13 Cumulative Impact Assessment

13.1 Introduction

This Chapter describes the potential cumulative impacts that could arise from the interaction between the construction and operation of the A82 Pulpit Rock Improvements and other land development projects and transport schemes in the area. DMRB states that during the assessment of the potential environmental implications of highway schemes, regard should be given to the possibility of cumulative effects (both beneficial and adverse). As mitigation is provided for the A82 Pulpit Rock Improvement in specific topic chapter this chapter is not included in Chapter 14 – Summary of Effects and Mitigation or Chapter 15 – Schedule of Environmental Commitments.

13.2 Definition

Cumulative effects comprise the combined effects of reasonably foreseeable human induced changes within a specific geographical area on receptors and over a certain period of time and can be both direct and indirect. Assessment of the significance of cumulative effects needs to be undertaken in the context of the characteristics of the existing environment.

The 'Guidelines for the Assessment of Indirect and Cumulative Impacts as well as Impact Interactions' published by the European Commission (May 1999) define cumulative impacts as:

'Impacts that result from incremental changes caused by other past, present, or reasonably foreseeable action together with the project. For Example;

- *incremental noise from a number of separate developments;*
- *combined effect of individual impacts, e.g. noise, dust and visual, from one development on a particular receptor;*
- *several developments with insignificant impacts individually but which together have a cumulative effect…'* [1]

The DMRB Volume 11, Section 2, Part 7 (HA218/08) provides the same definition of cumulative impacts as given above but expands upon this to state;

For the purposes of the DMRB Volume 11 Guidance, a cumulative impact may arise as a result of

a) the combined impact of a number of different environmental topic-specific impacts from the proposed scheme on a single receptor/ resource; and

b) the combined impact of a number of different projects within the vicinity (in combination with the proposed scheme) on a single receptor/resource.

[1] Guidelines for the Assessment of Indirect and Cumulative Impacts as well as Impact Interactions 1999, pg7

For the purposes of this cumulative assessment point a) is addressed in section 13.5 *Cumulative Impact Assessment (Scheme Only)* and point b) is addressed in section 13.6 & 13.7 *Cumulative Impact Assessment (Including other developments)- Landscape and Visual and Other topic areas. .*

The definition of 'significant' is based on the guidance given in DMRB, Volume 11. The significance of an effect is a function of the environmental value (or sensitivity) of the resource or receptor and the magnitude of change caused by the project impact. This is a qualitative professional judgement. Table 13.1 sets out typical environmental value descriptors. The criteria used in the assessment are defined in Table 13.2 below. The magnitude is set against the sensitivity of receptor to produce a scale of significance of effects where 'Major' (is a significant implication for the environment), 'Moderate' (is an implication for the environment), 'Minor' (is a limited implication for the environment) and 'None' or 'Negligible' (is an insignificant implication for the environment). Entries in the matrix shaded in grey represent where the main or significant impacts are expected to be experienced.

Table 13.1 Environmental value typical descriptors

Value (sensitivity)	Typical descriptors
Very High	Very high importance and rarity, international scale and very limited potential for substitution
High	High importance and rarity, national scale, and very limited potential for substitution
Medium	High or medium importance and rarity, regional scale, limited potential for substitution
Low	Low or medium importance and rarity, local scale
Negligible	Very low importance and rarity, local scale

Table 13.2 Significance of Environmental Effects ((Effects falling within shaded boxes are considered to be significant)

Magnitude of Effect	Sensitivity of Receptor				
	Very High	High	Medium	Low	Negligible
Major	Major	Major	Moderate	Minor	Negligible
Moderate	Moderate	Moderate	Minor	Minor	Negligible
Minor	Moderate	Minor	Minor	Negligible	Negligible
None or Negligible	Negligible	Negligible	Negligible	Negligible	Negligible

13.3 Scope and Approach of the Assessment

13.3.1 Scope of Cumulative Impact Assessment

This assessment aims to identify the potential for cumulative impacts to occur during scheme construction and operation, and where possible, identify the significance of these effects. In determining the possible significance of such cumulative impacts,

the location and timing of potential developments and their associated impacts has been considered.

DMRB Volume 11 (Section 2, Part 5 HA 205/08) states that cumulative impacts should include other projects that are 'committed' and should include; trunk road and motorway projects that have been confirmed (i.e. gone through the statutory processes), and development projects with valid planning permissions as granted by the Local Planning Authority.

Given that the study area is within a National Park, a National Scenic Area and the variety of other environmental designations in the surrounding area, at the request of the Loch Lomond and Trossachs National Park Authority, the scope of this assessment is extended to include developments that are likely to be implemented within the reasonably foreseeable future (i.e. proposals currently being considered by the Planning Authority) and projects still at the indicative design stage.

The scope of potential developments to include was determined in consultation with the Loch Lomond and Trossachs National Park Authority in their scoping letter dated, 3rd March 2010 and in a subsequent meeting held on the 18th March 2010. These major potential developments are described in Tables 13.3 & 13.4.

For clarity the scope of this cumulative impacts assessment will include:

- developments/projects already built,
- developments which have planning (or similar) consent but not yet constructed,
- development applications which have been submitted but not yet determined.

However, it should be noted that it is not possible or appropriate for this assessment to consider in detail the potential individual environmental impacts associated with the other proposed developments, such impacts would need to be addressed separately to inform the planning applications for these developments.

The geographical scope for this assessment extends beyond the study area and its immediate surroundings and has been determined based on the nature and sensitivity of specific issues within a local context. For this cumulative assessment the geographical scope is considered to extend from Tarbet northwest to Crianlarich including both sides of the loch.

This cumulative assessment covers each topic as addressed in this Environmental Statement. However, it was decided that an assessment of Policies and Plans was beyond the scope of this assessment . There are a number of national, regional and local policies that are applicable to all developments, for example with regards to ecological issues or landscape issues and it is not purpose of this assessment to check if other developments comply with policy. It is therefore beyond the scope of this chapter to determine if individual developments considered here are compliant with policy as this should be determined by the responsible authority before granting permission. It should also be noted that the only relevant policy designation from the Loch Lomond and the Trossachs National Park Finalised Draft Local Plan (February 2010) within the study area are located at Tarbet. The development strategy for Tarbet focusing on strengthening its role as a tourism and recreation destination and includes open space and recreational uses and provision for tourism uses including

accommodation, retail, food and drink. It is not envisaged that these designations for open space and tourist uses will result in wider impacts beyond Tarbet and therefore are not considered further within this assessment.

The temporal scope of cumulative impact assessments is defined by reasonably foreseeable and committed developments within the local area (Tarbet to Crianlarich), and committed development and development proposals that are in the process of being determined by the Loch Lomond and Trossachs National Park Authority (LLTNPA).

13.3.2 Approach and Assessment Methodology

The following approach has been adopted for the assessment of cumulative impacts:

- Consultation with the LLTNPA to agree additional schemes to be considered;
- Desk based assessment of the likely changes that are likely to occur as a result of the additional schemes ; and
- The assessment of potential impacts on specific sensitive receptors resulting from cumulative changes arising from the Pulpit Rock scheme together with the additional schemes.

There is some uncertainty regarding the nature of other committed developments and their potential environmental impacts. There is also variation in the level of information available, for example Environmental Statements were available for some projects whereas for others only indicative scheme/route drawings were available at the time of the assessment. In these circumstances detailed assessment of the cumulative effects is limited.

13.4 Potential Developments

In order to assess the potential for cumulative impacts, it is necessary to define the potential location and timing of nearby developments along with a description of the development proposals. The following table details the proposed developments along the scheme together with dates when they are likely to be constructed / opened. The developments listed in Table 13.3 have been identified and agreed in consultation with LLTNPA to be considered in this cumulative impact assessment.

However, it should be noted that although the spatial scope of this assessment has been set as Tarbet to Crianlarich, the LLTNPA requested that two further developments, Cononish Mine and Rossdhu Golf Course were also considered although only from a Landscape perspective. Therefore these two developments are also detailed in Table 13.3 below but are only assessed in the landscape section and not under any other topic headings.

A description of each of the potential developments is provided in Table 13.3 below and where the information used to assess the developments is publically available a relevant link has been provided. Some of the potential developments are however only indicative at present and as such information is commercially sensitive, where this is the case a description is provided as background information to the assessment.

Figure 13.1 – Cumulative Assessment Schemes provides a location plan for all of the potential developments considered within this Cumulative Impact Assessment.

Table 13.3 Land Development Schemes

Development Name	Description	Status	Relevant Programme	Information Available to assessment team
Scottish and Southern Energy – realigned overhead line	Realignment and upgrading of Overhead Line between Sloy Power Station and Glen Falloch Hydro Schemes. Construction works will include dismantling of the existing circuit and construction of new overhead circuit. Certain sections of the route will be undergrounded in cable sections and tree cutting will be required in specific areas.	Proposals are purely indicative at this stage with landowners, tennants and Scottish Government consents all to be consulted and permissions sought	March 2011 - September 2011	Indicative drawing
Crainlarich Bypass	Proposal is for a western bypass that would leave the A82 near the southern edge of the town and rejoin the A82 immediately west of the village	Draft Orders Published September 2009. Public Exhibition held October 2009	It is anticipated that the scheme would open between the financial years of 2011 and 2012.	Environmental Statement http://www.transportscotland.gov.uk/reports/road/j11156b-00.htm
Sloy Pumping Station	Application for Section 36 consent under Electricity Act 1989 for an extension to the existing Hydro Electric Scheme. The proposals are all located within the grounds of the Sloy hydroelectric power station. The proposals include; two surface buildings, forebay, a pump hall, service yard, two new buried pipelines and a site establishment area.	Application pending with Scottish Government Energy Consents and Deployment Unit.	The Environmental Statement for Sloy Pumping Station anticipates that construction will commence in September 2010 and last for 28 months.	Environmental Statement http://eplanning.lochlomond-trossachs.org/OnlinePlanning/caseFile.do?category=application&caseNo=2009/0239/ECN
Glen Falloch hydro schemes	Section 36 applications for the Ben Glas, Derrydarroch, Allt Fionn and Upper Falloch Hydroelectric schemes. Between the four proposed schemes there will be a total of 9 intake structures and approximately 14km of buried pipeline.	Application approved April 2010 by Scottish Government Energy Consents and Deployment Unit.	All schemes have now been approved through the Energy Consents Unit of the Scottish Government the indicative start date as detailed in the Cumulative Impact Assessment (contained within the	Environmental Statement http://eplanning.lochlomond-trossachs.org/OnlinePlanning/caseFile.do?category=application&caseNo=2009/0249/ECN

	Each scheme will have a single powerhouse		Environmental Statements) is likely to remain. Construction is programmed to start in June 2011 and last for 26 months to July 2013.	
Cononish proposed gold mine operation	Extraction of 72,000 tonnes of ore per annum max. for a period of 10 years, followed by reinstatement, in order to extract gold. Works include underground mine workings, associated service and production building, plant, tailings storage area, pond and gauging station, access roads, bridge, car parking and diversion of burn	Application submitted and pending with Loch Lomond and Trossachs National Park Authority planning department.	The construction period is expected to last one year. Through correspondence with the LLTNPA Planning department it was agreed that a conservative estimate for a start date would be January 2011.	Environmental Statement http://eplanning.lochlomond-trossachs.org/OnlinePlanning/: Application No: 2010/0017/MIN
Rossdhu Golf Course (near Balloch)	Proposed second golf course next to Loch Lomond Golf Course	Planning Permission in Principle Obtained 2007. Approval of matters specified in conditions application is still pending	From consultation with LLTNPA it has been indicated that it is not expected that construction works will begin within the next 2 years. *Assumption start date will not be before January 2012 and would last 18 months.*	Environmental Statement http://eplanning.lochlomond-trossachs.org/OnlinePlanning/: Application No: 2007/00288/REM
	Temporary Structures erected in connection with Scottish Golf 0pen for one week in July every year from 2008 to 2012.	Planning application submitted each year for temporary works	June each year (assumed 1 month duration for set up and dismantle)	Example application available (2008): http://eplanning.lochlomond-trossachs.org/OnlinePlanning/: Application No: 2008/0092/DET

In addition, there are a number of Transport Scotland road improvement (maintenance) schemes in the immediate vicinity of the A82 corridor also to be considered and details have been provided by Transport Scotland. Those scheduled in the likely time frame of the proposed works at Pulpit Rock are detailed in Table 13.4.

Table 13.4 Transport Scotland Maintenance schemes

Scheme Location	Description	Relevant Programme
A82 Trunk Rd South of Inverarnan	Carriageway widening and minor realignment	Construction 2011 - 2012
Stuckendroin Bridge	Widening of the bridge structure	Construction commenced November 2009
A82 Trunk Road Tarbert to Inveruglas	Carriageway realignment and upgrade	Construction 2011 – 2014 With works carried out in phases.

13.5 Cumulative Impact Assessment (Scheme Only)

The construction of the A82 Pulpit Rock Improvements will inevitably have cumulative impacts particularly in terms of landscape and habitats in a sensitive area such as the National Park. The effects would reduce as mitigation planting matures and the scheme becomes an accepted part of the landscape, however there will be residual impacts as identified in other chapters of this ES. .

