



A96 Dualling Hardmuir to Fochabers

Detailed Options Assessment Pairwise Round 2 Workshop Report

A96PHF-MMS-GEN-00000-RP-PM-00006

**Mott MacDonald
Sweco**

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Revision Record

Ver No	Date	Originator	Checker	Approver	Status	Suitability
C01	31/05/18	Various	JMH	ICS	A1	Approved as Stage Complete

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1. Introduction

Pairwise Round 2 Workshop for the A96 Dualling Hardmuir to Fochabers scheme was held on 27 April 2018 at Transport Scotland, Glasgow with representatives from Transport Scotland (TS) and their scheme consultants Mott MacDonald Sweco (MMS).

The objective of the workshop was to present a series of paired elements in five specific areas and ratify which elements to take forward in the preferred option selection process.

This is the report from the workshop comprising background information about the scheme, the assessment process, agenda, workshop issues, attendees, presentation material and assessment outputs.

2. Workshop Information

The following sections provide background details about the A96 Dualling Hardmuir to Fochabers scheme and information required for the workshop session.

2.1 Background

Transport Scotland is progressing a programme to upgrade the A96 between Inverness and Aberdeen to dual carriageway standard by 2030. The route is approximately 160km (99 miles) long, of which 138km (86 miles) is currently single carriageway.

Following the Strategic Assessment (Design Manual for Roads and Bridges (DMRB) Stage 1), the A96 Dualling Programme has been divided into sections (i.e. individual schemes within the overall dualling programme) for further assessment at DMRB Stages 2 and 3 (route options assessment and preliminary design).

The Hardmuir to Fochabers Scheme (Western Section) will provide a new A96 dual carriageway between the tie-in of the Inverness to Nairn (including Nairn Bypass) Scheme at Hardmuir (east of Auldearn) to the east of Fochabers - approximately 46km (28 miles). MMS were appointed in June 2016 to take forward the design and assessment of this section.

A Stage 1 Handover workshop was held on 19 July 2016 and an Inception workshop was held on 30 September 2016. Scheme objectives were agreed at the Inception workshop. Since appointment and following these workshops MMS has commenced the identification of possible options and assessment of same as part of their DMRB Stage 2 tasks as indicated in Figure 2.1 below.



Figure 2.1 DMRB Stage 2 Process for A96 Dualling Hardmuir to Fochabers

An Options Sifting Workshop was held on 19 April 2017 to conclude the initial options assessment task. The workshop resulted in the de-selection of several poorer performing options prior to presentation of route options at public exhibitions between 19 and 22 June 2017 to gain vital feedback from the public. Detailed Options Assessment commenced following the consultation and this resulted in the Pairwise Round 1 Workshop held on 12 January 2018 and subsequently this Pairwise Round 2 comparison.

2.2 Scheme Objectives

The scheme objectives, which were agreed at the inception stage, are as follows:

1. To improve the operation of the A96 and inter-urban connectivity through:
 - 1.1. Reduced journey times;
 - 1.2. Improved journey time reliability;
 - 1.3. Increased overtaking opportunities;
 - 1.4. Improved efficiency of freight movements along the transport corridor; and
 - 1.5. Reduced conflicts between local traffic and other traffic in urban areas and strategic journeys.
2. To improve safety for motorised and non-motorised users through:
 - 2.1. Reduced accident rates and severity;
 - 2.2. Reduced driver stress; and
 - 2.3. Reduced non-motorised user conflicts with strategic traffic in urban areas.
3. To provide opportunities to grow the regional economies on the corridor through:
 - 3.1. Improved access to the wider strategic transport network; and
 - 3.2. Enhanced access to jobs and services.
4. To facilitate active travel in the corridor;
5. To facilitate integration with Public Transport Facilities; and
6. To avoid significant environmental impacts and, where this is not possible, minimise the environmental effects on:
 - 6.1. Communities and people in the corridor; and
 - 6.2. Natural and cultural heritage assets.

The scheme objectives have been numbered for ease of reference at the Pairwise Workshop.

2.3 Assessment Process

Introduction

This workshop report provides details of the various assessments undertaken in five specific areas of the A96 Dualling Hardmuir to Fochabers scheme. Selecting a preferred element within each of these areas will allow the options work to progress to further assessments and ultimately the preferred option decision for the scheme. The locations of these areas are shown in Figure 2.2 below and are:

- Pairwise D involving Purple element P1 being compared with Orange elements O1-O3-O4;

- Pairwise E involving Red / Purple elements R5, P2 being compared with the Blue element B1;
- Pairwise F involving Orange element O5 being compared with Green element G1;
- Pairwise G involving Orange element O7 being compared with Green element G2, P5; and
- Pairwise H involving Purple elements P4, P5 being compared with Red elements R6, R7.

Options Design Development

All of the options displayed at public exhibitions in June 2017 have been developed taking into account:

- feedback from consultations (public, statutory bodies, landowners, etc);
- three-dimensional geometric design of mainline, junctions and side roads;
- consideration of Non-Motorised Users (NMUs);
- preliminary drainage design;
- outputs from flood models to identify suitable structural forms for major river crossings;
- optimisation of junction locations using the A96 CRAM traffic model; and
- interaction with environmental / landscape specialists in optimising alignments and junction layouts.

Engineering Assessment

All designs are in accordance with DMRB guidance and no departures from standard are required for any of the options under consideration at this stage. The cost estimates prepared for each element provide the main differentiating factor between elements in engineering terms. It is considered that all elements can be developed using value engineering to reduce the costs and this will be carried out on the preferred option at DMRB Stage 3.

Traffic / Economic Assessment

Forecast traffic flows for each pairwise section have been produced to inform noise and air quality assessments. Traffic model outputs for the do-minimum (no scheme) and do-something (with scheme) scenarios have been used to calculate benefits of journey time savings (using TUBA) and accidents savings (using COBALT). The element with the best value for money has been identified by comparing the additional benefits and additional costs between each pair being assessed.

Environmental Assessment

The approach to environmental assessment has been adapted from Environmental Impact Assessment (EIA) methodology, drawing on relevant guidance from DMRB Volume 11 and other good practice guidance including Interim Advice Notes. The principles of the EIA assessment provide a robust basis for examination of the pairwise elements and their comparative performance. The assessment has been structured according to the 12 key environment topics drawn from DMRB which are reported in two groupings shown in the following table.

Topic	Group
Air Quality	Communities and People
Noise and Vibration	
People and Communities	
Agriculture, Forestry and Sporting	
Policies and Plans	
Materials	
Visual Effects	
Cultural Heritage	Natural and Cultural Heritage
Landscape	
Nature Conservation	
Geology, Soils, Contaminated Land and Groundwater	
Road Drainage and the Water Environment	

Environment Topics and Groups for Detailed Options Assessment

The significance of an environmental effect results from the interaction between its magnitude (which is related to the extent of the physical change, its spatial extent, duration and frequency) and the value of the resource or the number and sensitivity of those people who might be affected. Effects have been categorised into:

- none or negligible: no detectable change to the environment;
- minor: a detectable but non-material change to the environment;
- moderate: a material and important but non-fundamental change to the environment;
- major: a fundamental change to the environment and a principal consideration.

Effects categorised as being moderate or major (adverse or beneficial) are considered to be significant.

Assessment Framework

The engineering, environmental and traffic/economic findings and key differences have been drawn together into a multi-disciplinary framework for determining the element to be taken forward for each pairwise comparison. The following colour coding has been used to indicate preferences for each paired element:

	Clear preference
	Slight preference
	No preference

Tables 2.3 to 2.7 show the comparison frameworks and are included in Appendix A.

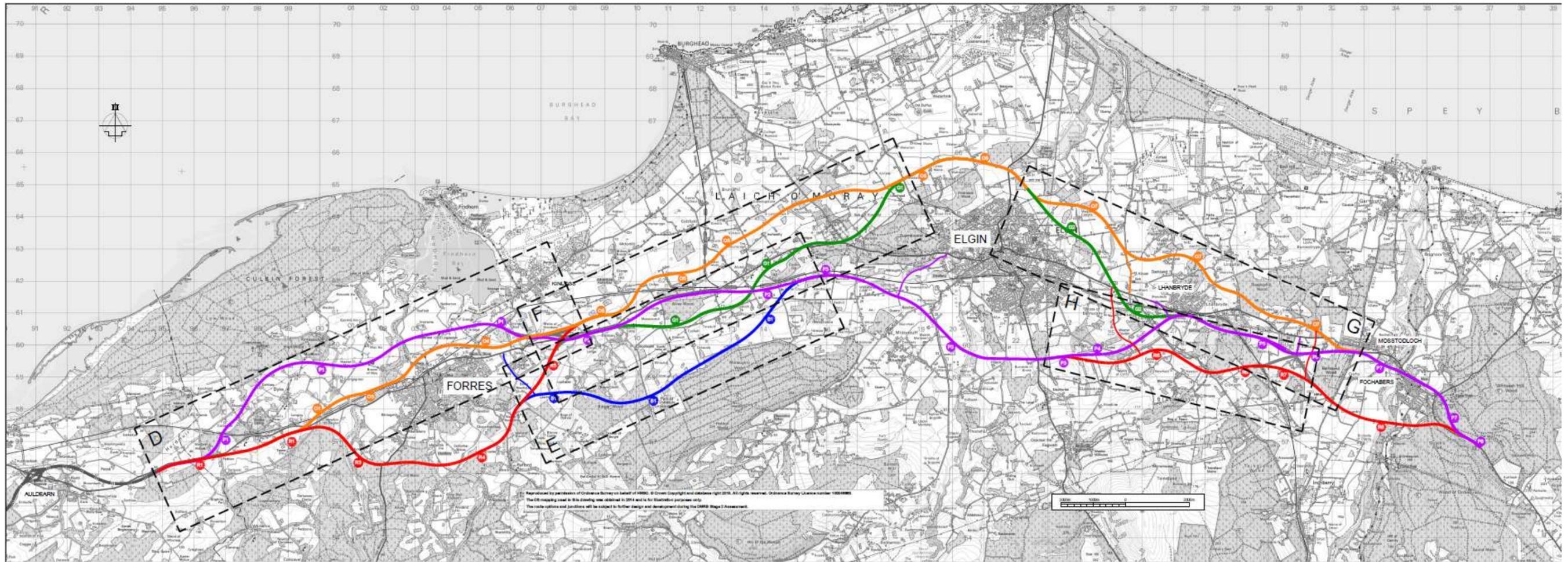


Figure 2.2 Pairwise Round 2 Locations

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3. Workshop Participants, Agenda and Outputs

3.1 Workshop Participants

Alasdair Graham	TS – A96 Dualling Programme Sponsor
John Macintyre	TS – A96 Dualling Hardmuir to Fochabers Project Manager
Adam Gould	TS – A96 Dualling Hardmuir to Fochabers Assistant Project Manager
Angus Corby	TS – Landscape Adviser
Yvette Sheppard	TS – Environmental Adviser
Jim Brown	TS – Bridges
Paul Junik	TS – Technical Analysis Branch
John McDonald	TS – Development Management
John Flynn	TS – Standards Branch
Graeme Paget	TS – Trunk Road and Bus Operations
Dominic Murphy	TS – Construction Branch
Paul Mellon	TS – Geotechnical Adviser
Stephen Orr	TS - Design and Planning Branch, Strategic Communications
Mike Hodgson	MMS - Contract Manager
Steve Wallace	MMS – Roads and Infrastructure Manager
Tara O’Leary	MMS – Deputy Traffic and Economics Manager
Annie Say	MMS – Environment and Landscaping Manager
Henry Collin	MMS – Deputy Environment and Landscaping Manager
Ronan Lyng	MMS – Senior Roads Engineer
Gordon Gray	MMS – Senior Roads Engineer

3.2 Workshop Agenda

Timings of the day were flexible but all items of the agenda were completed.

Time	Item
09:30	Introductions and Background
09:50	Workshop Process and Assessment Methods
10:00	Pairwise D (Purple vs Orange)
10:45	Coffee
10:55	Pairwise E (Red/Purple vs Blue)
11:40	Pairwise F (Orange vs Green)
12:30	Lunch
13:00	Pairwise G (Orange vs Green/Purple)
13:45	Coffee
13:55	Pairwise H (Purple vs Red)
14:40	Workshop Summary and Findings
15:00	Close

Appendix B contains the Workshop Presentation

3.3 Workshop Outputs

Each pairwise assessment was discussed at the workshop and Tables 3.1 to 3.5 summarise the findings for each pairwise assessment.

Table 3.1 Pairwise D Assessment – Summary

Topic		Preference		Comments
		North	South	
Environment	Communities & People		D (S)	Clear Preference for D South due to fewer effects on NMUs, community severance, visual amenity, agriculture and less materials requirement
	Natural & Cultural Heritage		D (S)	Clear Preference for D South which has less landscape, ecological and cultural heritage effects and lower risk of effects on the water environment
Engineering (cost)			D (S)	Clear Preference for D South due to cost differential (£42M). D South provides River Findhorn crossing location that has least effect on flood plain.
Traffic / Economic (NPV)			D (S)	Clear Preference for D South as it provides best value with effective transfer of traffic from existing network and significantly higher relief to existing A96 at Brodie.
Overall Preference			D (S)	D South is Clear Preference

Table 3.2 Pairwise E Assessment - Summary

Topic		Preference		Comments
		North	South	
Environment	Communities & People	E (N)		Clear Preference for E North which has lower effects on NMUs, community land, policy, materials and visual amenity
	Natural & Cultural Heritage	E (N)		Clear Preference for E North which has lower ecological and landscape effects
Engineering (cost)		E (N)		Slight Preference for E North due to cost differential (£17M) driven by significantly less earthworks.
Traffic / Economic (NPV)		E (N)		Clear Preference for E North as it provides best value and results in higher transfer of traffic from local road network
Overall Preference		E (N)		E North is Clear Preference

Table 3.3 Pairwise F Assessment – Summary

Topic		Preference		Comments
		North	South	
Environment	Communities & People			No preference. F North has greater noise, materials & visual effects. F South has more effect on agriculture and planning
	Natural & Cultural Heritage			No preference. F South has less effect on cultural heritage and habitat loss, F North less landscape effect
Engineering (cost)			F (S)	Clear Preference for F South due to cost differential (£56M) driven by significantly less earthworks.
Traffic / Economic (NPV)			F (S)	Clear Preference for F South as it provides best value and results in a larger transfer of traffic from the existing road network.
Overall Preference			F (S)	F South is Clear Preference

Table 3.4 Pairwise G Assessment - Summary

		Preference		Comments
		North	South	
Environment	Communities & People		G (S)	Clear Preference for G South which has less adverse noise effect and less effect on planning policy, land used by the community & materials
	Natural & Cultural Heritage	G (N)		Clear Preference for G North which has less effect on cultural heritage, ecology, landscape and soils
Engineering (cost)			G (S)	Slight Preference for G South which is £11M less expensive. G South has least intrusion on flood plain and has greater opportunity for design development and mitigation
Traffic / Economic (NPV)			G (S)	Slight Preference for G South as it provides best value with higher traffic flows and a more efficient Elgin East junction location
Overall Preference			G (S)	G South is Clear Preference

Table 3.5 Pairwise H Assessment - Summary

Topic		Preference		Comments
		North	South	
Environment	Communities & People	H (N)		Clear Preference for H North which has greater effects on noise & development land but less effect on land used by the community, agriculture, materials & visual amenity
	Natural & Cultural Heritage		H (S)	Clear Preference for H South which has lower cultural heritage effects and avoids key woodlands with importance for nature conservation
Engineering (cost)		H (N)		Clear Preference for H North as cost is £16M less. H North lies close to existing transport corridor and has greater opportunity for design development and mitigation
Traffic / Economic (NPV)		H (N)		Clear Preference for H North as it provides best value with higher traffic flows and has Elgin East Junction located close to the existing A96.
Overall Preference		H (N)		H North is Clear Preference

The output from the workshop was that the following route elements were to be taken forward to the next stage of assessment to identify the preferred option for the A96 Dualling Hardmuir to Fochabers scheme:

- Pairwise D - Orange elements O1-O3-O4;
- Pairwise E - Red / Purple elements R5, P2;
- Pairwise F - Green element G1;
- Pairwise G - Green / Purple elements G2, P5; and
- Pairwise H - Purple elements P4, P5

The following route elements were removed from further consideration:

- Purple element P1;
- Blue element B1;
- Orange element O5;
- Orange element O7; and
- Red elements R6, R7

A number of general comments were raised during the workshop following which responses were drafted and captured as recorded below.

