11. Vehicle Travellers

11.1. Introduction

11.1.1. This chapter describes the assessment undertaken to determine the potential impacts of the A77 Maybole Bypass on the quality of driving conditions for vehicle travellers. Two subject areas are assessed to give an indication of impact on vehicle travellers, these are:

- Views from the road and;
- Driver stress.

11.1.2. In accordance with Volume 11 of the Design Manual for Roads and Bridges (DMRB) Section 3, Part 9: Vehicle Travellers[71] 'views from the road' are defined as the extent to which travellers, including drivers, are exposed to different types and quality of scenery that they may pass along the route.

11.1.3. In accordance with DMRB 'driver stress' can be defined as the adverse mental and physiological effects experienced by a driver traversing a road network. The levels of stress vehicle travellers will experience can vary depending on the road layout, surface riding characteristics, junction frequency, and speed and flow per lane. Driver stress has three main components:

- Frustration,
- Fear of potential accidents, and
- Uncertainty relating to the route being followed.

11.1.4. A new road may allow people to see landscapes not easily visible previously and this can be positive or negative depending on the character of an area. The appraisal considers the extent to which travellers, including drivers, are exposed to different types and quality of landscape from the new road. Views from the road may also benefit drivers and help reduce stress but these benefits must be balanced with the need to integrate the new road in its landscape and to reduce its visual intrusion.

11.2. Methodology

Determination of Baseline Conditions

11.2.1. This assessment was carried out in accordance with the Design Manual for Roads and Bridges (DMRB) Volume 11, Section 3, Part 9: June 1993 – Vehicle Travellers.

11.2.2. Information regarding the existing baseline conditions was gathered through a desk-based review of available traffic data and other road network information, OS maps and previous site visits and reports. Assessment of the quality and character of the landscape, Chapter 7: Landscape Effects has been considered as part of the assessment of views from the road.

[71] Design Manual for Roads and Bridges (DMRB) (1993), Vol 11, Section 3, Part 9 Vehicle Travellers: http://www.standardsforhighways.co.uk/dmrb/vol11/section3/11s3p09.pdf [Accessed 21/06/2013]

Planning Policy, Legislative Context and Standards

Planning policy

11.2.3. The second National Planning Framework (NPF2)[72] was published in June 2009. It sets the spatial strategy for Scotland's development to 2030, and designates 14 national developments of strategic importance to Scotland.

11.2.4. The strategic outcomes set out in the National Transport Strategy are to:

- improve journey times and connections, to tackle congestion and the lack of integration in transport;
- reduce emissions, to tackle the issues of climate change, air quality and health improvement; and
- improve quality, accessibility and affordability, to give people a choice of public transport, where availability means better quality services and value for money or an alternative to the car

11.2.5. The Scottish Planning Policy (SPP) is a statement of Scottish Government policy on nationally important land use which was first published in February 2010. It is currently under review, with consultation on the new draft SPP completed in July 2013. The Transport policy of the SPP states the need for tackling congestion to support sustainable economic growth and reduce emissions, developing new transport infrastructure, making transport improvements for active networks and the aim to make urban areas safer for pedestrians.

- The strategic transport network, which includes the trunk road, motorway and rail networks, is critical in supporting a level of national connectivity that facilitates sustainable economic growth. The main purpose of the strategic transport network is to provide safe and efficient movement of strategic long distance traffic between major centres, although in rural areas it also performs important local functions.

11.2.6. Planning Advice Note (PAN) 75 Planning for Transport (2005)[73]: This PAN provides good practice guidance which planning authorities, developers and others should carry out in their policy development, proposal assessment and project delivery.

11.2.7. South Ayrshire Local Plan (2007)[74] sets out the proposals and policies for the management of transport and traffic. Strategic Policy SERV5 "states that the Council will seek to ensure that land uses generating high density travel demands are supported by green transport plans and are located where frequent and convenient public transport services are available, or will be made available".

