package to be progressed as part of the OBC.	No
AT31	The option was assessed to add to the existing active travel network and increase connectivity between Riverview Drive and Riverside Path. This included minor positive impacts across the appraisal criteria, including expected uptake of active travel for leisure trips in the study area.	Yes
AT33	Together with Option O2, AT33 offers complementary support for an overall integrated active travel strategy in the Victoria Street area. It was also assessed to offer minor positive impacts across the appraisal criteria.	Yes
AT35a	The option adds to the existing active travel network, supporting improvements to provision in the west of the study area.	Yes
AT41a/b	Improves active travel provision from the north of Old Meldrum Road to the retail park at Bucksburn Roundabout. The proposed works include a shared use facility or a carriageway reduction to facilitate a segregated two-way cycleway – the preferred design solutions are still to be identified.	Yes
AT43	The opportunity for substantial connectivity improvement was assessed to be limited by existing constraints on B977 corridor. While this option does enact changes to the northern extent of Option AT59, the assessment identified the only real benefit is to support accessibility and connection between bus stops on A947; however, such an impact was not considered significant.	No
AT48a	The option offers positive impacts across the majority of the appraisal criteria, supporting the promotion of an overall coherent and connected active travel network.	Yes
AT51	This option was identified to provide a higher level of service and safety compared to Option AT52 (assessed below). The option ties into active travel proposals at the south end of Old Meldrum Road, supporting integrated active travel for the north-west of the city.	Yes

Option	Detailed Appraisal Outcome	OBC Package
AT52	This option was assessed to have a similar impact to Option AT51 and therefore a decision was required between the options. The with-flow segregation on Option AT51 was considered to provide higher level of service for users; whilst Option AT52 was also assessed to be less safe in terms of vehicle crossovers and junctions, leading to a decision not to take it forward to the OBC package.	No
AT58	Option satisfies a gap in the northern part of the network, supporting a coherent and connected active travel network; it offers positive impacts across most of the appraisal criteria. Technical limitations need further consideration.	Yes
AT61a	Includes an overarching strategy to deliver an active travel environment in the Victoria Street area. This option offers moderate positive impacts on health, safety and wellbeing, wider economic impacts, accessibility and equality, and minor positive impacts across several other appraisal criteria.	Yes
AT65	Despite minor positive impacts across many appraisal criteria, the key components of this option could be considered by ACC as 'quick wins' – it was therefore not recommended for inclusion in the OBC package.	No
PT2	Adapting signals to improve bus priority with approach detection would only improve bus through-flow when buses are close to the front of queuing traffic. This is unlikely to lead to significant improvements to bus journey times.	No
O2	Junction layout alterations considered in conjunction with options to improve active travel infrastructure and safety support an overall integrated active travel strategy in the Victoria Street area; particularly supplementing Option AT33.	Yes
O3	The principles of these options are required as part of Option AT48a. As part of the assessment, the net impacts were assessed to be better under Option AT48a which has been chosen for progression; rather than Option O3, O4 and/or O5.	No
O4		No
O5		No
O7	Junction layout alterations can be considered in conjunction with options to improve active travel infrastructure and safety in this part of the study area. Both O7 and O8 have neutral impacts across most of the appraisal criteria.	Yes
O8		Yes
O10	Junction layout alterations can be considered in conjunction with Option AT41 to improve active travel infrastructure and safety in this part of the study area.	Yes
O16	It was determined that this option is not required in its own right to deliver benefits against the TPOs. In addition, the assessment noted that the OBC package could deliver against the principles associated with 20-minute neighbourhoods without this intervention. This led to the option being discounted at this stage.	No
O25	The option was assessed to deliver moderate negative impacts in terms of economy, with public accessibility also identified a significant potential risk. Furthermore, it was determined that it would be challenging to implement this option without impacting access to public services, commercial units and Dyce railway station. The option was therefore not recommended to be progressed at this time.	No
O26	The assessment identified complementary benefits for the wider package of measures being considered for Victoria Street, furthering the delivery of an integrated active travel strategy.	Yes

1.3.2 OBC Package Composition

A final OBC package was compiled comprising of the Table 2 options brought forward from the detailed appraisal recommendations discussed in Section 1.3.1, and the Table 1 options which progressed straight to OBC without further appraisal. The exception to Table 1 options relates to Option AT8 and AT19 which were subsequently determined not to be included – these are as follows:

- Option AT8 (Reconfigure the Auchmill Road/Old Meldrum Road junction to improve connections for pedestrians and cyclists): a decision was made for junction proposals at this location to be progressed and consulted on as part of the A96 corridor study design.
- Option AT19 (Implement pedestrian crossing facilities at the Old Meldrum Road/Mugiemoss Road Junction): upon review, junction alterations now delivered as part of the Barratt Homes development (along Mill Drive) are considered to supersede the requirement for this option.

Table 1-3 identifies the 26 options in the final OBC package. This was ratified following consultation undertaken between 17th May and 14th June 2024 (as described in the Detailed Appraisal Report).

Table 1-3 OBC Package Composition

Option reference	Description
Table 1 Options (not subject to appraisal)	
AT4	Implement measures to give active travel users priority over Burnside Drive when using the shared use path on Riverview Drive
AT13	Provide a formal pedestrian crossing point to the north of the A947/Riverview Drive Roundabout to facilitate movements to the Formartine and Buchan Way
AT14	Provide a formal pedestrian crossing point to the east of the A947/Riverview Drive Roundabout
AT16	Implement formal pedestrian crossing facilities on the arms of the Riverview Drive/Stoneywood Road Roundabout
AT17	Implement signalised crossing facility on Victoria Street adjacent to Tesco
AT30	Provide direct active travel link between Dyce Drive and Riverview Drive
AT32	Implement footways on the south side of the carriageway on Pitmedden Road
AT59	Widen the shared use path on the east side of the A947 to the north of Riverview Drive
AT60	Provide continuous footways on Riverview Drive for the duration of the route
O15	Introduce placemaking and gateway features on Victoria Street
Table 2 Appraised Options	
AT35a	Implement improvements to develop a mixed traffic street (which allows for safe, on-road cycling) on the local network west of the A947, incorporating Bankhead Road, Greenburn Road and Millhill Brae
AT41a/b	Improve active travel access to the retail park at the Bucksburn Roundabout
O10	Review layout of the A947/McDonalds access road junction
AT31	Improve active travel links between the Riverside Path and housing within Dyce
AT33	Provide improved active travel links between Dyce Rail Station and the A947 and the eastern section of Dyce, particularly along Station Road
AT61a	Implement package of active travel measures on Victoria Street
O2	Review the layout of the Victoria Street/Skene Place Junction
O26	Implement one-way restrictions for general traffic on Victoria Street
AT51	Implement with-flow segregated cycleway on Old Meldrum Road

Option reference	Description
O7	Review the layout of the A947/Stoneywood Road Junction at Co-Op/Marks and Spencer
O8	Review the layout of the A947/Stoneywood Brae Junction
AT48a	Implement active travel improvements to support highest practicable level of service on the A947 between the Bucksburn Roundabout and Riverview Drive Roundabout North
AT58	Implement shared use path on Dyce Drive between the A947 and Kirkhill Industrial Estate to the north of Aberdeen International Airport

1.4 Benefits Analysis

This section documents the appraisal results for the Table 2 options recommended for inclusion in the OBC package. Whilst the OBC package contains some Table 1 options, given they were not subject to further assessment at the detailed appraisal stage, they are not represented in this section. As previously noted, the detailed appraisal considers the TPOs, STAG and SIA criteria. The seven-point STAG assessment scale used is shown in Table 1-4.

Table 1-4: Assessment Scale

Impact	Description
Major positive impact (+3)	The option is expected to deliver large benefits or positive impacts – if this applies to a number of criteria it would be expected to assist in making a strong case for funding the scheme.
Moderate positive impact (+2)	The option is anticipated to have moderate benefits or positive impacts. Moderate benefits and impacts across a range of criteria would be expected to contribute significantly in terms of making the case for funding the scheme.
Minor positive impact (+1)	The option is anticipated to have only a small benefit or positive impact. Small benefits or impacts are those which are worth noting but may not be sufficient to make a case for funding the scheme.
Neutral impact (0)	The option is anticipated to have no or negligible benefit or negative impact.
Minor negative impact (-1)	The option is anticipated to have only a minor negative impact. Minor negative impacts are those which taken in isolation against individual criteria may not negate a scheme being progressed, but could do so if taken together across criteria.
Moderate negative impact (-2)	The option is anticipated to have a moderate negative impact. If the option has a moderate negative impact against number of criteria it could impact significantly in terms of the case for funding the scheme.
Major negative impact (-3)	Major negative impacts are a key consideration in considering whether to progress options. Major impacts against one or more criteria could represent potential 'show stoppers' in terms of delivery.

The Detailed Appraisal Report, provided to ACC under separate cover, outlines the appraisal approach, the full assessment of the options against TPOs, STAG criteria, SIA criteria, cost to Government, and deliverability criteria noting key risks and uncertainties, and consultation and engagement activities, which inform the public acceptability of the options.

1.4.1 Assessment against the TPOs

As set out in the Strategic Case, two TPOs are identified for the study:

- **TPO1** – Increase the number of walking trips in the study area by 20% within 5 years of project delivery (against a 2024 baseline); and
- **TPO2** – Increase the number of cycling trips in the study area by 20% within 5 years of project delivery (against a 2024 baseline).

