

## **53 Summary of Key Scheme Impacts**

### **53.1 Introduction**

20.1.1 Table 53.1 below contains a summary of the main environmental impacts for all three sections of the proposed scheme. For the purposes of assessing cumulative impacts, these were defined as any residual impact of Moderate significance or above, for the following environmental parameters:

- Land Use;
- Geology, Contaminated Land and Groundwater;
- Water Environment;
- Ecology and Nature Conservation;
- Landscape;
- Visual;
- Cultural Heritage;
- Air Quality;
- Traffic Noise and Vibration;
- Pedestrians, Cyclists, Equestrians and Community Effects;
- Vehicle Travellers;
- Disruption Due to Construction; and
- Policies and Plans.

20.1.2 The residual impact (i.e. following implementation of mitigation) is provided in terms of significance and is considered an adverse impact unless otherwise stated. Those impacts assessed as of Negligible residual significance are not included.

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**Table 53.1 - Summary of Key Impacts**

Environmental Parameter	Description of Impact	Significance of Residual Impact (i.e. with mitigation)	Comment
<b>Land Use</b>	<b>Agricultural Land</b>		
	Net loss of approximately 490ha agricultural land (49ha prime quality).	Moderate	
	65 land interests experiencing residual impacts of Moderate significance or above (4 with viability affected).	Moderate	
	<b>Demolition of Property</b>		
	Demolition of 16 residential properties (13 Southern Leg, 3 Northern Leg).	Substantial	
	Demolition of International School.	Adverse	
	<b>Commercial Impacts</b>		
	Loss of commercial land (9 locations).	Adverse	
	Improved access to north and south for 11 businesses.	Beneficial	
	Change (diversions/modifications) to businesses access (9 businesses affected).	Adverse	
	<b>Development Land</b>		
	Amenity/ land take affecting planning applications and development land.	Mostly adverse	
	Improved access arrangements and transport links at 5 locations.	Beneficial	
	<b>Community Land</b>		
	Small losses of woodland at 24 locations.	Negligible to Moderate	Woodland planting at some locations. Overall planting proposed exceeds woodland lost in Northern Leg, Southern Leg and Fastlink.
<b>Geology, Contaminated Land &amp; Groundwater</b>	Excavations will reach the solid geology in places Minor occurrences of contaminated land identified Risk of flow or contamination impacts on numerous private wells	No significant adverse impacts	Further investigation is required to fully understand impacts on Hare Moss
<b>Water Environment</b>	Northern Leg: 23 culverts, 5 bridges, 13 realignments, 11 outfalls Southern Leg: 13 culverts, 2 bridges, 10 realignments, 5 outfalls Fastlink: 9 culverts, 2 bridges, 11 realignments, 4 outfalls  <u>Operation</u> : Possible change to discharge regime, siltation, pollution, risk of accidental spillage, decreased geomorphological diversity and sinuosity.  <u>Construction</u> : Major earthworks, possible sediment release and loss of	<u>Operation</u> Northern Leg: Substantial Southern Leg: Moderate to Moderate/ Substantial Fastlink: Moderate to Moderate/ Substantial  <u>Construction</u> Northern Leg: Moderate to Moderate/ Substantial Southern Leg: Slight/ Negligible/ Unknown to	Mitigation includes: Appropriate drainage design Appropriate culvert and realignment design Best practice during construction to minimise sediment and pollution  Further investigation is required to determine the site specific impacts of the proposed scheme on Hare Moss and the Moss of