The proposed improvements would remove the traffic lights at Pulpit Rock and allow two-way flow of traffic which would provide a less congested route along the A82. Therefore, there is likely to be cumulative beneficial impacts to surrounding communities and users of the A82.

DMRB Volume 11 requires a cumulative assessment to consider *the combined impact of a number of different environmental topic-specific impacts from a single environmental impact assessment project on a single receptor/resource.*

The Cumulative Impact Assessment Matrix shown in Tables 13.5 & 13.6 below provides an assessment of receptors against assessment topics to identify overall cumulative impacts associated with the scheme for both the construction and operational phases of the scheme.

Cumulative Impacts Assessment Matrix for A82 Pulpit Rock Improvements (Scheme only)

Table 13.5 Construction phase

Receptors	Walkers on WHW/ Summits	Loch Lomond Boat Users	Water resources	Woodland	Species (otters/ red squirrel/bats / birds/fish)	Rough Grazing Land	Landscape	Recreational Users of the A82 (ped/cyclists /equestrians etc.)	Surrounding habitat	Local residents	Railway passengers	Recreational (campers etc.)	National Scenic Area	Other Statutory Designated Sites	Pulpit Rock SM	Island I Vow	Military Road
Landscape	X						X	X		X	X	X	X		X		
Ecology			X	X	X	O			O					O (on SAC integrity)			
Water			X														
Community	X	X						X		X		X					
Noise	X				X			X		X	X	X					
Air	X		X		X		X	X		X		X	X		X		
Land Use						X											
Archaeology and Cultural Heritage															X	O	O
Overall cumulative impact on receptors	X		X		X	X/O	X	X	O	X	X	X	X	O	X	O	O

O No significant effect likely
➳ Positive effect likely
X Negative effect possible
No effect given indicates that it is not applicable to that receptor/topic

Table 13.6 Operation phase

Receptors	Walkers on WHW/ Summits	Loch Lomond Boat Users	Water resources	Woodland	Species (otters/ red squirrel/bats / birds/fish)	Rough Grazing Land	Landscape	Recreational Users of the A82 (ped/cyclists / equestrians etc.)	Surrounding habitat	Local residents	Railway passengers	Recreational (campers etc.)	National Scenic Area	Other Statutory Designated Sites	Pulpit Rock SM	Island I Vow	Military Road
Landscape	X						X	X		X	X	X	X		O		
Ecology			O	O	X – otter, red squirrel, bats, birds. O – fish.				O					O			
Water			O														
Community	➳	O						➳		➳		➳					
Land Use						O											
Archaeology and Cultural Heritage															O	O	O
Overall cumulative impact on receptors	X/➳		O		O	O	X	X/➳	O	X/➳	X/➳	X/➳	X	O	O	O	O

O No significant effect likely
➳ Positive effect likely
X Negative effect possible
No effect given indicates that it is not applicable to that receptor/topic

13.5.1 Summary of Cumulative Impacts (Scheme Only)

The Cumulative Impact Assessment Matrix (Table 13.5) for the construction phase indicates that the most significant cumulative impacts will be as a result of the localised noise and air impacts on receptors during construction. In addition there is likely to be significant impact on a number of visual receptors including users of the A82, walkers on the surrounding summits, the West Highland Way and also users of the loch. It is also anticipated that there will be likely negative impacts on a number of community receptors including users of the A82 and local residents. These construction impacts will be largely temporary although there will be permanent significant effects as a result of removal of vegetation.

The Cumulative Impact Assessment Matrix (Table 13.6) for the operational phase indicates that the likely significant cumulative impacts will be on the landscape resource and visual receptors given the sensitivity of the scheme location within the National Park and National Scenic Area. The potential landscape and visual impacts will be reduced over time as mitigation planting and weathering softens its appearance in the landscape. However the scope for mitigation is limited and significant residual effects will occur.

13.6 Cumulative Impact Assessment (Including other developments) – Landscape and Visual

13.6.1 Introduction

The landscape and visual cumulative impact assessment has been given emphasis in a separate section as the landscape and visual effects are potentially the most significant given the sensitive location of the scheme in the National Park and in a National Scenic Area.

The landscape and visual effects of the scheme on individual receptors are described in Chapter 6 - Landscape and visual Assessment (LVIA). This chapter assesses the potential cumulative effects of specified other developments as agreed with the LLTNPA. The LVIA has identified other changes to the landscape which would also have potential cumulative effects, notably previous work e.g. rock cutting and structures associated with the upgrade of the A82 and introduction of the Tarbet to Crianlarich section of the railway and the Scottish and Southern Energy recently built sub station at Inverarnan. This previous work is discussed in the baseline of the LVIA and has been added into this section of the cumulative assessment.

The separate components of the Pulpit Rock scheme; the proposed treatment of the rock face and the proposed viaduct; relate separately to some developments in a cumulative way e.g. the rock cut relates to previous cuttings and the viaduct relates to carriageway improvements elsewhere. This is highlighted in the cumulative assessment where it occurs.

It should be noted that cumulative effects on landscape and visual amenity may well cause cumulative effects in other subject areas. The combined effects of varied impacts on individual receptors is assessed above but landscape and visual effects may also contribute to cumulative effects on other aspects such as recreation and tourism and the local economy.

This assessment has been carried out using information from the LVIA, information about the specified developments as described above and a number of site visits to assess the site and surroundings including the view from Loch Lomond, the Ardlui Ferry, the railway, the West Highland Way and the high summits.

As stated in section 13.4 the LLTNPA requested that two additional potential developments were assessed from purely a landscape perspective – Cononish Gold Mine and Rossdhu Golf Course. In addition this Landscape and visual cumulative assessment also considers both cuttings and structures introduced in relation to previous infrastructure work within the study area and also the new Scottish and Southern Energy Transformer at Inverarnan as these are considered relevant to the landscape assessment only.

13.6.2 Methodology

The assessment has been carried out in accordance with the 'Guidelines for Landscape and Visual Assessment' Second Edition, The Landscape Institute/Institute of Environmental Management and Assessment (Spon Press 2002) (GLVIA). In accordance with the GLVIA and in common with the LVIA the

cumulative effects in relation to landscape and visual amenity are assessed separately.

The purpose of this assessment was to identify any additional cumulative landscape and visual effects which are likely to occur as a result of more than one project being constructed. This includes past changes as well as present and future changes. The concluding purpose of the assessment will be to determine whether, in landscape and visual terms, the Pulpit Rock scheme is above the acceptable limit of change having considered the relative impact of each development.

In order to make this judgement the effects of the individual developments have been described and assessed at together with the Pulpit Rock scheme. Finally all the developments and the scheme have been assessed in combination.

13.6.3 Landscape character

The assessment includes:

- The cumulative effects on the overall character of landscape in relation to its character and integrity and sensitivity to development;
- The cumulative effects on the physical fabric of landscape components i.e. elements such as woodland, walls;
- The long term trends and pressures for change;
- An assessment of cumulative effects under the following headings: scale, effects on existing focal points in the landscape and wildness.

13.6.4 Visual impact

The relative impact of each development was considered in relation to whether there would be an increased degree of intrusion and whether there would be intervisibility between zones of visual influence (ZVI).

The following types of cumulative impact are considered (identified by David Tyldesley for SNH at PLI – Proposed Windfarm, An Suidhe, Inveraray, Argyll. November 2002 which would also be relevant in this context):

- in combination - where two or more features are seen together at the same time from the same place, in the same (arc of) view where their visual effects are combined;
- in succession - where two or more features are present in views from the same place (viewpoint) but cannot be seen at the same time - the observer has to turn to see new sectors of view whereupon the other features unfold in succession;
- in sequence - where two or more features are not present in views from the same place (viewpoint) - the observer has to move to another viewpoint to see the features that would appear in sequence. This includes duration, frequency and nature of combined views e.g. glimpses, more prolonged views.
- perceived – in the context of this assessment the perceived effects are defined as the expected perception of the viewer in relation to which developments or elements of change are seen in combination as perceived cumulative effects.

In addition intrusion can be described as an inappropriate intervention in the landscape.

13.6.5 Landscape and visual impacts of individual developments

13.6.5.1 Scottish and Southern Energy overhead line

Landscape: The proposed new overhead line to Sloy would be within the A82 corridor but its route varies with sections at higher level, sections above the railway, sections alongside the A82 and sections near to the river. It crosses the road, railway and river and involves some removal of trees. The section of the overhead line in the immediate vicinity of Pulpit Rock would be routed underground.

Pulpit Rock is a different type of development to the overhead line and both schemes are relatively small in scale. Neither the rock cut nor the viaduct elements of the Pulpit Rock scheme relate to the overhead line as an increase in scale of development. Even though the overhead line would be underground in the immediate vicinity of Pulpit Rock, there would be an additional man made element and clutter in the landscape. Both schemes would result in the removal of a significant amount of vegetation.

Visual: The proposed new overhead line would be visible intermittently from viewpoints within the A82 corridor e.g. at crossing points on the road, railway and river. More of an overview would be seen from the WHW and the high summits where the distance from view would reduce the impact. The schemes are unrelated visually but would be seen sequentially as additional man made elements. The additional degree of intrusion of both elements would be relatively minor but as the overhead line is in close proximity both schemes would be visible cumulatively.

13.6.5.2 Crianlarich Bypass

Landscape: The proposed new by-pass would add an additional element of infrastructure to the village setting but would have limited impact beyond owing to the topography and existing buildings and structures in the village. The main wider potential effect would be the cumulative effect with other road schemes including the Pulpit Rock (particularly the viaduct element) scheme of the gradual change in the character of the road and loss of local distinctiveness resulting from the introduction of modern highway standards.

Both schemes would result in the loss of trees and vegetation and changes to landscape components. However the two developments are sufficiently spaced apart in areas with different characters for the potential cumulative effects to be relatively minimal.

Visual: The ZVI of the bypass would be relatively limited by the topography, the existing viaduct and surrounding forestry. The introduction of a new section of road would be a significant visual feature from viewpoints within the village setting. The main wider potential effect would be the change in the experience of road users. Road users passing through would experience changes to their views at this point. A potential beneficial effect would be that the bypass is routed above the village at a higher level affording a better overview of the surrounding landscape. The bypass

and the Pulpit Rock schemes would be seen in sequence and would be perceived cumulatively because they are similar in nature. In addition there would be street lighting associated with the new bypass which have impacts on the dark skies quality of Strathfillian, however as there is no lighting proposed for the Pulpit Rock Scheme there will be no cumulative effect from lighting associated with the scheme.

13.6.5.3 Sloy Power Station

Landscape: The proposed extension to the power station including above ground new buildings and rock storage areas are contained in a limited area. It is screened to some extent by conifers and the ground formation with a buffer mound adjacent to the A82. The existing power station is a Grade A Listed Building and a very prominent feature in the landscape. The proposed additions would be related to the existing buildings and infrastructure and would not significantly affect the character of the wider landscape although some trees would be removed to accommodate the development.

The proposed power station extension is a different type of development to the Pulpit Rock scheme. However the Pulpit Rock scheme is an intervention into the landscape and shares some characteristics with the original Sloy Power Station i.e. both are in prominent positions in the landscape and have elements which reach high on to the adjoining valley sides. The Sloy Power Station is designed and constructed to a very high standard and adds character as a high quality feature in the landscape. It therefore is an exemplar for subsequent development which would be compared unfavourably to it if not built to high standards.

Visual: The existing power station is a very prominent feature which is visible from a wide area and is particularly visible from the Loch, WHW and Inversnaid Hotel. The proposed extension would be visible from the A82 although the buffer mound and conifers would screen it to some extent and would potentially be visible from the railway line and the summits. The proposed extension would be noticeable but visually related to the existing complex. It would be seen in sequence with the Pulpit Rock scheme but the two schemes will be perceived as unrelated.

13.6.5.4 Glen Falloch hydro schemes

Landscape: The four hydro electric schemes are on tributaries of the River Falloch with intake weirs, access tracks, powerhouses and underground pipelines to each development. The schemes would cause local impact on the exposed hillsides especially during construction but with landscape restoration mitigation measures the long term impact on the landscape character is expected to be low.

The hydro schemes and the Pulpit Rock scheme are relatively small scale and would not significantly create cumulative effects. There would be some loss of vegetation and the schemes would contribute to an incremental loss of wildness.

Visual: All of the four schemes are near to the A82 and would be visible from the road. However they are relatively small scale and with landscape restoration mitigation measures would have limited visibility in the wider landscape. The schemes would be seen in sequence together with the pulpit rock scheme.

13.6.5.5 Cononish proposed gold mine operation

Landscape: The proposed re-opening of the goldmine includes underground workings an associated production building, plant storage area, a tailings management facility (TMF) and access roads within the upland area. There is also a proposed bridge at Dalrigh, access road and car park near to the A82. The landscape assessment for the scheme identified moderate landscape impacts. Upon final restoration the landscape impacts have been assessed as negligible. The proposed works next to the A82 would be the most significant permanent effects in terms of views from the road and would represent changes and additional development to the setting of the road.