An assessment against these TPOs has been undertaken highlighting that:

- Active travel measures on Victoria Street (Option AT61a) are expected to deliver the highest impact, providing a major positive impact in terms of increased demand for cycling trips.
- Three options (AT61a, AT58 and O26) are expected to provide at least a moderately positive impact on both TPOs.
- Majority of options were assessed to contribute a minor benefit impact against at least one TPO.

A summary of performance against the TPOs is provided in Table 1-5 for each option.

Table 1-5: Appraisal against the TPOs

Option	TPO1	TPO2	Summary
AT35a	+1	+1	This option delivers improved active travel facilities on the local road network to the west of the A947, incorporating Bankhead Road, Greenburn Road and Millhill Brae. The implementation of quiet route measures, including on Millhill Brae and Greenburn Road also support this, as they are the main access points for Stoneywood School. The measures are assessed to promote walking/wheeling and/or cycling to this school, encouraging a minor increase in active travel use.
AT41a/b	+1	+1	AT41a/b provides improved active travel access to the retail park at Bucksburn Roundabout and indirectly to the local area west of the A947 through the creation of either; a shared use facility between the A947 crossing and the retail park, or a carriageway width reduction to facilitate a segregated two-way cycleway (the latter has the potential to create a moderate positive impact for TPO2 should it be identified as preferred). Both of the variants to this option are expected to enhance the active travel environment in the area leading to an increase in walking and cycling trips.
O10	+1	0	This option introduces a narrowing / repositioning of the A947/McDonalds access road junction to further protect pedestrians using an at-grade crossing north of the access road. The assessment determined it is likely to have a greater impact on walking/wheeling (minor positive impact) than cycling (neutral impact) trips.
AT31	+1	+1	The introduction of measures, including a new bound surface and dropped kerbs, are expected to enhance the active travel environment between the large residential areas in the centre of Dyce and the Riverside Path, particularly delivering benefits for leisure trips. The assessment is identified as minor positive noting the improvements largely relate to the formalisation of an existing active travel desire line.
AT33	+1	+2	The introduction of a one-way system on Station Road and adjacent streets is expected to create a space within the centre of Dyce which is more attractive to those not travelling in a private vehicle. The provision of a contra-flow cycle lane is assessed to facilitate increases in cycling, alongside improved active travel infrastructure which will make it easier to walk, wheel and cycle to access rail services. The option will therefore improve the overall accessibility and seamless connectivity to neighbouring locations such as Aberdeen.
AT61a	+2	+3	This option provides opportunity to improve accessibility and active travel opportunities in the 'heart' of Dyce. The introduction of active

Option	TPO1	TPO2	Summary
			travel measures along Victoria Street including a reduced speed limit, removal of on-street parking and mixed traffic street measures, together with sections of new segregated cycleway are envisaged to facilitate an increase in walking, wheeling and cycling trips in the centre of the study area. The extent of the measures proposed in this option are assessed to provide a moderate to significant positive impact.
O2	+1	+1	The simplification of traffic movements to and from Victoria Street by introducing a one-way system on Station Road, Merrivale and Skene Place, alongside the contra-flow cycle lane proposed in Option AT33, is expected to create a space within the centre of Dyce which is more attractive to those not travelling in a vehicle. This could facilitate an increase in the number of walking, wheeling and cycling trips in this part of the study area.
O26	+2	+2	The reprioritisation of the A947 along Riverview Drive enables the opportunity to implement one-way restrictions for general traffic on Victoria Street. While further assessment is required to better understand the impacts this option would have on residents, local businesses, and key transport service providers, it is assessed to create a space within the centre of Dyce which is more attractive to those not travelling in a vehicle. It is expected to improve the active travel environment in Dyce, providing support for an increase in the number of walking, wheeling and cycling trips in the centre of the study area.
AT51	0	+2	Implementation of a with-flow segregated cycleway on Old Meldrum Road, with an expected moderate positive impact on the number of cycle trips.
O7	0	0	The option seeks to address the high frequency of illegal turning manoeuvres occurring from vehicles continuing straight through the 'left only' exit from Stoneywood Road to the Co-op and Marks and Spencer retail access at Beech Manor. The option is not expected to generate a significant impact on increasing the number of walking, wheeling and cycling trips, however will improve operational performance.
O8	0	+1	The option seeks to address concerns about vehicle acceleration as the carriageway transitions from single to dual carriageway at the A947/Stoneywood Brae junction. The option is not expected to generate a significant impact on increasing the number of walking, wheeling and cycling trips, however will improve operational performance.
AT48a	+1	+2	This option implements new shared use and segregated cycleway facilities between the Bucksburn Roundabout and Riverview Drive Roundabout North, creating a more coherent and connective active travel network. This option has therefore been assessed to facilitate an increase in the number of walking, wheeling and cycling trips in the study area.
AT58	+2	+2	This option provides the opportunity to promote active travel access towards key employment areas in the A947 study area. The implementation of a shared use path on Dyce Drive between the A497 and Kirkhill Industrial Estate, including a reduced speed limit and priority pedestrian crossings on Dyce Drive between Pitmedden Road and the Industrial Estate is expected to increase the number of walking, wheeling and cycling trips to a key employment area as well as facilitating trips between Kirkhill Industrial Estate and the Formartine and Buchan Way leading to a moderate positive impact.

1.4.2 Assessment against the STAG Criteria

The STAG appraisal has assessed the benefits and disbenefits of the scheme options against the criteria of the environment; climate change; health, safety and wellbeing; economy; and equality and accessibility. The scores for each option are presented in Table 1-6.

Table 1-6: STAG Criteria Assessment

Option	Description	Environment								Climate Change			Health, Safety and Wellbeing					Economy		Equality and Accessibility				
		Biodiversity and Habitats	Geology and Soils	Land Use	Water, Drainage and Flooding	Air Quality	Historic Environment	Landscape	Noise and Vibration	Greenhouse Gas Emissions	Vulnerability to Effects of Climate Change	Potential to Adapt to Effects of Climate Change	Accidents	Security	Health	Access to Health and Wellbeing Infrastructure	Visual Amenity	Transport Economic Efficiency (TEE)	Wider Economic Impacts (WEI)	Public Transport Network Coverage	Active Travel Network Coverage	Comparative Access by People Group	Comparative Access by Geographic Location	Affordability
AT35a	Implement improvements to develop a mixed traffic street (which allows for safe, on-road cycling) on the local road network to the west of the A947, incorporating Bankhead Road, Greenburn Road and Millhill Brae	0	0	0	0	0	0	0	+1	0	0	0	+1	+1	+1	+1	0	+1	0	0	+1	+1	+1	+1
AT41a	Improve active travel access to the retail park at the Bucksburn Roundabout (Shared use)	-1	0	0	0	0	0	0	+1	0	0	+1	+1	+1	+1	+1	0	+1	+1	0	+1	+1	+1	+1
AT41b	Improve active travel access to the retail park at the Bucksburn Roundabout (Segregated)	0	0	0	0	0	0	0	0	0	0	+1												
O10	Review layout of the A947/McDonalds access road junction	0	0	0	0	0	0	0	0	0	0	0	+1	0	0	0	0	0	0	0	0	0	0	0
AT31	Improve active travel links between the Riverside Path and housing within Dyce	0	0	0	0	0	0	0	0	0	0	0	0	+1	+1	+1	0	+1	0	0	+1	+1	0	+1
AT33	Provide improved active travel links between Dyce Rail Station and the A947 and the eastern section of Dyce, particularly along Station Road	0	0	0	0	0	0	0	0	0	0	0	+1	+1	+1	+1	0	+1	0	0	+1	+1	+1	+1
AT61a	Implement package of active travel measures on Victoria Street	-1	0	0	0	0	0	0	+1	+1	-1	+1	+2	+1	+2	+2	+1	+1	+2	0	+2	+2	+1	+2
O2	Review the layout of the Victoria Street/Skene Place Junction	0	0	0	0	0	0	0	+1	0	0	0	+1	+1	0	0	0	0	0	0	0	0	0	0
O26	Implement one-way restrictions for general traffic on Victoria Street	0	0	0	0	+1	0	0	+1	+1	0	0	+1	+1	+1	+1	+1	+1	+1	-1	0	+1	+1	+1
AT51	Implement with-flow segregated cycleway on Old Meldrum Road	0	0	0	0	0	0	0	+1	0	0	0	+2	+1	+1	+1	0	-1	0	0	+1	+1	0	+1
O7	Review the layout of the A947/Stoneywood Road Junction at Co-Op/Marks and Spencer	0	0	0	0	0	0	0	0	0	0	0	+1	0	0	0	0	0	0	0	0	0	0	0
O8	Review the layout of the A947/Stoneywood Brae Junction	0	0	0	0	0	0	0	0	0	0	0	+1	0	0	0	0	0	0	0	0	0	0	0
AT48a	Implement active travel improvements to support highest practicable level of service on the A947 between the Bucksburn Roundabout and Riverview Drive Roundabout North	0	0	0	0	0	0	0	+1	+1	-1	+1	+2	+1	+2	+1	0	+1	+1	0	+1	+1	+1	+1
AT58	Implement shared use path on Dyce Drive between the A947 and Kirkhill Industrial Estate to the north of Aberdeen International Airport	-2	0	0	0	0	0	0	+1	+1	-1	+1	+2	+1	+1	+1	0	+1	0	0	+1	+1	+1	+1

An overall summary against each criteria is set out below:

Environment

The environmental assessment takes account of biodiversity and habitats, geology and soils, land use, water quality, drainage and flooding, local air quality, historic environment, landscape and noise and vibration considerations. As shown in Table 1-6, most of the options have been assessed to have a neutral to positive impact against the environment criteria.