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	morphological diversity.	Moderate/ Substantial Fastlink: Moderate	Auchlea and to input to detailed design.
Ecology and Nature Conservation	Direct Mortality		
	Increased risk of RTAs owing to increase in the number and speed of vehicles throughout entire study corridor.	Significant adverse effects possible on red squirrel, birds and bats.	Badger and otter fencing will prevent direct mortality. Sympathetic landscape planting and planted overbridges will minimise RTAs for birds and bats.
	Habitat Loss		
	Loss and fragmentation of habitat would result from the proposed scheme.	Significant adverse effects on a range of species and supporting habitat.	Provision of replacement habitat to offset loss, and installation of culverts, overbridges and underpasses to reduce fragmentation. Mitigation for Southern Leg and Fastlink to be developed.
	Loss and fragmentation of woodland areas will result in impacts on red squirrels.	Significant adverse effects on red squirrel.	Habitat creation and offset mitigation to be agreed with SNH.
	Loss and severance of habitat has the potential to affect bat foraging and roosting.	Significant adverse effects possible on bats.	
	Fragmentation		
	A total of 45 culverts (with otter ledges).	Potential for adverse impacts on otter through fragmentation of territories due to length of culverts and possible disinclination for otter usage.	
	Fragmentation of a large number of commuting routes for bird and bats is likely to occur as a result of the Southern Leg and Fastlink sections.	Significant adverse impacts on bird and bat populations possible for Southern Leg and Fastlink.	Provision of a green bridge around Kirkhill Forest and one wildlife overbridge at Bogenjoss Burn will reduce impacts. The inclusion of ecological planting on pedestrian overbridges will assist in encouraging their use by wildlife.
	Fragmentation of woodland at Craibstone and Kirkhill Forest and surrounds. Fragmentation and severance would occur in the currently contiguous habitats of Cleanhill Wood, Kingcausie and Durris Forest, as well as Silverburn Wood and Gairnhill Wood.	Adverse impacts possible for red squirrels and badgers. Significant adverse impact through increased interspecific competition which may lead to reduced viability of red squirrel populations.	The development of specific mitigation strategies are required to address impacts on red squirrels.
	Fragmentation of Fishermyre wetland and associated area.	Significant adverse impact upon the vole population possible. May threaten viability	Mitigation measures and habitat creation to be agreed with SNH.
Potential for hydrological disruption and loss of connectivity at Moss of Auchlea and Hare Moss. The complex mosaic of wetland habitats surrounding Fishermyre would be severed.	Likely to reduce habitat quality with impacts on a regional scale possible.	Specific drainage solutions for each site and habitat creation to be agreed with SNH.	
The introduction of road runoff to watercourses, culverting and realignments may lead to deterioration of freshwater aquatic and riparian habitat.	Potential decrease of habitat quality for fish and benthic macrofauna.	The application of best practice during construction and appropriate operational treatment of road runoff will reduce impacts.	

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<b>Ecology and Nature Conservation</b> [continued]	<b>Disturbance</b>		
	Construction disturbance over consecutive winters throughout the proposed scheme, but especially at the wetland mosaic of Red Moss, Lily and Corby Lochs in the Northern Leg.	Significant adverse effect due to possible abandoning of territories and/ or stress related effects on birth rates for wintering birds.	Best practice during construction and sympathetic landscape and ecological planting to reduce disturbance.
	Construction and operation of the proposed scheme could result in direct and indirect disturbance of protected species.	Significant adverse impacts in the form of disturbance on badger, breeding birds, otter and red squirrel are possible..	Best practice during construction, and planting, habitat creation and effective wildlife crossing mitigation will reduce disturbance effects.
<b>Landscape</b>	<b>Hill Type</b>		
	Stranog LLCA: Introduction of cuttings through the visually prominent landforms at Cookney, Rothnick and Stranog Hill. Adverse impacts on the setting of the prominent landmark at Cookney Church.	Substantial	Mitigation will include planting, screening, habitat provision, false cuttings, the easing of slopes and the use of drystone walls.
	Craigingles LLCA: Introduction of a large rock cutting across the hillside and loss of mature woodlands.	Substantial	
	Beanshill and Fifeshill LLCA: Introduction of cuttings, embankments, realigned side roads, overbridges, ponds and junctions.	Substantial	
	Tyrebagger Hill LLCA: Introduction of traffic movement, cuttings embankment, realigned side roads, overbridges and junctions which will be lit.	Moderate	
	<b>Open Farmland Type</b>		
	Blaikiewell LLCA: Introduction of a junction linking the Fastlink and Southern Leg, lighting, ponds, major earthworks and realignment of local roads in agricultural basin with extensive visibility.	Moderate to Substantial	Mitigation will include planting, screening, habitat provision, false cuttings, the easing of slopes and the use of drystone walls.
	Muchalls LLCA: Introduction of the Fastlink in a naturally exposed area enveloping the Burn of Muchalls. Severance of fields and the introduction of cuttings and embankments.	Substantial	
	Megray LLCA: Junction from the A90, diversion of Megray Burn and the introduction of a deep cutting, ponds and slip roads. Introduction of the cutting into views from Stonehaven.	Moderate	Mitigation will include planting, screening, habitat provision, false cuttings, the easing of slopes and the use of drystone walls.
	Haremoss and Clinnerty / West Brimmond LLCA: Introduction of cuttings, embankments, realigned side roads, overbridges, ponds and junctions.	Moderate to Substantial	

