Access to Argyll & Bute (A83) Strategic Environmental Assessment & Preliminary Engineering Services
Route Corridor Preliminary Assessment
Route Corridor 15 – Arrochar – Butterbridge

Route Corridor Details	
Route Corridor Option	Route Corridor 15 – Arrochar – Butterbridge
Route Corridor Description	Arrochar – Butterbridge is an off-line corridor that starts within Glen Loin and heads north-west across the mountain range towards the A83 Trunk Road at Butterbridge. The overall length of the route corridor is approximately 8.6 km. The route corridor passes through similar terrain to that of the Rest and Be Thankful. Road structures and ground engineering measures would likely be required to fit the new road in the topography of the corridor.
Rationale for Route Corridor	The Arrochar – Butterbridge route corridor was a suggestion submitted as part of the recent public consultation on A83 Access to Argyll and Bute project. This route corridor is considered to offer a potential alternative access route into Argyll and Bute bypassing the main landslide risk area on the A83 Trunk Road at the Rest and Be Thankful.
Geographic Context	The route corridor lies within the Argyll & Bute region, which comprises solely of the entirety of the Argyll & Bute local authority area. The route corridor end points are located a straight-line distance of approximately 31-35 miles from the city of Glasgow. The south-east extents of the route corridor is situated at Arrochar on the A83 Trunk Road. The west extents of the route corridor is situated at Butterbridge which is located between Cairndow and Arrochar on the A83 Trunk Road. The route corridor is located within the western extremities of the Loch Lomond and The Trossachs National Park (LLTNP).
Social Context	Given the geographically remote nature of large areas of Argyll & Bute, reducing the duration of journey times and improving journey time reliability for both strategic and local traffic has the potential to impact positively on deprivation levels, both geographic and economic. The Scottish Index of Multiple Deprivation (SIMD) identifies concentrations of deprived areas across Scotland. Argyll & Bute consists of 125 data zones, with 10 data zones (8%) identified as being amongst the 15% most overall deprived data zones in Scotland. These are located in the region's 5 main towns - Helensburgh, Oban, Dunoon, Campbeltown and Rothesay. The Geographic Access to Services considers deprivation in terms of drive times and public transport times to a selection of basic services such as schools, health services and retail centres. Forty-eight (38%) of Argyll and Bute's data zones are within the 15% most 'access deprived' data zones in Scotland – most of which are located outside the main towns.

	The region's population has been in decline for over a decade, against a backdrop of a population increase at the national level. Data from NHS Highland estimates that there are 26,000 referrals for Argyll & Bute patients each year, of which 44% are to hospitals within the region and 56% are to hospitals in the NHS Greater Glasgow and Clyde area. Disruption on the transport network can lead to missed appointments and have an adverse impact on patients' health and wellbeing. The region has twenty-three inhabited islands, more than any other local authority in Scotland, with seventeen percent of the regions' population inhabiting the islands. The A83 Trunk Road provides accessibility to services on the mainland via Kennacraig port, where ferry services depart to Islay with onward connections to Jura and Colonsay.
Economic Context	The A83 Trunk Road is one of only two east-west strategic trunk road network connections between Argyll & Bute and the central belt. The lack of a reliable strategic route linking Argyll & Bute with the rest of the country is understood to be constraining economic growth in the region. When the road connection via the A83 Trunk Road is severed, the impact on residents, visitors and businesses is severe due to the lack of alternative transport options. The A83 Trunk Road is known to carry goods of significant value to both the regional and national economy (including whisky and seafood). The A83 Trunk Road is also a key route for tourism, and a proposal to transform the Crinan Canal into a major tourism attraction in Mid-Argyll, could benefit significantly from improved resilience and / or access to the region. Anecdotal evidence suggests closures and restrictions cost the local economy £50k-£60k per day in addition to longer-term impacts on business investment within the region and, subsequently, the region's job market. Due to a large proportion of the region's geographic remoteness from the major economic centres of the central belt, only a few large scale, high skill industries are located within the area. The region's economy tends to be heavily influenced by sectors with lower growth, such as agriculture and public services. Given the focus on economic recovery post-COVID-19, enhanced connectivity for the Argyll & Bute region could contribute towards increasing inward investment and job opportunities for local communities. Improved and reliable access for Bute and Cowal and Mid-Argyll, Kintyre and Islay has the potential to have a transformational effect on local / regional economies.

Transport Planning Objectives		
Objective		Performance against planning objective
TPO1	Resilience – reduce the impact of disruption for travel to, from and between key towns within Argyll & Bute, and for communities accessed via the strategic road network	This route corridor offers enhanced resilience for both strategic A83 Trunk Road traffic accessing Cowal & Bute and Mid-Argyll, Kintyre and the Islands, and for local traffic travelling to / from and between key towns and communities within Argyll & Bute. The impact of landslide induced closures at the main landslide risk area on the A83 Trunk Road, at the Rest and be Thankful, is effectively bypassed by this route corridor. Communities located within close proximity to Glen Croe, including Arrochar, Inveraray and Lochgoilhead, which are subject to the longest diversion routes during closure of the A83 Trunk Road at the Rest and Be Thankful, are likely to benefit significantly from the enhanced resilience provided by this route corridor. In providing an additional route to the existing A83 Trunk Road (assuming it remains operational) enhanced resilience will be provided for large parts of Argyll & Bute, offering a more reliable connection between the region, the central belt and beyond.
TPO2	Safety – positively contribute towards the Scottish Government's Vision Zero road safety target by reducing accidents on the road network and their severity	Minor reductions in transport related casualties could, potentially, be realised as a result of reductions in vehicle kilometres associated with fewer landslide induced road closures and the associated long diversion routes for strategic traffic travelling to and from Argyll & Bute. During periods of closure the new route would provide a shorter diversion route for trips to the south.
TPO3	Economy – reduce geographic and economic inequalities within Argyll & Bute through improved connectivity and resilience	This route corridor does not provide a significant change in connectivity when compared to the existing route, under normal operating conditions. The route corridor does, however, offer potential enhancements in resilience, provided as a result of mitigating landslide induced closures, improving access to key domestic and international markets.
TPO4	Sustainable travel – encourage sustainable travel to, from and within Argyll & Bute through facilitating bus, active travel and sustainable travel choices.	It is considered unlikely that this route corridor would have any significant impact on public transport usage, active travel, reducing transport poverty or reducing reliance on private cars. This is primarily due to the nature of the route corridor and the areas within which it is located.

		Investment in a new route corridor within the region would however provide an opportunity to include enhanced active travel provision as part of the design.
TPO5	Environment – Protect the environment, including the benefits local communities and visitors obtain from the natural environment, by enhancing natural capital assets and ecosystem service provision through delivery of sustainable transport infrastructure. An example of ecosystem service provision is improving water quality regulation.	The range and scale of potential environmental effects identified for this route corridor is such that it is likely that extensive environmental mitigation will be needed and there is the potential for a range of significant environmental impacts that could affect ecosystem service provision.

