
14 Summary of Effects and Mitigation

14.1 Introduction

This chapter provides a summary of the environmental impacts that have been described in each environmental topic chapter.

Table 14.1 below reports the environmental impacts associated with the scheme, proposed mitigation where appropriate, and the identification of residual effects.

Table 14.1 Summary of Environmental Impacts (continued over)

Item	Description of Potential Impact	Mitigation Objective and Commitment	Sensitivity / Value of Receptor	Duration of impact Short / Long term	Magnitude of Impact With Mitigation	Significance of Impact with mitigation	Mitigation Item No.
Policies and Plans (Chapter 5)							
1	N/ A						
Landscape and Visual (Chapter 6)							
Construction Effects							
1	Effects of construction including; the siting of the contractors compound, removal of road/pavement surfaces, taking down of existing structures, excavation and dredging works, movement of construction vehicles, traffic management works, movement of materials, lighting and removal of vegetation.	Breaking up and planting the existing road bed which will be disused when the viaduct is built to soften the appearance of the scheme and compensate for loss of trees.	Very High/High	Short term	Major	Adverse	LV1
2	Loss of existing vegetation both mature and semi mature.	Retention of existing trees and vegetation wherever possible and incorporation with new planting proposals	Very High/High	Short term	Major	Adverse	LV2
3	Habitat loss due to vegetation removal, earthworks and the rock cut.	Enhancement of biodiversity through use of predominately native species, providing new wildlife habitats and complementing existing adjacent habitats	Very High/High	Short term	Major	Adverse	LV3
4	Potential for soil erosion / loss, in addition to slopes becoming unstable.	For all disturbed areas, road verges and rock slopes, native grass seeding is proposed with an acidic upland plant community mix of local provenance.	Very High/High	Short term	Major	Adverse	LV4
5	Loss of vegetation with minor earth movement	Construction compounds should be reinstated to former condition following completion of the works.	Very High/High	Short term	Major	Adverse	LV5

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6	Impact on visual amenity adjacent to Pulpit Rock and wider visual impact on views from the wider area.	Implementation of the landscape design proposal, including mitigation planting, shown in Figure 6.6 – Scheme Landscape Design	Very High/High	Short term	Major	Adverse	LV6
Operation Effects							
7	Introduction of a viaduct supported by piers and encroaching into the loch to the south of the existing promontory	Adherence to Viaduct Design Structure in Appendix 2 which sets out minimum design requirements.	Very High/High	Long term	Moderate	Adverse	LV7
8	Soil cutting/ rock cutting/rock treatment to the promontory face	Continued landscape architect input into the design of the treatment of the rock face during construction. Hydro-seeding is the proposed method for treating the exposed rock faces and slopes. Appropriate measures should also be taken to achieve rock cuts which reflect the natural strata and the existing rugged terrain, providing ledges, niches and benches to promote reestablishment of vegetation by natural regeneration.	Very High/High	Long term	Moderate	Adverse	LV8
9	Formation of drainage swale and Grasscrete maintenance track	To be designed with smooth flowing contours and to look as natural as possible to integrate with the surrounding landform. Planting of native marginal species will be undertaken to help soften the basin edges and promote biodiversity.	Medium	Long term	Minor	Adverse	LV9
10	Impact on external views within the wider landscape	Adherence to Viaduct Design Structure in Appendix 2, which has been informed by detailed input from specialists aesthetic advisors, aesthetic and design team workshops. Adherence to all other landscape mitigation measures to minimise impacts on views.	Very High/High	Long term	Moderate	Adverse	LV10
Land-use (Chapter 7)							