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Landscape [continued]	Auchlea and Merchants Croft LLCA: Introduction of cuttings, embankments, realigned side roads, overbridges, ponds and junctions with associated lighting.	Moderate		
	Goval LLCA - Area of Landscape Significance: Introduction of the AWPR, Goval junction, ponds and realignment of the A947.	Substantial		
	Newton (south), Potterton and Perwinnes LLCA: The introduction of traffic movement, cuttings embankment, realigned side roads, overbridges and junctions which will be lit.	Moderate		
	Wooded Farmland Type			
	Kempstone LLCA: Introduction of an embankment and underbridge for Limpet Burn, embankments and realignment of local access roads.	Moderate	Mitigation will include planting, screening, habitat provision, false cuttings, the easing of slopes and the use of drystone walls.	
	Netherly / Alries LLCA - Area of Landscape Significance: Introduction of an embankment on the approach to the River Dee crossing and the loss of mature woodland. Adverse impacts on the setting of Kingcausie House.	Moderate to Substantial		
	Craigton, Broomfold and Kingswells LLCA: Introduction of cuttings, embankments, realigned side roads, overbridges, ponds and junctions with associated lighting.	Moderate		
	Craibstone LLCA: Introduction of the AWPR, A96 underbridge, A96 link road, A96 junction, A96 roundabout and ponds will sever the landform with the loss of significant areas of woodlands.	Substantial		
	Red Moss LLCA: The introduction of traffic movement, cuttings embankment, realigned side roads, overbridges and junctions which will be lit.	Moderate		
	Valley Type			
	Dee Valley LLCA - Area of Landscape Significance: Introduction of a new bowstring arch bridge spanning the river and ponds within a relatively tranquil area despite busy roads to the north and south and the existing bridge. Permanent adverse impact on the scenic quality of the area and on views into and along the valley.	Substantial to Severe	Mitigation will include easing of gradients, planting, false cuttings and sensitive pond design.	
	Lower Goval LLCA - Partly within Area of Landscape Significance: Introduction of a new bridge spanning the river and ponds and realignment of the B977. Bridge links the industrial areas at Dyce with the farmlands to the north side of the river.	Moderate to Substantial		