[72] The Scottish Government. The second National Planning Framework (NPF2). http://www.scotland.gov.uk/Topics/Built-Environment/planning/National-Planning-Policy/npf
[73] The Scottish government. Planning Advice Note (PAN) 75- Planning for Transport 2005. http://www.scotland.gov.uk/Publications/2005/08/16154453/44548
[74] South Ayrshire Council. South Ayrshire Local Plan. http://www.south-ayrshire.gov.uk/documents/?file=SALocalPlanFinal.pdf [Accessed 03/06/2013]

Standards

11.2.8. Design Manual for Roads and Bridges (DMRB) Volume 11, Section 3, Part 9: June 1993 – Vehicle Travellers.

Consultations

11.2.9. Consultation was sought from South Ayrshire Council under the terms of The Town and Country Planning (Environmental Impact Assessment) (Scotland) Regulations 2011[75]. The feedback stated that the ES should assess the impact of the construction and operational phases of the proposed development on the public road network in terms of the effects of the additional vehicular traffic generated, particularly heavy goods vehicles and abnormal loads, on traffic management, road safety, road layout and road condition.

Driver Stress

11.2.10. The available research evidence does not permit the use of finely graded assessments of driver stress as no reliable relationship has been established between physical factors and driver stress. Considering this a three point descriptive scale of low, moderate or high has been established by comparing the average peak hourly flow with the average journey speed.

11.2.11. Existing and predicted levels of driver stress have been determined using the ratings stated within DMRB as indicated in Table 11.1.

Table 11.1 Driver Stress (Single Carriageway Roads)

Average peak hourly flow per lane, in flow Units/ 1 hour*	Average Journey Speed Km/hr.		
	Under 50	50-70	Over 70
Under 600	High*	Moderate	Low
600-800	High	Moderate	Moderate
Over 800	High	High	High

*(*A car or light van equals one flow unit. A commercial vehicle over 1.5 tons, unladen weight, or public service vehicle equals 3 flow units. *Moderate in urban areas)*

11.2.12. In accordance with DMRB the assessment should be made for the worst year in the first fifteen years after opening.

View from the Road

11.2.13. The sensitivity of views from the road is assessed in Table 11.2. The magnitude of impact of any change in views from the road is presented in Table 11.3.

[75] Town and Country Planning Regulations 2011.http://www.legislation.gov.uk/ssi/2011/139/contents/made [Accessed 03/06/2013]

Table 11.2 Criteria for Assessing Sensitivity of Views from the Road[76]	
Sensitivity	**Views from the Road**
Very High	The traveller experiences extensive views of high quality unique landscape. The area is of National importance. e.g. National Scenic Area
High	The traveller experiences extensive views of high quality landscape, area of unique landscape or prominent features of particular interest.
Medium	The traveller is exposed to partial/intermittent views of a high quality landscape (or extensive views of a moderate quality landscape), area of unique/distinctive landscape character or features of interest.
Low	The traveller is exposed to views of an area of low quality landscape/unremarkable or degraded landscape character or heavily restricted views/no view of the surrounding landscape.
Negligible	The traveller is exposed to views of no particular importance at a local level. Alteration to such views would not be noticeable.

Table 11.3 Criteria for Assessing Magnitude of Impact on Vehicle Travellers	
Magnitude	**Views from the Road**
Major	A major alteration in views from the road such that the driver experience is completely altered either adversely or beneficially
Moderate	An alteration in views from the road such that the driving experience would be diminished or enhanced to a noticeable degree.
Minor	Small changes in views from the road but these are not considered to have any noticeable effect on the driving experience.
Negligible	Very little appreciable change in views from the road and not considered to have any noticeable effect on the driving experience.
No Change	No alteration in views from the road such that the driver won't be affected.

Determination of Impact Significance

11.2.14. Views from the road are assessed using a combination of sensitivity values and magnitude of impact. These two values are combined using Table 2.4: Chapter 2 to give an overall significance of impact.

11.2.15. Impact significance does not apply to driver stress as Table 11.1 states actual driver stress values based on average peak hourly flow and average speed. To assess the change in driver stress existing values were compared to predicted values to identify any change.