Options AT41a and AT61a were assessed to have a minor negative impact against biodiversity due to the requirement for land take and the potential for removal of vegetation and habitats. Option AT58 would also require land acquisition together with the removal of vegetation adjacent to the carriageway along the eastern part of the link, with the potential for impacts to roosting bats, resulting in a moderate negative impact.

Due to the potential to influence modal shift from private car towards walking, wheeling and cycling, several options are assessed to have a minor positive impact on noise and vibration (AT35a, AT41a, AT48a, AT51, AT58, AT61a, O2 and O26).

Climate Change

The climate change appraisal assessed impacts with regard to greenhouse gas emissions, vulnerability to the effects of climate change and the potential to adapt to the effects of climate change. All options were assessed to contribute towards increases in walking, wheeling and cycling as alternatives to private car use. For most options, the impact on greenhouse gas emissions was assessed to be negligible and considered to be neutral. However, Option AT61a, through a proposed reduction to on-street parking along Victoria Street, and O26, through the implementation of one-way traffic restrictions, were assessed to deliver a minor positive impact, alongside Option AT48a and AT58.

Most of the options are anticipated to have a neutral impact with respect to vulnerability to climate change; however, AT48a, AT61a and AT58 are scored minor negative due to their proximity to the River Don or its tributaries, which put elements at increased risk of flooding.

Furthermore, many of the options have limited ability to adapt to the effects of climate change as they do not propose additional infrastructure measures. New active travel infrastructure is to be designed in such a way to adapt to the potential effects of climate change, and in accordance with relevant planning, design, engineering practice and codes. Mitigation and adaptation measures are to be considered at later design development stages to address any potential risks. For this reason, Options AT41a, AT41b, AT48a, AT58 and AT61a are scored minor positive.

Health, Safety and Wellbeing

Health, Safety and Wellbeing is assessed with respect to performance against accidents, security, health, access to health and wellbeing infrastructure and visual amenity criteria. Overall, all options are anticipated to have a positive or neutral impact against these criteria.

The proposed package measures have the potential to reduce the risk of accidents and collisions between active travel users and general traffic, with most options offering a minor positive impact. AT51, AT48a, AT58 and AT61a are considered to have a moderate positive impact due to the implementation of a segregated cycleway or reduced speed limits. Due to the small scale of Option AT31, this scored neutral against this criterion.

Increasing the number of people walking, wheeling and cycling is expected to have a positive impact on personal security due to increased natural surveillance. Whilst Options O7, O8 and O10 are unlikely to contribute to this in isolation, and therefore scored neutral, all other options have a minor positive impact.

Walking, wheeling and cycling can be one of the easiest ways to incorporate activity into daily routine, which can bring physical and mental health benefits. It can also provide access to health and wellbeing facilities, including GP surgeries, health centres and fitness facilities. Each of the 'AT' options and O26 will support uptake of physical activity, with associated positive impacts on health

and access to health and wellbeing infrastructure. AT61a scored moderate positive against both sub-criteria due to the greater level of intervention.

By encouraging and facilitating modal shift to active travel trips, the number of car trips is anticipated to reduce which would in turn enhance the visual amenity. However, the extent of this is not significant generally, with the exception being for Options AT61a and O26 which are anticipated to have a minor positive impact.

Economy

Whilst the options are not anticipated to improve journey times, access to markets, vehicle operating costs or fares, all active travel options will offer a minor improvement to journey quality.

Removal of on-street parking proposed through Option AT51 could have a detrimental impact on businesses with a frontage on the southern extents of Old Meldrum Road, which resulted in a minor negative score overall against Transport Economic Efficiency.

All other active travel options scored minor positive and O2, O7, O8 and O10 neutral.

The package of improvements on Victoria Street under AT61a is anticipated to have a moderate positive impact on wider economic impacts by enabling active travel journeys to local shops and services, transport hubs and residential areas in the centre of Dyce and to employment and training opportunities.

AT41a/b, AT48a and O26 also provide improved connectivity but to a lesser extent, scoring minor positive.

All other options were unlikely to have a direct impact result in a neutral score against wider economic impacts.

Equality and Accessibility

The options progressed to the OBC package did not target public transport coverage directly, resulting in a neutral impact for all options except for O26, which was minor negative impact due to the requirement to reroute bus services on Riverview Drive in one direction.

Option AT61a makes the strongest contribution to the active travel network coverage criteria through a variety of measures, including reduced vehicle speeds to 20mph, mixed traffic street measures, segregated cycleways, and removal of on-street parking, scoring a moderate positive benefit. All other active travel ('AT') options are anticipated to have a minor positive impact by improving the existing active travel network. Whilst other options would improve the attractiveness of active travel, they do not extend network coverage and have a neutral impact.

The biggest transport-related barrier for people on low incomes is the cost of transport, particularly the cost of public transport. Improving active travel infrastructure supports low-travel options such as walking, wheeling and cycling and benefits affordability, with Option AT61a anticipated to have a moderate positive impact while other active travel options have a minor positive impact.

All options are anticipated to make a positive or neutral impact to groups with protected characteristics and those in geographic locations at risk of transport poverty.

Further detail on the STAG criteria assessment is presented in the Detailed Appraisal Report, including the rationale for each of the scores reported in Table 1-6.

1.4.3 Assessment against the SIA

Table 1-7 reports the SIA appraisal against the Equalities Impact Assessment (EqIA); Children's Rights and Wellbeing Impact Assessment (CRWIA), Health Inequalities Impact Assessment (HIIA) and Fairer Scotland Duty Assessment (FSDA) criteria, highlighting a neutral to moderate positive impact for each option.

Table 1-7: Statutory Impact Assessment Results

Option	Description	EqIA	CRWIA	HIIA	FSDA
AT35a	Implement improvements to develop a mixed traffic street (which allows for safe, on-road cycling) on the local road network to the west of the A947, incorporating Bankhead Road, Greenburn Road and Millhill Brae	+1	+1	+1	+1
AT41a/b	Improve active travel access to the retail park at the Bucksburn Roundabout	+1	+1	+1	+1
O10	Review layout of the A947/McDonalds access road junction	0	0	0	0
AT31	Improve active travel links between the Riverside Path and housing within Dyce	+1	+1	+1	0
AT33	Provide improved active travel links between Dyce Rail Station and the A947 and the eastern section of Dyce, particularly along Station Road	+1	+1	+1	+1
AT61a	Implement package of active travel measures on Victoria Street	+2	+1	+2	+1
O2	Review the layout of the Victoria Street/Skene Place Junction	0	0	0	0
O26	Implement one-way restrictions for general traffic on Victoria Street	+1	+1	+1	+1
AT51	Implement with-flow segregated cycleway on Old Meldrum Road	+1	+1	+1	0
O7	Review the layout of the A947/Stoneywood Road Junction at Co-Op/Marks and Spencer	0	0	0	0
O8	Review the layout of the A947/Stoneywood Brae Junction	0	0	0	0
AT48a	Implement active travel improvements to support highest practicable level of service on the A947 between the Bucksburn Roundabout and Riverview Drive Roundabout North	+1	+1	+1	+1
AT58	Implement shared use path on Dyce Drive between the A947 and Kirkhill Industrial Estate to the north of Aberdeen International Airport	+1	0	+1	0

The overall impact against the SIA criteria is further summarised in Table 1-8.