Existing Route Corridor Conditions		
Engineering	Route Corridor Length	The route corridor is approximately 8.6km long.
	Existing Roads	The route corridor intersects the A83 Trunk Road at both its south-east and west extents. The route corridor does not intersect any Local Authority operated / maintained 'A' / 'B' / 'C' roads.
	Existing Accesses	A class road: 0 B class road: 0 C class road: 0 Unclassified road/direct access: 5 Relative to the other route corridors, the low number of accesses noted above is attributed to the undeveloped, rural setting of the route corridor. All local accesses from the A83 in the area around Glen Croe would be retained should this route corridor be taken forward; however, the additional work to retain these accesses has not been included in the Preliminary Assessment of this route corridor.

	Topography and Land Use	The route corridor is rural in nature and ground levels along the centre of the route corridor rise gently along the valley floor from the existing A83 Trunk Road at Succoth and Arrochar, which climbs from approximately 10m to 30m above ordnance datum on the west side of the valley floor. This then rises steeply up the valley side and across the mountain range with the highest point along the centre of the route corridor at 1000m above ordnance datum at Beinn Ime. The route corridor reaches this elevation over approximately 5km from the floor of Glen Loin, however this then descends steeply to 180m above ordnance datum over approximately 2km to the connection with the A83 Trunk Road at Butterbridge. There are two settlements within the route corridor, both within the valley floor of Glen Loin at approximately 20m above ordnance datum. Land use within the route corridor includes commercial interests in the form of properties at Arrochar and mixed/coniferous plantation woodland on both sides of Glen Loin. There is also evidence, based on available aerial imagery, of agricultural operations within the route corridor with agricultural buildings and fencing at the settlements at Feorlinn within Glen Loin. Furthermore, an extensive network of overground and underground infrastructure feeds into Loch Sloy within the vicinity.
	Geology / Geomorphology	The route corridor leaves the A83 Trunk Road at Arrochar and curves round to the north of the village. It crosses the flat valley floor and heads directly north-west towards Butterbridge. The mountainous area it crosses includes Cruach nam Miseag, Beinn Narnain, Creag Tharsuinn, Beinn Ime and Beinn Chorranach. The lower slopes of Glen Loin are forested, but further northwest the slopes have no forest cover and are uneven with many rock exposures. The route corridor passes across this area and joins the A83 Trunk Road just to the south of Butterbridge in Glen Kinglas. The mapping of superficial deposits in this route corridor is of notably poor resolution. River Terrace Deposits comprising gravel, sand, silt and clay are recorded on the flat valley floor in the vicinity of, and to the north of, Arrochar. Alluvium is recorded towards the west side of the valley, close to Succoth. Areas of glacial Till (diamicton) are recorded on some of the lower slopes and in minor valleys and lower corries. Elsewhere, and on the upper slopes, no superficial deposits are recorded, indicative of them being thin or absent. The western end of the route corridor displays more detailed mapping and deposits of Hummocky (Moundy) Glacial Deposits are recorded on the western slopes of Beinn Ime and the northern slopes of Beinn Luibhean in the vicinity of the western A83 Trunk Road tie-in. No artificial ground is mapped within the route corridor; however, made ground is anticipated in association with existing development around Arrochar, the A83 Trunk Road and existing minor roads within Glen Loin.

		The proposed route corridor is underlain by Dalradian metamorphic rocks of the Southern Highland Group, comprising predominantly psammites, pelites, semipelites, schists and metawackes of the Beinn Bheula Schist Formation. The strata display some variation in the orientation of the foliation, indicative of the folding and deformation to which they have been subject. An extensive intrusion of diorite belonging to the South of Scotland Granitic Suite is recorded between Beinn Ime and A'Chrois. Smaller areas of granitoid rock and igneous Breccia are also recorded in association with this intrusion. Several igneous dykes are recorded within the route corridor; orientations are variable but are mostly east to west or northeast to southwest. There are several faults recorded in the eastern part of the route corridor, these predominantly trend north to south. A persistent northeast-southwest trending fault is recorded along Glen Loin, this is shown as terminating just north-east of Succoth. There are several shorter, parallel, faults recorded on the slopes of A'Chrois. A further regional scale northeast to southwest fault is recorded along the Kinglas Water between Beinn Chorranach and Stob Coire Creagach to the northwest. This fault is mapped approaching the western tie-in and a possible continuation is mapped further to the southwest. Strata in the vicinity of the western tie-in to the A83 may be faulted as a result. No historical ground investigation (GI) is recorded within the route corridor. References: • British Geological Survey, Geological Survey of Scotland, 1:63,360/1:50,000 geological map series. Accessed via BGS maps portal https://www.bgs.ac.uk/information-hub/bgs-maps-portal/, October to December 2020. • British Geological Survey, Onshore GeoIndex, https://mapapps2.bgs.ac.uk/geoindex/home.html, accessed October to December 2020. Datasets used include National Landslide Database (NLD), Mass Movement Deposits (1:50,000 scale), Superficial Deposits (1:50,000 scale), Bedrock Geology (1:50,000 scale), Linear Features (1:50,000 scale), Borehole Records. • British Geological Survey, The BGS Lexicon of Named Rock Units, https://webapps.bgs.ac.uk/lexicon/home.cfm. Accessed October to December 2020.

	Hydrology and Drainage	This is covered under 'Water Environment' in the 'Environment' part of this table.
	Structures	There are no existing structures on the route corridor.
Environment	Biodiversity, Fauna and Flora	The route corridor intersects Glen Etive and Glen Fyne Special Protection Area (SPA), Loch Lomond Woods Special Area of Conservation (SAC), Glen Loin Site of Special Scientific Interest (SSSI), and Beinn an Lochain SSSI. There are 2 parcels of woodland listed on the Ancient Woodland Inventory (AWI) within the corridor.
	Population and Human Health	The route corridor is rural in nature, with the settlements of Succoth and Arrochar located in the south-eastern extent of the corridor. As such, there are numerous residential receptors located within the route corridor which are present both within these settlements and elsewhere within the route corridor. Two long distance walking paths (Three Lochs Way and Loch Lomond and Cowal Way) intersect the route corridor at its south-eastern extent to the south and south-east of Succoth respectively. Both paths then travel north until they meet to the east of Succoth and thereafter follow the same route north through Ardgartan Forest until they exit the north-east extent of the route corridor. Several forest walking routes are located in the south-eastern and eastern extents of the route corridor. Succoth Burn Walk (Blue), Stronafyne Loop and Arrochar to Station routes are located in and/or around the settlement of Succoth. Glen Loin Loop transects the route corridor to the south-west of Succoth and travels north through Ardgartan Forest until it exits the route corridor. The walking route briefly re-enters the corridor at Gleann Leacann Sheileach where it crosses the stream then loops around and exits the route corridor once more. There are also several Munros, Corbetts, mountains and hills popular with hill-walkers within the route corridor, including Beinn Narnain, Beinn Ime, Beinn Luibhean, Stob Coire Creagach, Cruach nam Miseag, A'Chrois, Beinn Chorranach, Creag Bhrosgan and Creag Tharsuinn.
	Water Environment	The route corridor crosses or is in the vicinity of four water bodies classified under the Water Framework Directive, including: • Three river water bodies, Loin Water, Allt Coiregrogain and Kinglas Water; and