General Comments Raised

1. Would maintenance costs be taken into account in the route selection process?

Response: In this pairwise round 2 (and in pairwise round 1) the cost estimates used are sufficient to identify any differential that would also reflect differing maintenance burdens. TS confirmed that in the determination of the preferred option there would be specific consideration of other attributes such as deliverability, constructability and operations / maintenance.

Pairwise D - No Comments Raised

Pairwise E Comments Raised

2. Was an alternative junction location considered on the Red/Blue route at the intersection with the B9010 St. Leonards Road?

Response: A junction location was not considered at the intersection with the B9010 St. Leonards Road, as this would result in significant increases in traffic levels that would not be acceptable to Moray Council, in particular at the one-way system towards the centre of Forres.

Pairwise F Comments Raised

3. Earthwork materials acceptability – Is the assessment sensitive to 60/40 acceptability assumption?

Response: All cost estimates to date have been based on the 60/40 acceptability assumption for the purposes of direct comparison. The cost estimates were also examined to establish their sensitivity to changes in acceptability and earthworks slope assumptions. The resulting changes to costs had no material impact on the cost comparisons. For the preferred option assessment a Quantified Risk Assessment for

each shortlisted options will allow for variability in acceptability in relation to each route element.

4. Landscape Mitigation – It was noted there may be more opportunities to mitigate element F South than F North.

Response: MMS agreed this was likely and supported the overall recommendation that F South should be taken forward.

Pairwise G Comments Raised

5. Cultural Heritage – Can the setting impacts at Coxtan Tower be mitigated at DMRB Stage 3?

Response: MMS noted that the team was aware of the need to reduce setting effects as far as possible through design development which would be reviewed at Stage 2 and further mitigation, if required at Stage 3.

6. Calcots Road – Due to the increased traffic flow has potential upgrading costs been included and/or has the option to stop up Calcots Road been considered to mitigate the local impacts?

Response: If G (north) was taken forward to become the preferred option then Moray Council may well seek widening of the road to make it a standard two-lane layout and remove the need for passing places. A further traffic test has shown that Calcots Road traffic flows would further increase in this scenario. The economic comparison between G North and G South for this scenario (with the upgrade costs included) are:

- *Additional PVC £9M (north)*
- *Additional PVB £8M (south)*
- *Best Value is G (south) being £17M*

This reinforces the clear preference for G (south).

An additional assessment was also undertaken with the closure of Calcots Road at the B9103. The economic comparison between G North and G South for this scenario are:

- *Additional PVC £5M (north)*
- *Additional PVB £25M (south)*
- *Best Value is G (south) being £30M*

This also reinforces the clear preference for G (south).

7. Landscape Mitigation – Similar to value engineering, the potential to mitigate should be reviewed through the design and assessment process to ensure findings of options assessment remain robust?

Response: MMS agreed and noted that design optimisation would include building in mitigation through the process and back checking developing findings (for all remaining shortlisted route options).

Pairwise H – No Comments Raised



Appendix A

Comparison Frameworks



Table 2.3 Pairwise D Assessment – Comparison Framework

	Pairwise D North (Purple)	Pairwise D South (Orange)	Preference	Comment / Summary of Key Differences
Engineering Assessment				
- Cost Estimate Difference (2014 prices)	<ul style="list-style-type: none"> £42M more than D South with more extensive structures required to cross the River Findhorn flood plain and more significant utility diversions. 	<ul style="list-style-type: none"> £42M less than D North and has River Findhorn crossing location that has least effect on flood plain. 	D(S)	Clear Preference for D South, includes a River Findhorn crossing location that has least effect on flood plain.
Environmental Assessment – Communities and People				
- Air Quality	<ul style="list-style-type: none"> Approx. 970 receptors predicted to experience minor (non-significant) beneficial effects on local air quality (reduced NO₂ and PM₁₀ concs.) Approx. 70 receptors predicted to experience minor (non-significant) adverse effects on local air quality (increased NO₂ and PM₁₀ concentrations) 	<ul style="list-style-type: none"> Approx. 960 receptors predicted to experience minor (non-significant) beneficial effects on local air quality (reduced NO₂ and PM₁₀ concs.) Approx. 40 receptors predicted to experience minor (non-significant) adverse effects on local air quality (increased NO₂ and PM₁₀ concentrations) 		No preference since differences between effects are negligible in terms of numbers of receptors and all predicted effects are non-significant
- Noise & Vibration	<ul style="list-style-type: none"> Approx. 190 dwellings with significant adverse traffic noise impacts (approx. 170 major), approx. 300 dwellings with significant beneficial traffic noise impacts (approx. 70 major) 	<ul style="list-style-type: none"> Approx. 480 dwellings with significant adverse traffic noise impacts (approx. 120 major), approx. 180 dwellings with significant beneficial traffic noise impacts (approx. 80 major) 	D(N)	Slight Preference for D North due to fewer overall adverse traffic noise impacts although D South has fewer major adverse changes
- People & Communities	<ul style="list-style-type: none"> Potential to affect amenity on 11 NMU routes, of which three would have increased journey length. Improved amenity on two NMU routes Alteration to access for one property at Hardmuir A loss of approx. 2ha woodland used by the community and impacts on NMU access to woodland areas at the edge of Culbin Forest 	<ul style="list-style-type: none"> Potential to affect amenity on nine NMU routes, of which eight would also have increased journey length. Improved amenity on three NMU routes Alteration to access for one property at Hardmuir and at Greshop House Increased journey length and loss of amenity for NMUs making community journeys between Broom of Moy and Forres 	D(S)	Slight Preference for D South which avoids most effects on NMU routes accessing woodland areas to the north of communities in the area, avoids loss of woodland used by the community and which has greater relief of existing community severance
- Agriculture, Forestry and Sporting	<ul style="list-style-type: none"> Land take from 16 farm / forestry units with a loss of approx. 146ha of agricultural land, approx. 80ha of which is prime land. Major adverse effects at two agricultural holdings and two equestrian holdings 	<ul style="list-style-type: none"> Land take from 15 farm / forestry units with a loss of approx. 117ha of agricultural land, approx. 82ha of which is prime land. Major adverse effects at four agricultural land holdings 	D(S)	Slight Preference for D South which adversely affects fewer farm units and requires a smaller permanent land take of agricultural and commercial forest land
- Policies & Plans	<ul style="list-style-type: none"> Potential for conflict with 23 LDP policies No material effects on LDP designated sites or planning applications 	<ul style="list-style-type: none"> Potential for conflict with 23 LDP policies Moderate land take from Springfield East employment site in Forres 	D(N)	Slight Preference for D North as it avoids designated site and encroaching into a settlement boundary
- Materials	<ul style="list-style-type: none"> Materials required for road pavement (13.5km mainline & 8.7km side roads) and structures (deck area approx. 30,000m²) Bulk earthworks approx. 3.3Mm³, of which net import of approx. 1.6Mm³ Woodland clearance of approx. 31ha 	<ul style="list-style-type: none"> Materials required for road pavement (12.8km mainline & 7.1km side roads) and structures (deck area approx. 21,100m²) Bulk earthworks approx. 2.3Mm³, of which net import of approx. 2.0Mm³ Woodland clearance of approx. 6ha 	D(S)	Slight Preference for D South due to shorter road length, smaller deck areas for structures and less woodland clearance. Higher import required but lower overall bulk earthworks
- Visual Effects	<ul style="list-style-type: none"> Benefits partially from the screening effect for woodland to the north (Culbin Forest), however overall route is in an exposed landscape which gives rise to significant adverse visual effects on isolated residential receptors and some recreational routes 	<ul style="list-style-type: none"> Located on embankment and would give rise to significant adverse visual effects on isolated properties and some recreational routes. However, D South is located in a more visually contained position closer to built structures and the existing A96 than D North 	D(S)	Clear Preference for D South as it would have fewer significant effects on visual receptors than D North due to its more visually contained position closer to built structures and the existing A96
Overall – Impacts on Communities and People	<i>D South closer to urban edge of Forres than D North and follows route of existing transport corridor for much of its length. D South has a greater effect on development land and more receptors are affected by noise (although fewer with major effects) but D North has greater effects on visual receptors, NMUs, recreational routes, and community severance. D North also has greater effects on agriculture and materials requirement</i>		D(S)	<i>Clear Preference for D South due to fewer effects on NMUs, community severance, visual amenity, agriculture and less materials requirement</i>
Environmental Assessment – Natural and Cultural Heritage				
- Cultural Heritage	<ul style="list-style-type: none"> Predicted significant effects on the setting of Brodie Castle GDL, on the Category A Listed Buildings at Inverene and Grange Hall and on four other B Listed Buildings 	<ul style="list-style-type: none"> Predicted significant effects on setting of Grange Hall Category A Listed Building and on five other B Listed Buildings. Significant direct effect on regionally significant archaeological site at Waterford Road 	D(S)	Clear Preference for D South which avoids effects on Brodie Castle GDL and A Listed building at Inverene
- Landscape	<ul style="list-style-type: none"> Significant adverse residual landscape effects predicted from the contrast to rural characteristics and enclosed spaces in the west and contrast to the wide, open, simple landscape near Findhorn Bay 	<ul style="list-style-type: none"> Significant adverse residual landscape effects predicted from removal of historic tree features at Darnaway and Grange Hall and imposition on some settlement clusters (eg Greshop, Cassieford, Banarach) 	D(S)	Clear Preference for D South due to closer relationship to existing infrastructure and less imposing on rural/ enclosed landscapes and Findhorn Bay
- Nature Conservation	<ul style="list-style-type: none"> Loss of approx. 23ha ancient woodland and approx. 6ha native woodland Some sections of route in proximity to Moray and Nairn Coast SPA and Culbin Forest SSSI (within 300m) Road creates a species dispersal barrier between woodlands to the north and south which is exacerbated by the loss of habitat from Hardmuir Wood 	<ul style="list-style-type: none"> Loss of approx. 3.5ha ancient woodland and approx. 4ha native woodland Some sections of route in proximity to Moray and Nairn Coast SPA and Darnaway and Lethen Forest SPA (within 1.5km) Road creates a species dispersal barrier between woodlands to the north and south 	D(S)	Clear Preference for D South due to less woodland habitat loss, more remote from coastal Natura sites and in particular avoids loss of Hardmuir Wood which is important for habitat connectivity
- Geology, Soils, Contaminated Land & Groundwater	<ul style="list-style-type: none"> Potential for encountering contamination associated with former landfill Risk of effect on water supplies and hydrogeology with potential to affect groundwater drainage to Culbin Forest SSSI and Findhorn Bay SSSI 	<ul style="list-style-type: none"> Risk of effects on hydrogeology and water supplies 	D(S)	Clear Preference for D South due to scale of remediation to mitigate potentially significant contamination risks on D North associated with proximity to former landfill
- Road Drainage & Water Environment	<ul style="list-style-type: none"> No predicted material changes in flood levels Minor effect on river geomorphology at Findhorn crossing 	<ul style="list-style-type: none"> No predicted material changes in flood levels Geomorphological effects on Findhorn not predicted to be significant 	D(S)	Slight Preference for D South as crossing point of River Findhorn has potentially fewer morphological effects
Overall – Impacts on Natural and Cultural Heritage	<i>Significant effects on landscape character predicted for both options although D North is more intrusive in the landscape and runs through more intimate and undeveloped countryside. D South avoids effects on the setting of Brodie Castle GDL, the loss of Hardmuir Wood and is generally more remote from the coastal nature conservation sites. D South crosses the River Findhorn in a more geomorphologically stable location and avoids affecting a former landfill site</i>		D(S)	<i>Clear Preference for D South which has less landscape, ecological and cultural heritage effect and less risk of effects on the water environment</i>
Traffic / Economic Assessment				
- Traffic assessment	<ul style="list-style-type: none"> Effective transfer of traffic from existing network Forres West junction is further distant (3km) from the town than D South 	<ul style="list-style-type: none"> Effective transfer of traffic from existing network Significantly higher relief to existing A96 at Brodie 	D(S)	Clear Preference for D South as it provides best value with effective transfer of traffic from existing network and significantly higher relief to existing A96 at Brodie.
- Additional Cost (PVC)	£21M	-		
- Additional Benefit (PVB)	-	£23M		
- Best Value	-	£44M		