[76] Criteria developed from the Guidelines for Landscape and Visual Impact Assessment, 3rd Edition (2013). Landscape Institute and IEMA.

11.3. Baseline conditions

Views from the Road

Landscape Character

11.3.1. Scottish Natural Heritage[77] (SNH) designates the landscape as "Foothills" on their Landscape Character Assessment. The landscape of the study area is dominated by open agricultural grassland with only minor areas of woodland present. Several minor streams flow through the study area generally towards the south-east. The proposed route does not pass through any designated sites.

11.3.2. The topography of the study area is generally undulating, reflecting the morainic nature of the local geology with slopes ranging from shallow to steep. Immediately to the west and north of Maybole are Gallow Hill and Kirklandhill respectively which range in elevation from approximately 85m AOD to 145m Above Ordnance Datum (AOD). Moving to the north-east of Maybole two further unnamed hills are present which range in elevation from approximately 75m AOD to 120m AOD.

11.3.3. Residential areas of Maybole are located to the south of the study area and isolated dwellings are present at a number of other locations. Maybole town centre is classed as a conservation area. The study area is intersected by several local roads and the north-eastern portion is flanked on the south western side by the Ayr to Stranraer railway line.

11.3.4. The landscape quality within Maybole town centre is classed as ordinary, due to the dominance of buildings and lack of green space. In comparison the quality of the landscape surrounding Maybole Bypass transitions from very attractive at the southern end of the bypass, to ordinary between Culzean road and Alloway road, and finishes with a stretch of good quality landscape up to the northern point of the bypass. Overall the landscape surrounding the new bypass has open, extensive views and areas of woodland resulting in a higher quality.

11.3.5. Further details on the landscape character and quality are located within the Landscape effects Appendix E2.

Current Route

11.3.6. The A77 passes through the centre of Maybole along the High Street, which is the main retail area in the town.

11.3.7. The High Street has been developed since the medieval ages and has restricted carriageway and footway widths, which results in poor conditions for pedestrians and road users alike.

11.3.8. This results in existing traffic problems for the community and a bottleneck for strategic traffic, partly due to the large numbers of cars and heavy goods vehicles (HGV's) using the A77 to travel to the port facilities at Cairnryan.

[77] Scottish Natural Heritage. Ayrshire Landscape Assessment.http://www.snh.org.uk/pdfs/publications/review/111.pdf [Accessed 21/05/2013]

11.3.9. The view from the existing trunk road is very restricted and of low quality, therefore the sensitivity is assigned a value of low in accordance with Table 11.2. The current conditions are shown in Figure 11.1. The location of all Figures is located on Drawing No. 25000182/ENV/11.1.

Figure 11.1. Conditions on the existing A77 through Maybole town centre

Proposed Route

11.3.10. The proposed route is approximately 5km in length and ties into the existing A77 south of Maybole by means of a new roundabout, Broomknowes Roundabout. From here the route climbs steeply, maximum gradient 6 %, up the south flank of Gallow Hill, where it passes to the east of the summit close to the urban fringe of Maybole. Figure 11.2 shows the position of Broomknowes Roundabout and Figure 11.3 shows the distance of properties from the proposed route.

Figure 11.2. Shows the proposed position of Broomknows Roundabout (south facing view)

Figure 11.3. View of the urban fringe from the proposed bypass (North east view)

11.3.11. The route then crosses the B7023 Culzean Road before turning on a 720m radius right hand curve before crossing Gardenrose Path approximately 150 metres from the extents of the developed land. The section between the B7023 Culzean Road and Gardenrose Path will be on an embankment. Figure 11.4 shows the existing view of the landscape in between Gardenrose Path and Kirklandhill path, although this section will be in cutting.