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1	Potential temporary severance to sheep creep under railway line	Maintain access where possible	Low	Temporary	Slight	Negligible	LU1
2	Temporary Land take for works compound	Minimise land take as far as possible	High	Temporary	Moderate	Moderate	LU2
3	Loss of rough grazing agricultural land	Minimise land take where possible	Medium	Long term	Minor	Minor	LU3
4	Loss of woodland to permit preferred road alignment	Minimise woodland land-take	Medium	Long term	Minor	Minor	LU4
Cultural Heritage (Chapter 8)							
1	Effect on Pulpit Rock, Scheduled Monument	Avoid impact to the monument	High	N/a	None	None	CH1
2	Effect on Tarbet to Crianlarich Military Road	Avoid impact to the monument	Low	N/a	None	None	CH2
3	Discovery of hitherto unknown archaeological remains	Appropriate archaeological mitigation measures to be adopted to ensure preservation by record of any remains that are present	Unknown (but unlikely to be higher than low)	Long term	Unknown (Low)	Unknown	CH3
Ecology and Nature Conservation (Chapter 9)							
1	Atlantic / western Oak Wood Habitat fragmentation caused by loss of habitat during construction. Dust deposition during construction and operation.	Minimise and compensate loss of habitat. Significantly reduce pollution risk Local replanting	High / National	Long term Short Term	Moderate impact Slight	Not significant	ECOL1
2	Running Water Possible pollution during construction and operation	Significantly reduce pollution risk to site through employment of SEPA PPGs / SUDS.	Low / Local or Parish	Short term	Slight	Not significant	ECOL2
3	Loch Lomond Possible pollution during construction and operation. Habitat removal and loss along the Loch shoreline	Significantly reduce pollution risk. Under terms of EPS mitigation licences in respect of otter	High / National	Temporary Permanent	Moderate Moderate	Not significant Significant negative	ECOL3
4	Lower plant assemblage Habitat removal/ damage and destruction	Selectively translocate any identified specimens in situ on cut trunks/branches or rocks and relocate	High / National	Short term	Slight	Not significant	ECOL4

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		sensitively					
5	Non Native Invasive Species Spread of Japanese knotweed during construction	Manage Japanese knotweed on site following knotweed code of practice under licence prior to construction in order to avoid risk of spreading plant material and breach of legislation	No Value	Long term	Negligible	Not significant	ECOL5
6	Bats Loss of foraging and commuting habitat during construction. Possible loss of roost sites. Disturbance from artificial lighting	Pre-construction survey of trees and cave system Obtain EPS mitigation licence Minimise loss of habitat Replanting of trees Minimise disturbance of any roost sites Install specified bat boxes on trees and on viaduct piers Avoid light spill over loch shore and into nearby woodland	Low / Local or Parish	Long term Short term Short term	Slight Moderate Slight	Significant negative Significant negative Not significant	ECOL6
7	Pine Marten Disturbance and loss of den sites in rock armour / scree. Disturbance from artificial lighting.	Avoid light spill over loch shore.	Low / Local or Parish	Short term	Slight Slight	Not significant	ECOL7
8	Otter Loss of habitat including refuges, disturbance and possible increased road mortality during construction and operation. Disturbance from artificial lighting.	Pre-construction survey. Obtain EPS mitigation licence. Minimise loss/disturbance of habitat and minimise road mortality. Install artificial holts. Facilitate otter dispersal by installing an otter friendly culvert at Culvert 2 if this culvert is replaced Avoid light spill over loch shore	Low / Local or Parish	Long term	Moderate Slight positive	Significant negative Significant positive	ECOL8
9	Breeding Birds Loss of habitat and disturbance during construction.	Minimise loss of habitat. Avoid disturbance to breeding birds by undertaking	Low / Local or Parish	Short to Medium-	Moderate	Significant negative	ECOL9