Table 2.4 Pairwise E Assessment – Comparison Framework

Topic and Assessment Indicator	Pairwise E North (Red / Purple)	Pairwise E South (Blue)	Preference	Comment / Summary of Key Differences
Engineering Assessment				
- Cost Estimate Difference (2014 prices)	£17M less than E South. Route generally follows mainly gentle topography along existing transport corridor (road/rail) between Forres and Elgin.	£17M more than E North mainly due to significantly more earthworks. E South passes through steep topography that would require climbing lanes.	E(N)	Slight Preference for E North due to cost differential driven by significantly less earthworks
Environmental Assessment – Communities and People				
- Air Quality	<ul style="list-style-type: none"> Approx. 170 receptors predicted to experience minor (non-significant) beneficial effects on local air quality (reduced NO₂ and PM₁₀ concs.) Approx. 70 receptors predicted to experience minor (non-significant) adverse effects on local air quality (increased NO₂ and PM₁₀ concentrations) 	<ul style="list-style-type: none"> Approx. 170 receptors predicted to experience minor (non-significant) beneficial effects on local air quality (reduced NO₂ and PM₁₀ concs.) Approx. 50 receptors predicted to experience minor (non-significant) adverse effects on local air quality (increased NO₂ and PM₁₀ concentrations) 		No preference since differences between effects are negligible in terms of numbers of receptors and all predicted effects are non-significant
- Noise & Vibration	<ul style="list-style-type: none"> Approx. 150 dwellings with significant adverse traffic noise impacts (approx. 130 major), approx. 220 dwellings with significant beneficial traffic noise impacts (approx. 90 major) 	<ul style="list-style-type: none"> Approx. 110 dwellings with significant adverse traffic noise impacts (approx. 100 major), approx. 270 dwellings with significant beneficial traffic noise impacts (approx. 100 major) 	E(S)	Slight Preference for E South due to slightly fewer adverse traffic noise impacts and more beneficial noise impacts
- People & Communities	<ul style="list-style-type: none"> Potential to affect amenity on six NMU routes, of which five would also have increased journey length. Improved amenity on one NMU route A loss of approx. 16ha land used by the community (including from Alves Wood and woodland and coarse fishing ponds at Hardhillock) and impacts on NMU access to these areas 	<ul style="list-style-type: none"> Potential to affect amenity on 25 NMU routes, of which 12 would also have increased journey length. Improved amenity on one NMU route A loss of approx. 33ha land used by the community (including from Burgie Wood, Monaghty Wood and the coarse fishing ponds at Hardhillock) and impacts on NMU access to these areas through increased journey length 	E(N)	Clear Preference for E North due to fewer NMU routes being affected and less impact on woodlands used by the community
- Agriculture, Forestry and Sporting	<ul style="list-style-type: none"> Land take from 13 farm / forestry units with a loss of approx. 116ha of agricultural land, approx. 36ha of which is prime land. Major adverse effects on two agricultural holdings 	<ul style="list-style-type: none"> Land take from 13 farm / forestry units with a loss of approx. 128ha of agricultural land, approx. 9ha of which is prime land. Major adverse effects on three agricultural land holdings 		No Preference. E North affects less agricultural land and one fewer farm holding is significantly affected albeit H South affects less prime land
- Policies & Plans	<ul style="list-style-type: none"> Potential for conflict with 12 LDP policies No material effects on LDP designated sites Minor land take from planning application site (access route to new house) at Easter Cloves 	<ul style="list-style-type: none"> Potential for conflict with 14 LDP policies Minor land take impact on a designated housing site at Lochyhill and two employment sites at Forres Enterprise Park No material effects on planning applications 	E(N)	Slight Preference for E North which avoids land take impacts on designated LDP sites in Forres, and avoids encroaching on a settlement boundary
-				
- Materials	<ul style="list-style-type: none"> Materials required for road pavement (11.6km mainline & 7.3km side roads) and structures (deck area approx. 5,200m²) Bulk earthworks approx. 2.1Mm³, of which net import of approx. 1.0Mm³ Woodland clearance of approx. 20ha 	<ul style="list-style-type: none"> Materials required for road pavement (11.7km mainline & 7.2km side roads) and structures (deck area approx. 4,700m²) Bulk earthworks approx. 2.9Mm³, of which net import of approx. 1.3Mm³ Woodland clearance of approx. 40ha 	E(N)	Slight Preference for E North since materials requirements are lower for bulk earthworks, material import and woodland clearance. Slightly higher structures deck area and slightly shorter road length
- Visual Effects	<ul style="list-style-type: none"> Significant adverse visual effects predicted on isolated residential receptors, however effects are lessened due to proximity to the existing A96, reasonably consistent route elevation which limits its visibility within surrounding area, and the screening benefit of woodland 	<ul style="list-style-type: none"> Option benefits from partial screening by woodland, however its elevated position on reasonably steep, north facing slopes would expose some of its length to extensive visibility to, and significant adverse effects on, visual receptors to the north 	E(N)	Slight Preference for E North which would have slightly fewer significant visual effects than E South, in part due to its generally less visually exposed position
Overall – Impacts on Communities and People	<i>E North is more closely aligned with existing A96 corridor for much of its length and has less impact on visual amenity. E South affects fewer noise sensitive receptors but E North has less impact on NMUs, land used by the community, materials and less effect on future development land</i>		E(N)	Clear Preference for E North due to less effect on NMUs, community land, policy, materials and visual amenity
Environmental Assessment – Natural and Cultural Heritage				
- Cultural Heritage	<ul style="list-style-type: none"> Predicted significant effects on the setting of the Category B Listed Buildings at Cathay House Gate Lodge and on setting of Alves Parish Church 	<ul style="list-style-type: none"> Predicted significant effect on the setting of the Category B Listed Buildings at Cathay House Gate Lodge 	E(S)	Clear Preference for E South which has less effects on setting of cultural heritage assets
- Landscape	<ul style="list-style-type: none"> Significant adverse residual landscape effects predicted due to collective dominance of infrastructure and imposition upon local houses as well as on the strath floor at Lawrenceton 	<ul style="list-style-type: none"> Significant adverse residual landscape effects predicted from imposition of sub-option at its western junction, across strath floor by Monaghty and Cloves, and cutting through the hillside at Burgie Wood 	E(N)	Clear Preference for E North due to closer relationship to existing infrastructure and less imposing on rural, open landscapes and hill landforms
- Nature Conservation	<ul style="list-style-type: none"> Loss of approx. 14.5ha ancient woodland and approx. 2.5ha native woodland Woodland affected includes Alves Wood whose ecological functionality is already affected by the existing A96 	<ul style="list-style-type: none"> Loss of approx. 21ha ancient woodland and approx. 4.5ha native woodland Woodland affected includes Burgie Wood which is of high quality with considerable protected species interest 	E(N)	Clear Preference for E North which avoids impact on the high quality habitat of Burgie Wood, requires less loss of ancient woodland and avoids proximity to SSSI at Lethenhill
- Geology, Soils, Contaminated Land & Groundwater	<ul style="list-style-type: none"> Risk of effect on hydrogeology and water supplies from cuttings and embankments, including on the water supply for Glenburgie Distillery 	<ul style="list-style-type: none"> Risk of effect on hydrogeology and water supplies from cuttings and embankments, including embankment sections crossing upstream watercourses that feed private water supplies to the Burgie Estate and Glenburgie Distillery 		No Preference as similar effects on hydrogeology and water supplies are predicted for both options
- Road Drainage & Water Environment	<ul style="list-style-type: none"> No predicted material changes in flood levels No significant permanent effects on river morphology or water quality 	<ul style="list-style-type: none"> No predicted material changes in flood levels No significant permanent effects on river morphology or water quality 		No Preference as predicted effects are similar for both options and neither is significant
Overall – Impacts on Natural and Cultural Heritage	<i>Significant effects on landscape character predicted for both options although E South is more intrusive in the landscape and with greater woodland loss. E South avoids effects on setting of the listed Alves Church, but is predicted to have greater effects on nature conservation (including potentially on Lethenhill SSSI) and protected species associated with the higher quality woodland at Burgie</i>		E(N)	Clear Preference for E North which has less ecological and landscape effect
Traffic / Economic Assessment				
- Traffic assessment	<ul style="list-style-type: none"> Effective transfer of traffic from existing network Higher relief to existing A96 at Alves 	<ul style="list-style-type: none"> Effective transfer of traffic from existing network, but significantly less than E North 	E(N)	Clear Preference for E North as it provides best value, results in higher transfer of traffic from local road network compared to E South
- Additional Cost (PVC)	-	£9M		
- Additional Benefit (PVB)	£17M	-		
- Best Value	£26M	-		

Table 2.5 Pairwise F Assessment – Comparison Framework

Topic and Assessment Indicator	Pairwise F North (Orange)	Pairwise F South (Green)	Preference	Comment / Summary of Key Differences
Engineering Assessment				
- Cost Estimate Difference (2014 prices)	£56M more than F South due to significantly more earthworks	£56M less than F South	F(S)	Clear Preference for F South due to cost differential (£56M) driven by significantly less earthworks.
Environmental Assessment – Communities and People				
- Air Quality	<ul style="list-style-type: none"> Approx. 2,230 receptors predicted to experience minor (non-significant) beneficial effects on local air quality (reduced NO₂ and PM₁₀ concs.) Approx. 270 receptors predicted to experience minor (non-significant) adverse effects on local air quality (increased NO₂ and PM₁₀ concentrations) 	<ul style="list-style-type: none"> Approx. 2,220 receptors predicted to experience minor (non-significant) beneficial effects on local air quality (reduced NO₂ and PM₁₀ concs.) Approx. 300 receptors predicted to experience minor (non-significant) adverse effects on local air quality (increased NO₂ and PM₁₀ concentrations) 		No preference since differences between effects are negligible in terms of numbers of receptors and all predicted effects are non-significant
- Noise & Vibration	<ul style="list-style-type: none"> Approx. 760 dwellings with significant adverse traffic noise impacts (approx. 360 major), approx. 490 dwellings with significant beneficial traffic noise impacts (0 major) 	<ul style="list-style-type: none"> Approx. 750 dwellings with significant adverse traffic noise impacts (approx. 280 major), approx. 340 dwellings with significant beneficial traffic noise impacts (approx. 70 major) 	F(S)	Slight Preference for F South due to fewer major adverse traffic noise impacts and more major beneficial traffic noise impacts
- People & Communities	<ul style="list-style-type: none"> Potential to affect amenity on three NMU routes, of which one would also have increased journey length. Improved amenity on three NMU routes Alteration to access for approx. 17 properties at Cassieford and Milton of Grange from stopping up of the B9011 road to vehicles Relief from severance in vicinity of existing A96 in Alves and Forres due to reduced traffic flows 	<ul style="list-style-type: none"> Potential to affect amenity on five NMU routes, of which one would also have increased journey length. Improved amenity on three NMU routes Alteration to access for approx. 12 properties at Burgie Lodge area from closure of direct access to A96 A loss of approx. 5ha land used by the community including loss of picnic area at Carsehill and impacts on NMU access to woodland at Carden Hill Relief from severance in vicinity of existing A96 in Alves and Forres 		No preference due to similar effects on NMUs, community land and severance
- Agriculture, Forestry and Sporting	<ul style="list-style-type: none"> Land take from 20 farm / forestry units with a loss of approx. 163ha of agricultural land, approx. 73ha of which is prime land. Major adverse effects at four agricultural holdings 	<ul style="list-style-type: none"> Land take from 22 farm / forestry / equestrian units with a loss of approx. 183ha of agricultural land, approx. 134ha of which is prime land. Major adverse effects at six agricultural holdings and one equestrian holding 	F(N)	Clear Preference for F North which affects less high value agricultural land and has fewer predicted material effects on farm businesses
- Policies & Plans	<ul style="list-style-type: none"> Potential for conflict with 13 LDP policies Moderate land take impact from designated employment site at Springfield East in Forres and minor impact on Springfield West employment site No material effects on planning applications 	<ul style="list-style-type: none"> Potential for conflict with 13 LDP policies Moderate land take impact from designated employment site at Springfield East in Forres and minor impact on Springfield West employment site Major land take from planning application site (new house) at Beechbrae 	F(N)	Slight Preference for F North which avoids the major impact on a planning application site associated with F South
- Materials	<ul style="list-style-type: none"> Materials required for road pavement (15.7km mainline & 11.5km side roads) and structures (deck area approx. 7,600m²) Bulk earthworks approx. 3.0Mm³, of which net import of approx. 2.5Mm³ Woodland clearance of approx. 8ha 	<ul style="list-style-type: none"> Materials required for road pavement (16.2km mainline & 11.3km side roads) and structures (deck area approx. 10,100m²) Bulk earthworks approx. 4.4Mm³, of which net export of approx. 0.2Mm³ Woodland clearance of approx. 9ha 	F(S)	Slight Preference for F South despite larger deck area for structures due to much lower requirement for import of fill
- Visual Effects	<ul style="list-style-type: none"> Significant adverse visual effects predicted on isolated residential receptors and some recreational routes as the road would be located on embankment for much of its length 	<ul style="list-style-type: none"> Significant adverse visual effects predicted on isolated residential receptors and some recreational routes, however the road would be located in a slightly undulating landscape, limiting its exposure, and is located close to the existing A96 for approximately one third of its length 	F(S)	Slight Preference for F South which would give rise to fewer visual effects than F North due to the screening effect of the surrounding landform and its position closer to the existing A96
Overall – Impacts on Communities and People	<i>F South, which is generally closer to more developed areas, is predicted to have less effect from traffic noise and has overall less material demand than F North. F North has fewer impacts on farm businesses and avoids impact on a site with planning consent for a new house but greater overall effects on visual amenity</i>			<i>No preference. F North has greater noise, materials & visual effects. F South has less effect on agriculture and planning</i>
Environmental Assessment – Natural and Cultural Heritage				
- Cultural Heritage	<ul style="list-style-type: none"> Predicted significant effect on the setting of the Category A Listed Building at Grange Hall and on the setting of six other B Listed Buildings along the route (Grange Hall Lodge, Windsor Lodge, Alves Old Parish Church, Sparrow Castle, Rosehaugh Old House & Wester Kintrae) 	<ul style="list-style-type: none"> Predicted significant effects on setting of Grange Hall Category A Listed Building and on three other B Listed Buildings along the route (Grange Hall Lodge, Rosebrae House & Wester Kintrae) 	F(S)	Slight Preference for F South due to fewer adverse setting effects on Category B listed buildings
- Landscape	<ul style="list-style-type: none"> Significant adverse residual landscape effects predicted due to prominence, local imposition and spatial obstruction where raised upon embankments or bridges as well as contrast to historic landscape pattern at Westerfield although at broader level relates to landscape scale, simplicity and form 	<ul style="list-style-type: none"> Significant adverse residual landscape effects predicted from intrusion into the enclosed, rural strath along the Monaughty burn, removal of mature trees at Newton and imposition upon views and contrast to landscape pattern experienced from Quarrelwood 	F(N)	Slight Preference for F North despite visibility of structure within open areas, has better fit with landscape scale, pattern and landform and less imposing upon enclosed spaces
- Nature Conservation	<ul style="list-style-type: none"> Loss of approx. 0.5ha ancient woodland and approx. 3ha native woodland Species records for barn owl and corn bunting close to the route 	<ul style="list-style-type: none"> Loss of approx. 1.5ha native woodland Species records for barn owl close to the route 	F(S)	Slight Preference for F South due to slightly less habitat loss
- Geology, Soils, Contaminated Land & Groundwater	<ul style="list-style-type: none"> Risk of effect on hydrogeology and water supplies from cuttings and embankments, including potential to affect shallow groundwater supplies feeding low lying drainage channels 	<ul style="list-style-type: none"> Risk of effect on hydrogeology and water supplies from cuttings and embankments, including Glenburgie Distillery and those at Rosebrae and Ardye House located downgradient of major cutting sections 		No Preference as similar effects on hydrogeology and water supplies are predicted for both options
- Road Drainage & Water Environment	<ul style="list-style-type: none"> No predicted material changes in flood levels No significant permanent effects on river morphology or water quality 	<ul style="list-style-type: none"> No predicted material changes in flood levels No significant permanent effects on river morphology or water quality 		No Preference as predicted effects are similar for both options and neither is significant
Overall – Impacts on Natural and Cultural Heritage	<i>F North affects the setting of a larger number of listed buildings than F South and has slightly greater predicted ecological effects. F South is predicted to have slightly greater overall landscape effects than F North</i>			<i>No Preference. F South has less effect on cultural heritage and habitat loss, F North less landscape effect</i>
Traffic / Economic Assessment				
- Traffic assessment	<ul style="list-style-type: none"> Effective transfer of traffic from existing network, but significantly less than F South 	<ul style="list-style-type: none"> Significant transfer of traffic from local road network with Elgin West Junction being in a more effective location. 	F(S)	Clear Preference for F South as it provides best value and results in a larger transfer of traffic from the existing road network.
- Additional Cost (PVC)	£28M	-		
- Additional Benefit (PVB)	-	£40M		
- Best Value	-	£68M		