Figure 11.4. Views from the proposed route between Gardenrose Path and Kirklandhill path (south facing view)

11.3.12. Continuing on a straight, the route passes to the south of the property of Kirklandhill, approximately 130m from the properties on Kilhenzie View and Ashgrove Avenue. From here the route continues to the north of the Stranraer/Glasgow railway line before tying into the existing A77 by means of a roundabout, approximately 400m north of Smithston Bridge. Figures 11.5 and 11.6 shows the view from the route at two separate points. This stretch will be a mixture of sections in cutting and embankments.

Figure 11.5. North facing view from the route to Kirklandhill property

Figure 11.6. View from the propopsed route looking south east towards the railway line

Figure 11.7. Shows where the bypass will re-join the A77

11.3.13. The views from the proposed route would be more open and of a higher quality, especially those from the north east section of the route. These views will be subject to change over time due to landscaping vegetation establishment. Due to these factors the sensitivity is assigned a value of high in accordance with Table 11.2.

Driver Stress

11.3.14. The existing A77 trunk road is a single carriageway (S2) with no overtaking opportunities along the rural section and narrow width in Maybole town centre. Traffic flow levels (2013 average): 404 vehicles per hour (two way) passing through the town centre. Average speed is 12.4mph (20kph).

- The road through the town centre is subject to speed restrictions of 30mph (48kph), with the rural sections subject to 60mph (97kph).The existing route in the town centre contains many side road junctions, runs through main shopping area and residential areas and passes the access to the secondary school (Carrick Academy) which results in a large number of child pedestrians walking alongside the A77.
- The major issues within Maybole town centre are the narrow roads, parked cars, high volume of Heavy Goods Vehicles (HGVs), the presence of pedestrians and the general constrained nature of the town centre.

- Factors which influence levels of stress can include road layout and geometry, surface riding characteristics, junction frequency, and speed and flow per lane.

11.3.15. An assessment of the existing route of the A77 therefore indicates that drivers experience high levels of frustration, fear of potential accidents, and uncertainty when using the route due to the lack of safe overtaking sections and congestion. These factors are particularly acute in Maybole town centre.

- DMRB Volume 11 Part 9 Tables 1 to 3 gives guidance on the appropriate levels of driver stress to be used for assessment purposes. Referring to Table 3 of this guidance it is determined that driver stress on the existing A77 within the 30mph (48kph) area is assessed as high due to low speed and heavy traffic flow. Driver stress within the 60mph (97kph) area is assessed as low due to increased speed and dispersal of traffic.

11.4. Impact Assessment

During construction

Views from the Road

11.4.1. On the existing A77, there is a very restricted view from Maybole town centre and an intermittent/open view from the more rural sections. The new bypass should enable people to see a more open view of the landscape.

- During construction the same volume of travellers will continue to pass through Maybole town centre. The views from the road may be disrupted at points where the bypass joins the existing A77. However the majority of the alignment can be constructed off-line, therefore there will be little change from the current view from Maybole town centre. The magnitude of impact on views from the road is assessed as negligible in accordance with Table 11.3, which produces a significance of slight in accordance with Table 2.4: Chapter 2.

Table 11.4 Vehicle Travellers Impact Significance during Construction (Maybole High Street)

Principal Receptor	Sensitivity	Magnitude	Significance
View from the Road	Medium	Negligible	Neutral

Driver Stress

11.4.2. It is predicted that drivers will experience minor delays due to Traffic Management (TM) being in place during the construction phase.

11.4.3. TM is likely to impact the smaller side roads during construction as opposed to the main route through Maybole town centre. There will be single way working on some of the side roads and Kirklandhill Path and Gardenrose Path will be closed at alternate times. The Laigh Grange Road will require a permanent or temporary diversion during the construction of the north link but will require a closure during the road construction.

11.4.4. The side roads have a low traffic flow relative to Maybole High Street therefore the impact should be minimal. However disruption will add to driver stress, which is anticipated to remain high during construction.

Post Construction

Views from the Road

11.4.5. The proposed A77 Maybole bypass will allow more open views of the surrounding countryside compared to the current route which has very restricted views.