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		habitat clearance outwith breeding season. Replant trees and scrub. Install specified nest boxes in appropriate locations		term			
10	Fish and fisheries Possible impacts on water quality may impact on adults, larvae and eggs and also on spawning habitat within the vicinity of the construction area.	Pre construction survey of importance of minor watercourse for salmonids Significantly reduce water pollution risk by using best practice SEPA PPGs and construction methods.	High / National	Short term	Slight	Significant negative	ECOL10
Pedestrians, Cyclists, Equestrians & Community Effects (Chapter 10)							
1	Temporary disruption to receptors using the A82 at Pulpit Rock during the construction period when traffic management measures in place.	Access to be maintained for all users by the temporary extension of the one-way traffic light controlled management system already in place on the A82 at Pulpit Rock. Appropriate advance warning signage should be installed to inform users of traffic management measures.	Medium/High	Short Term	Moderate Adverse Impact	Significant	PCEC 1
2	Temporary severance of A82 "through-access" at Pulpit Rock affecting receptors for a number of weeks during the full closure construction period.	Provision of advance signage information (e.g. signs at Tarbet and Crainlarich) warning receptors of temporary suspension of "through access" on the A82 at Pulpit Rock. Provision of advance signage information of the primary diversionary route from Tarbet to Crainlarich via Inveraray (and vice-versa) - using the A83/A819/A85 (and vice-versa). This mitigation should include signs at Tarbet and Crainlarich/, radio station traffic bulletin updates and information displays on Traffic Scotland signs in the wider central Scotland road network).	Medium/High	Short Term	Major Adverse Effect	Significant	PCEC 2
3	Temporary severance of A82 "through-access" at Pulpit Rock affecting Emergency Services for a number of weeks during the full closure construction period.	A strategy should be prepared in liaison with the emergency service providers to ensure that service is maintained through the full closure construction period.	High	Short Term	Major Adverse Effect	Significant	PCEC 3

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4	Temporary severance of A82 “through-access” at Pulpit Rock affecting receptors for a number of weeks during the full closure construction period.	Scheduled Bus Services - Discussions to be held between Transport Scotland and Scottish Citylink to identify options for temporary amendments to affected scheduled services (914/915/916). Options could include temporary suspension of these services during the full road closure period or temporary diversion of the affected services between between Tarbet and Crianlarich via Inveraray (and vice-versa) - using the A83/A819/A85 (and vice-versa). Tour Bus Services - Discussions to be held between Transport Scotland and Tour Bus operators currently using the A82 between Tarbet and Crianlarich to provide advance warning of temporary severance of “through access” and the need to make route diversions during this period.	Medium	Short Term	Major Adverse Effect	Significant	PCEC 4
5	Temporary severance of A82 “through-access” at Pulpit Rock affecting receptors for a number of weeks during the full closure construction period.	Discussions to be held between Transport Scotland/ Contractor and the seasonal ferry service operators (the Ardlui Hotel and the Inversnaid Hotel) to consider options for temporary amendments to the affected services in order to maintain the ferry links e.g.:- Explore possibility of a temporary “circular” ferry service linking Inveruglas/Inversnaid/Ardleish/Ardlui (and vice-versa) to avoid temporary severance of public access to the baseline ferry services during the full A82 Pulpit Rock road closure period.	Medium	Short Term	Minor	Not Significant	PCEC 5
6	Permanent loss of leisure craft access to water area “lost” by construction of scheme into Loch Lomond.	During the scheme construction period implement a temporary “exclusion zone” for leisure craft (on health & safety grounds) around the works extending into Loch Lomond.	Medium	Short Term	Moderate	Not Significant	PCEC 6
7	The scheme provides a verge on the east side of the Viaduct that would be suitable for shared use by Pedestrians and Cyclists but <u>not</u> Equestrians. It	Appropriate signage should be installed for High Pedestrians, Cyclists and Vehicle Drivers if in the future non-motorised provision is provided north and	High	Long Term	Moderate	Significant Beneficial	PCEC 7

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	<p>should be noted that this non-motorised provision is provided as 'future proofing' should connecting non-motorised provision be provided north and south of the scheme and will not be signed as off-road provision until such time.</p> <p>No provision is proposed for Equestrians as the scheme does not change the baseline A82 on-road provision at Pulpit Rock (i.e. shared use of road with vehicles).</p>	<p>south of the scheme. Signage should providing advance warning of new off-road facility provision. No signage to be provided until such time as non-motorised provision is provided north and south of the scheme</p>					
8	Scheme operation results in the removal of traffic light controls on the A82 at Pulpit Rock.	N/A	Medium/High	Long Term	Major	Significant Beneficial	PCEC 8
Water Quality and Drainage (Chapter 11)							
1	Sediment mobilisation and spillage or discharge of other pollutants into watercourses / drainage paths or the Loch (Construction Phase)	<p>The Contractor shall produce a Site Management Plan (SMP), which will describe the specific procedures to be put in place to control sediment mobilisation, surface water discharges, and spillages. The SMP shall be discussed and agreed with SEPA prior to commencement of site works, and all staff on site shall be briefed on and trained in the procedures contained within the SMP. The SMP shall incorporate best practice guidance as detailed in PPG's published by SEPA and CIRIA Reports C532 & C648, as a minimum. In particular, the following measures shall be adopted on site: -</p> <ul style="list-style-type: none"> ▪ CAR Licences shall be obtained prior to start on site (note this is a separate consenting regime from the approval of the planning application) for work in the loch and the Watercourses, and these shall be displayed prominently on a notice board in the site offices, ▪ Identify and clearly sign all surface water features during site set up and brief personnel on their location during induction, ▪ Site compound and site access routes shall be 	High (Loch Lomond), Low (Watercourses 1 – 3) & Low (Drainage Paths 1 - 4)	Short term	Negligible Adverse	Negligible Adverse for Loch Lomond & Negligible Adverse for Watercourses & Drainage Paths	WQD1