Table 2.6 Pairwise G Assessment – Comparison Framework

Topic and Assessment Indicator	Pairwise G North (Orange)	Pairwise G South (Green / Purple)	Preference	Comment / Summary of Key Differences
Engineering Assessment				
- Cost Estimate Difference (2014 prices)	<ul style="list-style-type: none"> £11M more than G South mainly due to more extensive structure required to cross the River Lossie and two additional flood relief structures in the flood plain. 	<ul style="list-style-type: none"> £11M less than G North although G South has more significant utility diversions. G South has least intrusion on flood plain and has greater opportunity for design development and mitigation. 	G(S)	Slight Preference for G South. G South has least intrusion on flood plain and has greater opportunity for design development and mitigation
Environmental Assessment – Communities and People				
- Air Quality	<ul style="list-style-type: none"> Approx. 3,100 receptors predicted to experience minor (non-significant) beneficial effects on local air quality (reduced NO₂ and PM₁₀ concentrations) Approx. 1,080 receptors predicted to experience minor (non-significant) adverse effects on local air quality (increased NO₂ and PM₁₀ concentrations) 	<ul style="list-style-type: none"> Approx. 3,400 receptors predicted to experience minor (non-significant) beneficial effects on local air quality (reduced NO₂ and PM₁₀ concentrations) Approx. 470 receptors predicted to experience minor (non-significant) adverse effects on local air quality (increased NO₂ and PM₁₀ concentrations) 		No preference since differences between effects are negligible in terms of numbers of receptors and all predicted effects are non-significant
- Noise & Vibration	<ul style="list-style-type: none"> Approx. 910 dwellings with significant adverse traffic noise impacts (approx. 320 major), approx. 520 dwellings with significant beneficial traffic noise impacts (approx. 30 major) 	<ul style="list-style-type: none"> Approx. 1,310 dwellings with significant adverse traffic noise impacts (approx. 250 major), approx. 510 dwellings with significant beneficial traffic noise impacts (approx. 150 major) 	G(S)	Slight Preference for G South due to fewer major adverse noise impacts and more major beneficial noise impacts
- People & Communities	<ul style="list-style-type: none"> Potential to affect amenity on 13 NMU routes, of which six would also have increased journey length. Improved amenity on two NMU routes A loss of approx. 23ha land used by the community particularly in Crooked Wood, Sleepieshill Wood, Balnacoul Wood and Castle Hill Wood 	<ul style="list-style-type: none"> Potential to affect amenity on 13 NMU routes, of which nine would also have increased journey length. Improved amenity on four NMU routes Change in vehicle access to six private properties Loss of approx 18ha community use land at Lochanbo and Kirkhill Woods 	G(S)	Slight Preference for G South due to less effect on woodlands used by the community and less overall severance of communities
- Agriculture, Forestry and Sporting	<ul style="list-style-type: none"> Land take from 18 farm / forestry units with a loss of approx. 167ha of agricultural land, approx. 32ha of which is prime land. Major adverse effects at four agricultural holdings (significant effects on six holdings overall) 	<ul style="list-style-type: none"> Land take from 21 farm / forestry units with a loss of approx. 160ha of agricultural land, approx. 11ha of which is prime land. Major adverse effects at five land holdings (significant effects on eight holdings overall) 		No Preference as G North adversely affects fewer farm holdings but G South requires more prime land
- Policies & Plans	<ul style="list-style-type: none"> Potential for conflict with 14 LDP policies Moderate land take impact from designated greenspace site at Mosstodloch and minor impacts from land take on three other sites 	<ul style="list-style-type: none"> Potential for conflict with 15 LDP policies Minor land take impact from two designated housing sites and from one greenspace site and one amenity site 	G(S)	Slight Preference for G South due to slightly lower overall effects on designated LDP sites
- Materials	<ul style="list-style-type: none"> Materials required for road pavement (12.4km mainline & 7.1km side roads) and structures (deck area approx. 22,300m²) Bulk earthworks approx. 3.8Mm³, of which net import of approx. 1.0Mm³ Woodland clearance of approx. 25ha 	<ul style="list-style-type: none"> Materials required for road pavement (12.7km mainline & 6.7km side roads) and structures (deck area approx. 15,600m²) Bulk earthworks approx. 3.7Mm³, of which net import of approx. 1.6Mm³ Woodland clearance of approx. 21ha 	G(S)	Slight Preference for G South due to smaller deck area for structures. Higher net import of earthworks is offset as majority of material for G South predicted to be sourced from adjacent areas of the site
- Visual Effects	<ul style="list-style-type: none"> Option predicted to have significant adverse visual effects on isolated residential receptors and various recreational routes 	<ul style="list-style-type: none"> Option predicted to have significant adverse visual effects on isolated residential receptors and various recreational routes 		No preference identified by the visual assessment
Overall – Impacts on Communities and People	<i>G South is predicted to have fewer major adverse noise impacts than G North and more major noise decreases. G South has less overall effect on communities and agriculture and fewer planning issues. G South also has a lower overall requirement for materials than G North</i>		G(S)	<i>Clear Preference for G South which has less adverse noise effect and less effect on land use</i>
Environmental Assessment – Natural and Cultural Heritage				
- Cultural Heritage	<ul style="list-style-type: none"> Predicted significant effect on the setting of the Category A Listed Building at Longhill Mill and significant direct effects predicted on two regionally significant archaeological sites at Easter Calcots and Longhill Mill 	<ul style="list-style-type: none"> Predicted significant effects on setting of scheduled monuments at Coxton Tower and Bogton Stone Circle, on the setting of Category A Listed Buildings at Coxton Tower and Pittensair House and significant direct effects predicted on regionally significant archaeological site at Lhanbryde 	G(N)	Clear Preference for G North due to fewer significant setting effects on standing monuments and listed buildings
- Landscape	<ul style="list-style-type: none"> Significant adverse residual landscape effects predicted due to prominence (including junction) in open areas and contrast to the undulating landform, intricate spaces and landscape pattern and settlements near Longhill/Urquhart. Effects are reduced along some stretches by road cuttings and woodland screening 	<ul style="list-style-type: none"> Significant adverse residual landscape effects predicted from cutting through the distinctive hill edge at Sheriffston (including large junction) and Kirkhill and removing distinctive mature woodland foci, as well as imposition on the landscape experience of woodland in the Loch na Bo area 	G(N)	Slight Preference for G North. Despite local visibility of structures in open areas, would relate better to landscape scale, landform and pattern plus effects would be reduced in some areas by use of cuttings
- Nature Conservation	<ul style="list-style-type: none"> Loss of approx. 22.5ha ancient woodland and approx. 1.5ha native woodland Severance of woodland habitat and potential effects on protected species including barn owl 	<ul style="list-style-type: none"> Loss of approx 16.5ha ancient woodland and approx. 3.5ha native woodland Severance of woodland habitat including woodland between Loch Oire and Loch na Bo, and potential effects on protected species including barn owl Approx 250m of Loch Oire SSSI (disturbance and habitat suitability risk) 	G(N)	Slight Preference for G North despite greater loss of ancient woodland as it has less disturbance to and severance of key woodland habitat between the waterbodies of Loch Oire and Loch na Bo
- Geology, Soils, Contaminated Land & Groundwater	<ul style="list-style-type: none"> Risk of effect on hydrogeology and water supplies at Evergreen and Muiryhall, and potential effects on shallow groundwater supplies feeding the Spynie Canal 	<ul style="list-style-type: none"> Risk of effect on hydrogeology and water supplies at Pittensair, Wester Marchfield and Wester Bauds, and potential effects on groundwater drainage to the Spynie Canal and Loch Oire SSSI Loss of approx. 1ha peat soils in Doo Hill area 	G(N)	Slight Preference for G North which avoids loss of peat
- Road Drainage & Water Environment	<ul style="list-style-type: none"> No predicted material changes in flood levels (although residual risk of adverse flood impacts to receptors is higher than for G South) No significant permanent effects on river morphology or water quality 	<ul style="list-style-type: none"> No predicted material changes in flood levels No significant permanent effects on river morphology or water quality 	G(S)	Slight Preference for G South due to the complexity of the mitigation measures for the control of flood risk impacts to receptors for G North
Overall – Impacts on Natural and Cultural Heritage	<i>G South has greater effects on cultural heritage than G North and is predicted to have more intrusion on the landscape and on woodland areas of ecological importance. G North avoids effects on peat soils associated with G South but has a slightly higher residual risk of adverse impacts on flooding</i>		G(N)	<i>Clear Preference for G North which has less effect on cultural heritage, ecology, landscape and soils</i>
Traffic / Economic Assessment				
- Traffic assessment	<ul style="list-style-type: none"> Effective transfer of traffic from existing network, but significantly less than G North with less efficient Elgin East Junction location. 	<ul style="list-style-type: none"> Effective transfer of traffic from existing network Efficient location for Elgin East Junction Significantly higher relief to existing A96 at Lhanbryde 	G(S)	Slight Preference for G South as it provides best value with higher traffic flows and a more efficient Elgin East junction location
- Additional Cost (PVC)	£5M	-		
- Additional Benefit (PVB)	-	£9M		
- Best Value	-	£14M		

Table 2.7 Pairwise H Assessment – Comparison Framework

Topic and Assessment Indicator	Pairwise H North	Pairwise H South	Preference	Comment / Summary of Key Differences
Engineering Assessment				
- Cost Estimate Difference (2014 prices)	<ul style="list-style-type: none"> £16M less than H South. H North lies close to existing transport corridor and has greater opportunity for design development and mitigation at key environmental constraints. 	<ul style="list-style-type: none"> £16M more than H North and involves provision of new link road infrastructure to connect to Elgin East Junction. 	H(N)	Clear Preference for H North. H North lies close to existing transport corridor and has greater opportunity for design development and mitigation.
Environmental Assessment – Communities and People				
- Air Quality	<ul style="list-style-type: none"> Approx. 500 receptors predicted to experience minor (non-significant) beneficial effects on local air quality (reduced NO₂ & PM₁₀ concentrations) Approx. 100 receptors predicted to experience minor (non-significant) adverse effects on local air quality (increased NO₂ and PM₁₀ concentrations) 	<ul style="list-style-type: none"> Approx. 500 receptors predicted to experience minor (non-significant) beneficial effects on local air quality (reduced NO₂ & PM₁₀ concentrations) Approx. 40 receptors predicted to experience minor (non-significant) adverse effects on local air quality (increased NO₂ and PM₁₀ concentrations) 		No preference since differences between effects are negligible in terms of numbers of receptors and all predicted effects are non-significant
- Noise & Vibration	<ul style="list-style-type: none"> Approx. 350 dwellings with significant adverse traffic noise impacts (approx. 40 major), approx. 140 dwellings with significant beneficial traffic noise impacts (approx. 70 major) 	<ul style="list-style-type: none"> Approx. 270 dwellings with significant adverse traffic noise impacts (approx. 50 major), approx. 890 dwellings with significant beneficial traffic noise impacts (approx. 140 major) 	H(S)	Clear Preference for H South due to fewer adverse traffic noise impacts and more beneficial noise impacts
- People & Communities	<ul style="list-style-type: none"> Potential to affect amenity on eight NMU routes, of which three would have increased journey length. Improved amenity on four routes A loss of approx. 9ha land used by the community with land take and amenity effects including Threapland Wood (used by disabled equestrians) 	<ul style="list-style-type: none"> Potential to affect amenity on nine NMU routes. Improved amenity on four NMU routes. Demolition of two derelict cottages A loss of approx. 11ha land used by the community with land take and amenity effects including Threapland Wood (used by disabled equestrians) 	H(N)	Slight Preference for H North due to less effect on NMUs and woodland used by the community and avoids demolition of (derelict) dwellings
- Agriculture, Forestry and Sporting	<ul style="list-style-type: none"> Land take from 15 farm / forestry units with a loss of approx. 81ha of agricultural land, none of which is prime land. Major adverse effects at two agricultural holdings and one forest holding 	<ul style="list-style-type: none"> Land take from 14 farm / forestry / equestrian units with a loss of approx. 91ha of agricultural land, approx. 1ha of which is prime land. Major adverse effects at two agricultural land holdings and one equestrian holding 	H(N)	Slight Preference for H North which requires less agricultural land
- Policies & Plans	<ul style="list-style-type: none"> Potential for conflict with 14 LDP policies Minor land take impact from designated industrial site at Troves Industrial Estate and designated housing site at Lhanbryde 	<ul style="list-style-type: none"> Potential for conflict with 11 LDP policies Minor land take from designated industrial site at Barmuckity 	H(S)	Slight Preference for H South which has less land take from designated LDP sites
- Materials	<ul style="list-style-type: none"> Materials required for road pavement (8.7km mainline & 6.6km side roads) and structures (deck area approx. 7,200m²) Bulk earthworks approx. 1.8Mm³, of which net export of approx. 0.2Mm³ Woodland clearance of approx. 16ha 	<ul style="list-style-type: none"> Materials required for road pavement (8.5km mainline & 6.5km side roads) and structures (deck area approx. 7,600m²) Bulk earthworks approx. 2.0Mm³, of which net import of approx. 0.2Mm³ Woodland clearance of approx. 15ha 	H(N)	Slight Preference for H North due to less materials requirement for structures and avoids requirement for earthworks import
- Visual Effects	<ul style="list-style-type: none"> Despite being visually contained in cutting for some of its extent, significant adverse visual effects are predicted on isolated residential receptors and some key recreational routes particularly in and around Loch Na Bo 	<ul style="list-style-type: none"> Significant adverse visual effects predicted on isolated residential receptors, particularly within the eastern half of the study area as the route is mostly on embankment and near the link road for the Elgin junction 	H(N)	Slight Preference for H North which is predicted to have less significant effects on visual amenity
Overall – Impacts on Communities and People	<i>H South has more predicted beneficial noise impacts than H North and avoids land take from two LDP designated sites. H North is predicted to have less effect on visual amenity, land used by the community, materials requirement and agriculture and is preferred overall</i>		H(N)	<i>Clear Preference for H North. Greater effects on noise & development land but less effect on communities, agriculture, materials & visual amenity</i>
Environmental Assessment – Natural and Cultural Heritage				
- Cultural Heritage	<ul style="list-style-type: none"> Predicted significant effects on setting of scheduled monuments at Coxton Tower and Bogton Stone Circle, on the setting of Category A Listed Buildings at Coxton Tower and Pittensair House Significant direct effects predicted on three regionally significant archaeological sites at Lhanbryde, Pittensair House and Bogton 	<ul style="list-style-type: none"> Predicted significant effects on setting of scheduled monument and Category A Listed Building at Coxton Tower and on Category B listed Loch na Bo Croft and Category C listed Coxton Tower House Significant direct effects predicted on regionally significant archaeological site at Errol 	H(S)	Clear Preference for H South which has fewer significant effects on scheduled sites and listed buildings and fewer direct effects on archaeology
- Landscape	<ul style="list-style-type: none"> Significant adverse landscape effects predicted from imposition on the landscape experience of the Loch na Bo area and contrast with the landform, imposition on some semi-enclosed spaces and woodland removal. Better fit with existing infrastructure south of Lhanbryde 	<ul style="list-style-type: none"> Significant adverse landscape effects predicted from contrast with the landform and landscape pattern, tree removal and imposition on the small, semi-enclosed spaces and landscape elements around Greens of Coxton, Erroll and Ardkeiling 	H(N)	Slight Preference for H North which is predicted to relate better to existing infrastructure south of Lhanbryde and has slightly less imposing on sensitive small scale landscapes
- Nature Conservation	<ul style="list-style-type: none"> Loss of approx. 10ha ancient woodland & approx. 6ha native woodland Species records for barn owl and osprey close to the route Severance of woodland habitat in Threapland Wood route within approx. 250m of Loch Oire SSSI (disturbance and habitat suitability risks) 	<ul style="list-style-type: none"> Loss of approx. 7.5ha ancient woodland & approx. 1ha native woodland Species records for barn owl close to the route 	H(S)	Clear Preference for H South which has lower woodland loss than H North and avoids potential adverse impacts on Loch Oire SSSI and disturbance to and severance within Threapland Wood
- Geology, Soils, Contaminated Land & Groundwater	<ul style="list-style-type: none"> Risk of effect on hydrogeology and water supplies from cuttings and embankments, with potential effects on water supplies including Wester Coxton, Coxton Tower and Wester Marchfield downgradient of major cuttings, and potential effects on groundwater drainage to Loch Oire SSSI 	<ul style="list-style-type: none"> Risk of effect on hydrogeology and water supplies, with potential effects on water supplies including at Hallowood located downgradient of major cuttings 		No Preference as similar effects on hydrogeology and water supplies are predicted for both options
- Road Drainage & Water Environment	<ul style="list-style-type: none"> No predicted material changes in flood levels No significant permanent effects on river morphology or water quality 	<ul style="list-style-type: none"> No predicted material changes in flood levels No significant permanent effects on river morphology or water quality 		No Preference as predicted effects are similar for both options and neither is significant
Overall – Impacts on Natural and Cultural Heritage	<i>H South has fewer significant effects on the setting of important cultural heritage sites, affects less woodland than H North and is predicted to have less ecological effect in sensitive areas such as Threapland Wood and Loch Oire SSSI. Both options have significant landscape effects with slightly less for H North</i>		H(S)	<i>Clear Preference for H South which has less effect on cultural heritage and nature conservation</i>
Traffic / Economic Assessment				
- Traffic assessment	<ul style="list-style-type: none"> Effective transfer of traffic from existing network, significantly more than H South which has less efficient Elgin East Junction location. 	<ul style="list-style-type: none"> Effective transfer of traffic from existing network 	H(N)	Clear Preference for H North as it provides best value with higher traffic flows and has Elgin East Junction located close to the existing A96.
- Additional Cost (PVC)		£8M		
- Additional Benefit (PVB)	£46M			
- Best Value	£54M			

Appendix B

Workshop Presentation





A96 Dualling Hardmuir to Fochabers DMRB Stage 2 Pairwise Round 2 Workshop 27 April 2018

**Mott MacDonald
Sweco**



Agenda

09:30	Introductions and Background
09:50	Workshop Process and Assessment Methods
10:00	Pairwise D (Purple vs Orange)
10:45	Coffee
10:55	Pairwise E (Red/Purple vs Blue)
11:40	Pairwise F (Orange vs Green)
12:30	Lunch
13:00	Pairwise G (Orange vs Green/Purple)
13:45	Coffee
13:55	Pairwise H (Purple vs Red)
14:40	Workshop Summary and Findings
15:00	Close

Background to A96 Dualling



- **Strategic Transport Projects Review (2008)**
 - Specific intervention: upgrade A96 between Inverness and Nairn to dual carriageway and also a bypass of Nairn
- **Infrastructure Investment Plan 2011**
 - Commitment to complete the dualling of the A96 between Inverness and Aberdeen by 2030
- **Ministerial Announcement, 9th May 2013**
 - Preliminary engineering and strategic environmental assessment work along A96 corridor (May 2015 exhibitions presented outcome of this work)
 - Ongoing route option assessment work between Inverness and Nairn, including Nairn Bypass (preferred option announced in October 2014)
- **Ministerial Announcement, 11th May 2015**
 - Based on outcome of preliminary work, next stage of design to be taken forward based on Western (46km), Central (31km) and Eastern (42km) Sections starting with the Western Section in 2016.
- **A96 Dualling Hardmuir to Fochabers (Western Section)**
 - Mott MacDonald Sweco Joint Venture were appointed in June 2016 to take forward design and assessment of the Western Section.