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<b>Landscape</b> [continued]	<b>Urban Type</b>		
	Milltimber LLCA: Introduction of a large cutting through the south facing slope north of the River Dee with the loss of dwellings and a school. Impact on the landscape setting of the area due to views of road cuttings.	Substantial to Severe	Mitigation will include planting.
<b>Visual</b>	<b>Built Receptors</b>		
	The introduction of the road, associated earthworks, structures, fast moving traffic and lighting into views from properties and settlements.	Significant impacts for 368 built receptors in Northern Leg, 448 in Southern Leg and 69 in Fastlink Combined total of 885 (14.9%) built receptors.	Mitigation includes drystone walls, grading out of embankment and cutting slopes and planting.
	<b>Outdoor Receptors</b>		
	The introduction of the road, associated earthworks, structures, fast moving traffic and lighting into views from outdoor spaces.	Significant for 45 outdoor receptors in Northern Leg, 116 in Southern Leg and 79 in Fastlink. Combined total of 240 (71.0%) outdoor receptors).	Mitigation includes drystone walls, grading out of embankment and cutting slopes and planting.
<b>Cultural Heritage</b>	<b>Direct Impacts</b>		
	Direct impacts on sites of cultural heritage importance.	Northern Leg – Moderate direct impacts on 3 sites and direct impacts on 8 sites of unknown importance. Southern Leg – direct impacts on 5 sites of unknown importance. Fastlink – direct impacts on 3 sites of unknown importance.	As a form of mitigation, targeted appropriate evaluation including geophysical surveys and trial trenching will be implemented prior to works commencing. There is the potential for the discovery of unknown cultural heritage features.
	<b>Indirect Impacts</b>		
	Indirect impacts on the settings of sites of cultural heritage importance.	Northern Leg – Substantial indirect impacts on 3 sites and a Moderate indirect impact on 1 site. Southern Leg and Fastlink – not assessed as specific mitigation has not been designed as part of this assessment.	Northern Leg – Landscape planting and earthwork creation. Southern Leg and Fastlink - Specific mitigation measures have yet to be designed for indirect impacts.
<b>Air Quality</b>	<b>Impacts on Health</b>		
	Changes in concentrations of key traffic-related air pollutants at locations where members of the public will be exposed, taking account of the scheme itself and all major roads within 10km of the scheme.	Northern Leg - Moderate adverse to Moderate beneficial. Southern Leg - Moderate adverse to Slight beneficial. Fastlink - Moderate adverse to Moderate beneficial.  More adverse than beneficial impacts.	Over the entire study area, 25,000 properties would experience a deterioration in air quality. 70,000 properties would experience improved air quality. Some exceedences of air quality objectives and European Union limit values would be prevented and none would be caused.

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<b>Air Quality</b> [continued]	<b>Impacts on Sensitive Ecosystems</b>		
	Changes in concentrations and deposition rates of key traffic-related air pollutants over designated ecological sites near to any major road within 10km of the scheme. Air pollution concentrations over organic farmland near to the proposed scheme itself are also assessed.	No significant effects to designated ecological sites. Pollution levels over organic farmland to remain exceptionally low.	
	<b>Wider Scale Impacts</b>		
	Changes in pollutant emissions from all vehicles using major roads within 10km of the scheme.	Entire study area - Medium increase in emissions; Negligible significance in context.	
	<b>Greenhouse Gases</b>		
	Changes in carbon dioxide emissions from all vehicles using major roads within 10km of the scheme.	Entire study area - Small increase in emissions.	
<b>Traffic Noise and Vibration</b>	<b>Changes in the level of traffic noise</b>		
	Changes in the level of traffic noise for properties within 500m of the proposed scheme.	Northern Leg – Substantial beneficial to Substantial adverse. Southern Leg – Moderate / Substantial adverse to Substantial adverse. Fastlink – Moderate / Substantial beneficial to Substantial adverse.  More adverse than beneficial impacts.	Northern Leg – Mitigation includes lower noise surfacing throughout the scheme and false cuttings at specified locations.  3 properties in Northern Leg, 5 in Southern Leg and 1 in Fastlink may qualify for noise insulation as per Noise Insulation (Scotland) Regulations 1975.  Detailed mitigation for the Southern Leg and Fastlink is to be developed.
	<b>Wider Scale Impacts</b>		
	Indirect changes to noise levels as a consequence of changes to traffic flows and speeds on the existing road network.	750 fewer people out of a total of 33,219 people (2.25%) would be annoyed by noise with the proposed scheme in place than would be without the scheme.	No mitigation proposed.
<b>Pedestrians and Others</b>	<b>Increase in Journey Length</b>		
	Increase in journey length along some paths and minor roads as a result of diversions.	Northern Leg – Severe to Moderate Southern Leg – Major to Moderate Fastlink – Moderate	Closures avoided through provision of diversions, overbridges and alternative routes.
	<b>Amenity Value</b>		
	Reduction in amenity value of journeys made by pedestrians and others as a result of visual, noise, air and traffic impacts.	Moderate	Assessment of severance impact based on change in journey length, traffic and need to use an overbridge/ underpass.