Table 1-8: SIA Commentary

SIA Criteria	Assessment Commentary
EqlA	<p>The EqlA assessment demonstrates that the proposed active travel improvements are expected to support protected groups. Options that improve path surfaces, dropped kerbs and tactile paving as part of pedestrian environment improvements are anticipated to support those with mobility issues, including disabled and older people. The measures also provides an opportunity to engender confidence in vulnerable and underrepresented groups who currently do not travel actively in the study area due to a lack of sufficient facilities, such as women, who are less likely to cycle than men.</p> <p>An uptake in active travel on the corridor provides the opportunity to improve physical health and mental wellbeing outcomes. Furthermore, the assessment highlighted that there may be additional health benefits resulting from improved air quality due to reduced emissions attributed to modal shift away from private vehicles. This is expected to benefit those who are more vulnerable to air pollution, including children, older people, pregnant women and disabled people.</p> <p>The assessment also notes that construction activities may result in negative impacts for local communities, which could have a negative impact on groups who are more vulnerable to noise, vibration and air quality such as children, older people, disabled people and pregnant women. However, it is considered that these impacts would be temporary and limited.</p> <p>All active travel options scored minor positive, with a moderate positive impact for Option AT61a.</p>
CRWIA	<p>The CRWIA assessment determines if the options might impact on children and young people. The package options to enhance active travel are expected to benefit children by improving safety, which is a key issue with regards to transport. Increased active travel amongst children and young people is also expected to provide health benefits associated with increased physical activity. Embedding active lifestyles at a younger age will also lead to longer-term health benefits.</p> <p>Overall, all active travel options were scored minor positive with the exception of AT58, which is remote from communities and considered to have a neutral impact.</p>
HIIA	<p>The HIIA assesses where the options can support a reduction in health inequalities. The assessment highlights that access to active travel and transport systems in the study area will encourage active living and regular physical activity which is an important factor in combatting obesity and improving physical health, as well as having beneficial impacts on mental health and wellbeing. Furthermore, the assessment identifies that there may be additional health benefits resulting from improved air quality in the study area due to reduced emissions attributed to modal shift away from private vehicles.</p> <p>All active travel options were scored as delivering minor positive impacts, with a moderate positive impact for Option AT61a.</p>
FSDA	<p>The FSDA assessment determines if the options might impact on socio-economically disadvantaged groups and help to reduce inequalities of outcome resulting from socio-economic disadvantage. Transport is seen as an essential component for low-income families to access services, such as education, employment and childcare as a means of escaping poverty and supporting wellbeing. The provision of a safe and affordable active travel network could therefore positively impact socio-economically disadvantaged groups who could otherwise be excluded from opportunities. Improved accessibility from active travel options could provide a beneficial impact in tackling inequality experienced by socio-economically disadvantaged groups, supporting reduced social isolation and improved health and wellbeing.</p> <p>All active travel options were assessed to have a minor positive impact, except for AT31 which scored neutral as it does not provide additional benefits above the existing situation, and AT51 and AT58 scored neutral due to the scale of intervention.</p>

1.5 Quantitative Assessment

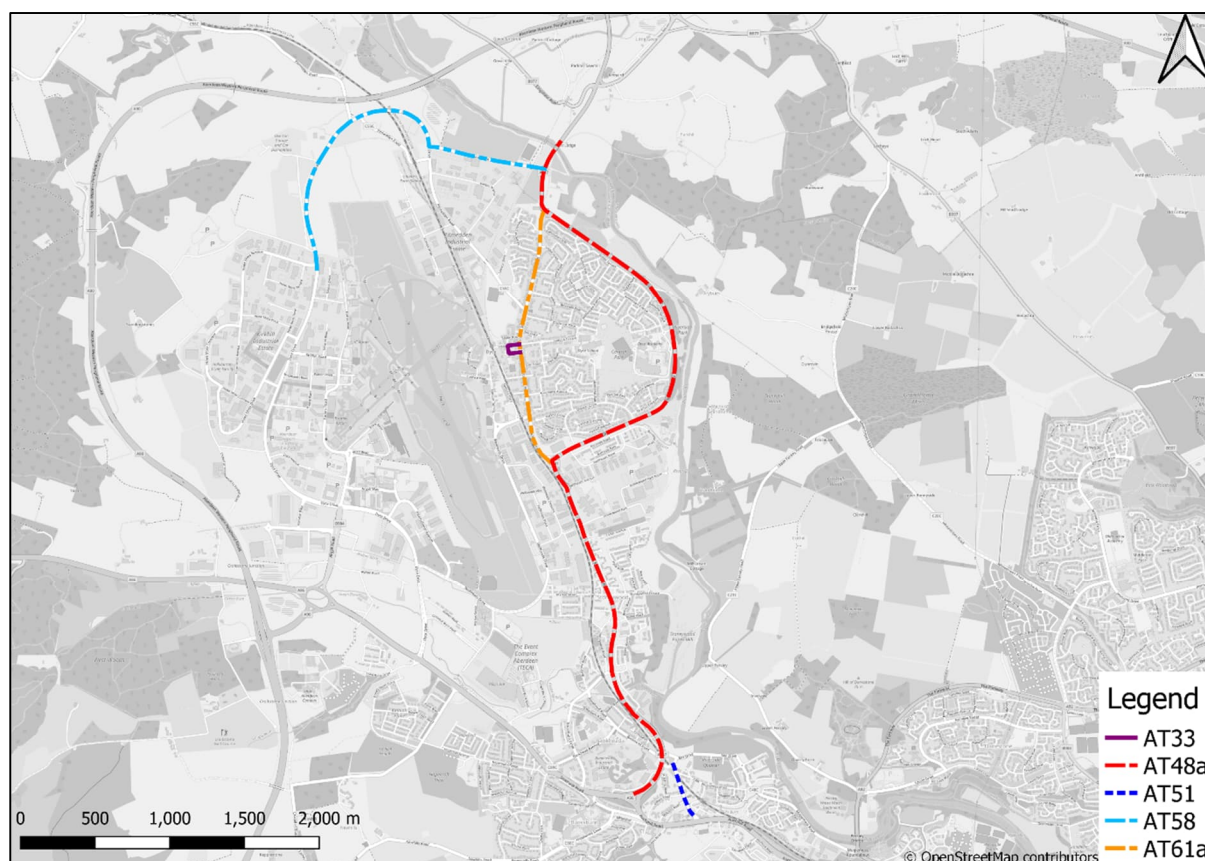
Building on the qualitative appraisal of options set out above, quantification of the active travel benefits for the scheme options has also been undertaken using AMAT in line with principles of best practice set out in TAG.² This assessment has been completed with respect to a select number of options within the overall package, including:

- AT33: Provide improved active travel links between Dyce Rail Station and the A947 and the eastern section of Dyce, particularly along Station Road;
- AT48a: Implement active travel improvements to support highest practicable level of service on the A947 between the Bucksburn Roundabout and Riverview Drive Roundabout North;
- AT51: Implement with-flow segregated cycleway on Old Meldrum Road;
- AT58: Implement shared use path on Dyce Drive between the A947 and Kirkhill Industrial Estate to the north of Aberdeen International Airport; and
- AT61a: Implement package of active travel measures on Victoria Street³.

These options have been selected as these are considered the most likely to achieve modal shift, taking account of option route length and change in extent of physical infrastructure provision.

The options that have been assessed are illustrated spatially in **Figure 1.1**.

Figure 1.1: Options Assessed



The results of the AMAT assessment are reported in Table 1.9, with detailed results reported in **Appendix A**.

² Transport Analysis Guidance (TAG), DfT, April 2024 [Transport analysis guidance - GOV.UK \(www.gov.uk\)](https://www.gov.uk/government/publications/transport-analysis-guidance)

³ This option provides the opportunity to improve accessibility and active travel opportunities in the 'heart' of Dyce and has been considered in three sections: 1) Victoria Street/Riverview Drive South Roundabout to Farburn Terrace; 2) Farburn Terrace to Pitmedden Road; and 3) Pitmedden Road to Victoria Street/Riverview Drive North Roundabout.

Table 1.9: Present Value of Benefits – Health, Journey Quality and Modal Shift Impacts (2010 values and prices)

Option	Reduced Risk of Premature Death	Reduced Absenteeism	Journey Ambience	Congestion Benefit	Accident	Local Air Quality	Noise	Greenhouse Gas	Indirect Taxation	Present Value Benefits
AT33: improved active travel links between Dyce Rail Station and A947 and eastern section of Dyce, particularly along Station Road	£8,720	£1,500	£93,520	£750	£120	£10	£10	£50	£0	£104,690
AT48a: active travel improvements to support highest practicable level of service on A947 between Bucksburn Roundabout and Riverview Drive Roundabout North	£1,210,020	£201,960	£326,840	£107,990	£17,400	£740	£1,160	£7,080	-£40	£1,873,160
AT51: with-flow segregated cycleway on Old Meldrum Road	£133,220	£25,660	£261,430	£10,070	£1,620	£70	£110	£660	£0	£432,850
AT58: shared use path on Dyce Drive between A947 and Kirkhill Industrial Estate north of Aberdeen International Airport	£387,300	£65,200	£157,860	£5,380	£1,290	£70	£70	£2,000	£100	£619,270

Option	Reduced Risk of Premature Death	Reduced Absenteeism	Journey Ambience	Congestion Benefit	Accident	Local Air Quality	Noise	Greenhouse Gas	Indirect Taxation	Present Value Benefits
AT61a: package of active travel measures on Victoria Street.	£176,670	£32,280	£99,340	£14,290	£2,300	£100	£150	£940	-£10	£326,060

Table 1.10 provides a summary of the Present Value of Benefits (PVB), the Present Value of Costs (PVC), and the Benefit-Cost Ratio (BCR) for each option in 2010 values and prices.

Table 1.10: Present Value of Benefits (PVB), Costs (PVC), and BCR (rounded, 2010 values and prices)

Option	PVB	PVC	BCR
AT33: improved active travel links between Dyce Rail Station and A947 and eastern section of Dyce, particularly along Station Road	£104,690	£41,710	2.51
AT48a: active travel improvements to support highest practicable level of service on A947 between Bucksburn Roundabout and Riverview Drive Roundabout North	£1,873,160	£2,451,490	0.76
AT51: with-flow segregated cycleway on Old Meldrum Road	£432,850	£400,570	1.08
AT58: shared use path on Dyce Drive between A947 and Kirkhill Industrial Estate north of Aberdeen International Airport	£619,270	£1,738,800	0.36
AT61a: package of active travel measures on Victoria Street.	£326,060	£320,190	1.02

Based on value of money categories described in the AMAT guidance⁴, Options AT48a and AT58 have a 'Poor' BCR (between 0 and 1), Options AT51 and AT61a have a 'Low' BCR (between 1 and 1.5) and Option AT33 has a 'High' BCR (between 2 and 4).