The proposed extraction including the TMF is some distance from the A82 and Pulpit Rock. Although the rock cutting elements are similar to the Pulpit Rock scheme the two would not create cumulative effects. However the proposed car park for the Colonish scheme would together with the Pulpit Rock scheme, represent incremental changes to the character and setting of the A82. The schemes are sufficiently far apart and small in scale for the cumulative effects to be relatively minor.

Visual: The visual assessment for the scheme has identified moderate/ major impacts particularly during construction and from certain viewpoints. Upon final restoration the visual impacts have been assessed as negligible. The proposed works next to the A82 would be the most significant permanent effect in terms of views from the A82. The proposed works next to the A82 and the Pulpit Rock scheme would be seen in sequence and would be perceived cumulatively because they are similar in nature.

13.6.5.6 Rossdhu Golf Course

Landscape: Outline planning permission has been granted for the formation of the golf course. This proposal is located some distance to the south of Tarbet adjacent to the existing Loch Lomond Golf Club where there is a concentration of tourist development. Changes to the landscape to form a golf course and associated car parking and access arrangements would intensify the overall pattern of development in this area to some extent and locally change the character of the landscape but would not have a significant landscape impact in the wider landscape to the north. The temporary structures associated with large events would not significantly alter the character of the landscape.

The Rossdhu and Pulpit Rock schemes are unrelated, some distance apart and are in different character zones and therefore would have minimal cumulative effects. The Rossdhu site is in the more developed south section of the Loch whereas Pulpit Rock is in the wilder northern section. There would be some changes to landscape elements. The temporary structures erected for events would relate more to the construction effects but the schemes are sufficiently far apart to not cause cumulative effects.

Visual: Depending on the final design of the proposed golf course it is likely that changes would be noticed from certain viewpoints and affect nearby receptors. Changes are likely to be noticeable from the A82. Temporary structures and changes to the traffic patterns associated with large events may have significant short term

adverse visual effects on specific receptors. The scheme would be seen in sequence with the Pulpit Rock scheme but as they are some distance apart and in areas with different characters the effects would not be perceived as cumulative.

13.6.5.7 A82 Trunk Rd South of Inverarnan

Landscape: The proposal is to carry out carriageway widening and minor realignment over a distance of approximately 1.7km. The proposal will involve some removal of vegetation and introducing cuttings and embankments. There will also be associated signage, barriers etc. This would result in a change in the character of the road at this point and a loss of local distinctiveness owing to the design of the road improvements to modern highway standards. There would be potential cumulative effects with other road schemes including the Pulpit Rock scheme of the gradual overall change in the character of the road. There would also be cumulative effects in the loss of trees and vegetation.

Visual: The ZVI of the proposal would be relatively limited by the topography and surrounding forestry and woodland. There would be some local changes to views resulting from the proposal and there would be a change in the southern approach to Inverarnan. The main wider potential effect would be the change in the experience of road users. A more uniform appearance of the road and higher speeds would change the perception of the wider landscape. The Inverarnan and Pulpit Rock schemes will be seen in sequence and perceived as similar types of development.

13.6.5.8 Stuckendroin Bridge

Landscape: this proposal to widen the bridge structure is currently under construction at the time of this assessment. The scheme has resulted in some loss of vegetation. It represents a relatively minor change to the landscape character of the road. There would be potential cumulative effects with other road schemes including the Pulpit Rock scheme, which is relatively close, of the incremental overall change in the character of the road. However the two schemes are relatively small in scale. There would be some cumulative loss of trees and vegetation.

Visual: The ZVI of the proposal is relatively limited by the topography and some woodland. There would be some local changes to views resulting from the proposal. The scheme would contribute to a small extent to the change in the experience of road users. The Stuckendroin bridge scheme will be seen in sequence with the Pulpit Rock scheme and be perceived cumulatively as a similar scheme. There will be intervisibility between the ZVI's of the schemes.

13.6.5.9 A82 Trunk Road Tarbert to Inveruglas

Landscape: The proposal is to carry out carriageway realignment and upgrade over a distance of approximately 3.6km. The proposal would involve removal of vegetation and introducing cuttings. There would also be associated signage, barriers etc. This would result in a change in the character of the road over a significant distance with associated loss of local distinctiveness owing to the design of the road improvements to modern highway standards. There would be potential cumulative effects with other road schemes including the Pulpit Rock scheme of the gradual overall change in the character of the A82. This scheme is close to the

Pulpit Rock scheme and similar in nature and cumulatively would represent a change in character of a significant section of the A82. There would also be a significant loss of trees and vegetation.

Visual: The ZVI of the proposal would be relatively extensive owing to the location of the proposal at the edge of the Loch. The change in the views would be significant because of the removal of vegetation to accommodate the scheme. The wider potential effect would be the change in the experience of road users. A more uniform appearance of the road and higher speeds would change the perception of the wider landscape. This scheme will be seen in succession and sequence with the Pulpit Rock scheme and there would be intervisibility between the ZVI's of the two schemes.

13.6.5.10 Cuttings and structures introduced in relation to previous infrastructure works

Landscape: There are a number of existing large rock cuttings and retaining walls associated with previous improvements to the A82 and the introduction of the Tarbet to Crianlarich railway. Some of the cuttings have vegetated over but there are a number of large cuttings which appear as bare rock outcrops. Where the rock outcrops immediately adjacent to the banks there are some vertical or overhanging faces adjacent to the road. The old retaining walls are generally of high quality stonework and contribute to the historic dimension of the landscape together with Victorian viaducts and historic buildings e.g. Sloy Power Station. There are a number of noticeable cuttings and structures which have not vegetated over in the section between Tarbet and Pulpit Rock. There are also a number of larger scale cuttings in the section to the south of Tarbet which are more recent and intrusive and where the pre-splitting drill lines are visible.

The introduction of cuttings and structures at Pulpit Rock would add to the existing interventions in the landscape as an incremental upgrade to the A82 over a long period of time. The scheme would be compared unfavourably to the previous schemes if it is not of high quality.

Visual: The extent of visibility of individual cuttings and structures varies according to the scale of the development and its location in relation to the shore, the topography and tree cover. Most of the cuttings and structures are clearly visible from the road and many are visible from the water. The larger previous cuttings are high and can be seen above the shoreline tree belt. These cuttings are visible from greater distances on the water and from the WHW and opposite summits. The Pulpit Rock scheme would be seen in succession and sequence with the previous schemes and the elements would be subject to comparison especially the rock cutting and treatment of the rock face at close range by road users.

13.6.5.11 Scottish and Southern Energy – new transformer at Inverarnan

Landscape: The Scottish and Southern development is a large intrusive industrial type development (largely completed) in an elevated position. It has a considerable adverse impact owing to its scale, elevated location and the introduction of a large industrial feature into the natural landscape of the National Scenic Area (NSA). The most intrusive components are the new sub station at Inverarnan and the

replacement 275Kv tower. The new access tracks and existing overhead line add clutter but are less intrusive elements.

The Pulpit Rock scheme is a different type of development and is unrelated to the Inverarnan scheme. However, cumulatively the two schemes would represent an encroachment of man made structures in the wild landscape. The Pulpit Rock scheme is, however relatively small in scale compared to the Inverarnan scheme.

Visual: The ZVI of the Scottish and Southern development is relatively limited from the north and south owing to the topography, however the development is highly visible from the Loch, the WHW and the opposite summits. The sub station and tower is screened to some extent from the A82 by its elevated location behind trees and the angle of view from the road. Its greatest impact is when seen as a very intrusive feature in the wider landscape from distance, particularly from the WHW. The Inverarnan and Pulpit Rock schemes would be seen in succession and sequence and there would be intervisibility between the ZVI's when seen from the WHW and summits, in particular, Stob nan Eighrach and Maol an Fhithich.

13.6.6 Summary of Cumulative landscape and visual effects

The following two tables (Tables 13.7 & 13.8) provide a summary of both the cumulative landscape and visual effects of the above schemes along with Pulpit Rock.

Table13.7 Cumulative landscape effects

Schemes with Pulpit Rock	Overall character	Landscape components	Long term trends	Scale	Existing focal points	Wildness
SSE overhead line	✓	✓	✓	X	✓	✓
Crianlarich Bypass	✓	✓	✓	✓	X	X
Sloy Power Station	✓	✓	X	X	✓	✓
Glen Falloch hydro schemes	X	✓	X	X	X	✓
Cononish proposed gold mine	✓	✓	✓	X	X	✓
Rossdhu Golf Course	X	✓	X	X	X	X
A82 Trunk Rd South of Inverarnan	✓	✓	✓	✓	✓	✓
Stuckendroin Bridge	✓	✓	✓	X	X	✓
A82 Trunk Road Tarbert to Inveruglas	✓	✓	✓	✓	X	✓
Previous cuttings and structures	✓	✓	✓	✓	✓	✓

SSE sub station at Inverarnan	X	✓	✓	X	✓	✓
All	✓	✓	✓	✓	✓	✓

✓ = cumulative effect expected
X = no cumulative effect expected

Table 13.8 Cumulative visual effects

Schemes with Pulpit Rock	**Combination**	**Succession**	**Sequence**	**Perceived**	**Intrusion**	**Intervisibility**
SSE overhead line	✓	✓	✓	✓	X	✓
Crianlarich Bypass	X	X	✓	✓	X	X
Sloy Power Station	X	X	✓	X	X	X
Glen Falloch hydro schemes	X	X	✓	X	X	X
Cononish proposed gold mine	X	X	✓	✓	X	X
Rossdhu Golf Course	X	X	✓	X	X	X
A82 Trunk Rd South of Inverarnan	X	X	✓	✓	X	X
Stuckendroin Bridge	X	X	✓	✓	X	✓
A82 Trunk Road Tarbert to Inveruglas	X	✓	✓	✓	X	✓
SSE sub station at Inverarnan	X	✓	✓	X	X	✓
Previous cuttings and structures	X	✓	✓	✓	✓	✓
All	X	X	✓	✓	X	✓

✓ = cumulative effect expected
X = no cumulative effect expected

13.6.7 Conclusions – Construction effects

13.6.7.1 Landscape cumulative effects

. As construction effects are generally temporary there would be little permanent effect on the landscape character. However there would be permanent effects as a result of the removal of trees and vegetation in advance of the construction works.

Owing to the scale and nature of the scheme the temporary effects may be significant. The cumulative temporary effects would depend on the programming of construction in relation to other schemes in the area, particularly the other road schemes in the near vicinity. There is likely to be a number of construction elements

e.g. works compounds, scaffolding, storage of materials, movement of vehicles, temporary traffic lights etc. introduced into the landscape in succession in fairly close proximity over a period of time.

The removal of trees and vegetation would be a significant permanent cumulative effect which is discussed below under operational effects.

13.6.7.2 Visual cumulative effects

The LVIA describes the expected visual effects in relation to construction There would be temporary cumulative effects on a range of receptors and some of these may be significant effects on individual receptors depending on the location of construction compounds, materials storage and removal of vegetation etc. As there are few receptors living close to the various sites, the largest group and most significant effects would be on the road users. The road users would notice a succession of construction works in the landscape over a period of time, some of which may be close together. It is unlikely that the temporary effects would significantly affect the overall visual amenity of the wider landscape but would have localised effects.

There would be permanent construction effects on receptors as a result of the removal of trees and vegetation in advance of construction. These effects are discussed below under operational effects.

13.6.8 Conclusions – Operation effects

13.6.8.1 Landscape cumulative effects

Overall character: Pulpit Rock together the other road schemes and in particular the A82 Tarbet to Inveruglas scheme, would create significant additional cumulative effects and represent an incremental change in the character of the A82. The Tarbert to Inveruglas and Pulpit Rock schemes are close together and represent relatively large scale road widening schemes which would significantly alter the character of the A82 in this vicinity. The other individual road schemes are either relatively small in scale or are in a different section of the road with a different character (e.g. Crianlarich) so the additional cumulative effects would be less. The other non road schemes are relatively self contained and Pulpit Rock would not significantly increase the effects. This is not to say that these schemes themselves would not have significant adverse effects (notably the Scottish and Southern Energy sub station proposal). All of the developments taken together, however would have a significant effect on the overall landscape character.

Landscape components: Each individual development together with Pulpit Rock would result in a change to or loss of landscape components notably the loss of woodland and for the road schemes and a change in the topography in the form of embankments and cuttings. There may also be a cumulative loss of some other elements such as walls. All of the schemes taken together would result in quite a significant loss of woodland.

Long term trends: All of the schemes in combination represent a long term trend of incremental development and intrusion of man made structures and infrastructure

into the relatively wild landscape. The road schemes in combination would result in a general move towards uniformity loss of local distinctiveness with the introduction of modern highway standards. The loss of woodland would result in a more open character to the road which may have both adverse and beneficial effects.

Scale: Pulpit Rock in combination with the A82 Trunk Road Tarbet to Inveruglas and the A82 Trunk Rd South of Inverarnan schemes would significantly increase the scale of changes to the character of this section of the road. The other road schemes are relatively small in scale or are in a different area. Pulpit Rock together with the other developments would not significantly affect the scale of development in the area. This is not to say that these schemes themselves are not large scale developments (notably the Scottish and Southern Energy proposal).