11.4.6. The proposed route ties into the existing A77 south of Maybole by means of a roundabout, Broomknowes Roundabout. From this point the route climbs steeply up the south flank of Gallow Hill, where it passes to the east of the summit close to the urban fringe of Maybole. The route then curves to the right, crossing the B7023 Culzean Road and Gardenrose Path. Although the urban fringe is within close proximity, views in the south west section will be more open and of a higher quality than the current route.

11.4.7. Continuing on a straight, the route passes to the south of the property of Kirklandhill, approximately 130m from the properties on Kilhenzie View and Ashgrove Avenue. From here the route continues to the north of the Stranraer/Glasgow railway line before tying before tying into the existing A77 by means of a roundabout at Smithston. Views in the north east section of the route will be extensive.

11.4.8. There will be linear plantations along the route, with extensive screening between the B7023 Culzean Road and Gardenrose Path. Along the route there will be a mixture of embankments (ranging from 6.1m-9.45m) and sections in cutting (ranging from 9.2m-12.96m). The views in the north east section will be extensive, although there will be some intermittent views where sections are in cutting or due to landscaping. Views from the road will change over time as vegetation establishes.

11.4.9. As a result of the proposed alteration in road alignment, an impact magnitude of major (beneficial) is envisaged in accordance with Table 11.3. This is due to the major contrast in views from the new route compared to the current, resulting in an enhanced view for travellers. The overall significance of impact is thus assessed as large or very large in accordance with Table 2.4: Chapter 2.

Table 11.5 Vehicle Travellers Post Construction Impact Significance (A77 Maybole bypass)			
Principal Receptors	**Sensitivity**	**Magnitude**	**Significance**
View from the Road	High	Major	Large (Beneficial)

Driver Stress

11.4.10. The proposed bypass is predicted to have a positive impact on driver stress by reducing congestion, increasing speeds, providing longer sight lines and the provision of overtaking lanes. Due to these factors driver fear and frustration should be reduced.

11.4.11. The extent of stress induced in individual drivers will differ due to variations in their skills, experience, temperament, knowledge of the route and state of health. DMRB notes that, in principle, driver stress can be a factor in decisions on the traffic capacity to be provided for new schemes, though traffic capacity aspects will usually be the subject of more detailed engineering and traffic design investigations. The guidance suggests that for new or improved routes, designed in accordance with current standards, the appropriate category would normally be 'moderate' or 'low'. Table 11.6 and 11.7 shows the predicted traffic flows and speeds with and without the scheme.

Table 11.6 Traffic Information						
	2013					
	Do Nothing			Do Something		
	Maybole High Street	Maybole Bypass		Maybole High Street	Maybole Bypass	
		North of Culzean Road	South of Culzean Road		North of Culzean Road	South of Culzean Road
Two way traffic Flow (AADT)	9702	0	0	4854	6266	5337
Average Traffic Speed (kph)	20	0	0	23	76	71

Table 11.7 Traffic Information						
	2018					
	Do Nothing			Do Something		
	Maybole High Street	Maybole Bypass		Maybole High Street	Maybole Bypass	
		North of Culzean Road	South of Culzean Road		North of Culzean Road	South of Culzean Road
Two way traffic Flow (AADT)	10216	0	0	5070	7082	5664
Average Traffic Speed (kph)	24	0	0	27	90	72

(The traffic flows stated in the above table are predicted to further increase in future years)

11.4.12. The hourly traffic flow once the scheme is operational is predicted to be approximately 211 vehicles per hour on Maybole High Street (approximately 50% decrease), 295 vehicles on Maybole bypass north of Culzean Roundabout and 236 on Maybole bypass south of Culzean Roundabout. Due to the new bypass the traffic is anticipated to be able to travel at an average speed of 27kph through Maybole town centre.

11.4.13. The number of HGVs using Maybole town centre will reduce significantly from 12% (2012) to 2.7% (2018). This will reduce congestion and improve pedestrian safety.

11.4.14. Although there is a predicted 50% reduction in traffic on Maybole High Street, driver stress will remain high (in accordance with Table 11.1) through Maybole town centre due to the speed restriction. However driver stress is predicted to be low on the bypass.