This has been derived on travel to work/study and therefore does not include other potential benefits derived from leisure and recreational use. The shorter lengths of routes associated with Options AT33 and AT51 may reduce the time people spend cycling or walking by providing more direct route choice and may partially offset the benefits associated with new walking and cycling trips generated by these options.

In addition, Option AT33 is in close proximity to Dyce Rail Station and would be expected to result in greater benefits beyond those captured by AMAT. It should also be noted that the options presented within this appraisal are not mutually exclusive and the cumulative effects would be greater.

Furthermore, it should be noted that there are a number of potential additional benefits that are not captured in the AMAT process:

- Research suggests that cycling benefits the local economy through bicycle manufacturing, cycle and accessory sales and cycling related employment. A study carried out by the London School of Economics⁵ in 2010 concluded that each cyclist contributes a Gross Cycling Product (GCP) of £230 per year to the UK economy, accounting for a total of £2.9bn in 2010. This research is supported by a European-wide study⁶ which found that cycling delivers wider economic benefits in terms of supporting jobs and driving tourism, with cycling having greater employment intensity than any other transport sub-sector. It is noted that additional benefits as a result of GCP have not been quantified in the appraisal of options to date.
- There are a number of potential impacts of cycling and walking interventions which cannot currently be quantified in AMAT but nevertheless might constitute a material benefit of interventions such as improvements to landscape, townscape and heritage.
- Cyclist and pedestrian specific accident changes resulting from the intervention – AMAT only calculates safety impacts related to changes in car kilometres not from other factors such as the increase in cycling or adjustments based on infrastructure types such as segregation.

⁴ AMAT User Guide, Section 3.37, DfT, May 2022, https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/1102781/active-model-appraisal-toolkit-user-guidance.pdf

⁵ Gross Cycling Product Report, London School of Economics, 2010, <http://eprints.lse.ac.uk/38063/1/BritishCyclingEconomy.pdf>

⁶ European Cycling Federation, CYCLING WORKS: Jobs and Job Creation in the Cycling Economy, 2014 <https://ecf.com/system/files/141125-Cycling-Works-Jobs-and-Job-Creation-in-the-Cycling-Economy.pdf>

- Journey time impacts relating to changes in road space for other road users, for example cars and buses.
- Morbidity-related health impacts and health impacts for children.
- Impacts relating to improved natural surveillance and lighting.

1.6 Summary and Conclusion

The Socio-Economic Case has outlined the approach and outcome of the Detailed Appraisal, which has been used to assess the Table 2 Options and determine which options are progressed to the OBC Package alongside the Table 1 Options. The appraisal has shown that the Table 2 Options which are included in the OBC Package generally have a positive impact against the TPOs, STAG criteria and SIA, with active travel options performing strongest.

Appendix A – Active Mode Appraisal Toolkit (AMAT) Assessment

Active Mode Appraisal Toolkit (AMAT) Assessment

Client name Aberdeen City Council	Project name A947 Multi-Modal Corridor Study	Date 16 August 2024	Project number 60709527
Prepared by Sam Stirling & Eleanor Bagnall	Approved by Andrew Robb	Checked by Rob Sutherland	Verified by Joanne Melarkey

Revision History

Revision	Revision date	Details	Authorised	Name	Position
0	06/06/2024	Draft for Client Comment	AR	Andrew Robb	Project Manager
1	16/08/2024	Final Appendix	AR	Andrew Robb	Project Manager

1. Introduction

This Note sets out an assessment of potential costs and benefits arising from improved active travel infrastructure on the A947 corridor between the Aberdeen Western Peripheral Route (AWPR) and the A96 (at the Bucksburn Roundabout), as part of the A947 Multi-Modal Corridor Study. The Department for Transport's (DfT) Active Mode Appraisal Toolkit (AMAT) has been used to calculate these benefits and summarise these against costs in line with principles of best practice set out in Transport Analysis Guidance (TAG)¹.

This assessment appraises six options included in the Detailed Appraisal. This includes:

- AT33: Provide improved active travel links between Dyce Rail Station and the A947 and the eastern section of Dyce, particularly along Station Road;
- AT48a: Implement active travel improvements to support highest practicable level of service on the A947 between the Bucksburn Roundabout and Riverview Drive Roundabout North;
- AT51: Implement with-flow segregated cycleway on Old Meldrum Road;
- AT52: Implement two-way segregated cycleway on Old Meldrum Road;
- AT58: Implement shared use path on Dyce Drive between the A947 and Kirkhill Industrial Estate to the north of Aberdeen International Airport; and
- AT61a: Implement package of active travel measures on Victoria Street².

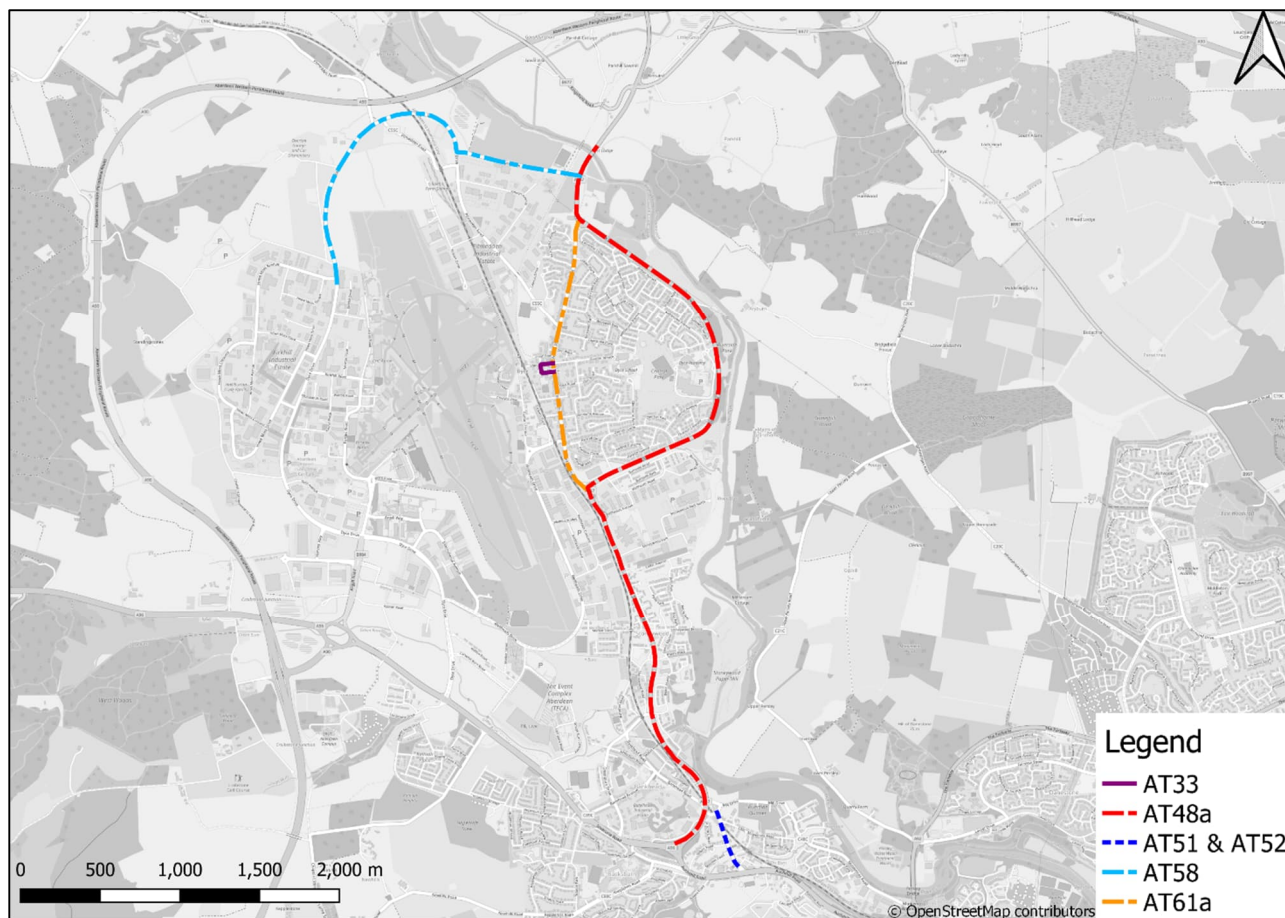
This assessment considers active travel only. The above options have been selected as those most likely to achieve modal shift, taking account of option route length and change in extent of physical infrastructure provision.

The options that have been assessed are illustrated in **Figure 1.1**.