Assessment Programme



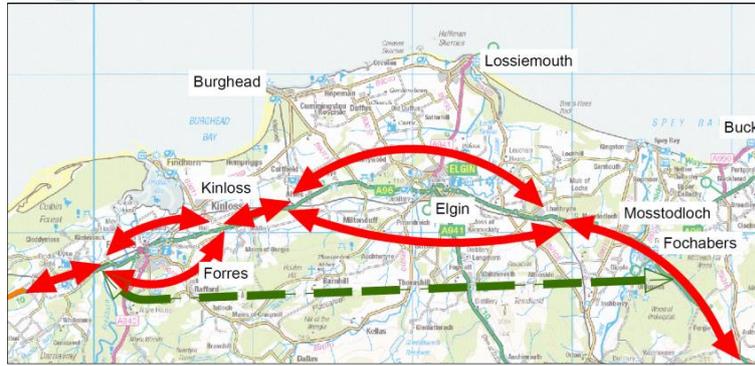
The A96 Dualling Programme has been split into four sections:



DMRB Stage 1 Report



The outcome of DMRB Stage 1 for Hardmuir – Fochabers was to take Improvement Strategy Option B & Option N forward to DMRB Stage 2



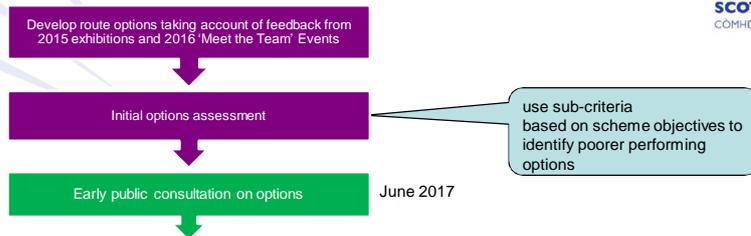
Improvement Strategy Option B (Red)

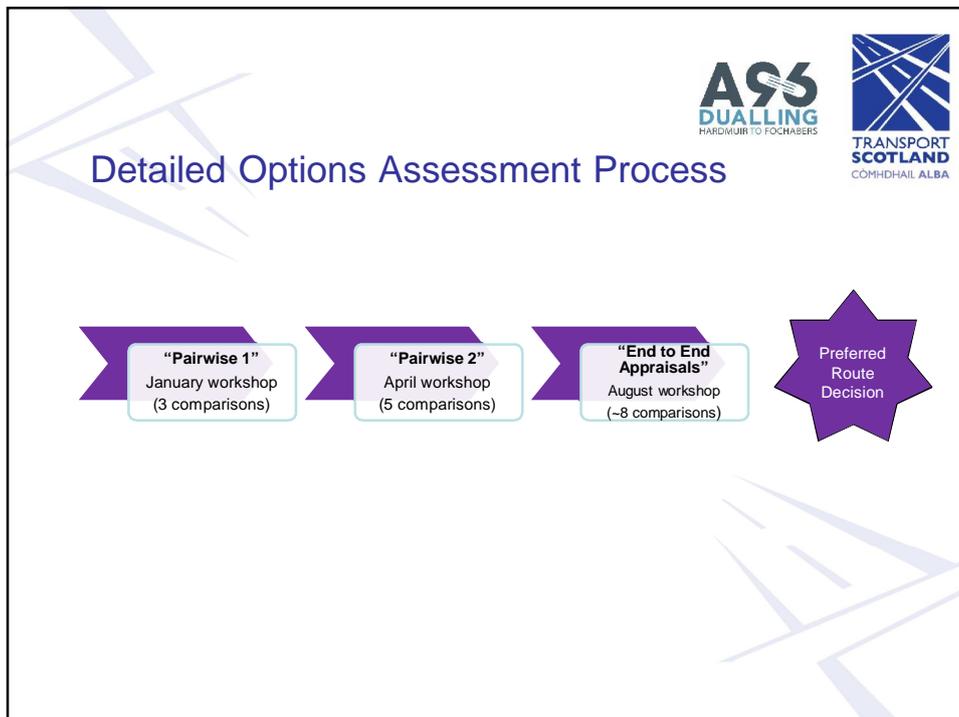
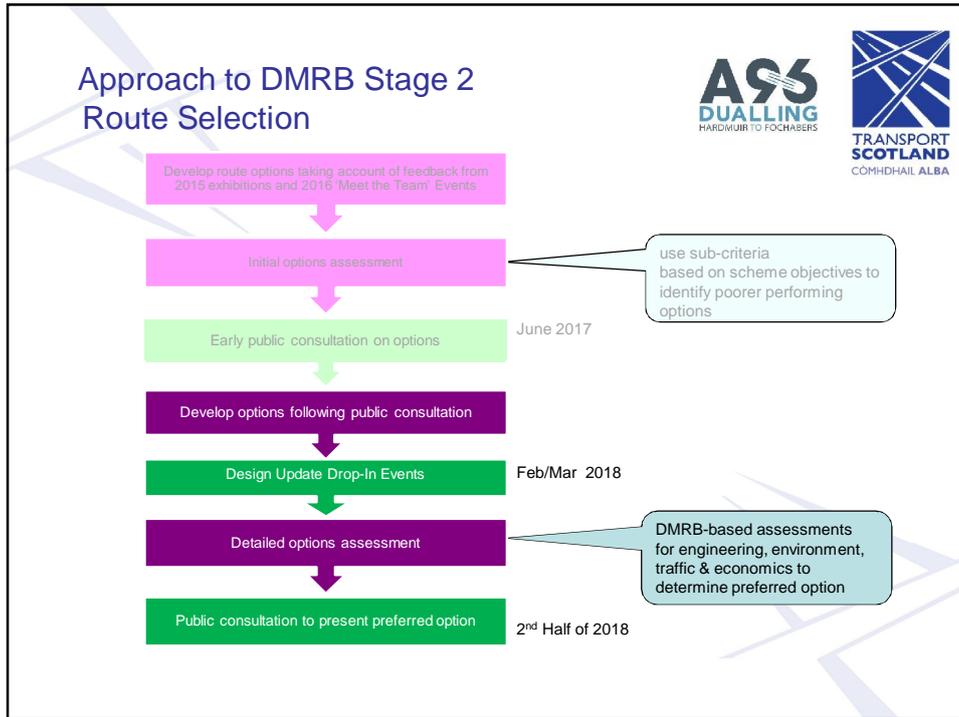
Improvement Strategy Option N (Green)

Primarily following existing A96 corridor with offline bypasses, likely to be offline within existing corridor with A96 retained as local road

Offline from west of Forres to south of Fochabers

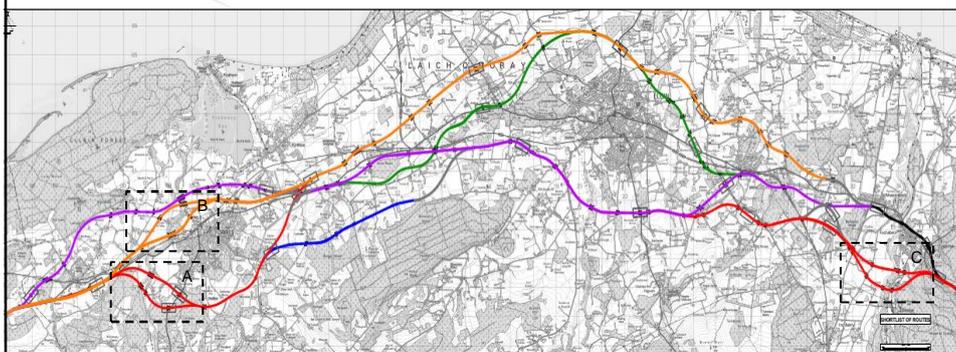
Approach to DMRB Stage 2 Route Selection





Pairwise Round 1

A96
DUALLING
HARDMUIR TO FOCHABERS



Workshop Process

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- To present a series of paired elements in five specific areas;
- The workshop objective is to ratify which elements are taken forward in the preferred option selection process;
- The decisions are informed by :
 - engineering assessments;
 - traffic / economic assessments; and
 - environmental assessments.
- The reason(s) for selecting a particular element is documented in the workshop handbook.

Options Design Development



- feedback from consultations (public, statutory bodies, landowners, etc);
- three-dimensional geometric design of mainline, junctions and side roads;
- consideration of Non-Motorised Users (NMUs);
- preliminary drainage design;
- outputs from flood models to identify suitable structural forms for major river crossings;
- optimisation of junction locations using the A96 CRAM traffic model; and
- interaction with environmental / landscape specialists in optimising alignments and junction layouts.

Engineering Assessment



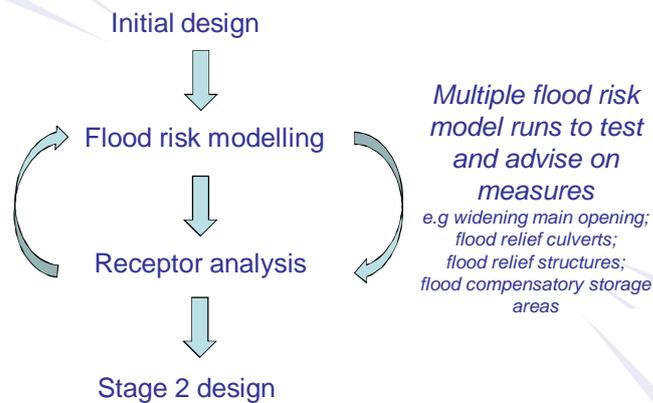
- The development of the designs is in accordance with the DMRB.
- River crossings have been designed to avoid significant flood impacts.
- Cost estimates provide the main differentiating factor between elements.
- Considered that elements can be developed using value engineering at Stage 3

Cost Estimates



- Rates derived from other schemes and/or Spons 2017;
- Costs quoted at 2014 prices;
- Earthworks designs have 1:3 side slopes in cut and fill;
- Consideration of haul distances with differing import rates;
- Land values (per hectare) provided by District Valuer; and
- Optimism Bias:
 - 44% for pairwise assessments
 - 25% for end to end assessments that will have quantified risk assessments

A96HF - Option Modelling Process



Traffic / Economic Assessment



- Forecast traffic flows for each pairwise section have been produced to inform noise and air quality modelling.
- Traffic model outputs for the do-minimum (no scheme) and do-something (with scheme) scenarios have been used to calculate benefits of:-
 - journey time savings (using TUBA) and
 - accidents savings (using COBALT).
- By comparing the additional benefits and additional costs the element with the best value for money can be identified.

Environmental Assessment



Adapted from Environmental Impact Assessment (EIA) methodology, drawing on relevant guidance from DMRB Volume 11.

The assessment is structured according to the key environment topics drawn from DMRB which are reported in two groupings:

- Communities and People
- Natural and Cultural Heritage

The significance of an effect results from the interaction between its magnitude and the value of the resource or the number and sensitivity of those people who might be affected. Effects are categorised into:

- none or negligible: no detectable change to the environment
- minor: a detectable but non-material change to the environment
- moderate: a material and important but non-fundamental change to the environment
- major: a fundamental change to the environment and a principal consideration

Effects categorised as being moderate or major are considered to be significant.

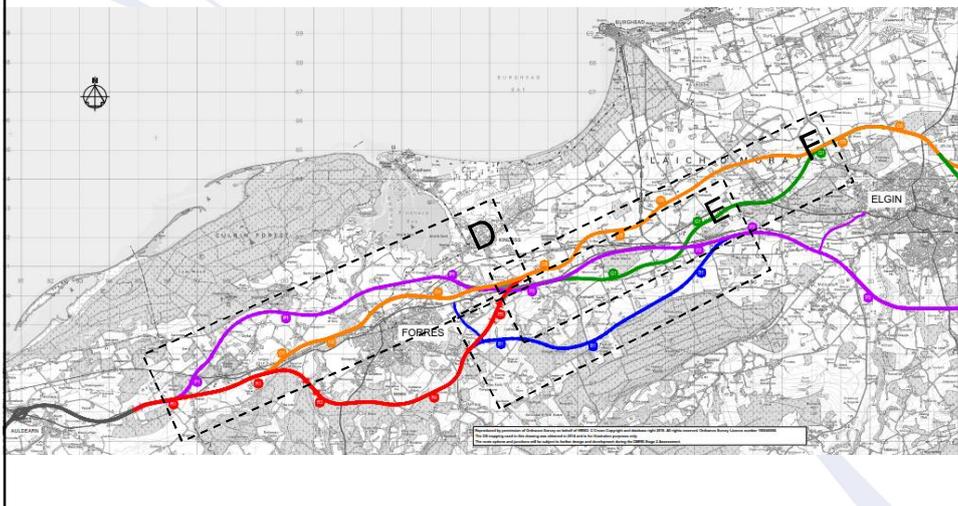
Assessment Framework



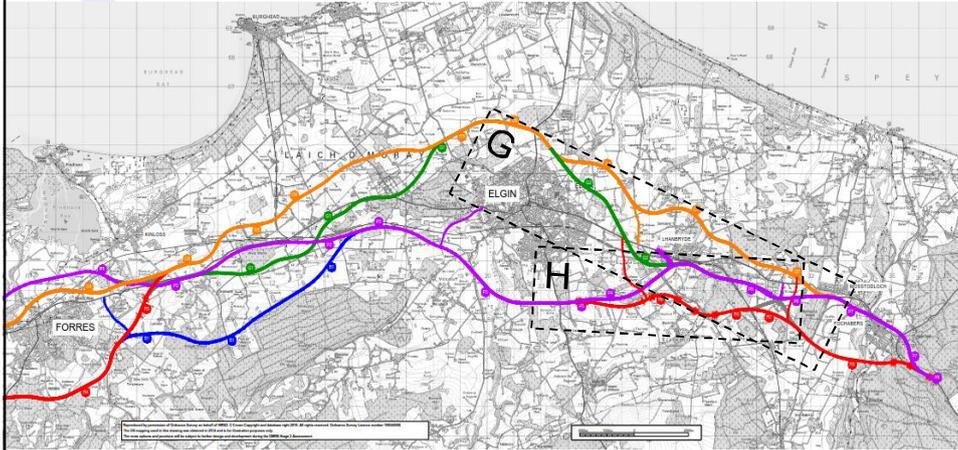
The engineering, environmental and traffic/economic findings are drawn together into a multi-disciplinary framework for determining the option to be taken forward for each pairwise comparison. The following colour coding has been to indicate preferences for each paired element:

	Clear preference
	Slight preference
	No preference

Route Options for Public Consultation showing Pairwise Round 2 Locations

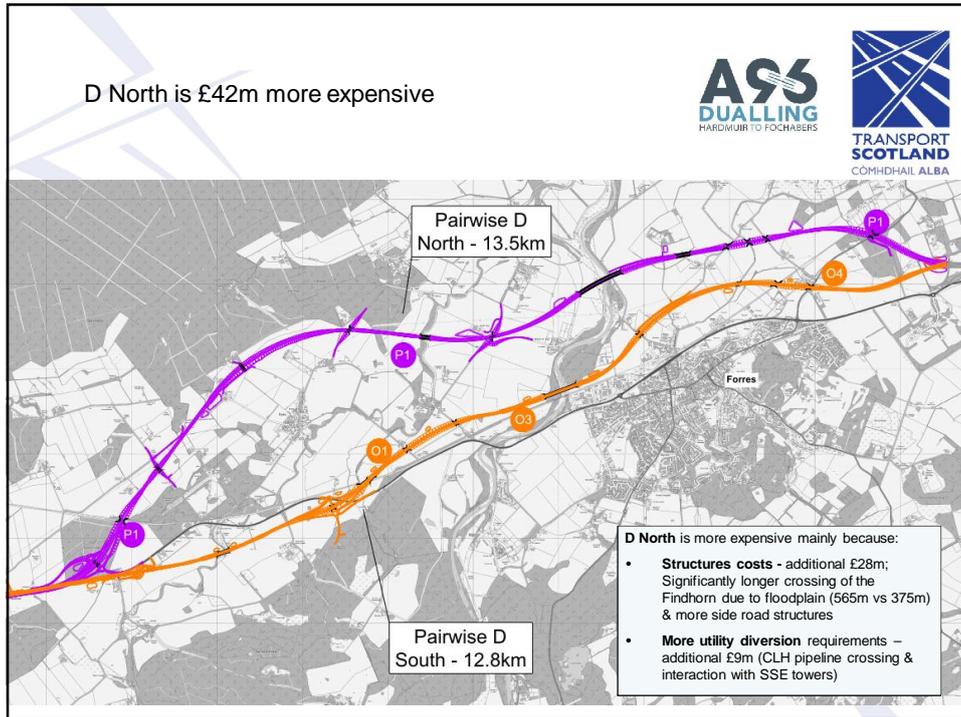


Route Options for Public Consultation
showing Pairwise Round 2 Locations



Pairwise D
D North (Purple) vs D South (Orange)





Pairwise D – Air Quality & Noise



Topic	D North	D South	Preference
Air Quality (Opening Year)	<ul style="list-style-type: none"> Approx. 970 receptors with minor beneficial change Approx. 70 receptors with minor adverse change 	<ul style="list-style-type: none"> Approx. 960 receptors with minor beneficial change Approx. 40 receptors with minor adverse change 	No preference
Noise & Vibration (Opening Year)	<ul style="list-style-type: none"> Approx. 190 dwellings with significant adverse traffic noise impacts (170 major) Approx. 300 dwellings with significant beneficial traffic noise impacts (70 major) 	<ul style="list-style-type: none"> Approx. 480 dwellings with significant adverse traffic noise impacts (120 major) Approx. 180 dwellings with significant beneficial traffic noise impacts (80 major) 	D North

Pairwise D – People & Communities



Topic	D North	D South	Preference
People & Communities	<ul style="list-style-type: none"> Amenity affected on 11 NMU routes, of which 3 would have increased journey length Alteration of route serving 1 property Loss of approx. 2ha woodland used by community & increase in journey length on paths accessing Culbin Forest and Brodie Castle areas 	<ul style="list-style-type: none"> Amenity affected on 9 NMU routes, of which 8 have increased journey length Alteration of route serving 2 properties Increased journey length on NMU route from Forres to Broom of Moy 	D South
Agriculture, Forestry & Sporting	<ul style="list-style-type: none"> Loss of approx. 146ha agricultural land of which approx. 80ha prime land Adverse effects on 16 farm/forest/equestrian units (4 major) 	<ul style="list-style-type: none"> Loss of approx. 117ha agricultural land of which approx. 82ha prime land Adverse effects on 15 farm/forest units (4 major) 	D South

Pairwise D – Policy, Materials & Visual Effects



Topic	D North	D South	Preference
Policies & Plans	<ul style="list-style-type: none"> No material effects on LDP sites or planning applications 	<ul style="list-style-type: none"> Land take from LDP industrial site at Springfield East, Forres 	D North
Materials	<ul style="list-style-type: none"> Materials required for road pavement (13.5km mainline & 8.7km side roads) and structures (deck area 30,000m²) Bulk earthworks 3.3Mm³ (incl. import 1.6Mm³) 	<ul style="list-style-type: none"> Materials required for road pavement (12.8km mainline & 7.1km side roads) and structures (deck area 21,100m²) Bulk earthworks 2.3Mm³ (incl. import 2.0Mm³) 	D South
Visual	<ul style="list-style-type: none"> Significant adverse visual effects on isolated residential receptors and recreational routes in a generally open landscape 	<ul style="list-style-type: none"> Significant adverse visual effects on isolated residential receptors and recreational routes, partly contained by built structures and the existing A96 	D South

Pairwise D – Communities & People: Summary



Topic	Preference	Reasons
Air Quality		
Traffic Noise	D North	Fewer significant adverse noise effects overall
People & Communities	D South	Less effects on NMU routes accessing woodland areas used by community and greater relief of community severance
Agriculture	D South	Less overall loss of farm land and fewer adverse effects on farm units
Policies & Plans	D North	Avoids impact on designated industrial development site
Materials	D South	Shorter road length and smaller deck area for structures. Higher import required but lower overall bulk earthworks
Visual	D South	Fewer significant effects on sensitive receptors
Overall – Communities & People	D South	Clear Preference for D South due to fewer effects on NMUs, community severance, visual amenity, agriculture and less materials requirement

Pairwise D – Cultural Heritage, Landscape & Nature Conservation



Topic	D North	D South	Preference
Cultural Heritage	<ul style="list-style-type: none"> Predicted significant effects on setting of Brodie Castle GDL Significant setting effects on Category A listed Inverene (house) and Grange Hall and on four Category B listed buildings 	<ul style="list-style-type: none"> Predicted significant setting effects on Category A listed Grange Hall and on five Category B listed buildings Impacts archaeological site at Waterford Road 	D South
Landscape	<ul style="list-style-type: none"> Significant adverse landscape effects from contrast to rural character of route in west and contrast to open landscape of Findhorn Bay in east 	<ul style="list-style-type: none"> Significant adverse landscape effects particularly from loss of historic trees at Darnaway & Grange Hall and from elevated route sections 	D South
Nature Conservation	<ul style="list-style-type: none"> Loss of approx. 23ha ancient woodland and approx. 6ha native woodland Species dispersal barrier of road exacerbated by loss of Hardmuir Wood Proximity to coastal SPA sites and Culbin Forest SSSI 	<ul style="list-style-type: none"> Loss of approx. 3.5ha ancient woodland and approx. 4ha native woodland Proximity to coastal SPAs and Darnaway & Lethen Forest SPA 	D South

Pairwise D – Geology & Water



Topic	D North	D South	Preference
Geology, Soils, Contaminated Land & Groundwater	<ul style="list-style-type: none"> Potential contamination associated with former landfill at Waterford Road in proximity to route Risk of effects on hydrogeology and private water supplies, including to coastal SSSIs 	<ul style="list-style-type: none"> Risk of effects on hydrogeology and private water supplies, including in vicinity of Benromach Distillery 	D South
Road Drainage & Water Environment	<ul style="list-style-type: none"> Potential effect on river geomorphology at Findhorn crossing 	<ul style="list-style-type: none"> No significant effects 	D South

Pairwise D – Natural & Cultural Environment: Summary



Topic	Preference	Reasons
Cultural Heritage	D South	Avoids effects on Brodie Castle GDL and Category A listed buildings
Landscape	D South	Less imposing on sensitive landscapes
Nature Conservation	D South	Less woodland loss which provides habitat connectivity from Darnaway to Culbin Forests and more remote from Natura sites
Geology, Soils, CL & Groundwater	D South	Further from potential sources of contamination at former landfill site on Waterford Road
RDWE	D South	Lower risk of morphological effects at river crossing
Overall – Natural & Cultural Environment	D South	Clear Preference for D South which has lower landscape, ecological and cultural heritage effects and lower risk of effects on the water environment

Pairwise D - Summary



Topic		Preference		Comments
		North	South	
Environment	Communities & People		D (S)	Clear Preference for D South due to fewer effects on NMUs, community severance, visual amenity, agriculture and less materials requirement
	Natural & Cultural Heritage		D (S)	Clear Preference for D South which has less landscape, ecological and cultural heritage effects and lower risk of effects on the water environment
Engineering (cost)			D (S)	Clear Preference for D South due to cost differential (£42M). D South provides River Findhorn crossing location that has least effect on flood plain.
Traffic / Economic (NPV)			D (S)	Clear Preference for D South as it provides best value with effective transfer of traffic from existing network and significantly higher relief to existing A96 at Brodie.
Overall Preference			D (S)	D South is Clear Preference

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TRANSPORT SCOTLAND
COMHDAIL ALBA

Pairwise E

E North (Red/Purple) vs E South (Blue)

E South is £17m more expensive

A96
DUALING
HARDMUIR TO FOCHABERS

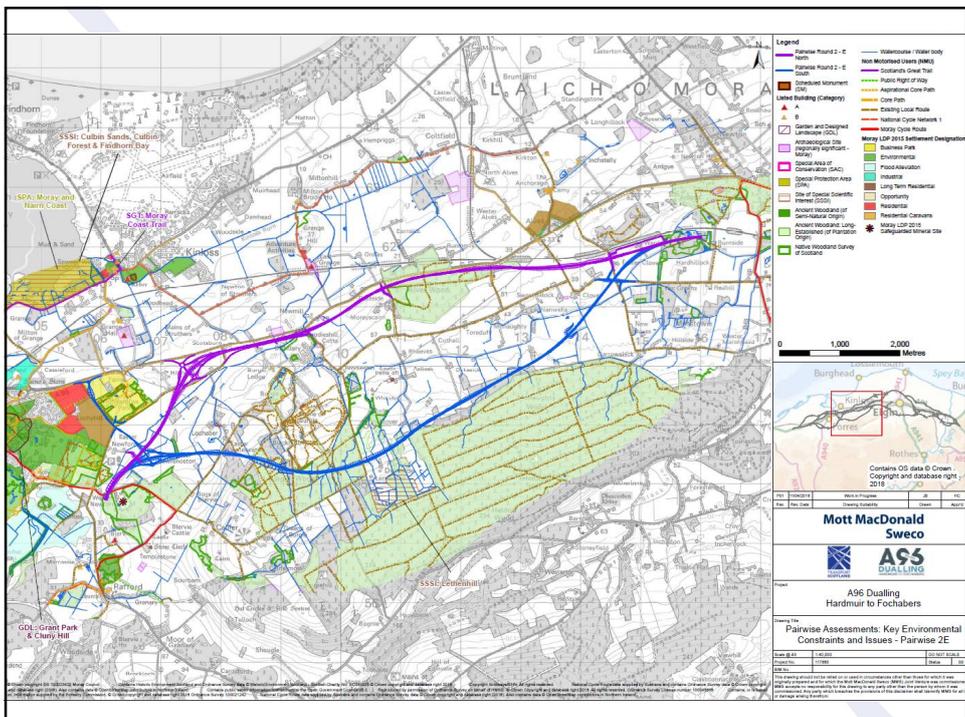
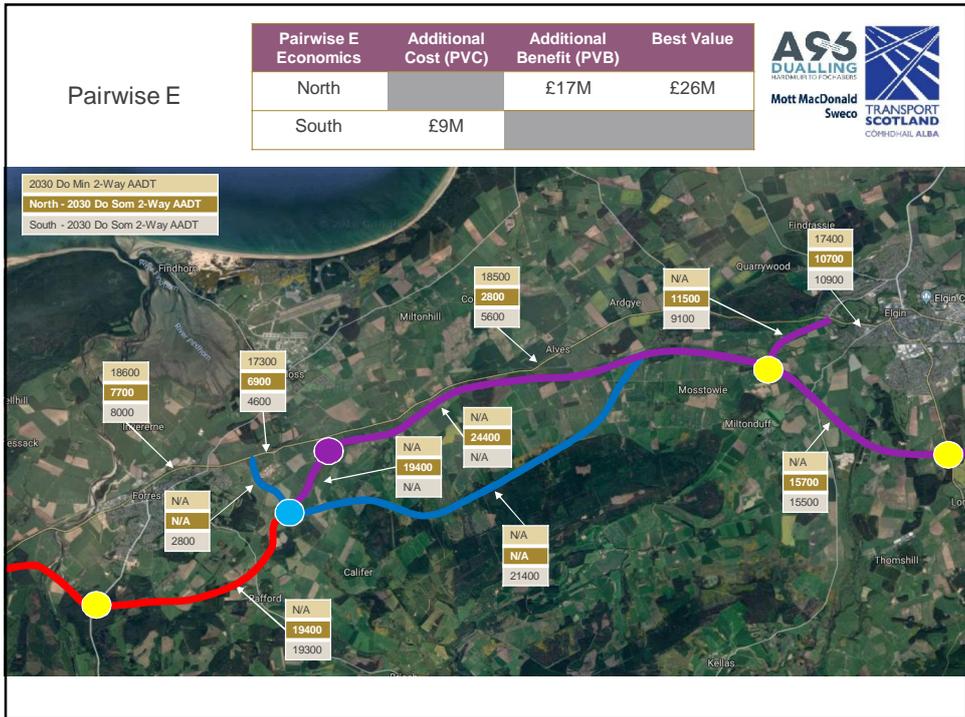
TRANSPORT SCOTLAND
COMHDAIL ALBA

E South is more expensive mainly because:

- Significantly **more earthworks** (earthworks cost + £15m)

Pairwise E North - 11.6km

Pairwise E South - 11.7km





Pairwise E – Air Quality & Noise



Topic	E North	E South	Preference
Air Quality (Opening Year)	<ul style="list-style-type: none"> Approx. 170 receptors with minor beneficial change Approx. 70 receptors with minor adverse change 	<ul style="list-style-type: none"> Approx. 170 receptors with minor beneficial change 50 receptors with minor adverse change 	No preference
Noise & Vibration (Opening Year)	<ul style="list-style-type: none"> Approx. 150 dwellings with significant adverse traffic noise impacts (130 major) Approx. 220 dwellings with significant beneficial traffic noise impacts (90 major) 	<ul style="list-style-type: none"> Approx. 110 dwellings with significant adverse traffic noise impacts (100 major) Approx. 270 dwellings with significant beneficial traffic noise impacts (100 major) 	E South

Pairwise E – People & Communities



Topic	E North	E South	Preference
People & Communities	<ul style="list-style-type: none"> Amenity affected on 6 NMU routes, of which 5 would have increased journey length Loss of approx. 16ha land used by community including at Alves Wood 	<ul style="list-style-type: none"> Amenity affected on 25 NMU routes, of which 12 would have increased journey length Loss of approx. 33ha land used by community at Burgie Wood and Monaughty Wood 	E North
Agriculture, Forestry & Sporting	<ul style="list-style-type: none"> Loss of approx. 116ha agricultural land of which approx. 36ha prime land Adverse effects on 13 farm/forest units (2 major) 	<ul style="list-style-type: none"> Loss of approx. 128ha agricultural land of which approx. 9ha prime land Adverse effects on 13 farm/forest units (3 major) 	No Preference