		• One coastal water body, Loch Long (North). The route corridor also contains approximately 30-40 minor watercourses. SEPA Flood Maps (SEPA, 2020) indicates that the route corridor may be at existing coastal flood risk from Loch Long (North) during a medium likelihood event (0.5% Annual Exceedance Probability (200-year) event). The route corridor may be at existing fluvial flood risk from Loin Water, Allt Coiregrogain and Kinglas Water during a medium likelihood event (0.5% Annual Exceedance Probability (200-year) event). The route corridor passes in the vicinity of Loch Lomond Woods Special Area of Conservation (qualifying features include Otter (Lutra lutra)). The Loch Long Shellfish Water Protected Areas are within the vicinity of the route corridor. There are no Active Aquaculture Sites, CAR licenced fish farms and Classified Shellfish Harvesting Areas within the vicinity of the route corridor. The route corridor passes through two surface water Drinking Water Protected Areas. No bathing waters are in the vicinity of the route corridor.
	Soils	Soil type within the route corridor is mixed with peaty podzols, peaty gleys, montane soils, brown soils and mineral podzols all present. Montane soils and peaty podzols are predominant within the route corridor with montane soils located on the higher slopes and brown soils, mineral podzols and peaty gleys present in the south-eastern section of the corridor around Succoth. The route corridor, where peat is present, predominantly transects peat identified as Class 5 (no peatland habitat recorded, soils are carbon rich and deep peat) and Class 3 (not priority peatland habitat with carbon rich soils and some areas of deep peat) in the Carbon and Peatland 2016 Map. However, smaller pockets of peat identified as Class 2 (nationally important carbon-rich soils, deep peat and priority peatland habitat, areas of potentially high conservation value and restoration potential) and Class 1 (nationally important carbon rich soils, deep peat and priority peatland habitat, areas likely to be of high conservation value) are located throughout the route corridor. Given the combination of soils, climatic conditions and topography the Land Capability for Agriculture (LCA) Class within the route corridor is predominantly Class 6 (Class 6.1, 6.2 and 6.3) which is non-prime land capable of use as rough grazing only. However, a small area of land surrounding Succoth at the south-eastern extents of the corridor is LCA Class 4.2 which is also non-prime agricultural land but capable of producing a narrow range of crops. There are no Geological Conservation Review (GCR) sites in the route corridor.

		Given the combination of soils, topography and climate the Land Capability for Forestry (LCF) class includes Class F5 (Land with limited flexibility for the growth and management of tree crops), Class F6 (Land with very limited flexibility for the growth and management of tree crops) and Class F7 (Land unsuitable for producing tree crops) with Class F7 predominating. However, a small pocket of Class F2 (Land with very good flexibility for the growth and management of tree crops) is located to the east of Succoth at the south-eastern extents of the route corridor and an area of Class F4 (Land with moderate flexibility for the growth and management of tree crops) is located at the north-western extents of the route corridor. There are existing strands of commercial forestry in the route corridor but these are predominantly located on either side of the Glen Loin valley in the south-eastern extents of the corridor and near Butterbridge at the north-western extent of the route corridor. The route corridor is located within the LLTNP Authority Trees and Woodland Strategy area. Land within the study area is identified in the strategy as 'Preferred' (where native woodland creation would have the greatest impact in improving woodland connectivity, providing a more suitable climate for tree growth) predominantly on the eastern slopes of Beinn Narnain and the western slopes of Beinn Ime. Other areas are identified as 'Potential' (where native woodland creation would contribute to the wider strategy's objectives) throughout the route corridor and 'Sensitive' (where there is limited capacity for woodland creation due to higher value nature conservation or landscape objectives) in the land within Succoth.
	Air Quality	The route corridor is rural in nature; receptors sensitive to changes in air quality are present at the settlement of Succoth and Arrochar located in the south-eastern extent of the route corridor, and Tarbet within 200m. There is also a property at Butterbridge at Glen Kinglas. There are no AQMAs within the route corridor or in the Argyll and Bute Council area. Air quality in Argyll and Bute is considered to be generally very good and complies with all the air quality objectives for Scotland (Argyll and Bute Air Quality Annual Progress Report, 2020). Air quality in Argyll and Bute is considered to be generally very good and complies with all the air quality objectives for Scotland (Argyll and Bute Air Quality Annual Progress Report, 2020). Modelling results for sources of nitrogen dioxide and fine particulates in the Argyll and Bute Air Quality Annual Progress Report (APR) illustrate that background concentrations are very low, with the traffic considered as the main potential source of pollution in the absence of industry hotspots in the region. The Argyll and Bute APR did not identify any areas where air quality objectives may be under threat and where specific actions would be required to improve air quality.

	Climatic Factors	The baseline for climatic factors is not considered to differ greatly between the route corridor options. However, due to the northern location of the route corridor, it is considered to be more vulnerable to the impacts of climate change, such as landslides or flooding, due to the steep topography in the area. The topography of the route corridor rises gently along the valley floor from the A83 at Arrochar then rises steeply across the mountain range at Beinn Ime. The route corridor is within a location that may be at existing coastal flood risk from Loch Long (North) during a medium likelihood event. The route corridor may be at existing fluvial flood risk from Loin Water, Allt Coiregrogain and Kinglas Water during a medium likelihood event. There are areas of forestry in the route corridor particularly in the eastern section of the corridor, including Ardgartan Forest which is either side of Loin Water. As described in the 'Soils' section, there are areas of peat soils in the route corridor. Forestry area and peat lands have high carbon sequestration and sink value.
	Material Assets	The route corridor is located in a rural environment and is offline from its start point within Glen Loin, where it heads north west across the mountain range towards the A83 Trunk Road at Butterbridge. As stated in the Climate section, natural material assets within the route corridor include forestry and peat soils. There is evidence of agricultural activity at the settlements at Feorlinn within Glen Loin. There is also a mixed/coniferous woodland plantation on both sides of Glen Loin. Built material assets within the route corridor include power cables within Glen Loin. There are no additional infrastructure assets within the route corridor. The closest commercial waste disposal site is located in Helensburgh to the south.
	Cultural Heritage	There are two designated cultural heritage resources within this route corridor. These are two Category C Listed Buildings at Succoth. There are no other designated cultural heritage resources within the route corridor, but there is potential for undesignated or undiscovered cultural heritage resources (e.g. archaeological remains) to be located here.