¹ Transport Analysis Guidance (TAG), DfT, November 2022, <https://www.gov.uk/guidance/transport-analysis-guidance-tag#supplementary-guidance>

² This option provides the opportunity to improve accessibility and active travel opportunities in the 'heart' of Dyce and has been considered in three sections: 1) Victoria Street/Riverview Drive South Roundabout to Farburn Terrace; 2) Farburn Terrace to Pitmedden Road; and 3) Pitmedden Road to Victoria Street/Riverview Drive North Roundabout. In Section 1, there is adequate space on the eastern side to develop a segregated cycleway connection by reallocating the existing advisory cycle lanes and utilising the existing verge space. In Section 2, there is limited scope to widen the existing footways or reduce the carriageway width due to bordering property boundaries. A reduction of the speed limit to 20mph and introduction of various measures would allow this section to be formalised as a mixed traffic street. Section 3 has three sub-improvement options, with varying volumes of works required. Option 3a involves the reduction of the road carriageway width to 6m, removal of on-street parking and speed limit reduction to 20mph. Option 3b – reduction of speed limit to 20mph and removal of on street parking would create opportunity to widen and reclassify existing footways on Eastern side to shared use desirable minimum width, with local sections of absolute minimum shared use width due to corridor constraints. Option 3c would continue the measures introduced as part of Option 3b with a reduced speed limit to formalise Section 3 as a mixed traffic street.

Figure 1.1: Options Assessed



2. Demand

Baseline (Do Minimum) demand for walking and cycling has been estimated by applying mode share factors to a population catchment within a 1km buffer of the study routes. A background growth rate has then been applied to factor this demand to the estimated scheme opening year, assumed for the purposes of this assessment to be 2027.

Future (Do Something) demand for walking and cycling has been estimated using the disaggregate mode-choice model set out in Section 2.3 of TAG Unit A5.1³. This approach is described in the following sections below.

2.1 Population

A 1km buffer has been created in GIS for each option outlined in **Figure 1.1**. This buffer has then been intersected with Scottish Neighbourhood Statistics (SNS) Data Zones⁴ to set out an estimate of the area of influence of each option. The data zones which intersect the buffer have then been spatially joined to the latest available data zone population estimates (2021) available from the National Records of Scotland (NRS)⁵ to obtain a baseline (2021) population catchment for each option. It is noted that no weighting or scaling has been applied to the intersecting population catchment for each data zone, i.e. the full population for the data zone has been included in the catchment if the zone intersects the buffer.

As different mode share factors can be identified for different journey purposes, the population catchments for each option have been split into three constitutive age groups for the purposes of the demand analysis: 4-18 years, 19-66 years and 67+ years. The 4-18 years age range has been selected to be approximately representative of those who travel to education, and the 19-66 age range to be approximately representative of those who travel to work. **Table 2.1** shows the

³ TAG Unit A5.1 - Active Mode Appraisal, DfT, November 2022, <https://www.gov.uk/government/publications/tag-unit-a5-1-active-mode-appraisal>

⁴ Census Geographies, 2011, Scotland's Census, <https://www.scotlandscensus.gov.uk/about/2011-census/2011-census-geographies/>

⁵ Mid-2021 Small Area Population Estimates for 2011 Data Zones, NRS, September 2022, <https://www.nrscotland.gov.uk/statistics-and-data/statistics/statistics-by-theme/population/population-estimates/small-area-population-estimates-2011-data-zone-based/mid-2021>

baseline population catchment for each option in 2021, noting that options AT51 and AT52 are identical in terms of catchment area and subsequent catchment population.

Table 2.1: Population Catchments by Option and Age Group (2021)

Option	<4	4-18	19-66	67+
AT33: improved active travel links between Dyce Rail Station and A947 and eastern section of Dyce, particularly along Station Road	204	927	3,777	1,467
AT48a: active travel improvements to support highest practicable level of service on A947 between Bucksburn Roundabout and Riverview Drive Roundabout North	946	3,022	12,710	3,694
AT51: with-flow segregated cycleway on Old Meldrum Road	830	2,555	10,055	2,363
AT52: two-way segregated cycleway on Old Meldrum Road	830	2,555	10,055	2,363
AT58: shared use path on Dyce Drive between A947 and Kirkhill Industrial Estate north of Aberdeen International Airport	322	1,159	4,731	1,745
AT61a: package of active travel measures on Victoria Street.	391	1,347	5,794	2,110

The 4-18 age group represents approximately 15% of the total population catchment, with the 19-66 age group representing approximately 61%⁶. In determining these figures, it has been assumed that either option AT51 or AT52 would be implemented (not both) and therefore AT51/AT52 has been considered as one option to avoid double counting.

It is noted that the focus of this assessment is on travel to work/education due to the nature of the mode-choice model being applied to estimate future growth, discussed further in the **Future Demand** section below. As such, the population of those over 67 years of age has not been included in this analysis, nor have estimates of the impacts to leisure demand more generally. This is not to say that the measures included as part of the options will not affect those travelling for leisure, nor that those over 66 years of age would not experience benefits, rather that modelling these impacts is difficult and not well understood. The results of this assessment could therefore be considered conservative as a result.

The scheme opening year has been assumed to be 2027 for the purposes of this analysis. Since the latest NRS mid-year population estimates are for 2021, a background growth factor has been applied to estimate the future population during the scheme opening year. This factor has been calculated as the unweighted average of (a) cycle trip growth between 2021 and 2027, obtained from the National Trip End Model (NTEM)⁷, (b) walk trips growth between 2021 and 2027, obtained from the NTEM⁸, and (c) population growth between 2021 and 2027, obtained from NRS Population Projections⁹. The resulting background growth factor is 1.4%.

2.2 Mode Share

Baseline mode share factors for walking and cycling have been identified for both travel to education (Sustrans Hands Up Survey, HUS)¹⁰ and for travel to work (Scottish Household Statistics, SHS)¹¹ for the Aberdeen City area and have been applied. These mode share splits by journey purpose and active travel mode are shown in **Table 2.2**.

To mitigate against potential short-term travel trends, the mode shares presented here are five-year averages, 2015-2019 for travel to work (2019 being the latest available), and 2018-2022 for travel to education (2022 being the latest available). It is noted that HUS data includes all school types (but not nurseries). It is also noted that sample sizes for SHS data are very low (~130 responses for Aberdeen City in 2019), so some caution is urged with these results.

⁶ The remaining population segments are less than four years old (4%) and 67 years old or older (20%)

⁷ National Trip End Model (NTEM), DfT, February 2023, <https://www.data.gov.uk/dataset/11bc7aaf-ddf6-4133-a91d-84e6f20a663e/national-trip-end-model-ntem>

⁸ National Trip End Model (NTEM), DfT, February 2023, <https://www.data.gov.uk/dataset/11bc7aaf-ddf6-4133-a91d-84e6f20a663e/national-trip-end-model-ntem>

⁹ Population Projections for Scottish Areas (2018-based), NRS, 2020, <https://www.nrscotland.gov.uk/statistics-and-data/statistics/statistics-by-theme/population/population-projections/sub-national-population-projections/2018-based>

¹⁰ Hands Up Survey Scotland, Sustrans, May 2023, <https://www.sustrans.org.uk/our-blog/projects/uk-wide/scotland/hands-up-scotland-survey>

¹¹ Scottish Household Survey Travel to Work, 2008-2019, Table 8.25, <https://scotland.shinyapps.io/sq-scottish-household-survey-data-explorer/>

Table 2.2: Do Minimum (baseline) Mode Share Factors

Local Authority	Education		Work	
	Walk	Cycle	Walk	Cycle
Aberdeen City	49.3%	4.0%	20.4%	2.5%

2.3 Do Something Demand

Do Something (with scheme) demand has been estimated using a disaggregate mode-choice model as set out in Section 2.3 of TAG Unit A5.1¹². This model forecasts the impacts of improvements in the attractiveness of cycling for commuting trips based on several factors, including the type of infrastructure to be implemented, the existing mode share, distance travelled, and the proportion of those for whom cycling would be a viable alternative.

The AMAT guidance¹³ notes that “[this model] *could be extended to cover walking but research in this area is problematic. People do not regard walking as a mode of transport in quite the same way as driving, using a bus or even cycling so studying their reaction to changes in the walking environment is difficult*”. In the absence of a bespoke model to calculate walking (and non-commuting trips more generally), the uplift to walk trips to work and the uplift in both walk and cycle trips to education have been calculated by applying the same process. Some additional caution is therefore required around these figures. It is noted, however, that trips to work represent the majority of trips estimated in this assessment (the working population represents approximately 61% of the total population) and that the uplift in cycle trips calculated by the model is far larger than for walking – the uplift for walking is around 8% compared with 39% for cycling¹⁴.

Mode share figures for the Do Something scenario, based on the above approach, are shown in **Table 2.3**.

Table 2.3: Do Something (with scheme) Mode Share Factors

Section	Education		Work	
	Walk	Cycle	Walk	Cycle
AT33: improved active travel links between Dyce Rail Station and A947 and eastern section of Dyce, particularly along Station Road	49.5%	4.1%	20.5%	2.5%
AT48a: active travel improvements to support highest practicable level of service on A947 between Bucksburn Roundabout and Riverview Drive Roundabout North	53.4%	7.5%	24.3%	4.8%
AT51: with-flow segregated cycleway on Old Meldrum Road	50.4%	4.3%	21.3%	2.6%
AT52: two-way segregated cycleway on Old Meldrum Road	50.4%	4.3%	21.3%	2.6%
AT58: shared use path on Dyce Drive between A947 and Kirkhill Industrial Estate north of Aberdeen International Airport	53.0%	7.0%	23.9%	4.4%
AT61a: package of active travel measures on Victoria Street.	51.3%	4.8%	22.2%	3.0%

¹² TAG Unit A5.1 - Active Mode Appraisal, DfT, November 2022, <https://www.gov.uk/government/publications/tag-unit-a5-1-active-mode-appraisal>

¹³ Ibid.