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		<p>clearly defined during site set up with the minimum number of watercourse crossing points clearly defined. Formal watercourse crossings shall consist of a piped culvert and vehicle access over the top,</p> <ul style="list-style-type: none"> ▪ The Contractor shall provide bunds around all fuel, oil, and other chemical stores, and shall centralise and minimise the number of these stores, ▪ A formal wheel wash and concrete wash out area shall be set up on site and this shall drain to a lined sump with the surface water either treated on site or disposed of to a licensed facility off site, ▪ Overburden shall be stripped in sections and shall be the minimum area required for that phase of the works, ▪ Stripped areas and stockpiles shall have silt fences placed so as to intercept the surface water run off from these areas, ▪ The Contractor shall give consideration to creating the sustainable drainage system infrastructure at the outset of construction work, and this could then be used to treat some of the construction stage site run off prior to discharge. If this is not done the Contractor shall provide some other form of treatment to the surface water run off from the site prior to it reaching the watercourses, ▪ Construction materials and other stockpiles shall be stored away from the surface water features (minimum 10m), ▪ Plant shall be stored and maintained away from surface water features, ▪ The Contractor shall instigate re-vegetation of stripped areas on a sectional basis as early as possible within the programme to reduce the potential for silt laden run off, ▪ Measures to minimise sediment disturbance, 					

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		<p>increased turbidity, and spread of spillages during works in the Loch shall be implemented to prevent a plume of sediment or other pollutant extending out into the loch. This may involve floating booms and a silt fence around the working area,</p> <ul style="list-style-type: none"> Watercourse realignments and culvert extensions shall be undertaken prior to road widening <p>The SMP shall identify a clear monitoring regime to confirm the application of the above mitigation requirements. It is anticipated that the Contractor's site management personnel would be made responsible for monitoring and in practice many of the measures could be monitored based on a daily or weekly inspection of the site and the completion of a "mitigation requirements" tick sheet. These tick sheets would then be retained as auditable evidence of the monitoring of the mitigation requirements.</p>					
2	Flood risk to surrounding land from development (Construction Phase)	<ul style="list-style-type: none"> The Contractor shall ensure that all culverts are inspected on a daily basis and shall keep all culverts clear of construction / non-construction debris for the entire duration of the construction period, The Contractor shall keep close control of permanent and temporary earthworks operations in the vicinity of Watercourses 1, 2, & 3 and Drainage Paths 1 – 4 to prevent any obstructions of the Watercourse / Drainage Path channels, The Contractor shall not store materials within or immediately adjacent to watercourse / drainage path channels, Where works in the watercourse / drainage path channels are required (i.e. for culvert extension / replacement), the Contractor will be required to provide temporary flow bypass facilities (e.g. 	Rural land is considered as having a Low sensitivity to increased flood risk, but property is considered as having a High sensitivity to increased flood risk.	Short term	Negligible Adverse	Negligible Adverse	WQD2