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<b>Pedestrians and Others</b> [continued]	<b>Severance from Community Facilities</b>		
	Increases in traffic, journey length and character may create severance from community facilities, such as shops, schools and recreational areas.	Northern Leg – Moderate around Craibstone Southern Leg – Severe at Milltimber & Peterculter Fastlink – Moderate at Cookney	Reduced traffic on local roads can improve access to community facilities
<b>View From the Road</b>	<b>Northern and Southern Legs</b>		
	Winter year of opening and summer 15 years after opening: change to the views currently experienced by travellers on the A90.	Significant beneficial	Views will generally be more rural in character and will provide attractive views across the rolling countryside around Aberdeen. A more pleasant journey than the enclosed urban journey that is currently experienced by travellers through Aberdeen City.
	<b>Fastlink</b>		
	Winter year of opening and summer 15 years after opening: change to the views currently experienced by travellers on the A90.	Not significant	Views from the Fastlink will be significantly different to those from the A90. Views will be more open with clearer views across rolling farmland and wooded hillsides. Views will be very similar to those from the B979.
<b>Driver Stress</b>	<b>Predicted Increases</b>		
	A96 Blackburn to Craibstone eastbound. A944 Aberdeen to Westhill eastbound (west of Kingsford Industrial Estate). A944 Aberdeen to Westhill westbound (west of Kingsford Industrial Estate). A947 Aberdeen to Oldmeldrum to Turriff southbound. B977 Echt to Balmedie north east of Goval junction northbound.	Driver stress levels are expected to be High along the Northern Leg. Increases in driver stress on local road network range from Moderate to High.	The proposed scheme has been designed to the Scottish Executive's current design standards and appropriate mitigation has already been incorporated into the preliminary design.
	<b>Predicted Decreases</b>		
	B9077 South Deeside Road (east of B979) eastbound. B979 between A944 and A96 southbound. C89C east of North Kingswells Roundabout. C89C south-west of Kingswells Roundabout. B977 south-east of Goval junction Roundabout northbound. B999 Aberdeen Tarves Road southbound. A90(T) Newtonhill to Portlethen. B979 Netherley Road southbound.	Driver stress levels are expected to be Low along the Southern Leg and Fastlink. Decreases in driver stress on local road network will be from High to Moderate.	The proposed scheme has been designed to the Scottish Executive's current design standards and appropriate mitigation measures have already been incorporated into the preliminary design.



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<b>Disruption Due to Construction</b>	<b>Noise, Dust, Loss of Amenity</b>		
	Noise nuisance likely at properties close to the scheme A risk of soiling 2265 properties within 500m of the proposed length of the scheme. A risk of enhanced PM <sub>10</sub> concentrations for 713 properties within 100m of the proposed length of the scheme. Disturbance to wildlife and loss of amenity for local residents, pedestrians etc is likely	Significant adverse overall	Control measures for noise and dust will be implemented. Contractor must comply with approved Environmental Management Plan.
<b>Policies and Plans</b>	<b>Ecology and Nature Conservation</b>		
	Habitat loss and fragmentation likely	Conflict with ecological and nature conservation policies is envisaged.	Ecology mitigation will be implemented.
	<b>Public Access</b>		
	Diversions and loss of amenity likely for some pedestrian, cyclist and equestrian access routes.	Conflict with planning policies which seek to protect and enhance public access.	Crossing points and diversions provided where appropriate
	<b>Landscape and Visual</b>		
	Substantial impacts on the landscape and visual character of the area, as a result of the Northern and Southern Legs sections of the proposed scheme in particular, have been identified.	Planning policies require the protection and enhancement of areas of landscape character and value such as the Dee Valley. A conflict with planning policy has therefore been identified.	While these impacts cannot be wholly avoided, the provision of mitigation measures such as landscape planting will reduce impacts.
	<b>Water Environment</b>		
	Numerous watercourses will be culverted and/ or realigned.	Planning policies require the minimisation of pollution and protection of the quality of the watercourses. A conflict with planning policy is considered possible.	Implementation of best practice and SUDS.