¹⁴ Averaged across the options

3. Costs

Total investment (i.e. capital expenditure) costs for each option have been obtained utilising SPONS Civil Engineering and Highway Works Price Book, Local Authority Framework Rates and construction costs from similar projects. These costs include preliminaries; site clearance and construction costs for the individual measures included in each option. Risk and contingency has been set at 44% across all options in line with the Green Book for this design stage. More detail about specific measures included within the costings is included in Chapter 13 of the Detailed Appraisal Report.

No ongoing operating costs have been included, although these could be included as part of future sensitivity testing. Additionally, as per the AMAT User Guide¹⁵, costs have been inserted in current (2024) nominal prices, i.e. they have not been adjusted for inflation. **Table 3.1** illustrates the total capital cost for each option.

Table 3.1: Costs by Option

Option	Total Costs (Inclusive of Risk and Contingency at 44%)
AT33: improved active travel links between Dyce Rail Station and A947 and eastern section of Dyce, particularly along Station Road	£84,000
AT48a: active travel improvements to support highest practicable level of service on A947 between Bucksburn Roundabout and Riverview Drive Roundabout North	£4,939,000
AT51: with-flow segregated cycleway on Old Meldrum Road	£807,000
AT52: two-way segregated cycleway on Old Meldrum Road	£650,000
AT58: shared use path on Dyce Drive between A947 and Kirkhill Industrial Estate north of Aberdeen International Airport	£3,502,000
AT61a: package of active travel measures on Victoria Street.	£645,000

For the purposes of this assessment, these costs have been assumed to be incurred over a two-year period, 50% in 2026, and 50% in 2027.

¹⁵ Section 3.3, AMAT User Guide, DfT, May 2022,
https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/1102781/active-model-appraisal-toolkit-user-guidance.pdf

4. AMAT Assessment

Based on the methodology described in the sections above, the estimated number of trips per day across the options in the Do Minimum and Do Something scenarios are shown in **Table 4.1**. It is again noted that these trip numbers do not include leisure users, and as such the resulting demand uplift could be considered a conservative estimate¹⁶.

Table 4.1: Daily Trip Estimates and % Uplift for each Option

Option	Do Minimum (baseline)		Do Something (with scheme)		Uplift	
	Walk	Cycle	Walk	Cycle	Walk	Cycle
AT33: improved active travel links between Dyce Rail Station and A947 and eastern section of Dyce, particularly along Station Road	473	50	475	51	1%	2%
AT48a: active travel improvements to support highest practicable level of service on A947 between Bucksburn Roundabout and Riverview Drive Roundabout North	1,572	168	1,812	322	15%	91%
AT51: with-flow segregated cycleway on Old Meldrum Road	1,275	136	1,321	145	4%	7%
AT52: two-way segregated cycleway on Old Meldrum Road	1,275	136	1,321	145	4%	7%
AT58: shared use path on Dyce Drive between A947 and Kirkhill Industrial Estate north of Aberdeen International Airport	592	63	672	111	14%	76%
AT61a: package of active travel measures on Victoria Street.	711	76	762	92	7%	20%

The following additional assumptions have been included in the AMAT assessment across all options:

- The intervention opening year is defined as 2027, and the last year of funding has been defined as 2027.
- The appraisal period has been defined as 20 years. Sensitivity testing could be conducted on longer periods (up to 60 years), which would enhance benefits and may be considered appropriate for these options.
- The local area type has been defined as 'Rural' for option AT58 as the majority of this option lies within the more rural area to the north of Aberdeen International Airport. 'Other Urban' has been used as the local area type for all other options as the majority of these routes lie within the Aberdeen City boundary.
- No current existing cycling infrastructure is assumed. This has been selected as the most appropriate measure since the majority of the proposed route alignments have no existing cycling infrastructure. The proposed infrastructure type for options AT33 and AT58 has been chosen as 'on-road non-segregated cycle lane'. For options AT48a, AT51 and AT52, 'on-road segregated cycle lane' has been chosen. The proposed infrastructure type for option AT61a has been chosen as 'wider lane', albeit some sections of the route will be on-road segregated cycle lane. Since AMAT is rigid in allowing only one proposed infrastructure type, this option has been selected to cover both.
- The proposals are assumed to include kerb levelling, pavement evenness, street lighting and directional signage, but not measures to implement information panels, reduce crowding, nor install benches¹⁷.
- The present value of benefits and costs are discounted to 2010 prices and values.

Benefits identified in AMAT are grouped into three main categories: health, journey quality improvements, and mode shift. Each of these are considered below.

¹⁶ A basic assumption could be made that the proposals would likely improve leisure trips via active modes

¹⁷ AMAT User Guide Annex C, DfT, May 2022,

https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/1102781/active-model-appraisal-toolkit-user-guidance.pdf

4.1 Health Benefits

The health benefits quantified in AMAT relate primarily to a reduced risk of premature death, and a reduced rate of absenteeism as a result of health benefits associated with improved active travel uptake.

Research shows that physical activity increases life expectancy and decreases the risk of many adverse health conditions, including coronary heart disease, type 2 diabetes, and breast and colon cancers¹⁸. Increased active travel uptake delivers health benefits due to the associated reduction in the risk of premature death.

Increased physical activity of individuals improves their health and therefore reduces their number of 'sick days', resulting in increased economic activity. There is evidence that better health due to increased physical activity (such as cycling or walking to work) can also lead to reduced rates of absenteeism¹⁹, which provides a range of benefits resulting from increased workforce productivity. In the UK there are 4.6 days 'lost' per worker due to sickness or injury²⁰.

The toolkit indicates that, for all options combined, there would be an estimated 195 fewer days of short-term sick leave and an estimated £28,184 increased output from this reduction in absenteeism. It should be noted, that for the purposes of determining this metric, it has been assumed that either option AT51 or AT52 would be implemented (not both) and therefore AT51/AT52 has been considered as one option in the combined total to avoid double counting. **Table 4.2** shows the days reduced absenteeism by each option, per year, and **Table 4.3** shows the present value of these benefits over the 20-year appraisal period.

Table 4.2: Days reduced absenteeism (annual)

Option	Metric
	Annual Days Reduced Absenteeism
AT33: improved active travel links between Dyce Rail Station and A947 and eastern section of Dyce, particularly along Station Road	1
AT48a: active travel improvements to support highest practicable level of service on A947 between Bucksburn Roundabout and Riverview Drive Roundabout North	121
AT51: with-flow segregated cycleway on Old Meldrum Road	15
AT52: two-way segregated cycleway on Old Meldrum Road	15
AT58: shared use path on Dyce Drive between A947 and Kirkhill Industrial Estate north of Aberdeen International Airport	39
AT61a: package of active travel measures on Victoria Street.	19

Table 4.3: Present Value of Health Benefits (2010 values and prices)

Option	Metric	
	Reduced Risk of Premature Death	Reduced Absenteeism
AT33: improved active travel links between Dyce Rail Station and A947 and eastern section of Dyce, particularly along Station Road	£8,720	£1,500
AT48a: active travel improvements to support highest practicable level of service on A947 between Bucksburn Roundabout and Riverview Drive Roundabout North	£1,210,020	£201,960
AT51: with-flow segregated cycleway on Old Meldrum Road	£133,220	£25,660
AT52: two-way segregated cycleway on Old Meldrum Road	£133,220	£25,660
AT58: shared use path on Dyce Drive between A947 and Kirkhill Industrial Estate north of Aberdeen International Airport	£387,300	£65,200

¹⁸ Impact of Physical Inactivity on the World's Major Non-Communicable Diseases, Lee et al, 2012, <https://www.ncbi.nlm.nih.gov/pmc/articles/PMC3645500/>

¹⁹ NICE, 2008, Business Case Tool for Physical Activity in the Workplace; Leisure time physical activity and sickness absenteeism: a prospective study, Van Amelsvoort et al, 2006; Effects of an Employee Fitness Program on Reduced Absenteeism, Lechner et al, 1997

²⁰ Office for National Statistics (ONS), Sickness Absence in the Labour Market, 2021, <https://www.ons.gov.uk/employmentandlabourmarket/peopleinwork/labourproductivity/articles/sicknessabsenceinthelabourmarket/2021>

Option	Metric	
	Reduced Risk of Premature Death	Reduced Absenteeism
AT61a: package of active travel measures on Victoria Street.	£176,670	£32,280

4.2 Journey Quality Benefits

Journey quality impacts are generally comprised of improvements to journey ambience which might enhance and improve a user's experience of travelling along a route.

Benefits to new and existing cyclists or pedestrians as a result of improvements to infrastructure can relate to a perception of improved safety and/or environmental conditions. These benefits have been quantified using monetary values set out in TAG²¹ for pedestrian and cycle features, including for aspects such as the quality of the infrastructure (for cycling) and street lighting, kerb levelling, pavement evenness etc. (for walking). The values are provided in pence per kilometre (for pedestrian features) and in pence per minute (for cycle infrastructure). These impacts are subjective and primarily experienced by existing route users, i.e. those who are best placed to measure the effects of the improvements. TAG recommends applying a 'rule of a half', whereby current users of a route will experience the full benefit of improvements to quality, but the benefits for new users should be divided by two.²²

The table below shows the present value of these benefits for both new and existing users over the 20-year appraisal period.