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		<p>temporary damming of the watercourses / drainage paths just upstream and the provision of pumps on a duty and stand by arrangement) with sufficient capacity to pass a 1:20yr flow or other such temporary requirement agreed with SEPA in the CAR Licensing process,</p> <ul style="list-style-type: none"> All engineering works within the watercourses and drainage paths will need to be carried out in accordance with the Controlled Activities Regulations (i.e. a CAR Licence will be required), The timescale of such operations would need to be limited to prevent significant effects on the passage of flows (i.e. works to be undertaken during low flow periods only), All work within watercourses or drainage paths shall be undertaken in accordance with a detailed construction method statement to be produced by the Contractor and discussed and agreed with SEPA in advance of the works <p>The Contractor's site management personnel will ultimately be responsible for monitoring the application of most of these mitigation requirements. Again it is suggested that the monitoring of the application of mitigation requirements is completed via regular inspections of the site and the completion of a tick sheet which summarises the mitigation measures in a readily useable for rapid assessment on site.</p>					
3	Alteration of watercourse crossing (Construction Phase)	<p>Geomorphology</p> <ul style="list-style-type: none"> Working areas on the loch shore and within the loch, and around and within the Watercourses & Drainage Paths shall be clearly set out prior to commencement of construction works, and these shall be the minimum areas required to safely complete the works, The Contractor shall not store materials within 	Loch Lomond – High (see "Baseline" section) Small Watercourses & Drainage Paths – Low	Short term	Geomorphology – Moderate Adverse for the small watercourses and drainage paths & Slight Adverse for	Minor Adverse for geomorphology for the watercourses / drainage paths & the Loch.	WQD3

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		<p>or immediately adjacent to watercourse / drainage path channels,</p> <ul style="list-style-type: none"> ▪ Plant movements should be kept to a minimum on the loch shore and on the banks of the Watercourses / Drainage Paths, ▪ A survey to record the form and vegetation along the loch shore and the watercourse / drainage path channels shall be completed by an ecologist or a water engineering specialist covering the area predicted to be disturbed during the works. This information shall provide sufficient detail to allow the alignment, levels, and form of the shore and channels to be reinstated after the works, ▪ Reinstatement shall include re-vegetation with local plant species to stabilise the structure of the completed shore / banks, ▪ As noted above, all engineering works within the watercourses and drainage paths will need to be carried out in accordance with the Controlled Activities Regulations (i.e. a CAR Licence will be required) <p>Monitoring of the above mitigation measures would be achieved via the Client's Agent inspecting the site during set up to supervise the working areas being set up and ensure they are the minimum practical working areas, and also inspecting the site during the works to confirm the working areas, material storage areas, and reinstatement works are being undertaken satisfactorily.</p> <p>Hydrology</p> <ul style="list-style-type: none"> ▪ As noted above, the Contractor shall ensure that all culverts are inspected on a daily basis and shall keep all culverts clear of debris, ▪ As noted above, construction materials and other stockpiles shall be stored away from the surface water features (minimum 10m), 			<p>the loch</p> <p>Hydrology – Negligible</p> <p>Negligible Adverse for all of all features.</p> <p>Adverse for the features</p>		

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		<ul style="list-style-type: none"> As noted above, consideration shall be given to creating the sustainable drainage system infrastructure at the outset of construction work, as this could then be used to attenuate some of the construction stage site run off prior to discharge. If this is not done the Contractor shall provide an alternate means of controlling the surface water run off from the site to ensure the culvert capacities are not exceeded, The Contractor shall apply for a temporary discharge licence under the Controlled Activity Regulations if required by SEPA for the works. <p>As noted above, these are to be monitored by the Contractor's site personnel and the Client's Agent based on regular inspections using a tick sheet assessment.</p>					
4	Potential disturbance of groundwater movement (Construction Phase)	None required at this stage.	High (see "Baseline" section)	Short Term	Negligible Adverse	Negligible Adverse	WQD4
5	Potential contamination to shallow groundwater (Construction Phase)	<p>As noted above, the Contractor shall produce a Site Management Plan (SMP), which will describe the specific procedures to be put in place to control site discharges and the potential for pollutant spillages. The SMP shall be discussed and agreed with SEPA prior to commencement of site works, and all staff on site shall be briefed on and trained in the procedures contained within the SMP. The SMP shall incorporate best practice guidance as detailed in PPG's published by SEPA and CIRIA Reports C532 & C648, as a minimum. In particular, the following measures shall be adopted on site in relation to mitigating the potential effects on groundwater quality: -</p> <ul style="list-style-type: none"> The Contractor shall provide bunds around all fuel, oil, and other chemical stores, and shall centralise and minimise the number of these 	High (see "Baseline" section)	Short term	Negligible adverse	Negligible adverse	WQD5