	Landscape and Visual Amenity	The route corridor is approximately 8.6km long. The route corridor is situated between Arrochar, one of the main gateways to the Argyll Forest Park, and Butterbridge, and lies entirely within the LLTNP. There are no National Scenic Areas or Wild Land Areas within the route corridor, however the central part of the route corridor around the summits is characterised by steep rugged terrain with a considerable degree of wildness, remoteness and tranquillity. This route corridor is located predominantly within the Highland Summits Landscape Character Type (LCT) with small sections also located within Settled Coastal Fringe and Upland Glens - Loch Lomond & the Trossachs LCTs as well as Head of Loch Long Seascape Character Area (SCA). There are several existing tracks in the eastern part of the route corridor and no existing roads or tracks or other large-scale man-made elements in the central or western part of the route corridor (which passes between the Arrochar massif summits of Beinn Narain, Beinn Luibhean and Beinn Ime) until the existing A83 Trunk Road and Glen Kinglas access track at the route corridor's western end. Land cover within the route corridor consists mainly of open grassland, moorland, rocky outcrops and numerous watercourses with pockets of native broadleaved woodland, including Ancient Woodland sites, as well as commercial coniferous forestry in the east at the head of Loch Long and a large block of young native woodland to the west. All of these are located within the Argyll Forest Park. In addition, the LLTNP Trees and Woodlands Strategy (2019) identifies areas around the Highland summits as preferred or potential native woodland creation opportunities. Two of Scotland's Great Trails, Three Loch Way and Cowal Way, and a number of LLTNP core paths are located at the eastern end of the route corridor. Several hill walking trails are also located within this route corridor. Butterbridge, an old stone single arched bridge over Kinglas Water and a popular viewpoint, is located just outside the study area at the western end of the route corridor and the A83 in this location is part of the scenic Argyll Coastal Route.
Traffic		Annual average daily traffic (AADT) flow levels on the A83 Trunk Road in 2019 were 2,300 vpd (vehicles per day) on the stretch between Campbeltown and Tarbert and 4,400 vpd west of Tarbet, with the HGV percentage between 5% and 9%. At the Rest and Be Thankful, A83 Trunk Road traffic volumes were in the order of 4,500 vpd in 2019, with the HGV percentage around 9%, suggesting that, on average, around 400 HGVs pass through Glen Croe, on a daily basis. Additionally, around 17% of average daily traffic in 2019, on the A83 Trunk Road within Glen Croe (approximately 800 vehicles) was a light goods vehicle. Approximately 100 buses and coaches per day passed through Glen Croe via the A83 Trunk Road, in 2019.

	Travel routes to/from, and within, Argyll & Bute are highly seasonal, with greater volumes of people movements within the region during the summer months (predominantly as a result of increased visitor levels). Due to the geography and topography of the region, seasonal fluctuations in traffic volumes and the presence of slow-moving vehicles, travel times via the A83 Trunk Road between the key main towns/cities can be long relative to the distances involved and unreliable.

Implementability		
Engineering	Topography and Alignment Considerations	The topography at the east extents of the route corridor is likely to allow for desirable minimum alignment geometry to be achieved at or near existing ground levels and without the need for large embankments or cuttings. The topographic profile from Arrochar to Butterbridge in a north-western direction is very challenging. As a result, it is not technically feasible to achieve desirable minimum alignment geometry at or near existing ground levels. The use of numerous switchbacks, likely non-standard with respect to road design standards, in combination with deep cuttings and high embankments would be required to provide an open road alignment. The provision of a tunnel would allow for desirable minimum alignment geometry to be achieved where the most challenging topography is found.
	Geology / Geomorphology Considerations	As noted above, it is likely that a tunnel would be required for the majority of the route to achieve the desirable minimum alignment geometry within this route corridor. The following information on landslide records is provided for completeness however the provision of a tunnel would allow the assessment of, and potential mitigation against, landsliding to be limited to the vicinity of the portals and any open road sections. The summary of potentially difficult ground conditions includes considerations applicable to tunnelling in addition to open road sections as appropriate. The National Landslide Database records landslides to have occurred within the route corridor. It should be noted that additional landslides may have occurred which are not recorded within the database. Potential landslide hazards may require measures to protect any route alignment and this should be considered as part of detailed assessment should this route corridor be retained. The database records landslides to have occurred at the following locations: • One landslide near the summit of Cruach nam Miseag.

		• One landslide near the summit of Beinn Narnain. • One landslide near the summit of A'Chrois. • Two landslides on the north-west slopes of Beinn Ime. No mass movement deposits are mapped within this route corridor. An assessment of other potential issues including potentially difficult ground conditions is summarised below: • The relatively low resolution of geological mapping means that potentially hazardous deposits such as peat, alluvium and mass movement deposits may not be recorded. • Potential presence of soft or loose deposits (Alluvium, River Terrace Deposits). • Shallow rockhead and variability in rock strength due to the presence of igneous intrusions of high strength which may cause difficulties for shallow excavations and any tunnelled sections. • Faulting can create zones of weak and/or highly fractured rock which is a significant hazard when tunnelling or excavating cuttings. Conversely, faulting can also create zones of extremely strong 'welded' fault rock, which again would create difficulties for tunnelling or areas of cutting in relation to excavatability. • The presence of faults may provide a preferential pathway for groundwater flow, and groundwater may pose significant issues for excavation in cuttings and for tunnelling if the groundwater table is high.
	Hydrology and Drainage Considerations	This is covered under 'Water Environment' in the 'Environment' part of this table.
	Structures Considerations	<u>Tunnel</u> • A tunnel is considered to be required to satisfy a practical road alignment through the route corridor. The proposed tunnel would be approximately 7.0 km in length with a constant gradient of about 2.3% ascending in a straight alignment from Succoth in the east to Butterbridge in the west. • It is initially considered that the tunnel would be constructed by a single bore providing a single carriageway with bi-directional traffic through the tunnel; however, there are important fire life safety, and associated ventilation and escape provisions, backed up by European and National highways standards that will govern the tunnel configuration.

		• For a single carriageway, bi-directional tunnel, these provisions are quite complex. The ventilation system must be in permanent operation and in the event of a fire, smoke and heat have to be removed from the tunnel using semi-transverse ventilation, which draws the smoke and heat into an overhead duct. In a long tunnel such as this, exhausts are likely to be required through intermediate shafts. Escape from the fire is also more problematic in that an escape duct has to be provided within the tunnel section. People trapped in the tunnel cannot be expected to be able to walk far through such a narrow duct, and so intermediate shafts or a parallel escape bore must be provided to facilitate escape to free air. Given the depth of intermediate shafts of 400m deep or more, lifts and a recovery suite at the shaft head would have to be provided. Alternatively, a parallel rescue bore could be constructed parallel to the main bore with enough space for rescue vehicles. • Accordingly, a twin bore, dual carriageway tunnel may be more appropriate. In such tunnels, in the event of a severe vehicle fire, longitudinal jet fan ventilation is ramped up to full strength to blow the smoke and heat in the direction of flow of traffic, away from vehicles queued behind the incident, while those ahead of the incident escape by continuing as normal. For those trapped in the tunnel, they can escape into the other non-incident bore through cross-passages, at say 100-150m intervals, and can be evacuated by rescue vehicles. Intermediate shafts would not typically be required other than to vent pollution. <u>Bridges</u> • 2 new single 20m span composite concrete deck road underbridge on reinforced concrete abutments. • 2 new single 20m span composite concrete deck watercourse underbridge on reinforced concrete abutments. • Approximately 6 new culverts. The single span underbridges would comprise integral concrete precast Y beams with insitu deck slabs on reinforced concrete abutments or bankseats as required. Foundations would be spread footings or piled. Constructability, operation and maintenance in relation to structures are discussed elsewhere within the document.
	Constructability Considerations	<u>Major Structures Constructability Considerations – Tunnel</u> • The tunnel could be advanced by drill and blast techniques or by using a large Tunnel Boring Machine (TBM).