Existing focal points: Pulpit Rock and Sloy Power Station are themselves focal points in the landscape and therefore would be affected by landscape changes. The other schemes are not either of sufficient scale or in locations where in combination they would significantly affect focal points with the exception of the Scottish and Southern Energy proposal which is of sufficient scale to create a focal point.

Wildness: All of the schemes with the exception of the Crianlarich bypass and the Rossdhu Golf Course either individually with Pulpit Rock or taken together represent a gradual loss of wildness and incremental man made influence in the landscape. This is particularly apparent in this northern section of the glen which has a relatively wild character.

13.6.8.2 Visual cumulative effects

Combination: Pulpit Rock would not be seen in combination with the other schemes except from distant vantage points such as the high summits which affords an overview of the whole area. From these locations Pulpit Rock and the Tarbet to Inveruglas schemes may be seen in combination with the most significant aspect being the loss of trees. The other schemes near to Pulpit Rock are of too small a scale to be visible from this distance.

Succession: From the vantage point of the West Highland Way or the high summits the larger scale developments which are relatively close together may be seen in succession. These schemes are Pulpit Rock, the Scottish and Southern Energy Proposal at Inverarnan and the Tarbet to Inveruglas scheme. The other schemes would be either too small in scale or in different areas.

Sequence: All of the schemes would be seen in sequence along the A82 and taken together would form an incremental change in the experience of travelling along the road. There would be a gradual uniformity in the appearance of the road and the area would be perceived as becoming increasingly influenced by man. The road schemes are relatively close together and would result in a slight increase in the speed of travel so the change in views would be frequently sequential.

Perceived: The Rossdhu Golf Course would be perceived as being in a different area and probably not perceived in relation to the other schemes. All of the road schemes including the Connonish Gold Mine access road and car park would be perceived as a gradual upgrade of the A82. Although there would be an overall move towards uniformity and adverse effects on the experience of road users some aspects would

be beneficial e.g. the opening up of views of the Loch, the opportunity to swing out over the Loch by the Pulpit Rock scheme and the overview gained from the Crianlarich By pass.

Intrusion: There would be no additional cumulative effects on the degree of intrusion into the view because the schemes are sufficiently separated to not be seen in combination except from distant vantage points.

Intervisibility: The ZVI's of the Scottish and Southern Energy sub station proposal, Stuckendroin Bridge and the A82 Tarbet to Inveruglas schemes overlap when viewed from the WHW, the Loch and high summits. Puplit Rock and Stuckendroin bridge are relatively close together. Weather and light conditions also affect intervisibility. There is no intervisibility between Pulpit Rock and the other schemes.

13.6.8.3 Threshold of acceptable level of change

The main cumulative effects are the gradual change to the character of the A82 over the long term, the significant incremental loss of woodland and loss of wildness in this section of the glen. These effects relate to the landscape resource and also to the visual experience of the landscape. The Pulpit Rock scheme together with the other road schemes would contribute mainly to the gradual change in the character of the A82 and loss of woodland and to a much lesser extent to the loss of wildness.

In determining the threshold of acceptable level of change the overall landscape objective in the area should be taken into account i.e. whether the landscape objective is

- to maintain the integrity and quality of the landscape (appropriate within a designated landscape);
- to maintain the landscape character; or
- to accept landscape change.

In the National Scenic Area the maintenance of the integrity and quality of the landscape is of the highest priority but in order to meet current needs some landscape change is inevitable and should be acceptable. This landscape is large in scale with varied topography and extensive areas of woodland and therefore has some capacity to absorb limited development. The development which has taken place in the past has tended to be large prominent features which are very noticeable e.g. Sloy Power Station and the Inversnaid Hotel. The landscape in this area is nearing capacity for this type of development and other more recent development e.g. the Scottish and Southern Energy Sub Station at Inverarnan would fall into this category.

The Pulpit Rock scheme would not, however, fall into the above category as it is considered to be within the limits of acceptable change in a landscape that has the capacity to accommodate this scale of development, although the viaduct element would be a prominent feature. This scheme is more related to the gradual change in the character of the A82, particularly as experienced by the road users. There would undoubtedly be significant cumulative effects but this has to be balanced with the need to meet other priorities i.e. that the upgrade of the A82 supported in a number of policy documents – see Chapter 5 – Policies and Plans. In these circumstances

the Pulpit Rock scheme, in principle, would represent an acceptable landscape change as it is part of the gradual change experienced along the road corridor.

The main issue is how it is done. In the National Scenic Area and in such an iconic location a high standard of design and materials should be expected and elements which may be acceptable elsewhere in undesignated locations may not be of sufficient quality in this special landscape. The previous cuttings and structures have led the way in setting examples of how high quality materials and traditional construction methods can be absorbed into the landscape and become interesting historical features rather than discordant elements. The proposed intervention at Pulpit Rock would be compared unfavourably with the previous schemes if it is not of high quality. There are many examples of how contemporary high quality design and materials can create landscape features of beauty e.g. the Skye Bridge. The same level of care should be taken at Pulpit Rock.

The loss of woodland in the glen would have adverse landscape and visual effects but it would also have beneficial effects in opening up views of the Loch and improving the travelling experience of road users. Much of the vegetation loss due to the engineering works would be from self seeded woodland at the shore which often blocks views of the Loch especially in summer. The clearance of this type of vegetation together with the proposed viaduct structure would swing road users out over the Loch giving open views up and down its length. Landscape restoration and repair mitigation including compensatory planting is proposed to compensate for loss of woodland and to fit the proposed development into the existing landscape structure.

It is concluded that there would be significant cumulative landscape and visual effects as a result of the Pulpit Rock scheme but these represent an acceptable level of change subject to careful mitigation.

13.6.9 Mitigation

High quality design, materials and construction methods should be applied to all elements of the scheme and in particular to the proposed rock cutting, the engineering works, the viaduct and subsequent landscape restoration and repair. The landscape mitigation is detailed in Chapter 7- Landscape and Visual Effects.

13.7 Cumulative Impact Assessment (Including other developments) – other topic areas

13.7.1 Land Use

The land use impacts associated with the scheme are described in Chapter 7 – Land Use. In summary, the impacts on land-use as a result of the scheme will be limited. While the construction will necessitate the land take of some areas of agricultural land, this has limited agricultural value due to the topography and soil quality. Furthermore, this land also has minimal grazing potential. Small areas of semi-natural broad-leaved woodland will be required but mitigation planting should ensure the impact of this land take is kept to a minimum.

13.7.1.1 Methodology

The assessment of impacts on land use considers the impacts of demolition of property, loss of land, effects on development land and agricultural land.

13.7.1.2 Land Use Impact of individual developments.

Scottish and Southern Energy Overhead Line

The proposal to remove the existing overhead line (OHL) and replace it with a new upgraded line is purely indicative at present. The proposed rerouting of the OHL may be altered as the design progresses and as such this assessment cannot be carried out with any certainty. No information is available at present on where access tracks would be located and therefore this cannot be addressed in this assessment. In addition no information is available on the type of pole/pylon that will be required to facilitate the OHL making it difficult to assess the impacts of land take.

The main impacts on land use associated with the new line will be related to any tree removal required, land take for structures (which could include agricultural land) and any underground route and also temporary impacts from access tracks. It should be noted that any impact associated with tree removal and the respective impacts on habitat networks will be dealt with in the ecology section.

Crianlarich Bypass

The bypass would skirt the western side of the village which is situated between the junction of the A85 (T) and the A82 (T) at the edge of the floodplain of the River Fillan. Surrounding land uses in the area include extensive areas of forest on the lower slopes of the hills surrounding the village and grazing land in the river valley.

The construction of the scheme would result in a change of land use of some 13ha. Landtake would be mainly from degraded peatland and commercial forestry. This total includes the land required for construction of earthworks, the new road, tie ins and roundabouts, road drainage (including filter trenches, and detention basins) and land for essential mitigation, principally new landscaping and noise bunding. There would be no loss of land from gardens of properties. No public open space would be

affected by the proposals. The land take is not considered significant within the Crianlarich Bypass ES.

Sloy Power Station

The proposed development would take place entirely within land owned by SSE and the majority of activities would take place within the existing Sloy power station site, an area already affected by industrial activities. However, the wider area is a popular recreational area and a variety of recreational pursuits occur in the vicinity of the proposed development.

Glen Falloch Hydro Schemes

The Environmental Statement for the Glen Falloch Hydro Schemes does not address land use as a standalone issue. The location for the schemes is described as exposed hillside and upland glen. The proposed developments have the potential to impact on areas of ancient woodland, semi-natural woodland and peat.

Transport Scotland Maintenance Schemes

For all the proposed maintenance schemes the main impact on land use will involve any land take required outside of the existing trunk road boundary. Only indicative scheme drawings are available for assessment at present. Through the use of satellite imagery it is clear that the schemes may impact upon agricultural land and also involve removal of vegetation.

13.7.1.3 Potential Cumulative Impacts

The combination of all of the potential developments on land use is not considered significant. The Crianlarich Bypass is likely to result in the most significant impact in terms of land use and land take whereas both the OHL proposal and the Glen Falloch Hydro Schemes are not likely to result in major operational land take requirements although there may be significant temporary land take during construction. The Transport Scotland maintenance schemes will result in land take on either side of the A82 to facilitate the road widening required and integration of non-motorised user provision. The Sloy Power Station proposals are located within an already industrialised setting and impacts are likely to be significant during construction and related to rock storage.

Overall the biggest cumulative impact associated with the potential developments will be tree loss during both construction and operation. The Pulpit Rock scheme will entail tree removal to facilitate construction but this is not considered significant and will be mitigated through replacement planting. Therefore in conclusion the impact on land use is considered moderate and it is not expected that the Pulpit Rock Scheme in combination with the other developments will contribute in any significant way to overall cumulative impacts on land use.

13.7.2 Archaeology and Cultural Heritage

Cumulative impacts on the cultural heritage resource result from changes to the current baseline setting of the resource caused by the proposed development in

conjunction with other developments that occurred in the past, present or are likely to occur in the foreseeable future.

It has been predicted that the A82 Pulpit Rock Improvements would have an effect of minor significance on the setting of one cultural heritage site: Pulpit Rock, which is protected as a Scheduled Monument. Two further sites would not be affected by the Improvements, Island I Vow Castle and Settlement (a Scheduled Monument) and the Tarbet to Crianlarich Military Road (a NMRS and SMR site).

None of the three cultural heritage sites is predicted to experience a significant adverse effect arising from the Improvements, either alone or with the seven relevant consented or proposed developments summarised in Section 31.4, above.

As the A82 Pulpit Rock Improvements will only impact on Scheduled Monuments, the following cumulative assessment is based on the impact on scheduled monuments from the other potential developments; this is detailed in Table 13.9 below.

Table 13.9 Impact on Scheduled Monuments

Development Name	Scheduled Monument within locale	Predicted Impact
Scottish and Southern Energy	Inveruglas Castle SM Pulpit Rock SM	No impact anticipated – proposed OHL is located a sufficient distance way as to not impact on SM Proposed OHL line is to be undergrounded in the vicinity of Pulpit Rock
Crianlarich Bypass	Loch Dochart Castle SM	No impact anticipated
Sloy Power Station	Inveruglas Castle SM	No impact anticipated – proposed pumping station at Sloy Power Station is located a sufficient distance away as to not impact on SM
Glen Falloch hydro schemes	None	N/A
A82 Trunk Rd South of Inverarnan	None	N/A
Stuckendroin Bridge	None	N/A
A82 Trunk Road Tarbert to Inveruglas	None	N/A

13.7.2.1 Potential Cumulative Impacts

The proposed SSE buried cable route would pass within 25m of the Pulpit Rock Scheduled Monument, with work due to take place in March 2011. Transport Scotland is committed to measures to protect the scheduled area during the Improvements. It is presumed that similar measures would be adopted during the laying of the cable. Liaison between Transport Scotland and SSE construction teams

and Historic Scotland would ensure that the measures were adequate to shield the site from both developments.

13.7.3 Ecology and Nature Conservation

Similar impacts from different developments acting together may result in a cumulative impact that is greater than when the same impacts act in isolation. Cumulative impacts may entail all the impacts of the scheme upon a feature (e.g. impacts at the construction and operation stage), or the impacts of a number of schemes that will affect the same feature in the same area.

The significance on the ecological integrity of a site depends upon all of these factors. The accepted definition of site integrity is 'the coherence of its ecological structure and function, across its whole area, that enables it to sustain that habitat, complex of habitats and/or the levels of populations of the species for which it was classified' (Scottish Executive, 2000).

The effect on ecological integrity of the site is either deemed to be significant or not significant. The terms 'significant' and 'not significant' are used as described in Chapter 9 – Ecology and Nature Conservation. Initially consideration of the impact on ecological integrity does not take account of any recommendations for mitigation that might subsequently be described. Residual impacts and significance takes these mitigation measures into consideration.

The potential impacts of the A82 Pulpit Rock Road Improvement are outlined below, following consideration of the baseline conditions. This is followed by a summary of the potential impacts of other schemes assessed in this report for potential cumulative impacts. Only ecological receptors considered at risk of incurring an impact from this scheme and another scheme (a cumulative impact) within the assessment area are included within this report.

At present, there is limited information available for the detailed design of some of the proposed developments within the assessment area and therefore a precautionary approach has been taken. This assessment is based on information available at the time of writing.