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		<p>stores,</p> <ul style="list-style-type: none"> ▪ The Contractor shall complete all servicing, fuelling, and storage of vehicles at construction compounds, ▪ The Contractor shall provide dedicated wash down areas for concrete and other delivery vehicles, ▪ The Contractor shall implement drainage control measures at the site to prevent areas of standing surface water that could become contaminated and leach into the shallow groundwater. Where collection of water at the site is unavoidable (e.g. within excavations), provision should be made for this water to be collected and passed through some form of treatment before discharge), ▪ The Contractor shall liaise with SEPA regarding any proposed discharge from the site in respect to the Controlled Activities Regulations. <p>As noted above, these are to be monitored by the Contractor's site personnel and the Client's Agent based on regular inspections using a tick sheet assessment.</p>					
6	Discharge of road run off to watercourses (Operational Phase)	The new sections of road incorporate SUDS principles as far as practical, by providing a mixture of filter drains and a dry swale for the treatment of the road run off. These measures have been agreed with SEPA (refer to email dated 04/08/10 in Appendix B). In addition, it is noted that the proposed road alignment and profile has been designed to improve safety and hence reduce the risk of serious accidents and spillages from such accidents in the first place.	High (Loch Lomond) & Low (Watercourses 1-3 & Drainage Path 4)	Long term	Negligible Adverse	Negligible Adverse (both Loch Lomond, Watercourses 1-3, & Drainage Path 4)	WQD6
7	Discharge of pollutants from other road and infrastructure maintenance (Operational Phase)	Works to road infrastructure shall be completed under an approved method statement (approved by route manager within maintenance authority) and shall incorporate best practice measures (including	High (Loch Lomond) & Low (Watercourses 1-3 & Drainage	Short term	Negligible Adverse	Negligible Adverse for Loch Lomond, Watercourses	WQD7

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		<p>the SEPA Pollution Prevention Guidelines, General Binding Rules, and CIRIA Reports C532 & C632) to reduce the risk of significant of major sediment disturbance and spillages of potential contaminants to the surrounding water resources features.</p> <p>Provisions for monitoring the application of the best practice measures would also need to be noted in the method statement, and in practice this will likely mean that the supervisor of the works will be responsible for ensuring the application of the best practice measures on site.</p>	Path 4)			1 – 3, & Drainage Path 4	
8	Flood Risk to surrounding land from development (Operational Phase)	<p>The realigned channels and extended / replaced culverts shall be designed in accordance with the guidance in CIRIA Report C689 in regard to hydraulic capacity. This would generally be the acceptance of a 1:200yr flow. However, given the rural nature of the area upstream of A82 at this location SEPA may accept design to a lower return period. The designers of the scheme shall confirm the design return period with SEPA for all the culverts. The storm flows shall be calculated for the watercourses / drainage features where works are proposed using FEH or similar accepted hydrological assessment methods.</p> <p>The designers shall ensure that the rates of release of the surface water run off from the surface water drainage system are in accordance with the guidance provided in CIRIA Report C697 for acceptable rates of run off and advice from SEPA and the Local Authority regarding acceptable Greenfield run off rates.</p>	Rural land is considered as having a Low sensitivity to increased flood risk, but individual property is considered as having a High sensitivity to increased flood risk.	Short term i.e. during storm events only	Negligible Adverse	Negligible Adverse	WQD8
9	Alteration of watercourse / loch shore (Operation Phase)	The design of the extended culverts shall ensure that, as a minimum, the existing hydraulic capacity is maintained, but also refer to flood risk mitigation requirements noted above. The design of all new or	Loch Lomond – High Small Watercourses &	Long term	Slight Adverse for the loch & Moderate	Minor Adverse (Loch Lomond) &	WQD9