		• Whichever technique is used, short sections of cut and cover tunnel would be required at each portal location to form a vertical portal face in reasonably competent rock from which the tunnel can be advanced. At each drill-and-blast advance the flat-bottomed "horseshoe"-shaped excavation of newly cut rock would be evaluated by a geologist, classified and strengthened using a pre-set combination of supporting elements (rockbolts and sprayed concrete, etc.), to form a stable primary lining before the next advance is drilled and charged with explosive. Although this may seem a slow and laborious process it can be an economic method to construct tunnels in rock. The tunnel can be completed more quickly if the drill-and-blast sequence can be repeated at the opposite portal, or even from intermediate shafts. Once the tunnel is completed an in-situ cast secondary lining can be installed to form a durable final structure. • Alternatively, the tunnel can be bored using a large Tunnel Boring Machine (TBM), starting at one end and boring the 7.0km of tunnel consecutively. Although this involves a large capital investment in a TBM and large site set-up at the portal locations, when compared with drill-and-blast, the final circular structural lining of pre-cast segments can be formed as the tunnel advances. • Where vertical ventilation or escape shafts are required, depending on the form of tunnel selected, there are locations along the tunnel alignment having significant shaft depths, particularly under the Ben Ime and Ben Narnain peaks. Construction of vertical shafts will be challenging due to severe access restrictions and steep slopes. • The construction of a portal at the eastern end of the tunnel at Succoth at the head of Loch Loin looks feasible, with an area of flat farmland as a credible site location and transport of the TBM via Loch Loin. It may also be preferable to establish a marine facility in the loch to support ongoing tunnel construction and avoid putting construction traffic on the A83 Trunk Road for unsuitable material away and materials deliveries. • Access would also be possible from the west end of the tunnel, via Loch Fyne and the existing A83 through Glen Kinglas. There seems to be a reasonable piece of flat ground in this location, where a tunnel site could be established. • At the western end the tunnel portal is located close to the existing A83 Trunk Road. To process and remove the earthworks material from the tunnel it will be necessary to utilise the A83 Trunk Road carrying road going tipper lorries, possibly to a marine facility at north end of Loch Fyne in Cairndow around 7km away, depending on the final location for the spoil. Alternatively, all spoil would need to be removed along the existing A83/A82 Trunk Roads which would increase traffic flows along the route and potentially leave the unsuitable material away operations vulnerable to landslip events. It may be possible to locate a temporary storage area on the west side of the A83 Trunk Road opposite the tunnel portal, which could be fed by

		conveyor and would allow the spoil removal operation to be managed to accommodate peak traffic or closure periods. This would have a further impact on the landscape in the temporary case. <u>Other Constructability Considerations – Roads, Logistics and Small Structures</u> • Construction of the new road and minor bridges in the Glen Loin area should be relatively straightforward using standard construction techniques and with comparatively small amounts of earthworks. • Bridge construction would be conventional for the comparatively small single span bridges required. Abutments would comprise reinforced concrete abutment stems and wingwalls on piled or spread footing foundations as appropriate. The composite concrete decks would comprise pre-tensioned Y beams with insitu deck slabs constructed integrally with the abutments. Y beams would be delivered from manufactures and lifted by conventional mobile crane. Insitu concrete would be delivered by 'ready mix' supplier or by site batching.
Environment Considerations	Biodiversity, Fauna and Flora	21.35ha of Glen Etive and Glen Fyne SPA falls within the corridor study area. There could be temporary and permanent habitat loss within the SPA, which would be a major negative environmental effect. Disturbance to breeding golden eagle could occur during construction and operation, which would be a major negative environmental effect. 27.17ha of Loch Lomond Woods SAC falls within the corridor study area. There could be temporary and permanent habitat loss within the SAC, including the loss of the designated feature western acidic oak woodland and habitat suitable for the designated feature otter, which would be a major negative environmental effect. Moderate negative environmental effects could also occur as a result of nitrogen deposition. 34.22ha of Glen Loin SSSI falls within the corridor study area. There could be temporary and permanent habitat loss within the SSSI, including the loss of designated features upland mixed ash woodland and upland oak woodland, which would be a major negative environmental effect. Moderate negative environmental effects could also occur as a result of nitrogen deposition. 5.77ha of Beinn an Lochain SSSI within the corridor study area. There could be temporary and permanent habitat loss within the SSSI, including the loss of designated features tall herb ledge and upland assemblage, which would be

		a major negative environmental effect. Moderate negative environmental effects could also as a result of nitrogen deposition. There are 2 parcels of woodland listed on the AWI within the corridor study area. This could result in the loss of nationally important and irreplaceable habitat, which would be a major negative environmental effect and could require compensation. Moderate negative environmental effects could also occur as a result of nitrogen deposition. There is potential for negative effects on terrestrial and aquatic species from construction activities, as follows: • Disturbance from noise and vibration and light pollution. • Injury or mortality from vegetation removal, vehicle movements, or becoming trapped in uncovered holes and pipes during construction. • Fragmentation and loss of habitat suitable for shelter, foraging and commuting. • Changes in water flow conditions from runoff, or alterations to watercourses and groundwater. During operation, there is potential for habitat loss and fragmentation for protected species as a result of tree and vegetation clearance and loss of AWI.
	Population and Human Health	There is potential for localised minor noise and vibration effects on receptors within the route corridor during the construction phase. For example, noise nuisance and vibration caused by traffic and activities associated with construction works could result in general annoyance and/or sleep disturbance for local residents. During the operation phase, there is potential for receptors within the route corridor to experience minor noise and vibration effects from increased vehicle traffic. It is uncertain at this stage whether noise and vibration impacts on those receptors would be major during construction and operation. There is potential for other minor effects on population receptors resulting from construction traffic. Increased traffic volumes and construction activities could result in diversions and affect journey lengths for both vehicle travellers and non-motorised users (NMUs). The route corridor would provide a new link between the A83 Trunk Road at Succoth / Arrochar and the A83 Trunk Road at Butterbridge. and potentially reduce the severity and/or incidence of severance issues. . The route corridor is expected to improve accessibility and connectivity with the central belt for those living, working, and travelling in the Argyll and Bute region, through increasing the reliability of the trunk road network. It is also expected that the route

		corridor would provide greater accessibility to walking routes in the surrounding area, including Three Lochs Way, Loch Lomond and Cowal Way, Glen Loin Loop, Succoth Burn Walk (Blue), Stronafyne Loop, Arrochar to Station walk, and hill-walking routes such as Beinn Narnain, Beinn Ime, Beinn Luibhean, Stob Coire Creagach, Cruach nam Miseag, A' Chrois, Beinn Chorranach, Creag Bhrosgan and Creag Tharsuinn. There is also potential for paths to be severed as a result of the route corridor, but the extent and significance of such impacts are uncertain at this stage. There may be land-take from properties required to facilitate the operation of the route corridor. There is also potential for air quality effects which could affect human health; these are discussed further under Air Quality.
	Water Environment	Construction within the route corridor and operational structures and discharges may impact the hydromorphology and surface water quality of approximately three Water Framework Directive classified river water bodies, one coastal water bodies and approximately 30-40 minor watercourses. SEPA Flood Maps (SEPA, 2020) indicates that the route corridor may be at coastal flood risk from Loch Long and at fluvial flood risk from Loin Water, Allt Coiregrogain and Kinglas Water during a medium likelihood event (0.5% Annual Exceedance Probability (200-year) event). The route corridor passes in the vicinity of Loch Lomond Woods Special Area of Conservation (partially designated for otter, Lutra lutra), which may be impacted. The Loch Long Shellfish Water Protected Areas are within the study area and may be impacted by the route. The route corridor passes in the vicinity of two surface water Drinking Water Protected Areas, which may be impacted. The potential impacts of construction and operation within the corridor could result in significant negative effects on the water environment, subject to appropriate mitigation.
	Soil	The route corridor is assessed as having a minor negative or uncertain environmental effect. This recognises the route corridor has the potential to avoid effects on Class 1 (nationally important and of high conservation value) and Class 2 peat (nationally important and of potentially high conservation value and restoration potential) but would unavoidably affect non-priority peatland and carbon-rich soils. Loss of existing commercial forestry, Land Capability