13.7.3.1 Summary of Impacts of the Scheme

Construction phase

Cumulative impacts during construction will relate to site clearance (also referred to as enablement), physical removal of soils and vegetation, break-up of existing hard-standing and the introduction of artificial construction materials and active machinery.

The potential cumulative impacts involved with the construction of the scheme are:

- Habitat Loss (land-take), a direct and permanent effect. The severity of this effect is directly related to the amount of habitat lost and the conservation value of that habitat.
- Habitat fragmentation, a direct and permanent effect. Severance of habitat and /of the wildlife corridors linking them is also considered a direct impact.

Fragmentation can lead to reduced genetic diversity and increase the likelihood of species being lost;

- Indirect effects: These arise from disturbance (visual, lighting, noise or vibration), dust deposition, increased vehicle trafficking and changes in patterns of existing drainage. These impacts have the potential to affect habitats outside the boundary of the construction site, and will generally be temporary and link to construction impacts.

- Spread of alien invasive species: Construction traffic could result in fragments of invasive species, being spread around the scheme area, leading to the new establishment of the alien species;

- Release of hydrocarbons, chemicals, etc, into the watercourse from construction machinery, stockpiles and apparatus; and/or

- Release of soils, sediments etc. from partially construction embankments or other construction areas.

Operation phase

The potential negative cumulative impacts due to operation and maintenance of the road improvement scheme are:

- Water quality impacts due to contaminated surface water run-off into watercourses and Loch Lomond

- Increased risk of road traffic fatalities of bats, otter and pine marten due to faster moving traffic

13.7.3.2 Summary of impacts of other schemes

Sloy Power Station

Predominantly loss of grassland, sapling trees and scattered ornamental trees with potential impacts on breeding birds and red squirrel if habitat clearance is undertaken between spring and summer.

There is potential for localised water pollution of Loch Lomond which together with a low risk of fish entrainment and a high risk of the introduction of exotic or invasive species (ruffe and Canadian pondweed) into Loch Sloy is likely to affect protected native fish populations in Loch Sloy.

Glen Falloch Hydro Schemes

Allt Fionn

There is a high risk of disturbance to otter and breeding birds, a minor effect on bryophytes and a risk of pollution to minor watercourse flowing into the River Falloch during construction.

Ben Glas

There will be impacts to blanket bog and a designated site for pine woodland. There is the potential for disturbance to otter, loss of trees with potential for bat roosts and a high risk of disturbance to breeding birds during construction. There is a risk of pollution to minor watercourse flowing into the River Falloch. Minor effects on bryophytes

Derry Darroch

There is the potential for disturbance to otter, loss of trees with potential for bat roosts, and a high risk of disturbance to breeding birds during construction. There is also a risk of pollution to minor watercourse flowing into the River Falloch and a minor impact on common and widespread bryophytes.

Upper Falloch

There is expected to be effects on a statutory site designated for vascular plants and its upland habitats. There is potential for disturbance to otter, loss of trees with potential bat roosts, a high risk of disturbance to breeding birds, minor effects on common and widespread bryophytes, and a risk of pollution to minor watercourse flowing into the River Falloch.

SSE Overhead Line

This assessment is based on limited information in the form of two preliminary and indicative route maps. The main impact is anticipated to be loss and pruning of trees, woodland and other habitats as the route will cross areas of woodland and forestry. It is not possible to quantify the extent of habitat loss or disturbance, although this is expected to be significantly greater than for the Pulpit Rock road improvement. Neither is it possible to quantify the potential impacts on protected species, as no information is available at time of writing.

A82 Transport Scotland Maintenance Schemes

Stuckindroin Bridge

The Stuckindroin Bridge re-design and widening project will potentially impact on otter because it affects a watercourse. Otter mitigation is included in the bridge design (Transport Scotland, 2009).

South of Inverarnan carriageway widening and minor re-alignment

No detailed impact assessment information is available. However, the carriageway works are likely to entail removal and pruning of trees and scrub along both sides of the existing carriageway and potential impacts on minor watercourse and disturbance to otter.

Tarbet to Inveruglas carriageway re-alignment and upgrade

No detailed impact assessment information is available. However, the carriageway works are likely to entail removal and pruning of trees and scrub along both sides of the existing carriageway and potential impacts on minor watercourse and disturbance to otter.

Crianlarich Bypass

For the purpose of this assessment it is considered that Crianlarich Bypass project is too distant from the scheme to result in cumulative impacts within an ecologically meaningful area and it is not considered further in this report.

13.7.3.3 Ecological receptors at risk of cumulative impact

Atlantic / western oak woodland

Potential cumulative impacts on Atlantic / western oak woodland may result from the requirement to fell trees and habitat fragmentation. The Pulpit Rock scheme will require the clearance of a small area of woodland and scattered trees, which includes seven mature oaks. In addition there will be scrub clearance, encroachment upon supporting habitats which form part of the habitat mosaic of the scheme area including semi improved habitats, and the removal of rock face, boulders and scree. This will result in very minor effect of habitat fragmentation and its wildlife corridor function. It may also have negative impacts on European Protected Species such as bats that may be using the woodland for foraging and potentially for roosting. There will be permanent loss of semi-natural broad-leaved woodland along the existing carriageway of the A82 due to the Transport Scotland schemes.

There is potential for cumulative impacts resulting from habitat loss and fragmentation from neighbouring developments such as SSE OHL. A tentative calculation has been made that approximately 1.5 ha of woodland will be required to be felled for the OHL and this is assessed as significant. The proposed OHL will run from Sloy Power Station beyond Loch Lomond to the north and will almost certainly require tree felling and tree pruning. This will result in a cumulative impact within the upper Loch Lomond area. There is also some woodland and tree clearance required for at least two of the Glen Falloch Hydro schemes but this affects native pine woodland as opposed to broad-leaved woodland in the Scheme.

The cumulative habitat loss and fragmentation of Atlantic / western oak woodland is considered to be significant but overall will affect a relatively small proportion of the woodland resource within the wider area. The loss of trees and woodland at Pulpit Rock is negligible compared to that expected for other projects, which form by far the greatest contribution (probably >90%) of this cumulative impact.

Loch Lomond

The cumulative impact of the scheme on Loch Lomond is assessed as not significant after mitigation. This assessment is based on the assumption that all other developments within the assessment area will undertake best practice methods in order to minimise potential water pollution.

Running Water

It is considered that after mitigation the potential effects of the scheme in isolation on water quality would be of low magnitude and not significant. As a habitat, running water includes all minor watercourses and rivers. A cumulative impact on minor watercourses could be expected but as the projects assessed here are widely separated geographically, such impacts would act on different watercourses thus the

magnitude of impact would be slight or negligible in each case. This assessment is based on the assumption that all other developments within the assessment area will undertake best practice methods in order to minimise potential water pollution.

The scheme potentially affects one minor watercourse and impact on this is expected to be negligible after mitigation. By the nature of the development, the Glen Falloch Hydro Schemes have much greater potential to have a significant effect on rivers.

Aquatic macrophytes

Littoral habitat loss and water pollution are the most likely impact on this group. The impact on aquatic macrophytes as a result of the scheme is considered negligible and not significant. The Sloy Power Station works may have an affect on adjacent littoral areas of Loch Lomond which could result in a cumulative impact but this is anticipated to be of slight to negligible magnitude and not significant.

Bryophyte and Epiphyte communities

The impact on bryophytes and epiphytes as a result of the scheme is considered low and not significant. However, a cumulative loss of mature trees and rock/scree in shaded damp areas will occur as a result of all the schemes assessed. Where information know about other schemes is available, e.g. the Glen Falloch Hydro schemes, it is known that there will be a cumulative impact of loss of mostly widespread and common species which are typical of the region. It is assumed that other schemes will also result in a cumulative impact on these groups. In terms of the extent of suitable supporting habitat lost, the scheme will have minimal contribution to cumulative impacts on these communities. It is likely that impacts will mainly act on common and widespread species and the proportion of good quality habitat/plants disturbed or lost will be very small and is unlikely to affect the favourable conservation status of any species.

Japanese knotweed

This is a widespread plant and there is potential for several developments to inadvertently cause a spread of this invasive species without adequate mitigation during construction.

Bats

No bat roosts have been recorded within the scheme footprint, however 13 trees with features that have potential to support roosting bats are present. Trees that may support bat roosts have also been identified at two of the Glen Falloch Hydro scheme sites and it is expected that due to the number of trees potentially affected by the OHL scheme, as well as Transport Scotland road improvement schemes, there is a high potential for cumulative impacts on bats.

Without mitigation the cumulative effects of loss of bat roost sites may potentially be significant if the other developments planned within the zone of influence directly impact roost sites. However, if appropriate mitigation measures are implemented for the additional schemes the cumulative impact will not be significant.

The A82 passes through mature woodland habitat, which is good quality foraging habitat for woodland specialists or edge-feeding bat species. Trees can provide roost sites and together with associated shrubbery attract a wide variety of insects which are prey for bats. Bats also utilise trees and hedgerows as navigational landmarks. The edges of woodland and hedgerows are linear features which create a corridor for bats to commute from roosts to foraging/mating sites (Bat Conservation Trust, 2010). Both the A82 and the Loch shore create a corridor for bats travelling between sites. The cumulative removal of woodland and trees due to other road improvements, overhead line and other developments will reduce overall habitat availability and increase habitat fragmentation (in the long-term where mature trees are felled). However, the projects are probably situated far enough apart and in a well-wooded area for this impact not to be significant.

Bats may be disturbed by noise, artificial lighting, vibration and presence of people and machinery during the construction phase,. It is likely that construction activities of the scheme and one or more of the developments within the assessment area will coincide temporally and in the broadest sense this could be termed a cumulative impact but the schemes are geographically well separated and are likely to be beyond the typical home range of individuals or populations of bats thus any impact would act on the meta-population making any impact difficult to quantify but unlikely to be significant.

Red Squirrel

The A82 passes through many areas of woodland, some of which may be occupied by red squirrel. The species was not resident at Pulpit Rock but can be expected to disperse through the woodland habitats on site. The most likely cumulative impact on red squirrel is increased habitat fragmentation affecting dispersal. The cumulative removal of woodland and trees due to other developments will reduce overall habitat availability and increase habitat fragmentation. However, the projects are probably situated far enough apart not to affect the same animals and some will not affect woodland. The Pulpit Rock Scheme will only affect a very small extent of peripheral woodland habitat in comparison to the more extensive potential impacts from the OHL or Sloy Power Station, thus although a cumulative impact on the squirrel's woodland habitat is likely, the scheme itself only contributes a negligible proportion of such an impact.

The scheme together with the Transport Scotland road schemes which include the Tarbet to Inverglus road widening and realignment/straightening and the South of Inverarnan road widening and realignment are likely to facilitate increased traffic speeds which may increase the risk of squirrel road fatalities but this impact would not be significant at the population level.

Pine Marten

Notwithstanding that pine marten will use a wider variety of habitats than red squirrel, similar comments apply to pine marten as for red squirrel (above) and any cumulative impacts are likely to act at a similar magnitude.

Otter

There are likely to be both direct and indirect cumulative impacts on otter as a result of the Scheme. There is potential for cumulative impacts on otter as a result of other developments affecting the Loch Lomond shoreline and watercourses in the upper Loch Lomond area including Glen Falloch. Cumulative impacts that may arise with other projects will be habitat loss including lay-up sites and holts, disturbance, localised water pollution and increased road mortality. The road mortality risk would result mainly during operation phases of road schemes where potentially inappropriate culvert designs over watercourses imposed barriers to dispersal and forced animals to cross over roads. The road improvement schemes on the A82 corridor are also likely to encourage locally faster traffic speeds.

The schemes assessed are separated geographically by up to 20km, which is within a territorial home range of many individual otters. Therefore it is theoretically possible that cumulative impacts from several schemes could affect the same animals. However, in practice this is probably unlikely to occur as most otters are likely to range over much shorter distances. Long, linear schemes, such as the OHL or Glen Falloch Hydro schemes, which either traverse watercourses or affect longer stretches of rivers would proportionally have a greater magnitude of impact on otter (wetland) habitats than the relatively smaller extent of loch shore habitat affected by the Scheme.

Breeding Birds

There is likely to be cumulative impacts on woodland and scrub breeding birds due to habitat loss and disturbance, which would be greatest if it occurred during the breeding season. Loss of mature trees and long-established woodland will result in a long-term impact for woodland species. Species which favour woodland edge habitat are likely to benefit from woodland clearance and fragmentation as a result of linear developments such as the OHL. In comparison to the magnitude of impact on woodland and trees likely from the large scale developments, such as the OHL, Sloy Power Station and some of the Glen Falloch hydro schemes, the scheme will contribute a very small proportion of the overall cumulative impacts on breeding bird communities.

Fish and fisheries

The fish of conservation concern in Loch Lomond that are powan, salmon and lamprey spp. Of these, the most likely to be affected by a cumulative impact is powan and lamprey due to potential impacts to fish themselves and spawning or nursery sites in the littoral habitats of the Loch. Degradation in water quality and loss and disturbance to littoral substrate in Loch Lomond will potentially impact on the spawning success. The impact of the scheme has been assessed as of slight magnitude and not significant as the littoral substrates within the scheme footprint are suboptimal spawning habitat for powan and nursery habitat for lamprey. The nearest good quality spawning site for powan is approximately 0.5km distant, which is too distant to be impacted by the Scheme.