Table 4.4: Present Value of Journey Quality Benefits (2010 values and prices)

Option	Metric
	Journey Ambience
AT33: improved active travel links between Dyce Rail Station and A947 and eastern section of Dyce, particularly along Station Road	£93,520
AT48a: active travel improvements to support highest practicable level of service on A947 between Bucksburn Roundabout and Riverview Drive Roundabout North	£326,840
AT51: with-flow segregated cycleway on Old Meldrum Road	£261,430
AT52: two-way segregated cycleway on Old Meldrum Road	£261,430
AT58: shared use path on Dyce Drive between A947 and Kirkhill Industrial Estate north of Aberdeen International Airport	£157,860
AT61a: package of active travel measures on Victoria Street.	£99,340

4.3 Mode Shift Impacts

A transfer from car-based modes amongst functional route users would result in a reduction in vehicle kilometres travelled. The approximate amounts are displayed in **Table 4.5**.

Table 4.5: Approximate Reduction in Vehicle Kilometres Travelled

Option	Metric
	Approximate Reduction in Vehicle Kilometres Travelled
AT33: improved active travel links between Dyce Rail Station and A947 and eastern section of Dyce, particularly along Station Road	312
AT48a: active travel improvements to support highest practicable level of service on A947 between Bucksburn Roundabout and Riverview Drive Roundabout North	44,689
AT51: with-flow segregated cycleway on Old Meldrum Road	4,169
AT52: two-way segregated cycleway on Old Meldrum Road	4,169
AT58: shared use path on Dyce Drive between A947 and Kirkhill Industrial Estate north of Aberdeen International Airport	14,182

²¹TAG Data Book, November 2019, Table 4.1.6 and Table 4.1.7, DfT, <https://www.gov.uk/government/publications/tag-data-book>

²² DfT, TAG Unit A5.1 Active Mode Appraisal, November 2022, <https://www.gov.uk/government/publications/tag-unit-a5-1-active-mode-appraisal>

Option	Metric
	Approximate Reduction in Vehicle Kilometres Travelled
AT61a: package of active travel measures on Victoria Street.	5,912

These figures are calculated based on the total additional kilometres travelled by cyclists and pedestrians on each scheme, multiplied by the proportion of users who might otherwise use a car or taxi. The figures on proportion of users who would otherwise use a car or taxi have been obtained from cycling diversion factors set out in TAG²³.

This reduction creates benefits due to reduced traffic congestion, infrastructure benefits relating to reduced wear and tear on roads, fewer collisions, better air quality, less noise pollution, as well as indirect tax impacts. These benefits have been quantified according to TAG External Costs²⁴, which describe the marginal costs of each of these impacts in pence per vehicle kilometre. These costs have then been multiplied by the estimated reduction in vehicle kilometres for each option described above.

Table 4.6 shows the present value of these benefits over the 20-year appraisal period.

Table 4.6: Present Value of Journey Quality Benefits (2010 values and prices)

Option	Metric					
	Congestion Benefit	Accident	Local Air Quality	Noise	Greenhouse Gas	Indirect Taxation
AT33: improved active travel links between Dyce Rail Station and A947 and eastern section of Dyce, particularly along Station Road	£750	£120	£10	£10	£50	£0
AT48a: active travel improvements to support highest practicable level of service on A947 between Bucksburn Roundabout and Riverview Drive Roundabout North	£107,990	£17,400	£740	£1,160	£7,080	£-40
AT51: with-flow segregated cycleway on Old Meldrum Road	£10,070	£1,620	£70	£110	£660	£0
AT52: two-way segregated cycleway on Old Meldrum Road	£10,070	£1,620	£70	£110	£660	£0
AT58: shared use path on Dyce Drive between A947 and Kirkhill Industrial Estate north of Aberdeen International Airport	£5,380	£1,290	£70	£70	£2,000	£100
AT61a: package of active travel measures on Victoria Street.	£14,290	£2,300	£100	£150	£940	£-10

4.4 Cost Benefit Summary

Table 4.7 provides a summary of the Present Value of Benefits (PVB), the Present Value of Costs (PVC), and the Benefit-Cost Ratio (BCR) for each option in 2010 values and prices. The PVB below is equal to the sum of the benefits included in **Table 4.3**, **Table 4.4**, and **Table 4.6**.

Table 4.7: Present Value of Benefits (PVB), Costs (PVC), and BCR (rounded, 2010 values and prices)

Option	Metric		
	PVB	PVC	BCR
AT33: improved active travel links between Dyce Rail Station and A947 and eastern section of Dyce, particularly along Station Road	£104,690	£41,710	2.51
AT48a: active travel improvements to support highest practicable level of service on A947 between Bucksburn Roundabout and Riverview Drive Roundabout North	£1,873,160	£2,451,490	0.76
AT51: with-flow segregated cycleway on Old Meldrum Road	£432,850	£400,570	1.08

²³ TAG Data Book v1.16, September 2021, Table A5.4.7, DfT, <https://www.gov.uk/government/publications/tag-data-book>

²⁴ TAG Data Book v1.16, September 2021, Table A5.4.2, DfT, <https://www.gov.uk/government/publications/tag-data-book>

Option	Metric		
	PVB	PVC	BCR
AT52: two-way segregated cycleway on Old Meldrum Road	£432,850	£322,740	1.34
AT58: shared use path on Dyce Drive between A947 and Kirkhill Industrial Estate north of Aberdeen International Airport	£619,270	£1,738,800	0.36
AT61a: package of active travel measures on Victoria Street.	£326,060	£320,190	1.02

Based on value of money categories described in the AMAT guidance²⁵, options AT48a and AT58 have a 'Poor' BCR (between 0 and 1), options AT51, AT52 and AT61a have a 'Low' BCR (between 1 and 1.5) and option AT33 has a 'High' BCR (between 2 and 4). However, it should be noted that Section 5 of AMAT Guidance states "Scheme length – in some circumstances issues arise in the calculation of benefits where shorter walking and cycling routes are introduced. For example, where a scheme proposes a new shorter link, the scheme may encourage new walking and cycling trips due to an improved route option. However, these benefits may be partially offset if they reduce the time people spend cycling or walking by providing a more direct route choice". This may be reflected in the BCRs for options AT33, AT51 and AT52, given the shorter lengths of these routes. In addition, option AT33 is in close proximity to Dyce Rail Station and would be expected to result in greater benefits beyond those captured by AMAT.

4.5 Additional Benefits and Limitations

It should be noted that there are a number of potential additional benefits that are not captured in the AMAT process:

- Research suggests that cycling benefits the local economy through bicycle manufacturing, cycle and accessory sales and cycling related employment. A study carried out by the London School of Economics²⁶ in 2010 concluded that each cyclist contributes a Gross Cycling Product (GCP) of £230 per year to the UK economy, accounting for a total of £2.9bn in 2010. This research is supported by a European-wide study²⁷ which found that cycling delivers wider economic benefits in terms of supporting jobs and driving tourism, with cycling having greater employment intensity than any other transport sub-sector. It is noted that additional benefits as a result of GCP have not been quantified as part of this study.
- There are a number of potential impacts of cycling and walking interventions which cannot currently be quantified in AMAT but nevertheless might constitute a material benefit of interventions such as improvements to landscape, townscape and heritage.
- Cyclist and pedestrian specific accident changes resulting from the intervention – AMAT only calculates safety impacts related to changes in car kilometres not from other factors such as the increase in cycling or adjustments based on infrastructure types such as segregation.
- Journey time impacts relating to changes in road space for other road users for example, cars and buses.
- Morbidity-related health impacts and health impacts for children.
- Impacts relating to improved natural surveillance and lighting.

²⁵ AMAT User Guide, Section 3.37, DfT, May 2022, https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/1102781/active-model-appraisal-toolkit-user-guidance.pdf

²⁶ Gross Cycling Product Report, London School of Economics, 2010, <http://eprints.lse.ac.uk/38063/1/BritishCyclingEconomy.pdf>

²⁷ European Cycling Federation, CYCLING WORKS: Jobs and Job Creation in the Cycling Economy, 2014 <https://ecf.com/system/files/141125-Cycling-Works-Jobs-and-Job-Creation-in-the-Cycling-Economy.pdf>

5. Conclusion

This Note has provided an overview of the findings from the Active Mode Appraisal Toolkit (AMAT) Assessment undertaken to understand the potential costs and benefits arising from options for improving active travel infrastructure between the AWPR and the A96 (at the Bucksburn Roundabout), as part of the A947 Multi-Modal Corridor Study.

The assessment indicates that Options AT48a and AT58 would deliver poor value for money, Options AT51, AT52 and AT61a would deliver low value for money, and Option AT33 would be expected to deliver high value for money. As has been emphasised throughout this Note, this has been derived on travel to work/study and therefore does not include other potential benefits derived from leisure and recreational use. The shorter lengths of routes associated with Options AT33, AT51 and AT52 may reduce the time people spend cycling or walking by providing more direct route choice and may partially offset the benefits associated with new walking and cycling trips generated by these options. In addition, Option AT33 is in close proximity to Dyce Rail Station and would be expected to result in greater benefits beyond those captured by AMAT. It should also be noted that the options presented within this appraisal are not mutually exclusive and the cumulative effects would be greater.