		for Forestry (LCF) Class F2 and F4, and land identified as 'preferred' within the LLTNP Authority Trees and Woodland Strategy is likely to be unavoidable within the route corridor. Mitigation is likely to be achievable to reduce the potential for major negative environmental effects.
	Air Quality	There is potential for localised air quality impacts on receptors within the corridor during the construction phase: for example, dust generated from site activities and emissions from vehicular movements, which could result in annoyance for residents within settlements including Succoth, Arrochar, and Tarbet. The more intensive activities required to facilitate construction of the tunnel could result in these effects being greater. The route corridor does not follow an existing route and would therefore introduce traffic-related emissions to the area (e.g. carbon monoxide, sulphur dioxide, particulate matter) during operation. Although the existing air quality in the region is good, there are a number of settlements within the corridor which could potentially experience negative air quality effects; however it is expected that these would be reduced through mitigation measures. Potential air quality impacts on ecological receptors are assessed under Biodiversity, flora and fauna.
	Climatic Factors	The corridor is offline and has steep topography on either side of the centreline from Glen Loin. During periods of extended rainfall, the route corridor could be at risk of landslides from slope instability. Climate change is expected to increase the frequency and intensity of extreme weather events which could impact the route. As indicated in the 'Water Environment' section, the route corridor may be at coastal flood risk from Loch Long at fluvial flood risk from Loin Water, Allt Coiregrogain and Kinglas Water during a medium likelihood event. . As the route corridor option is primarily a tunnel, negative effects from landslides and flooding at ground level would be avoided. As indicated in the 'Soils' section, there are areas peatland that could be affected by the route corridor, leading to its degradation and release of carbon, although this is assessed as being a minor negative or uncertain environmental effect. Mitigation is likely to be achievable to reduce the potential for major negative environmental effects There are areas of forestry in the route corridor and any felling would release sequestered carbon and reduce the carbon sink value of forests within the corridor. As stated in the Biodiversity section, the loss of woodland would have

		major negative environmental effects. Woodland and Forestry Strategy areas, including existing planted woodland, potential, preferred and sensitive sites, need to be considered in the corridor selection process. The method of tunnel construction used would affect the impacts on surface natural assets. As stated in the 'Material Assets' section, engineering solutions would be required to accommodate aspects of the various options being considered for the route corridor construction. The construction of the tunnel would have a significant amount of embodied carbon in material usage and emissions from construction activities. Release of carbon emissions to construct the scheme and for vehicles using during operation would have a cumulative impact on increasing atmospheric carbon concentrations, contributing to climate change.
	Material Assets	The route corridor is offline from Glen Loin across the mountain range. Due to the topography of the corridor, significant engineering solutions would be required to achieve compliance. The route corridor is approximately 8.6km in length and would require significant raw material inputs and earthwork activities to construct including: • Total route corridor length: approximately 8.6km • Tunnel length: approximately 7.0km • 2 new single 20m span composite concrete deck road underbridge on RC abutments. • 2 new single 20m span composite concrete deck watercourse underbridge on RC abutments There are natural material assets in the route corridor, including forestry areas that would likely require felling for the corridor option, resulting in loss of natural material assets and having moderate negative environmental effects as stated in the Biodiversity section. Peat soils would also be affected by the route corridor, resulting in minor negative or uncertain environmental effect as stated in the Soils section. Short sections of cut and cover tunnels would be required at either end of the portal location with a drilling or a TBM being used to construct main section. The use of a tunnel would minimise the effects on surface material assets. Due to the rural nature of the route corridor option and use of a tunnel, environmental effects on built material assets would not be expected.

	Cultural Heritage	As there are relatively few designated cultural heritage resources, no significant impacts on cultural heritage are predicted. However, any construction works or temporary access routes would need to avoid impacts on the two Listed Buildings within the route corridor. There is also potential for construction works and tunnelling to damage unknown archaeological resources.
	Landscape and Visual Amenity	This route corridor has the potential to result in significant adverse effects on the special qualities of the LLTNP, such as such as the high relative wildness on and around the Highland summits, as well as the local landscape and seascape character and landscape elements including the rugged topography, watercourses, native and coniferous plantation woodland and Ancient Woodland sites due to the construction and operation of the carriageway and supporting infrastructure such as the tunnel vertical ventilation and escape shafts and tunnel portals. There is also potential for significant adverse effects on sensitive visual receptors such as the residents of Arrochar and Succoth, walkers on the nearby trails including the Three Lochs Way and Cowal Way (Scotland's Great Trails), LLTNP core paths, the Arrochar Alps hill walking routes and the summit viewpoints on Beinn Narnain, Beinn Luibhean and Beinn Ime. There is also potential for adverse effects on the landscape setting and views of and from the old bridge at Butterbridge and on views experienced by travellers on the Argyll Coastal Route. As the majority of the route corridor would need to be in a tunnel, the significance of the landscape and visual effects during operation would partially depend on the type of construction technique used, however it is considered unlikely that major significant adverse effects could be avoided.
Traffic	Traffic Flows	Given the relatively minor connectivity changes provided by implementing this route corridor, changes in traffic levels are likely to be low, in terms of traffic reduction on the existing A83 Trunk Road through the Rest and Be Thankful. This route corridor is proposed to be constructed through a glen which currently has no route, therefore will introduce traffic to the area. The majority of trips to/from the region are to the south towards Glasgow, rather than to the north on the A82 Trunk Road therefore this route corridor is not an attractive option for the majority of users.
	Accidents	Minor reductions in transport related casualties could, potentially, be realised as a result of reductions in vehicle kilometres associated with fewer landslide induced road closures and the associated long diversion routes for strategic traffic travelling to and from Argyll & Bute. During periods of closure the new route would provide a shorter diversion route for trips to the south.