Pairwise E – Policy, Materials & Visual Effects



Topic	E North	E South	Preference
Policies & Plans	<ul style="list-style-type: none"> Minor land take from access to 1 residential planning application site at Easter Cloves 	<ul style="list-style-type: none"> Minor land take from LDP housing site at Lochyhill and from 2 industrial sites at Forres Enterprise Park 	E North
Materials	<ul style="list-style-type: none"> Materials required for road pavement (11.6km mainline & 7.3km side roads) and structures (deck area 5,200m²) Bulk earthworks 2.1Mm³ (incl. import 1.0Mm³) 	<ul style="list-style-type: none"> Materials required for road pavement (11.7km mainline & 7.2km side roads) and structures (deck area 4,700m²) Bulk earthworks 2.9Mm³ (incl. import 1.3Mm³) 	E North
Visual	<ul style="list-style-type: none"> Significant visual effects on isolated residential receptors. Effects are lessened due to proximity to existing A96, consistent elevation which limits visibility within surrounding area and some woodland screening 	<ul style="list-style-type: none"> Partial screening by woodland, however elevated position on north facing slopes would expose some of route's extent to extensive visibility to visual receptors to the north 	E North

Pairwise E – Communities & People: Summary



Topic	Preference	Reasons
Air Quality		
Traffic Noise	E South	Fewer adverse noise effects
People & Communities	E North	Lower loss of land used by community, particularly woodlands and less effect on NMUs
Agriculture		E North affects more prime land, E South significantly affects more farm units
Policies & Plans	E North	Avoids impact on designated housing and industry LDP sites
Materials	E North	Lower bulk earthworks and import requirement
Visual	E North	Fewer sensitive receptors affected
Overall – Communities & People	E North	Clear Preference for E North which has lower effects on NMUs, policy, materials and visual amenity

Pairwise E – Cultural Heritage, Landscape & Nature Conservation



Topic	E North	E South	Preference
Cultural Heritage	<ul style="list-style-type: none"> Predicted significant effects on setting of Category B listed Cathay House Gate Lodge and Alves Parish Church 	<ul style="list-style-type: none"> Predicted significant effects on setting of Category B listed Cathay House Gate Lodge 	E South
Landscape	<ul style="list-style-type: none"> Significant adverse landscape effects from dominance of infrastructure and imposition on strath floor at Lawrenceton 	<ul style="list-style-type: none"> Significant adverse landscape effects particularly from imposition of western junction and on strath floor and cutting through Burgie Wood 	E North
Nature Conservation	<ul style="list-style-type: none"> Loss of approx. 14.5ha ancient woodland and approx. 2.5ha native woodland 	<ul style="list-style-type: none"> Loss of approx. 21ha ancient woodland and approx. 4.5ha native woodland Potential disturbance to Lethenhill SSSI 	E North

Pairwise E – Geology & Water



Topic	E North	E South	Preference
Geology, Soils, Contaminated Land & Groundwater	<ul style="list-style-type: none"> Risk of effects on hydrogeology and private water supplies, including to Glenburgie Distillery 	<ul style="list-style-type: none"> Risk of effects on hydrogeology and private water supplies, including at Glenburgie Distillery and Burgie Estate 	No Preference
Road Drainage & Water Environment	<ul style="list-style-type: none"> No significant effects 	<ul style="list-style-type: none"> No significant effects 	No preference

Pairwise E – Natural & Cultural Environment: Summary



Topic	Preference	Reasons
Cultural Heritage	E South	Avoids effects on Category B listed Alves Church
Landscape	E North	Closer relationship to existing infrastructure and less imposing on open landscapes and hill landforms
Nature Conservation	E North	Lower loss of woodlands and avoids effects of Lethenhill SSSI
Geology, Soils, CL & Groundwater		No preference
RDWE		No preference
Overall – Natural & Cultural Environment	E North	Clear Preference for E North which has less ecological and landscape effect

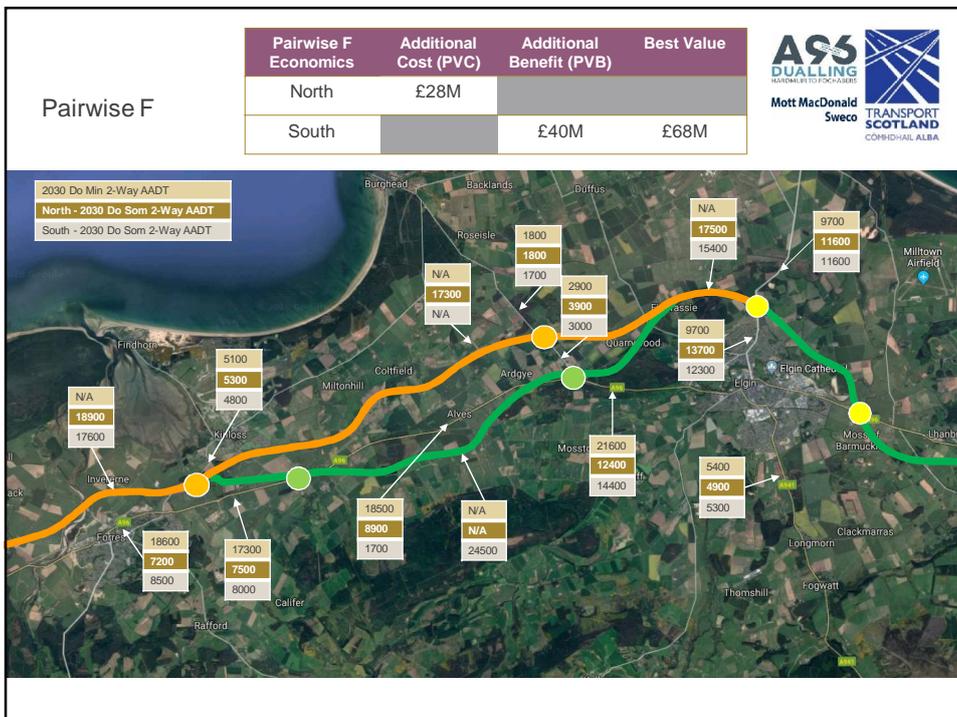
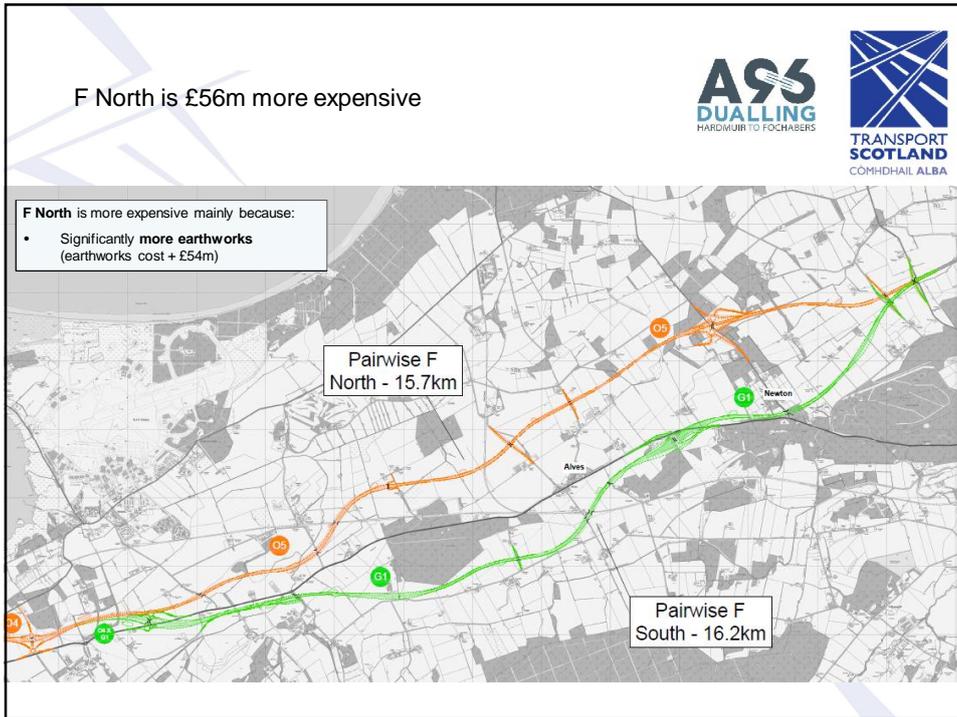
Pairwise E - Summary

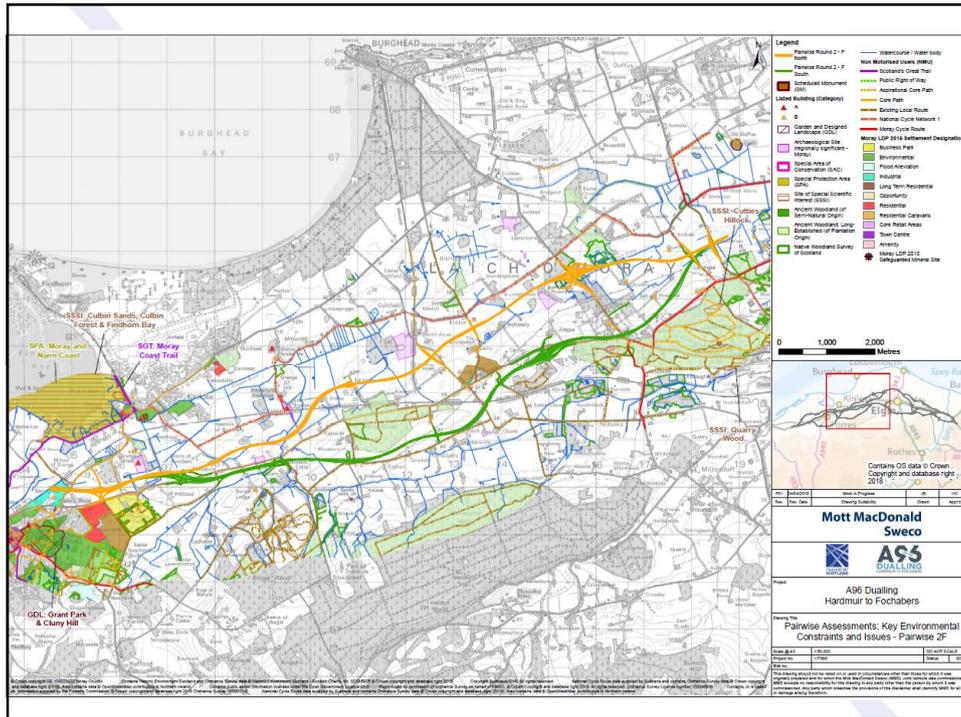


Topic		Preference		Comments
		North	South	
Environment	Communities & People	E (N)		Clear Preference for E North which has lower effects on NMUs, community land, policy, materials and visual amenity
	Natural & Cultural Heritage	E (N)		Clear Preference for E North which has lower ecological and landscape effects
Engineering (cost)		E (N)		Slight Preference for E North due to cost differential (£17M) driven by significantly less earthworks.
Traffic / Economic (NPV)		E (N)		Clear Preference for E North which provides best value and results in higher transfer of traffic from local road network
Overall Preference		E (N)		E North is Clear Preference



Pairwise F F North (Orange) vs F South (Green)





Pairwise F – Air Quality & Noise



Topic	F North	F South	Preference
Air Quality (Opening Year)	<ul style="list-style-type: none"> Approx. 2,230 receptors with minor beneficial change Approx. 270 receptors with minor adverse change 	<ul style="list-style-type: none"> Approx. 2,220 receptors with minor beneficial change Approx. 300 receptors with minor adverse change 	No preference
Noise & Vibration (Opening Year)	<ul style="list-style-type: none"> Approx. 760 dwellings with significant adverse traffic noise impacts (360 major) Approx. 490 dwellings with significant beneficial traffic noise impacts (0 major) 	<ul style="list-style-type: none"> Approx. 750 dwellings with significant adverse traffic noise impacts (280 major) Approx. 340 dwellings with significant beneficial traffic noise impacts (70 major) 	F South

Pairwise F – People & Communities



Topic	F North	F South	Preference
People & Communities	<ul style="list-style-type: none"> Amenity affected on 3 NMU routes, of which 1 would have increased journey length Alteration of route serving 17 properties at Cassieford 	<ul style="list-style-type: none"> Amenity affected on 5 NMU routes, of which 1 would have increased journey length Alteration of route serving 12 properties at Burgie 	No preference
Agriculture, Forestry & Sporting	<ul style="list-style-type: none"> Loss of approx. 163ha agricultural land of which approx. 73ha prime land Adverse effects on 20 farm/forest units (4 major) 	<ul style="list-style-type: none"> Loss of approx. 183ha agricultural land of which approx. 134ha prime land Adverse effects on 22 farm/forest/equestrian units (6 major) 	F North

Pairwise F – Policy, Materials & Visual Effects



Topic	F North	F South	Preference
Policies & Plans	<ul style="list-style-type: none"> Moderate land take from LDP employment site at Springfield East 	<ul style="list-style-type: none"> Moderate land take from LDP employment site at Springfield East Loss of site with planning consent for a house at Beechbrae 	F North
Materials	<ul style="list-style-type: none"> Materials required for road pavement (15.7km mainline & 11.5km side roads) and structures (deck area 7,600m²) Bulk earthworks 3.0Mm³ (incl. import 2.5Mm³) 	<ul style="list-style-type: none"> Materials required for road pavement (16.2km mainline & 11.3km side roads) and structures (deck area 10,100m²) Bulk earthworks 4.4Mm³ (incl. export 0.2Mm³) 	F South
Visual	<ul style="list-style-type: none"> Significant visual effects on isolated residential receptors and some recreational routes. Road located on embankment for much of its length 	<ul style="list-style-type: none"> Significant visual effects on isolated residential receptors and some recreational routes. Located in a slightly undulating landscape and partly located close to the existing A96 	F South

Pairwise F – Communities & People: Summary



Topic	Preference	Reasons
Air Quality		No preference
Traffic Noise	F South	Fewer adverse and more major beneficial impacts
People & Communities		Similar effects on NMUs
Agriculture	F North	Less overall loss of farm land and fewer adverse effects on farm units
Policies & Plans	F North	Avoids impact on site with consent for new house
Materials	F South	Larger deck area for structures but much less requirement for import of fill
Visual	F South	Fewer adverse visual effects
Overall – Communities & People		No preference. F North has greater noise, materials & visual effects but less effect on agriculture and planning

Pairwise F – Cultural Heritage, Landscape & Nature Conservation



Topic	F North	F South	Preference
Cultural Heritage	<ul style="list-style-type: none"> Predicted significant effects on setting of 6 Category B listed buildings 	<ul style="list-style-type: none"> Predicted significant effects on setting of 3 Category B listed buildings 	F South
Landscape	<ul style="list-style-type: none"> Significant adverse landscape effects particularly from spatial obstruction on embankments and from contrast to historic landscape pattern at Westerfield 	<ul style="list-style-type: none"> Significant adverse landscape effects with particular effects from intrusion within Monaughty Strath, loss of mature trees at Newton and contrast with landscape pattern at Quarrelwood 	F North
Nature Conservation	<ul style="list-style-type: none"> Loss of approx. 0.5ha ancient woodland and approx. 3ha native woodland Barn owl and corn bunting close to the route 	<ul style="list-style-type: none"> Loss of approx. 1.5ha native woodland Barn owl close to the route 	F South

Pairwise F – Geology & Water



Topic	F North	F South	Preference
Geology, Soils, Contaminated Land & Groundwater	<ul style="list-style-type: none"> Risk of effects on hydrogeology and private water supplies 	<ul style="list-style-type: none"> Risk of effects on hydrogeology and private water supplies, including at Glenburgie Distillery and down gradient of cutting at Rosebrae/Ardgye 	No preference
Road Drainage & Water Environment	<ul style="list-style-type: none"> No significant effects 	<ul style="list-style-type: none"> No significant effects 	No preference