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		extended culverts shall be undertaken with due consideration to the guidance contained in "River Crossing and Migratory Fish: Design Guidance", and where fish passage is considered possible then the new or extended culverts shall be designed in accordance with the above guidance. The channel realignment proposals shall include the replication of the form and vegetation of the natural channels. Where bank protection works are considered necessary these shall be "green" bank protection works (refer to "The Water Environment (Controlled Activities) (Scotland) Regulations 2005 - A Practical Guide" for details). Any bank protection works on the watercourses upstream and downstream of the realigned A82 shall be kept to the minimum length required, and shall not extend beyond the extent of the channel realignments (i.e. anticipated to be a maximum of around 60m across the three watercourses). The advice within CIRIA Report C551 Manual on Scour at Bridges and other Hydraulic Structures shall be taken into account in the design of the culverts.	Drainage Paths – Low		Adverse for the small watercourses and drainage paths	Minor Adverse (Small Watercourses & Drainage Paths)	
10	Run off from the scheme into watercourses (Operation Phase)	The surface water drainage proposals for the scheme include an element of SUDS design (including filter drains and a dry swale) fitted within the physical constraints of the site (refer to Figure 11.2 for further details). These features will provide some level of attenuation of the run off before discharge to the proposed northern and southern outfalls. It is understood that Argyll & Bute Council have confirmed that no specific surface water drainage attenuation is required for the development, presumably based on the fact that the loch is immediately downstream of the discharge points. However, it is always preferable to adopt best practice where possible, and it is therefore recommended that the designers try (physical restrictions permitting) to ensure that the rates of	Low (see "Baseline" section)	Short term i.e. during storm events only	Negligible Adverse	Negligible Adverse	WQD10

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		<p>release of the surface water run off from the road drainage system is in accordance with the guidance provided in CIRIA Report C697 for allowable rates of run off and that the combined flows (watercourse flows and surface water run off flows) do not exceed the capacity of the culverts.</p> <p>It is therefore considered that these proposals be adopted as mitigation requirements to assist in reducing the potential effect on the receiving watercourses.</p>					
11	Alteration to land drainage patterns (Construction and Operation Phase)	None required at this stage.	Low (Watercourses 2 & 3 and Drainage Path 4)	Long term	Negligible Adverse	Negligible Adverse	WQD11
12	Potential disturbance of groundwater movement from the new road construction (Operational Phase)	None included at this stage.	High (see "Baseline" section)	Long term	Negligible Adverse	Negligible Adverse	WQD12
13	Potential contamination to shallow groundwater (Operational Phase)	The surface water drainage proposals for the scheme include an element of SUDS design (including filter drains and a dry swale), and the use of linear filter drains wherever possible assists in reducing the risk to groundwater (refer to DMRB Method C). It is therefore considered that these proposals be adopted as mitigation requirements to assist in reducing the potential effect on the groundwater.	High (see "Baseline" section)	Long term	Slight Adverse	Minor Adverse	WQD13
Disruption due to Construction (Chapter 12)							
1	Full Road Closure period	Liaison with Transport Scotland and other local transport authorities to ensure road closures are outside the tourist season.	High	Short term	Severe	Substantial	DDC1
2	Full Road Closure period	Timely consultation should be conducted with	High	Short term	Severe	Substantial	DDC2

Item	Description of Potential Impact	Mitigation Objective and Commitment	Sensitivity / Value of Receptor	Duration of impact Short / Long term	Magnitude of Impact With Mitigation	Significance of Impact with mitigation	Mitigation Item No.
		communities between Tarbet and Crianlarich to alleviate as far as possible disruption during the construction period					
3	Impact of temporary Construction compound	Minimise environmental impacts by adopting best practice for all construction activities; produce Environmental Management Plan and Code of Construction Practice. Approval for site compounds should only be granted through discussions with Loch Lomond and the Trossachs National Park Authority.	High	Short Term	Moderate	Moderate	DDC3
4	Impact of Local Traffic during severance	Produce Traffic Management Plan	High	Short Term	Severe	Substantial	DDC4
5	Air Quality Impacts due to construction works	Current best practice mitigation and abatement measures should be applied to minimise impacts on air quality	High	Short Term	Negligible	Minor	DDC5
6	Noise levels generated by construction activities	None proposed as receptors are located over a distance of 800m away	Low	Short Term	None	None	DDC6