Operational Considerations	From a Trunk Road operation perspective, the main operational considerations within the route corridor are the risk of flooding and/or landslides, based on the steep topography and that the corridor passes over Loin Water and across the valley floor of Glen Loin. The centreline of the route corridor has a maximum elevation of 1000m above ordnance datum, with significant peaks all around providing shelter. This means it is likely that snow accumulates within the route corridor during the winter months, with potential winter resilience operational issues. Tunnel Operations • There is a need for regular inspection and maintenance of such tunnels. A tunnel manager, tunnel safety officer and a tunnel design & safety consultative group (TDSCG) must be set up early in the design process and continue through operation. The location and type of tunnel operations centre would need to be reviewed and investigated further, depending on the final location and length of tunnel provided. • A sufficient power supply will be required to allow operation of the tunnel ventilation system and any other systems, particularly those required in the event of an emergency incident. • The use of the tunnel by vehicles carrying potentially hazardous materials or dangerous goods (such as fuel tankers) is largely dependent on fire safety and ventilation and may require a tunnel ventilation system that allows for a larger design fire size. Dependent on the evaluation of risks, dangerous goods vehicles may need to be escorted through the tunnel in a convoy. It should be noted that a twin bore dual carriageway tunnel configuration is considered likely to result in fewer road traffic accidents (due to no bi-directional traffic flow), theoretically attracting a lower risk of emergency incidents. • For a twin bore dual carriageway configuration, vehicle crossovers may need to be provided at intervals if practicable, as per recommendation from the European Directive EUD 2004/54 EC. In addition, lay-bys should be provided at intervals. • The development of any tunnel design should be informed by consultation with emergency services and other relevant stakeholders and guided by European and National Standards to ensure that appropriately robust measures in the event of an emergency incident are put in place.
Financial Considerations	The estimated cost range of a scheme within this route corridor is approximately £1.45Bn - £1.91Bn.
Estimated Time to Completion	It is estimated it would take approximately 12 years to achieve a fully operational road in this route corridor assuming constructed as a single contract. If construction was phased with contracts in sequence, the time for completion would be greater.

Public Acceptability	The Arrochar – Butterbridge route corridor was suggested in the responses received to the public consultation on the A83 Access to Argyll and Bute project. There is therefore no public opinion on this route corridor that can be included in this assessment.

STAG Criteria		
Criteria		Assessment Summary
Environment		Refer to Implementability Assessment – Environment
Safety		Refer to Implementability Assessment – Accidents
Economy	Transport Economic Efficiency	This route corridor does not provide a significant change in connectivity for areas of Argyll & Bute, when compared to the existing route, under normal operating conditions, and is unlikely to provide any significant benefits associated with journey time savings. A high-level cost-benefit analysis undertaken for the different route corridor options proposed suggests that, assuming normal operation of the existing A83 Trunk Road, the benefit to cost ratio for the proposed route corridor is expected to be very low. Quantification of the economic benefits of the scheme will require further analysis of the cost of closures to the economy.
	Wider Economic Impacts	As a result of the enhanced resilience provided through mitigating landslide induced closures and, subsequently, increased business confidence and associated inward investment, this intervention is has the potential to provide a positive contribution towards wider economic impacts within the wider Argyll & Bute region. While this route corridor address issues with resilience, poor reliability and long journey times come about, not only because of issues with resilience at the Rest and Be Thankful. Even under normal operating conditions i.e. when the A83 Trunk Road is fully open to traffic, journey times for both strategic and local traffic using the A83 Trunk Road can be variable, due to slow moving vehicles and tourist/visitor traffic. The current road network and lack of suitable alternative routes inevitably mean that many areas would remain remote even if resilience issues at the Rest and be Thankful were overcome. This suggests that

STAG Criteria		
Criteria		Assessment Summary
		wider economic impacts, simply from removing the risks of landslides or A83 Trunk Road route closures, at the Rest and Be Thankful, potentially may be modest. It is also worth noting that, while rural depopulation (a significant issue within Argyll & Bute) is linked to wider economic outcomes, indications are that headline economic conditions are not the main driver of this. Transport interventions could likely play a part in arresting population decline, but only if considered alongside an integrated package of economic, cultural and social regeneration measures. A package of measures of this type, coupled with upgraded access to Kintyre, Bute and Cowal, has the potential to arrest population decline and reinvigorate local communities within Argyll & Bute.
Integration	Transport Integration	An integrated transport system aids accessibility by connecting people to opportunities and goods to markets. This route corridor may provide multi-modal opportunities to enhance transport integration. The intervention provides the opportunity to enhance linkages to walking and cycling routes and core paths. As part of the design process, it will be ensured that NMU facilities provided as part of the intervention address the needs of recreational walkers, cyclists and equestrians, as well as, to a more limited extent in this route corridor, commuters. The intervention will provide enhanced resilience and potential journey time reliability benefits for buses and coaches travelling via the A83 Trunk Road. In the context of providing reliable journey times, the length of improvement in the A83 corridor, compared to the overall corridor length, is small. Therefore, although corridor improvements at the Rest and be Thankful will make the route available more often, it will not necessarily provide a step change in overall journey time reliability. The resilience provided may provide bus and coach operators with an opportunity to review timetables, translating to more efficient operations and, potentially, a change in service frequency and the number of communities served. Landslide induced incidents on the A83 Trunk Road at the Rest & Be Thankful can lead to road closures and diversions. Should the Old Military Road also be closed, the diversionary route for A83 traffic between Tarbet and Inveraray is approximately 25 miles longer in length than if using the A83. Depending on journey origin and destination, the longest diversion length experienced by travellers would be over 60

STAG Criteria		
Criteria		Assessment Summary
		miles. The improved resilience may contribute towards a reduction in the variability of bus journey times and the likelihood of full closures, leading to service cancelations. This may also provide a health and welfare benefit to bus drivers, due to the reduction in instances where bus services are force to travel via longer diversion routes. This route corridor is not expected to have any material impact on the perception of a seamless public transport journey, as interchange and ticketing will not be affected to any great extent. However, interchange with bus services travelling on the A83, due to the reduction in cancelled or delayed services discussed above, may be more reliable. The intervention, through the enhanced resilience provided, will enable more efficient opportunities for freight transport, facilitating more efficient and effective transportation of goods of significant value to the regional and national economies, including high value aquaculture produce and whisky.
	Transport and Land Use Integration	The main aspect of appraisal within the transport and land-use integration criteria is identifying and mitigating any conflicts between the intervention and land-use planning policy and environmental designations. If selected as the preferred corridor, a strategic assessment of the impact of the route corridor on the environment would be carried out in the Strategic Environmental Assessment (SEA). More detailed Environmental Impact Assessment would be carried out as part of the DMRB Assessment Process. The route corridor is expected to support enhanced accessibility to and from developments in the wider region, and may support investment decisions in Argyll & Bute, more generally.
	Policy Integration	The route corridor contributes to strategic policy objectives set by the Scottish Government and Transport Scotland. A wide range of national and regional level policies from various plans, programmes and strategies have been reviewed, including Argyll and Bute's Local Development Plan, its' Strategic Environmental Assessment and the LLTNP Local Development Plan. The various relevant policies contained within these documents have been taken into account in the TPOs, the existing corridor