11.5. Mitigation

During Construction

View from the Road

11.5.1. Site supervision will be in place to ensure the site is kept tidy; however the traffic management and the presence of construction plant cannot be avoided. The impact on views from the current road during construction will remain as slight, as the majority of construction is taking place off line.

Driver Stress

11.5.2. Traffic management and thus delays are unavoidable during construction of the proposed improvement. All Traffic Management will be designed in accordance with standard and be designed to minimise disruption as much as possible with diversions in place. However the majority of construction will be undertaken offline and the impact should be minimal.

11.5.3. Residents will be advised of the duration of the works and a clear line of contact will be established so that concerns may be addressed. It is predicted that driver stress will remain high.

Post Construction

View from the Road

11.5.4. Mitigation measures aim to minimise the visual impacts of the A77 Maybole Bypass and maximise opportunities to enhance the landscape character and visual amenity of the area.

11.5.5. The vertical alignment of the road affects the extent to which travellers can see the surrounding landscape. This has been influenced by environmental considerations such as design standards, seeking to balance cut and fill, fitting the new road alignment into the surrounding topography, the need for noise barriers and planting and landscaping proposals to screen the road from nearby properties and to increase biodiversity. The view from the A77 Maybole Bypass experienced by travellers would also be affected by physical roadside obstructions such as safety barriers, signs, lighting and acoustic barriers.

11.5.6. Landscape proposals have been developed with the aim to provide a pleasant environment for the road user, including the retention of an attractive journey with pleasant views from the road where possible. Extended lengths of linear planting should be avoided to maintain views from the road to the wider landscape and opportunities for on and off line planting should be sought. However even where views are more restricted due to landscaping they will be of a higher quality than those from the current trunk road.

11.5.7. Hedges are proposed to be located either at the top or bottom of embankment or cutting where there are wide verges to allow for planting without management and visibility issues in the future. The strategic planting of the trees will allow views from the road into the surrounding countryside and help reduce driver stress as well as creating a soft screen. Opportunities will be created to add visual interest and quality whilst improving biodiversity.

11.5.8. Further information on landscape mitigation is provided within Chapter 7: Landscape Effects.

Driver Stress

11.5.9. The choice of alignment and road width influences the driver's perception of the road. Although the vertical alignment will change between sections in cutting and those on embankments, the surrounding views will be a higher quality than those from Maybole High Street. This will provide a more pleasing and less stressful experience for both drivers and passengers.

11.5.10. Driver frustration has been shown to decrease with better road surfaces, and less congestion, which will be achieved with the provision of overtaking opportunities. Similarly, longer sight distances and wider roads decrease driver fear of potential accidents. Good design and layout of signs can significantly decrease the stress caused by route uncertainty in relation to new schemes.

11.5.11. Any mitigation measures to further reduce driver stress will be achieved by compliance with DMRB standards for the improved alignment of the proposed option. The new route incorporates longer sight distances, a new road surface, a wider road, and opportunities for overtaking.

11.6. Residual Impacts

Post construction

Views from the road

11.6.1. The view from the bypass will change over time as vegetation establishes. Proposed planting will be immature in the first year and specimen trees will not have fully matured.

Driver stress

11.6.2. It will take time for vehicle travellers to become familiar with the new bypass which may result in an initial increase in driver stress although the long term impact will be beneficial.

11.7. Conclusions

11.7.1. The new A77 Maybole bypass will have a positive impact on both driver stress and views from the road. There is predicted to be a major beneficial impact on views from the road as the new bypass will provide open, high quality views compared to the restricted views of Maybole town centre. Driver stress levels are predicted to be low on the bypass compared to the high levels in Maybole town centre. Although driver stress levels will remain high due to the speed restriction, the traffic volume on Maybole High Street will reduce due to the bypass. The A77 Maybole bypass is predicted to have a positive impact overall, as traffic volumes through the town centre will reduce, safety will increase and drivers' stress will decrease.