Works that have the potential to impact on the water quality of the Loch will be subject to best practice pollution prevention mitigation measures which will minimise any potential negative impacts. Works at Sloy Power Station is expected to affect the Loch shore but it is unknown at present if the area is a potential powan spawning

site thus although a potential cumulative impact on powan in Loch Lomond is possible such an impact is likely to be of negligible magnitude. It has been recognised that a greater threat to powan populations in nearby lochs exists through entrainment of ruffe in pumped water resulting in its inadvertent introduction to good quality powan sites. Therefore this scheme will not contribute significantly to cumulative impacts on water quality or fish to the extent that some of the other developments may have.

The operational impacts of the scheme on the fish species of conservation concern have been determined to be not significant. Mitigation to prevent the deterioration of water quality has been proposed in the drainage design. Therefore the cumulative impact of this scheme is assessed as not significant on fish.

Summary of cumulative impact assessment

The scheme will contribute to a number of cumulative impacts on a number of ecological receptors but it is clear that the magnitude of most impacts from the scheme in relation to that from some of the other schemes within the assessment area is slight and of minor significance or not significant, see Table 13.10 below. In most cases the magnitude of impact of the scheme on habitats and species is slight or negligible (though moderate for otter). However many habitats and species (e.g. bats, pine marten, otter, red squirrel, bryophytes, oak woodland) recorded at Pulpit Rock and affected by the scheme and other developments in the region have healthy populations in the region and are therefore assessed as being of local or county value. Added to this the schemes considered here are separated by some distance thus effects at the population level are unlikely to be significant.

Table 13.10 Summary of ecological cumulative impacts

Ecological receptor ↓	Sloy Power Station	Glen Falloch Hydro Schemes	A82 Crianlarich Bypass	A82 Trunk Road South of Inverman – Carriageway widening and minor realignment	A82 Trunk Road Stuckendroin Bridge – Widening of the bridge structure.	A82 Trunk Road to Inveruglas – Carriageway realignment and upgrade	SSE Over Head Line
Statutory Sites							
Loch Lomond Woods SAC(*de facto* Pollochro Woods SSSI)	O	O	O	O	O	O	O
Habitats							
Ancient Woodland	O	O	O	O	O	O	O
Atlantic / western oak woodland	X – negative impacts from habitat loss, long-term for mature trees, causing habitat fragmentation	X – negative impacts from habitat loss, long-term for mature trees, causing habitat fragmentation	X – negative impacts from habitat loss, long-term for mature trees, causing habitat fragmentation	X – negative impacts from habitat loss, long-term for mature trees, causing habitat fragmentation	X – negative impacts from habitat loss, long-term for mature trees, causing habitat fragmentation	X – negative impacts from habitat loss, long-term for mature trees, causing habitat fragmentation	X – negative impacts from habitat loss, long-term for mature trees, causing habitat fragmentation
Running Water	X – water pollution	X – water pollution	X – water pollution	X – water pollution	X – water pollution	X – water pollution	X – water pollution

Ecological receptor ↓	Sloy Power Station	Glen Falloch Hydro Schemes	A82 Crianlarich Bypass	A82 Trunk Road South of Inverman – Carriageway widening and minor realignment	A82 Trunk Road Stuckendroin Bridge – Widening of the bridge structure.	A82 Trunk Road to Inveruglas – Carriageway realignment and upgrade	SSE Over Head Line
Loch Lomond	X – water pollution	X – water pollution	X – water pollution	X – water pollution	X – water pollution	X – water pollution	X – water pollution
Aquatic macrophyte community	X – habitat loss, water pollution	X – habitat loss, water pollution	X – habitat loss, water pollution	X – habitat loss, water pollution	X – habitat loss, water pollution	X – habitat loss, water pollution	X – habitat loss, water pollution
Bryophyte / epiphyte communities	X – habitat loss	X – habitat loss	X – habitat loss	X – habitat loss	X – habitat loss	X – habitat loss	X – habitat loss
Non native invasive plant species (Japanese knotweed)	X – risk of causing plant to spread	X – risk of causing plant to spread	X – risk of causing plant to spread	X – risk of causing plant to spread	X – risk of causing plant to spread	X – risk of causing plant to spread	X – risk of causing plant to spread
Bats	X –loss of roost and foraging habitat	X - loss of roost and foraging habitat	X - loss of roost and foraging habitat	X - loss of roost and foraging habitat	X - loss of roost and foraging habitat	X - loss of roost and foraging habitat	X - loss of roost and foraging habitat
Red Squirrel	X – loss of woodland and trees; habitat fragmentation	X – loss of woodland and trees; habitat fragmentation	X – loss of woodland and trees; habitat fragmentation	X – loss of woodland and trees; habitat fragmentation;	O	X – loss of woodland and trees; habitat fragmentation;	X – loss of woodland and trees; habitat fragmentation;

Ecological receptor ↓	Sloy Power Station	Glen Falloch Hydro Schemes	A82 Crianlarich Bypass	A82 Trunk Road South of Inverman – Carriageway widening and minor realignment	A82 Trunk Road Stuckendroin Bridge – Widening of the bridge structure.	A82 Trunk Road to Inveruglas – Carriageway realignment and upgrade	SSE Over Head Line
Pine Marten	X – loss of foraging habitat and den sites	X – loss of foraging habitat and den sites	X – loss of foraging habitat and den sites	X - loss of foraging habitat and lying up areas and increased risk of road mortality.	X - loss of foraging habitat and lying up areas.	X - loss of foraging habitat and lying up areas and increased risk of road mortality.	X – loss of foraging habitat and den sites; habitat fragmentation
Otter	O	X – loss of refuges, habitat, water pollution, obstruction to movement, road traffic mortality	X – loss of refuges, habitat, water pollution, obstruction to movement, road traffic mortality	X – loss of refuges, habitat, water pollution, obstruction to movement, road traffic mortality	X – loss of refuges, habitat, water pollution, obstruction to movement, road traffic mortality	X – loss of refuges, habitat, water pollution, obstruction to movement, road traffic mortality	X – loss of refuges, habitat, water pollution, obstruction to movement where route affects watercourses
Breeding Birds	X – disturbance to nests and habitat loss	X – disturbance to nests and habitat loss	X – disturbance to nests and habitat loss	X – disturbance to nests and habitat loss	X – disturbance to nests and habitat loss	X – disturbance to nests and habitat loss	X – disturbance to nests and habitat loss
Fish	X – habitat loss	X – habitat loss	X – habitat loss	X – habitat loss	X – habitat loss	X – habitat loss	X – habitat loss

O No significant cumulative effect likely
➳ Positive effect likely
X Negative cumulative effect possible

13.7.4 Pedestrians, Cyclists, Equestrians and Community Effects

13.7.4.1 Introduction

This section provides a desk-top assessment of the potential cumulative effects on pedestrians, cyclists, equestrians and communities as a consequence of the proposed development schemes listed in Table 13.3 (Land Development Schemes) and Table 13.4 (Transport Scotland Maintenance Schemes). However, it should be noted that the Rossdhu Golf Course and Cononish Mine included in Table 13.3 have not been assessed as the Loch Lomond & the Trossachs National Park Authority only wish these two developments to be considered from a landscape perspective.

In addition, it should be noted that where cumulative effects of factors such as Landscape and Visual impacts, Land-Use etc. may have a potential recreation, community and visitor effect relevance, the specific assessment of the potential cumulative effects of these is provided elsewhere in the Cumulative Impact chapter, and does not form part of this section.

13.7.4.2 Potential Effects of the Proposed Schemes

For ease of reference, the following sections contain a summary of each of the relevant schemes located between Tarbet and Crianlarich and their potential effect on pedestrian, cyclist, equestrian, and other recreational receptors where relevant (e.g. Loch Lomond boat users, Loch shore campers and picnickers), as well as the baseline community receptors - during both the scheme construction and operational stages.

A82 Pulpit Rock

The relevant assessment for both the scheme Construction and Operational stages is contained in Chapter 10 – Pedestrians, Cyclists, Equestrians and Community Effects of the A82 Pulpit Rock ES.

The Transport Scotland Maintenance Schemes

These schemes involve A82 road realignment/upgrade works between Tarbet and Inveruglas; carriageway widening and minor alignment south of Inverarnan; and bridge widening works at Stuckendroin. No ES documents are presently available for these three Transport Scotland maintenance schemes and the assessment has therefore been made on the basis of the draft design drawings which have been provided.

Construction Stage - These various road improvement schemes will require significant construction activities. Although the Stuckendroin Bridge works commenced in November 2009, the other two schemes are predicted to involve a degree of overlap in their construction timetables, and collectively, would extend over the period 2011 to 2014. It is therefore expected that there would be potential for disruption to the baseline conditions similar to those applicable to the A82 Pulpit Rock scheme e.g. cyclist and all vehicular movements along the A82 between Tarbet and Inverarnan (including informal road verge parking) with the use of temporary one-way traffic light controlled management systems etc. during the works. However it is not anticipated that the maintenance works would require temporary full closure

of the A82 or the need for temporary diversionary route measures. The use of advance information on the maintenance works e.g. on the A82 south of Tarbet and on the A82/A85 north of Crianlarich, together with regular radio station traffic bulletin updates and information displays on Traffic Scotland signs in the wider central Scotland road network would also be good route management.

Operation Stage – It is anticipated that all three schemes will improve the safety and quality of the route journey experience for all users along this section of the A82, although the potential for faster traffic speeds could accrue from the carriageway widening and re-alignment works. Furthermore it is assumed that all three of the Transport Scotland maintenance schemes will include cycle provision as promoted in accordance with the "Trunk Road Cycling Initiative" thereby contributing to enhancement of the baseline cycling conditions on the A82 between Tarbet and Inverarnan.

Sloy Power Station

SSE Generation Ltd is proposing to extend the existing Sloy hydro-electric power plant and convert it to a pumped storage scheme with the construction of a new underground pumping station located in the grounds of the existing Sloy power station. The planning application is currently pending but the ES prepared for the proposed project (by ASH design + assessment) indicates an anticipated construction programme of approximately 28 months, with work anticipated to commence *"no earlier than September 2010"*.

Construction Stage – During the construction phase it is estimated that between 75 to 100 people would be working on-site, with the majority travelling to/from the site on the A82 from the south. During the working day, these people moving around the Sloy power station site, would not require access to the A82. In addition, the construction period is anticipated to generate between 10 to 20 HGV deliveries to site per day with construction plant generally remaining on-site throughout the construction period. Any excavated material would remain on-site and would not require to be exported from Sloy via the A82. All construction vehicle movements to/from the A82 would be via the northern entrance to avoid any potential conflict with the existing southern access to the existing Sloy power station. Although the ES suggests that vehicle movements to/from the site during the construction phase can be managed via the application of best standard techniques, the movement of some of the HGV traffic (including the intended use of 40 foot articulated lorries) could result in some temporary disruption to vehicular and non-vehicular movements on the A82 e.g. temporary increase to local journey times. The ES deems these temporary impacts on road travellers as likely to be of a "Slight/Adverse" scale of significance.

The proposed scheme is located within the grounds of the existing Sloy power station and adjacent scrub woodland where there is currently no public access and therefore the ES concludes that there are unlikely to be any direct impacts on recreational activities. However the ES acknowledges the likely potential for indirect impacts e.g. walkers using the footpath adjacent to the A82, south from the Inveruglas visitor centre and proposes the use of information boards warning pedestrians of the scheme construction activities occurring within the Sloy power station site. In addition, there may also be a loss of amenity experienced by

recreational users in the area as a result of noise associated with the construction activity. The ES concludes that the impacts on recreation and access during the construction phase would be localised/short term and of a "Slight/Adverse" scale of significance.

Operation Stage – During the project operation stage, the pumping station would be largely unmanned and would typically result in an additional 10 vehicles per week accessing the site from the A82 via the existing southern entrance to Sloy power station. The Scheme ES reports no significant predicted impacts from this arrangement.

The operation of the proposed new pumping station would have no impact upon recreation and access and the ES states that following the scheme construction period all adverse impacts on recreation and access in the area would reduce to "Neutral" significance in the longer term (i.e. during the scheme operation).

Scottish & Southern Energy Overhead Power Line Scheme

An indicative route alignment for the proposed OHL scheme between Sloy power station and the Derrydarroch power station has been identified. Although no planning permission has yet been obtained, Scottish & Southern Energy has notionally scheduled construction to commence around March 2011 for between 20 to 25 weeks. Due to the current absence of an ES for the proposed scheme, the assessment has been made on the basis of the indicative plan information which has been made available.