STAG Criteria		
Criteria		Assessment Summary
		conditions and the implementability assessment. No over-riding conflicts have been identified and, in specific instances, the route corridor may contribute towards the delivery of specific policies. The A83 Trunk Road was identified in Transport Scotland's STPR as a route requiring network optimisation through route management and targeted investment. Transport Scotland's emerging STPR2 continues to appraise the need for investment in improved access to Argyll & Bute. It is likely that this route corridor will contribute positively to the NTS2 vision and several of the underpinning priorities and outcomes, including 'takes climate action' and 'helps deliver inclusive economic growth'. Achieving positive outcomes against several of the priorities and outcomes, however, will be dependent on the quality and nature of the infrastructure provided, particularly related with the facilitation and promotion of travel via active modes. This route corridor is likely to contribute positively towards the NPF3 vision, in terms of delivering 'a successful, sustainable place', 'a low carbon place' 'a natural resilient place' and 'a connected place'. NPF3 recognises that Scotland's varied coast and islands have an exceptional, internationally recognised environment and notes the opportunity to secure growth from renewable energy generation as well as other key economic sectors including tourism and food and drink (of key importance to the regional economy). It is recognised that infrastructure investment, including improved transport links are required to bring employment, reverse population decline and stimulate demand for development and services in rural areas. This route corridor is likely to contribute positively towards key objectives as set out within Argyll & Bute's Local Development Plan. An intervention within this route corridor will likely assist in the improvement of: - Argyll and Bute's connectivity, transport infrastructure, integration between land use, transportation and associated networks. - Argyll and Bute's main towns and key settlements, as increasingly attractive places where people want to live, work and invest - the economic and social regeneration of smaller rural communities

STAG Criteria		
Criteria		Assessment Summary
		- the continued diversification and sustainable growth of Argyll and Bute's economy, with a particular focus on sustainable assets in terms of renewables, tourism, forestry, food and drink, including agriculture, fishing, aquaculture and whisky production - addressing climate change impacts and reducing the region's carbon footprint This route corridor is likely to contribute positively towards the strategic principles set out within the LLTNP Local Development Plan. An intervention within this route corridor will contribute to the National Park by aiding the delivery of 'a successful, sustainable place', 'a low carbon place', 'a natural, resilient place' and 'a more connected place'. While the route corridor is likely to largely fit with policies related with transport based emissions, the nature of the construction and engineering activities required to deliver this route corridor are likely to result in significant emissions, on the basis of existing technologies. It is anticipated, however, that efficiencies in construction practices and the materials used, could be identified e.g. sustainably sourced materials, with a lower embodied carbon content. This would aid in ensuring that any emissions associated with construction activities are minimised, as far as practicably possible, making best use of advances in emerging decarbonisation technology. It is expected that the route corridor would be delivered in-line with measures, as set out within the Scottish Government's 'Update to the Climate Change Plan' (2018 – 2032), and associated documents, including the emerging findings from the 'Deep Decarbonisation Pathways for Scottish Industries: Research Report' relating with the decarbonisation of industry, including the construction sector. A further assessment of carbon, and opportunities for carbon reduction in design, would be considered in later stages of the project assessment process.
Accessibility and Social Inclusion	Community Accessibility	It is considered unlikely that this route corridor would have any significant impact on public transport usage, reducing transport poverty or reducing reliance on private cars. This is primarily due to the nature of the route corridor and the areas within which it is located.

STAG Criteria		
Criteria		Assessment Summary
		There exists an opportunity, through the infrastructure provided, to positively impact on the level of active travel undertaken within the route corridor. While there is the potential for local trips to be made via active modes, and for additional trips to be generated resulting from increased use of the infrastructure provided by visitors and tourists, it is unlikely, however, that the future level of active travel trips within the corridor would be significant. This route corridor provides a potential opportunity for the provision of enhanced parking facilities, improving access to the scenic area within which the route corridor sits. This could provide enhanced access to the natural environment for those wishing to park and proceed via active modes. Potential enhancements in resilience provided as a result of mitigating landslide induced closures could aid community accessibility, through better, more reliable access to services, both locally and further afield
	Comparative Accessibility	Due to the rural nature of the Argyll & Bute region, the distances between key towns and a lack of suitable public transport services (in some areas) car ownership levels are greater than the national average. Due to the current high dependency for travel by car, the scale of accessibility benefits that would be delivered to this main user group through delivery of an intervention within this route corridor include more reliable journeys to employment opportunities, recreation, education and health services located both within and outwith the region. Visitors and leisure users would also likely benefit from NMU infrastructure provided, linking to core paths, existing cycle networks, outdoor activities and viewpoints. The design of such infrastructure should ensure that local communities benefit fully from such facilities and are not adversely impacted by them. Freight users may see health and wellbeing benefits from the enhanced resilience provided by this route corridor, with fewer closures resulting in the need for lengthy diversion routes, which can add a significant duration to journeys, contributing towards driver fatigue and stress. Given the rural nature of the region, journeys made using the A83, may already be several hours in length.

STAG Criteria		
Criteria		Assessment Summary
		Positive impacts can be expected, in terms of mitigating impacts on socially excluded groups - Argyll & Bute has a higher proportion of older residents than the national average. Enhanced resilience may provide more reliable access to key services, including healthcare. This route corridor could contribute to reducing economic and geographic deprivation for currently socially disadvantaged groups (Argyll & Bute has several areas within the 10% most deprived communities in Scotland) through the improvement of accessibility and the enhancement of business confidence driving an associated increase in inward investment and jobs.

Assessment Summary

Transport Planning Objectives		Assessment						
Objective		Major Negative	Moderate Negative	Minor Negative	Neutral	Minor Positive	Moderate Positive	Major Positive
TPO1	Resilience – reduce the impact of disruption for travel to, from and between key towns within Argyll & Bute, and for communities accessed via the strategic road network.						✓	
TPO2	Safety – positively contribute towards the Scottish Government's Vision Zero road safety target by reducing accidents on the road network and their severity.					✓		
TPO3	Economy – reduce geographic and economic inequalities within Argyll & Bute through improved connectivity and resilience.					✓		
TPO4	Sustainable travel – encourage sustainable travel to, from and within Argyll & Bute through facilitating bus, active travel and sustainable travel choices.				✓			
TPO5	Environment – Protect the environment, including the benefits local communities and visitors obtain from the natural environment, by enhancing natural capital assets and ecosystem service provision through delivery of sustainable transport infrastructure.	✓						

Access to Argyll & Bute (A83) Strategic Environmental Assessment & Preliminary Engineering Services
Route Corridor Preliminary Assessment
Route Corridor 15 – Arrochar – Butterbridge

Implementability		RAG Rating		
		RED	AMBER	GREEN
Engineering	Topography and Alignment Considerations			
	Geology / Geomorphology Considerations			
	Structures Considerations			
	Constructability Considerations			
Environment	Biodiversity, Fauna and Flora			
	Population and Human Health			
	Water			
	Soil			
	Air Quality			
	Climatic Factors			
	Material Assets			
	Cultural Heritage			
	Landscape and Visual Amenity			
Traffic	Traffic Flows			
	Accidents			
Operational Considerations				
Financial Considerations				

Access to Argyll & Bute (A83) Strategic Environmental Assessment & Preliminary Engineering Services
Route Corridor Preliminary Assessment
Route Corridor 15 – Arrochar – Butterbridge

STAG Criteria		Assessment						
Criteria		Major Negative	Moderate Negative	Minor Negative	Neutral	Minor Positive	Moderate Positive	Major Positive
Environment		Refer to Implementability Assessment – Environment						
Safety		Refer to Implementability Assessment – Accidents						
Economy	Transport Economic Efficiency	✓						
	Wider Economic Impacts					✓		
Integration	Transport Integration				✓			
	Transport and Land Use Integration				✓			
	Policy Integration				✓			
Accessibility and Social Inclusion	Community Accessibility					✓		
	Comparative Accessibility					✓		