Construction Stage – The scheme construction involves the erection of overhead lines, dismantling of existing OHL structures, the burial of cables and tree cutting. Although most of the works are located away from the A82, there are sections of work adjacent to the A82 carriageway e.g. at Pulpit Rock and north of Ardlui. The scheme works could create the potential for:-

- *Temporary severance of any baseline Rights of Way, any adopted Core Paths and other paths or land covered by Part 1 of the Land Reform (Scotland) Act 2003 where statutory access rights (exercised responsibly) for recreational purposes is applicable. Potentially this impact could be mitigated by the implementation of temporary (and signed) recreational diversionary route around the OHL construction locations to maintain public access for baseline activities *(*only applicable if severance of any existing RoW, any adopted core path sections or other path alignments is required on health & safety grounds – e.g. machinery operation, overhead working/operational activity, works storage compounds, construction vehicle access and turning etc)*;
- Temporary extended local journey times created by the OHL construction works traffic use of the A82 for plant, equipment, materials, machinery etc movements etc. This could result in some temporary disruption to vehicular and non-vehicular movements on the A82 e.g. temporary increase to local journey times, increased "shared use" of the A82 by HGV and cyclists etc. However this could be mitigated by planning construction traffic movement activity on the A82 to "off-peak" times during the week/year.

If the potential effects illustrated above are successfully managed through appropriate mitigation, it is anticipated that their temporary effects will not be significant.

Operation Stage – Once the OHL scheme is operational, the potential effects on any pedestrian, cyclist, equestrian and local traffic receptors would only be temporary and are unlikely to be significant. If any ongoing OHL operational (and emergency) maintenance activity necessitates *temporary severance of any baseline Rights of Way, any adopted core paths or other paths as well as land which is covered by Part 1 of the Land Reform (Scotland) Act 2003, potentially this short-term operational impact could be mitigated by the implementation of temporary (and signed) recreational diversionary route around the OHL construction locations to maintain public access for baseline activities *(*only applicable if severance of any existing RoW, any adopted core path sections or other path alignments is required on health & safety grounds –e.g. machinery operation, overhead working/operational activity, construction vehicle access and turning etc).*

Glen Falloch Hydroelectric Schemes

The Glen Falloch Hydroelectric scheme involves the construction and operation of four hydro schemes (Derrydarroch, Allt Fionn, Ben Glas, and Upper Falloch) on various tributaries of the River Falloch, with intake structures, access tracks, powerhouses, and pipelines to each development. The planning application (submitted by Hydroplan on behalf of Osspower) was approved by the Scottish Government on 20 April 2010 and the ES information prepared by Hydroplan indicates construction periods for delivery of each of the four schemes ranges from between approximately 12 and 18 months.

Construction Stage – During the construction period for all four development locations, total traffic flows on the A82 will increase as a result of additional traffic moving to/from each site. The ES states that these movements will be *"significantly less than the threshold as set out under industry standards"* whilst the delivery of large construction components e.g. pipes and generating machinery will be subject to mitigation measures *"to minimise delays on local roads".* From the information provided it would appear that the movement of larger plant, supplies and machinery to/from each development site will result in some impacts on vehicular and non-vehicular traffic movements along the A82 between Tarbet and Crianlarich e.g. temporary increase to local journey times but that these impacts on the baseline conditions may not be adversely significant.

In addition, the construction phase for all four development locations will require the temporary, short-term, diversion of walkers away from the construction area on health and safety grounds e.g. deep excavation works and in the particular cases of Derrydarroch and Ben Glas where the pipelines cross the West Highland Way and around the powerhouse). These temporary diversions would therefore maintain access and avoid severance of walking routes. The ES proposes the implementation of good management measures including the provision of signs warning walkers of the construction traffic and giving details of the temporary route diversions at the start and middle sections of each affected track/path whilst appropriate passing places would be created at tight bends or pinch-points along the routes. From the information provided it appears that the proposed mitigation will result in there being

no significant adverse impact on public recreational access during the construction period.

Operation Stage – The operation of all four schemes will place neither restrictions on users of the A82 (either vehicular travellers, or non-vehicular receptors e.g. cyclists) nor recreational access for the public and therefore no significant effects would arise for these receptors.

Crianlarich Bypass

Transport Scotland is proposing to bypass Crianlarich with a western bypass leaving the A82 south of the village and rejoining the A82 west of the village. The new bypass carriageway would be connected to the existing A82 by two roundabouts (west and south of the village). It is anticipated that the scheme would require a 12 month construction period with a targeted completion between the financial years of 2011 and 2012. An ES for the proposed bypass scheme has been prepared by Natural Capital Ltd .

Construction Stage – During the bypass construction stage it is estimated that an average of 60 HGV movements per day would occur which would have potential to cause disruption to vehicle travellers on the A82, A85 and local Crianlarich village traffic. The ES assumes that additional car journeys generated by the bypass construction workers would not be significant in terms of disruption. It is suggested that management of the temporary construction disruption on the A82 (and A85) vehicle travellers as well as the Crianlarich local community would involve a variety of good practice measures including planning construction vehicle movements taking account of any other ongoing construction activities in the area, providing advance warning to drivers and the local community of construction activities and anticipated delays, briefing HGV drivers on the importance of allowing traffic to pass safely and avoid obstructions to other road users, maintaining access to all properties during the construction period etc. However the ES acknowledges that there would still be residual disruption as a result of the scheme construction e.g. the use of temporary traffic signals facilitating one-way traffic flows and that although the temporary construction disruption could be significant over short periods during the c.12 month construction programme, the effects could be reduced through good planning and effective mitigation.

The construction of the bypass would result in temporary changes in journey length or ease of making journeys for pedestrians, cyclists and equestrians through the construction activities. The ES states that *"the contractor would be encouraged to keep all community disruption to the minimum necessary for safe construction of the works"*. This would involve the signing of any access routes temporarily affected during construction. Access to the West Highland Way long distance walking route would be maintained and appropriately signed throughout the construction period – including during the period when the long distance path re-alignment and a pedestrian underpass below the new bypass to accommodate the West Highland Way spur was being built. Given that the mitigation measures proposed in the ES are successfully implemented, no significant adverse impacts are predicted.

Operation Stage – The operation of the Crianlarich bypass would have no significant impact on West Highland Way walkers route access whilst the reduction in traffic

passing through the village would provide a quieter and less congested environment for both pedestrians and cyclists as well as vehicle travellers making local journey trips. The ES for the scheme states that pedestrians and cyclists entering Crianlarich from the south and west would benefit from the design provision included for them in both new roundabouts whilst it is predicted that cyclists would not face any change in route length as they would be likely to continue to travel through Crianlarich – as opposed to using the bypass section. However, whilst this prediction is more likely to occur for leisure/holidaying cyclists, it is possibly less applicable to long distance/serious road cyclists who are more likely to be on a pre-determined route with less inclination to make a detour from their planned journey into Crianlarich – particularly as the shortened journey time for these long distance/serious cyclists using the by-pass section would be a potential beneficial to them. *(Note:- the consultation response to Scott Wilson from the Loch Lomond & the Trossachs National Park Authority Access Officer dated 14 April 2010 references a telephone discussion between the NPA and Transport Scotland's Cycling Officer which indicates that the Crianlarich scheme will include a section of shared path within the verge of the scheme and that the scheme will be "future proofed with the aspirational strategic link [Tarbet to Crianlarich] in mind").*

13.7.4.3 Assessment of Potential Cumulative Impacts

The assessment of the potential cumulative impacts of the above development projects can only be a high-level review due to the varying extent of information which is currently available for each of the projects. In addition, the cumulative assessment is based on the following assumptions:-

- All of the scheme proposals will receive the necessary planning approvals;
- There will be a significant degree of "over-lap" in the schemes construction programmes;
- Pulpit Rock, the Crianlarich bypass and the 3 x Transport Scotland maintenance schemes are the only proposals which have a direct, physical, construction impact on the A82 alignment between Tarbet and Crianlarich.

13.7.4.4 Construction Stage Cumulative Impacts

The potential cumulative impacts during the schemes construction stage include:-

- Temporary disruption to vehicular and non-vehicular traffic on the A82 between Tarbet and Crianlarich through the movements to/from the development locations of construction plant, machinery, equipment and materials. This creates the potential for extended local journey times and an increased "inter-face" between construction traffic and recreational users of the A82 e.g. leisure cyclists, vehicular traffic containing walkers, day trippers, loch shore picnickers, campers and boat users accessing Loch Lomond boat launching locations such as Ardlui. It is anticipated that the significance of these impacts can be mitigated by the implementation of measures such as advance warning signage, radio station traffic bulletins and information displays on Traffic Scotland signs, although some residual effects should still be anticipated;

- Only the Pulpit Rock scheme would appear to create temporary severance of "through access" along the A82 between Tarbet and Crianlarich. The complete road closure at Pulpit Rock would last for a number of weeks during the construction period requiring a temporary diversionary route (A82/A819/A85 – and vice-versa) to be taken. A strategic level appraisal of the residual effect on the baseline community etc receptors along this proposed diversionary route is provided in the Appendix 5 – A82 Full Closure _ Assessment Report
- Temporary disturbance for recreational users e.g. such as those illustrated in the first bullet point above. Although there would be a requirement for temporary (and signed) diversion route sections for walkers around construction locations (principally on health & safety grounds); none of the development schemes identify any temporary severance of public access to participate in recreational activities. Any such diversionary impacts would be localised/short-term and are unlikely to be significant.

13.7.4.5 Operation Stage Cumulative Impacts

The potential cumulative impacts during the operation of the development schemes includes:-

- Improvements in the safety and quality of the route journey experience (for vehicle and non-vehicle borne receptors) along the A82 between Tarbet and Crianlarich (and within the village);
- The enhancement of infrastructure provision for walkers and cyclists e.g. the new West Highland Way spur, the improved cycle provision on the A82 as promoted in accordance with the "Trunk Road Cycling Initiative" for the Transport Scotland maintenance schemes, the Pulpit Rock Scheme and the Crianlarich bypass roundabouts. The implementation of shared use path sections proposed for inclusion in these schemes will have positive effects in contributing to the achievement of the Tarbet to Crianlarich "Potential Strategic Link" identified in the Loch Lomond & the Trossachs National Park Plan (2007-2012) *(and which is supported by both the NPA and Sustrans in their Pulpit Rock consultation responses to Scott Wilson);*
- Generally no significant adverse effects on baseline recreational activities and access – although the Transport Scotland maintenance schemes (e.g. carriageway widening and re-alignments) could result in faster traffic speeds over these sections which could impact on cyclists e.g. in terms of safety issues concerning the inter-relationship between cyclist and vehicular traffic movements;
- Ongoing routine (and emergency) repairs and maintenance implications for all the development schemes but any effects on the pedestrian, cyclist, equestrian and community receptors between Tarbet and Crianlarich would be temporary and are unlikely to be significant.

13.7.4.6 Conclusion

The potential effects from the aforementioned development schemes would be unlikely to result in any potentially significant cumulative effects on pedestrian, cyclist, equestrian and community receptors provided effective and well planned

mitigation measures are implemented and communicated. However, the introduction of 'future proofed' sections of the A82 for non-motorised users will provide a beneficial impact in the long-term should the aspiration for a 'strategic link' along west Loch Lomond be achieved.

13.7.5 Road Drainage and the Water Environment

13.7.5.1 Purpose & Scope of the Assessment

This section assesses the potential cumulative effects on the water environment as a result of the schemes listed in Tables 13.3 & 13.4. The water environment includes surface waters (e.g. rivers, burns, static water bodies, tidal waters, etc.) and groundwater (e.g. shallow and deep aquifers). The assessment process used the characterisation of the existing water environment from the ES, identification and prediction of potential cumulative effects at a high level, and recommendations for any secondary mitigation measures (i.e. those not already included in the scheme outline design or thought of as standard practice) required to offset any significant residual cumulative effects. As the other schemes being assessed are remote from the small watercourses and drainage paths at Pulpit Rock, it is considered that it is only necessary to consider the cumulative effects on Loch Lomond and the wider groundwater body in this assessment.

13.7.5.2 Water Environment Related Elements & Potential Effects of the Proposed Schemes

A82 Pulpit Rock

Refer to Chapter 11 – Road Drainage and the Water Environment for full details of water environment related elements

Sloy Power Station

Construction Stage – the creation of an underground pumping station will involve the potential for construction related water pollution, but it is expected that this can be managed using standard best practice techniques. The Sloy Power Station ES reports no significant predicted impacts from this source.

Operation Stage – the project will transfer water from Loch Lomond to Loch Sloy and then back to Loch Lomond over short cycles (typically 24hrs) therefore causing a short term loss of water from Loch Lomond and potential mixing of the waters of these two water bodies. It is noted that as water is already transferred from Loch Sloy to Loch Lomond via the hydro plant this is not a change from the existing situation for Loch Lomond. The ES reports no significant effects from the mixing of the water from the two lochs, but did not specifically cover the water quality of Loch Lomond or the hydrology of Loch Lomond.

Glen Falloch Hydro Schemes

A number of small hydro schemes located on various tributaries of the River Falloch with intake structures, access tracks, powerhouses, and pipelines to each.

Construction Stage – these various small hydro schemes will require significant construction activities, giving rise to the potential for construction related water pollution. However, it is expected that this element can be managed via the application of standard best practice techniques, which should be able to ensure no significant effects on surrounding surface or groundwater water quality. From the plans provided it appears as though no construction works are required in or around Loch Lomond, and therefore there is not anticipated to be any significant effects on the geomorphology or hydrology of this feature.

Operation Stage – the project will slightly alter the flow regime in the River Falloch based on the location of intakes and outfalls, however the ES is not predicting any changes to the hydrology of the River Falloch immediately downstream of last outfall. Therefore there are not expected to be any significant effects on the hydrology of Loch Lomond. Once in operation the small hydro schemes are not anticipated to have any significant effects on the quality of the water reaching Loch Lomond via the River Falloch. Given that the proposals are to abstract and return water from surface water features there are not anticipated to be any significant effects on groundwater.

Crianlarich Bypass

It is noted that these proposals are not within the same watershed as Loch Lomond, as all surface water run off will pass to the River Fillan and east towards Loch Tay. Therefore, in terms of the water environment this scheme is not considered within the cumulative assessment. It is however noted that the proposals include a range of SUDS measures to treat road run off and the Scheme ES reports no significant adverse effects on the watercourses or groundwater in the area

Transport Scotland Maintenance Schemes

There are no ES documents for these schemes at present, and the assessment was made on the basis of basic plans of the schemes only.

Construction Stage – these various road improvement schemes will require significant construction activities, giving rise to the potential for construction related water pollution. However, it is expected that this element can be managed via the application of standard best practice techniques, which should be able to ensure no significant effects on surrounding surface or groundwater water quality. From the plans provided it appears as though no works are required in Loch Lomond, and therefore there is not anticipated to be any significant effects on the geomorphology or hydrology of this feature.

Operation Stage – the main potential impact in operation will be the surface water run off from the roads and into surrounding watercourses or the Loch. It is anticipated that all schemes would implement SUDS measures to some extent and therefore, given that the current drainage arrangements on the A82 are generally informal over the edge or ditch arrangements, it is expected that the implementation of more formal road drainage may improve the quality of road run off reaching the water environment. None of the schemes appear to have a significant impingement on the shores of the Loch so the long term geomorphology of this feature is not expected to be significantly affected. It is anticipated that each of the schemes would re-provide or extend existing culverts for small watercourses passing under the A82, and therefore the works should be able to be completed without significant

effects on natural drainage patterns and hence the hydrology of the Loch. Form the plans it appears as though the schemes do involve a significant amount of rock cut to create the additional carriageway width on the west side of the A82, but based on the assessment of potential groundwater effects at Pulpit Rock it is not anticipated that such works would significantly effect the long term movement or quality of the groundwater as long as adequate mitigation is included.

Overhead Line Schemes

There are no ES documents for these schemes at present, and the assessment was made on the basis of basic plans of the schemes only.

Construction Stage – the construction of overhead lines and burial of cables will involve the potential for construction related water pollution from the use of construction equipment and the creation of pole bases near water environment features. However, it is expected that these potential effects can be managed using standard best practice techniques.

Operation Stage – once constructed the presence and maintenance of overhead lines and cables is not anticipated to have any significant effects on water environment features.

13.7.5.3 Assessment of Potential Cumulative Impacts

Water Quality of Loch Lomond

Assuming all schemes apply best practice measures during the construction stages it is anticipated that all schemes should be able to be completed without a significant cumulative effect on the water quality of Loch Lomond. Assuming that all schemes apply SUDS measures to some degree where appropriate it is it is anticipated that all schemes should be able to be operated without a significant cumulative effect on the water quality of Loch Lomond. In fact the ongoing formalisation of road drainage arrangements along the A82 may give rise to a slight improvement of the road run off water quality reaching the Loch.

Geomorphology & Hydrology of Loch Lomond

Based on the information available it appears as though none of the proposals, with the exception of Pulpit Rock, contain any requirement to work within the Loch and therefore it is anticipated that the construction works should be able to be completed without a significant cumulative effect on the geomorphology or hydrology of the Loch. Once all the schemes are in operation it is not anticipated that there will be potential for significant cumulative effects on the geomorphology and hydrology of Loch Lomond.

Groundwater Quality and Movement in Wider Groundwater Body

Assuming all schemes apply best practice measures during the construction stages it is anticipated that all schemes should be able to be completed without a significant cumulative effect on the movement or quality of groundwater. Once in operation it is anticipated that the various schemes will be able to be operated without the potential for significant cumulative effect on the movement or quality of groundwater.

13.7.5.4 Conclusion

The potential effects from the various schemes considered should not give rise to any potential significant cumulative effects on the water environment features considered in this assessment. It is however, noted that this can only be taken as a high level assessment given that relatively little information is available in regard to a number of the proposed schemes.

13.7.6 Disruption during Construction

For the purposes of this assessment, the main cumulative impact associated with the construction of the potential schemes is the impact on users of the A82. There will be localised impacts associated with each of the potential schemes for example, related to noise and air quality impacts from construction activities. The localised impacts are beyond the scope of this cumulative assessment which will concentrate on the expected construction programmes for each of the potential schemes and the likely impacts on users of the A82 Trunk Road. This is particularly important as the construction works at Pulpit Rock will involve road closures to enable the viaduct structure to be tied into the existing road.

Table 13.3 indicates the expected construction programmes for each of the potential schemes and these have been extrapolated into a timeline to show where construction periods coincide, shown in Table 13.11 - Indicative Construction timetables for all potential developments.

Scottish and Southern Energy Overhead Line

It is difficult to know the extent of disruption to the A82 from the Scottish and Southern OHL works as the proposals are indicative at the present. However, it is not expected that construction will involve any lengthy disruption to the A82, although undergrounding of cable sections may cause localised disruption.

Crianlarich Bypass

The construction works for the Crianlarich Bypass will be significant but the majority of construction of the new road section would be off-line which would reduce the potential for disturbance on the A82. Traffic management measures would be put in place during certain construction phases of the roundabout tie-ins to the existing A82 which are assumed to require single lane working and traffic signal control.

Sloy Power Station

The power station currently utilises two accesses of the A82 with the northern junction acting as a secondary access. It is proposed that the northern access be used for construction purposes but to enable this vegetation will need to be cut back as a mitigation measure to improve visibility at the junction. Road signage would also be erected during the construction phase to warn other road users of the site access as well as informing deliveries etc. of the site whereabouts. It is therefore not expected that the works will involve any restriction of traffic flows on the A82 or any road closures. However, it is expected that traffic flows on the A82 will increase as a result of additional traffic moving to/from the site.

Glen Falloch Hydro Schemes

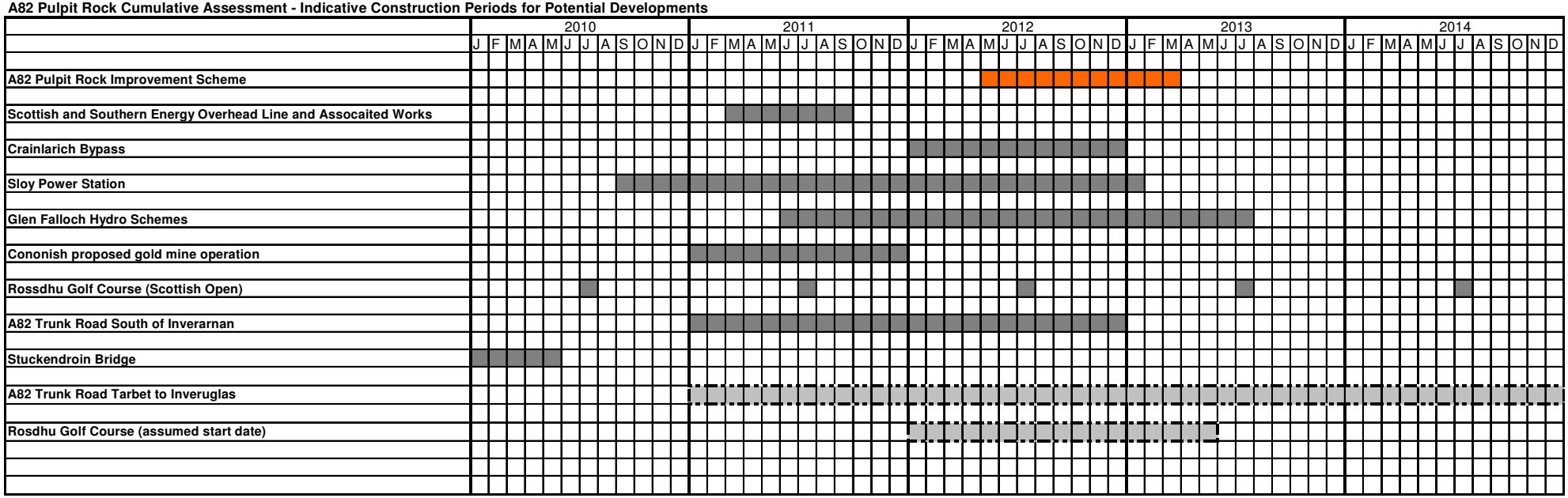
The Hydro Schemes will not involve any traffic management measures or road closures on the A82. However, it is expected that traffic flows on the A82 will increase as a result of additional traffic moving to/from each site.

Transport Scotland maintenance schemes

The maintenance schemes for the A82 will involve disruption to traffic. It is not expected that the schemes will involve any full closures however and traffic management measures will be implemented to ensure one-way traffic flow is maintained. It should be noted that the Tarbet to Inveruglas construction works are indicated as between 2011 – 2014, this is due to no firm construction dates being available, however it has been determined that the works are likely to be carried out in phases, so impacts will not be along the full length over the given time period.

Table 13. 11 – Indicative Construction timetables for all potential developments

A82 Pulpit Rock Cumulative Assessment - Indicative Construction Periods for Potential Developments



Note: A82 Trunk Road Tarbet to Inveruglas will be undertaken as phased works.

13.7.6.1 Potential Cumulative Impacts

It is clear from Table 13.11 that the construction period of a number of the potential developments will overlap, however, only the works at Pulpit Rock will invovle full closures. Most will nonetheless involve works to the A82 that will result in traffic being limited to one-way flows through controlled signals.

Further coordination is required between all of the potential developments to determine the impacts on users of the A82. The Pulpit Rock Scheme and also the Transport Scotland maintenance schemes have the potential to have the most significant impacts upon users of the A82. Transport Scotland will ensure that all of these schemes will be coordinated to minimise the impact on users and, where appropriate, any specific programming constraints will be stipulated in the construction contract as Employer's Requirements.

13.8 Conclusions

13.8.1 Construction impacts

The likely significant impacts concluded from the Scheme Only assessment show that the main impacts during construction are noise and air impacts upon a number of receptors. There is also likely to be negative impacts on a number of community receptors including users of the A82 and local residents during the construction phase. In addition the landscape impacts during both construction and operation of the A82 Pulpit Rock Scheme are predicted to be significant.

The impacts related to disruption due to construction in relation to other potential developments and overlaps in construction programmes can be mitigated through programming procedures stipulated in construction contracts.

13.8.2 Operation impacts

With regards to the wider cumulative assessment which included other potential developments within the study area of Tarbet to Crianlarich it is concluded that the most significant impact will be on the landscape. Although the potential landscape and visual impacts will be reduced over time as mitigation planting and weathering softens its appearance in the landscape, the scope for mitigation is limited and significant residual effects will occur. However the landscape and visual effects as a result of the Pulpit Rock scheme represent an acceptable level of change subject to careful mitigation.

For ecology and nature conservation it is concluded that the scheme will contribute to a number of cumulative impacts on a number of ecological receptors. However, in most cases the magnitude of impact of the scheme is slight or negligible and therefore not significant and does not contribute to a significant cumulative effect on the ecological integrity of habitats or populations of species occurring in the area.

The combination of all the potential developments is not considered significant for land use, archaeology and cultural heritage or on the water environment. The impacts on pedestrians, cyclists, equestrians and community is considered significant only during the construction phase.

13.9 References

- Crainlarich Bypass Environmental Statement - http://www.transportscotland.gov.uk/reports/road/j11156b-00.htm
- Sloy Pumping Station Environmental Statement http://eplanning.lochlomond-trossachs.org/OnlinePlanning/caseFile.do?category=application&caseNo=2009/0239/ECN
- Glen Falloch hydro schemes Environmental Statement - http://eplanning.lochlomond-trossachs.org/OnlinePlanning/caseFile.do?category=application&caseNo=2009/0249/ECN
- Cononish proposed gold mine operation Environmental Statement - http://eplanning.lochlomond-trossachs.org/OnlinePlanning/:
- Rossdhu Golf Course (near Balloch) Environmental Statement - http://eplanning.lochlomond-trossachs.org/OnlinePlanning/:
- Loch Lomond and Trossachs National Park E-Planning http://eplanning.lochlomond-trossachs.org/OnlinePlanning/:
- SNH Guidance - Cumulative Effect of Windfarms Version 2 revised 13.04.05 - http://www.snh.gov.uk/docs/A305440.pdf (including Appendix 2 - David Tyldesley's definition of cumulative landscape and visual impact presented to the An Suidhe PLI (November 2002))
- The Loch Lomond & the Trossachs National Park Authority - Core Paths Plan Consultation Draft (May 2008) and Approved Core Paths Plan Maps (June 2010).
- Scottish Executive (2000). Habitats and Birds Directives: June 2000 Guidance Notes. http://www.scotland.gov.uk/library3/nature/habd-01.asp