Pairwise F – Natural & Cultural Environment: Summary



Topic	Preference		Reasons
Cultural Heritage		F South	Fewer setting effects on Category B listed buildings
Landscape	F North		Better fit with landscape scale, pattern and landform and less imposing on enclosed spaces
Nature Conservation		F South	Less woodland habitat loss
Geology, Soils, CL & Groundwater			Potential hydrogeological effects with both options
RDWE			No predicted significant effects
Overall – Natural & Cultural Environment			No preference. F South has less effect on cultural heritage and habitat loss, F North less landscape effect

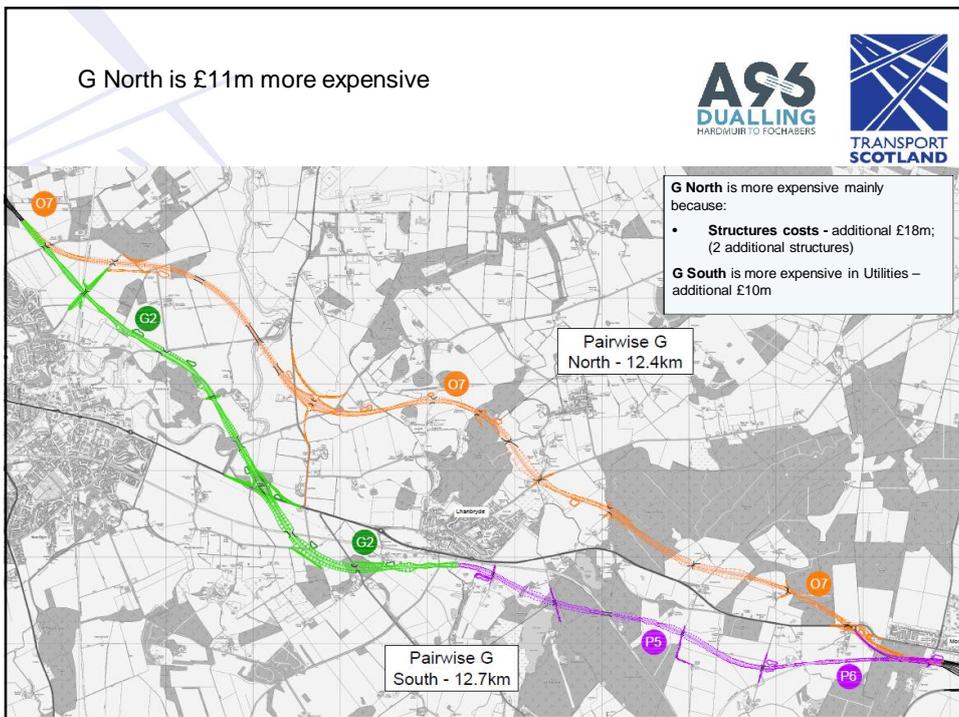
Pairwise F - Summary

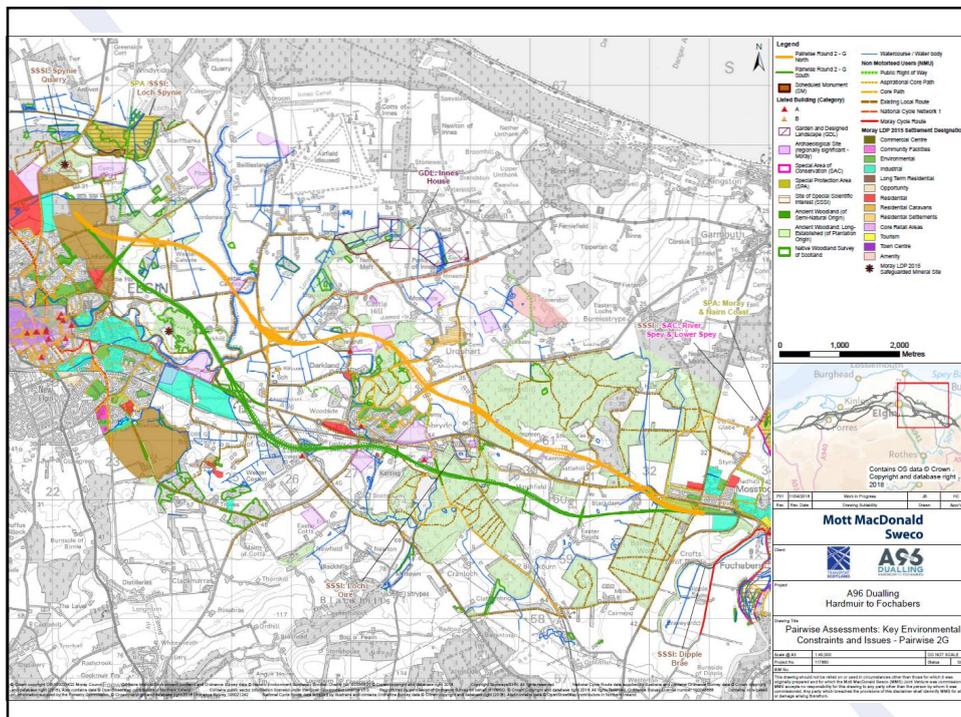
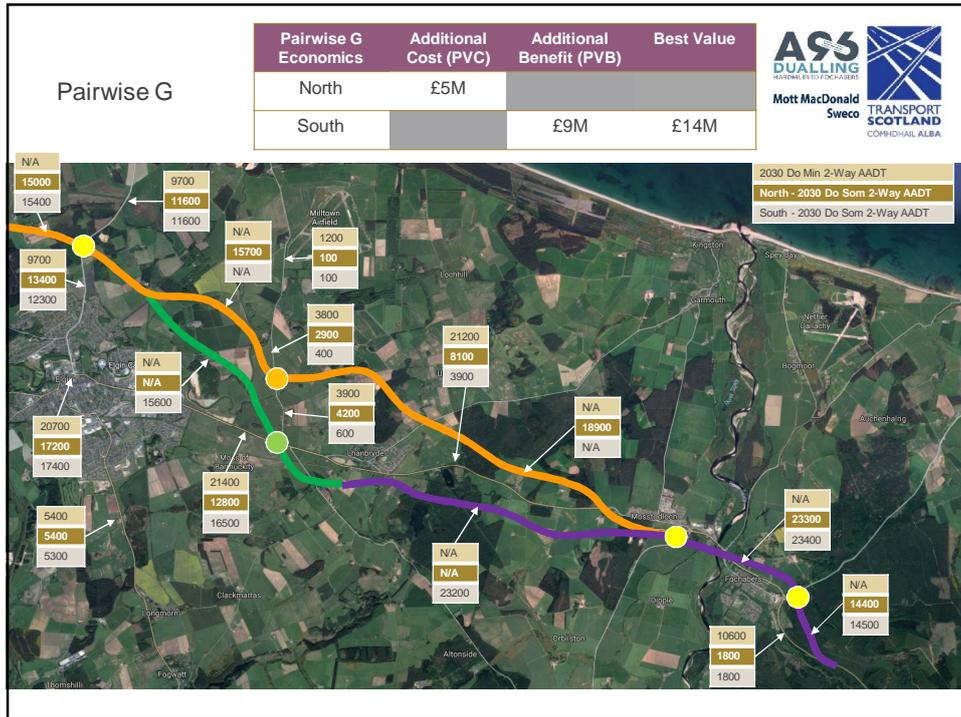


Topic		Preference		Comments
		North	South	
Environment	Communities & People			No preference. F North has greater noise, materials & visual effects. F South has more effect on agriculture and planning
	Natural & Cultural Heritage			No preference. F South has less effect on cultural heritage and habitat loss, F North less landscape effect
Engineering (cost)			F (S)	Clear Preference for F South due to cost differential (£56M) driven by significantly less earthworks.
Traffic / Economic (NPV)			F (S)	Clear Preference for F South as it provides best value and results in a larger transfer of traffic from the existing road network.
Overall Preference			F (S)	F South is Clear Preference



Pairwise G G North (Orange) vs G South (Green/Purple)







Pairwise G – Air Quality & Noise



Topic	G North	G South	Preference
Air Quality (Opening Year)	<ul style="list-style-type: none"> Approx. 3,100 receptors with minor beneficial change Approx. 1,080 receptors with minor adverse change 	<ul style="list-style-type: none"> Approx. 3,400 receptors with minor beneficial change Approx. 470 receptors with minor adverse change 	No preference
Noise & Vibration (Opening Year)	<ul style="list-style-type: none"> Approx. 910 dwellings with significant adverse traffic noise impacts (320 major) Approx. 520 dwellings with significant beneficial traffic noise impacts (30 major) 	<ul style="list-style-type: none"> Approx. 1,310 dwellings with significant adverse traffic noise impacts (250 major) Approx. 510 dwellings with significant beneficial traffic noise impacts (150 major) 	G South

Pairwise G – People & Communities



Topic	G North	G South	Preference
People & Communities	<ul style="list-style-type: none"> Amenity affected on 13 NMU routes, of which 6 would have increased journey length Loss of approx. 23ha woodland used by community at Crooked Wood, Sleepieshill Wood and Balnacoul Wood 	<ul style="list-style-type: none"> Amenity affected on 13 NMU routes, of which 9 would have increased journey length Loss of approx. 18ha woodland used by community at Loch na Bo and Kirkhill Wood 	G South
Agriculture, Forestry & Sporting	<ul style="list-style-type: none"> Loss of approx. 167ha agricultural land of which approx. 32ha prime land Adverse effects on 18 farm/forest units (4 major) 	<ul style="list-style-type: none"> Loss of approx. 160ha agricultural land of which approx. 11ha prime land Adverse effects on 21 farm/forest units (5 major) 	No preference

Pairwise G – Policy, Materials & Visual Effects



Topic	G North	G South	Preference
Policies & Plans	<ul style="list-style-type: none"> Moderate land take from amenity green space at Mosstodloch and minor land take from 3 other LDP sites 	<ul style="list-style-type: none"> Minor land take from 4 LDP sites 	G South
Materials	<ul style="list-style-type: none"> Materials required for road pavement (12.4km mainline & 7.1km side roads) and structures (deck area 19,400m²) Bulk earthworks 3.8Mm³ (incl. import 1.0Mm³) 	<ul style="list-style-type: none"> Materials required for road pavement (12.7km mainline & 6.7km side roads) and structures (deck area 15,600m²) Bulk earthworks 3.7Mm³ (incl. import 1.6Mm³) 	G South
Visual	<ul style="list-style-type: none"> Significant adverse visual effects on isolated residential receptors and recreational routes 	<ul style="list-style-type: none"> Significant adverse visual effects on isolated residential receptors and recreational routes 	No preference

Pairwise G – Communities & People: Summary



Topic	Preference	Reasons
Air Quality		No Preference
Traffic Noise	G South	Fewer major adverse noise impacts and more major beneficial impacts
People & Communities	G South	Less effect on woodlands used by the community and less overall severance of communities
Agriculture		G North affects more prime land, G South significantly affects more farm units
Policies & Plans	G South	Less impact on designated LDP sites
Materials	G South	Smaller deck area for structures. Higher import of earthworks but most material would come from within A96 site
Visual		Similar effects on visual receptors
Overall – Communities & People	G South	Clear Preference for G South which has less major adverse noise effect and less effect on land used by the community, development sites and materials

Pairwise G – Cultural Heritage, Landscape & Nature Conservation



Topic	G North	G South	Preference
Cultural Heritage	<ul style="list-style-type: none"> Predicted significant setting effects on Category A listed Longhill Mill Direct effects on 2 archaeological sites at Easter Calcots and Longhill Mill 	<ul style="list-style-type: none"> Predicted significant setting effects on setting of scheduled monuments at Bogton Stone Circle and Coxton Tower (also a Category A listed building) and on Pittensair House (A Listed) Direct effects on 1 archaeological site at Lhanbryde 	G North
Landscape	<ul style="list-style-type: none"> Significant adverse landscape effects from prominence in open areas and contrast to undulating landform and settlement pattern near Longhill / Urquhart 	<ul style="list-style-type: none"> Significant adverse landscape effects particularly from cutting through distinctive features at Kirkhill/Sheriffston (including junction), loss of woodland features and imposition on landscape at Loch na Bo 	G North
Nature Conservation	<ul style="list-style-type: none"> Loss of approx. 22.5ha ancient woodland and approx. 1.5ha native woodland 	<ul style="list-style-type: none"> Loss of approx. 17ha ancient woodland and approx. 3.5ha native woodland Habitat disturbance / severance effects to woodland between Loch Oire SSSI and Loch na Bo 	G North

Pairwise G – Geology & Water



Topic	G North	G South	Preference
Geology, Soils, Contaminated Land & Groundwater	<ul style="list-style-type: none"> Risk of effects on hydrogeology and private water supplies, including to Evergreen and Muiryhall 	<ul style="list-style-type: none"> Risk of effects on hydrogeology and private water supplies, including to Wester Marchfield, Wester Bauds, Loch Oire SSSI and Loch na Bo Loss of approx. 1ha peat soils at Doo Hill 	G North
Road Drainage & Water Environment	<ul style="list-style-type: none"> No material changes in flood levels More complex mitigation required to control flood impacts than G South 	<ul style="list-style-type: none"> No material changes in flood levels 	G South

Pairwise G – Natural & Cultural Environment: Summary



Topic	Preference	Reasons
Cultural Heritage	G North	Fewer significant setting effects on standing monuments and listed buildings
Landscape	G North	Relates better to landscape scale and pattern despite local effects of junction in open area
Nature Conservation	G North	Avoids potentially greater habitat severance and disturbance effects
Geology, Soils, CL & Groundwater	G North	Avoids loss of peat soils
RDWE	G South	Less complex flood mitigation measures required
Overall – Natural & Cultural Environment	G North	Clear Preference for G North which has less effect on cultural heritage, ecology, landscape and soils

Pairwise G - Summary



Topic		Preference		Comments
		North	South	
Environment	Communities & People		G (S)	Clear Preference for G South which has less adverse noise effect and less effect on planning policy, land used by the community & materials
	Natural & Cultural Heritage	G (N)		Clear Preference for G North which has less effect on cultural heritage, ecology, landscape and soils
Engineering (cost)			G (S)	Slight Preference for G South as it is £11M less expensive. G South has least intrusion on flood plain and has greater opportunity for design development and mitigation
Traffic / Economic (NPV)			G (S)	Slight Preference for G South as it provides best value with higher traffic flows and a more efficient Elgin East junction location
Overall Preference			G (S)	G South is preferred



Pairwise H H North (Purple) vs H South (Red)

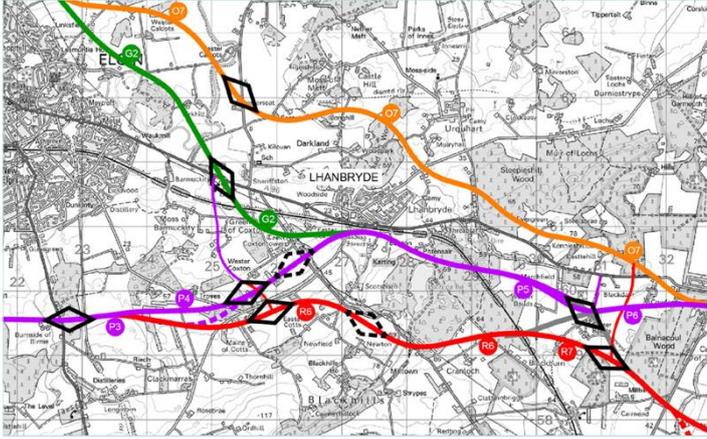
Pairwise H Introduction



A96
DUALLING
HARDUIR TO FOCHABERS



TRANSPORT SCOTLAND
CÒMHDHAIL ALBA



Elgin East Junction

- At February exhibition both Purple and Red show new link to East Road, Elgin
- On purple, opportunity identified to form junction closer to existing corridor at Lhanbryde
- Following traffic testing this solution adopted for Pairwise assessment

H South is £16m more expensive



A96
DUALLING
HARDUIR TO FOCHABERS

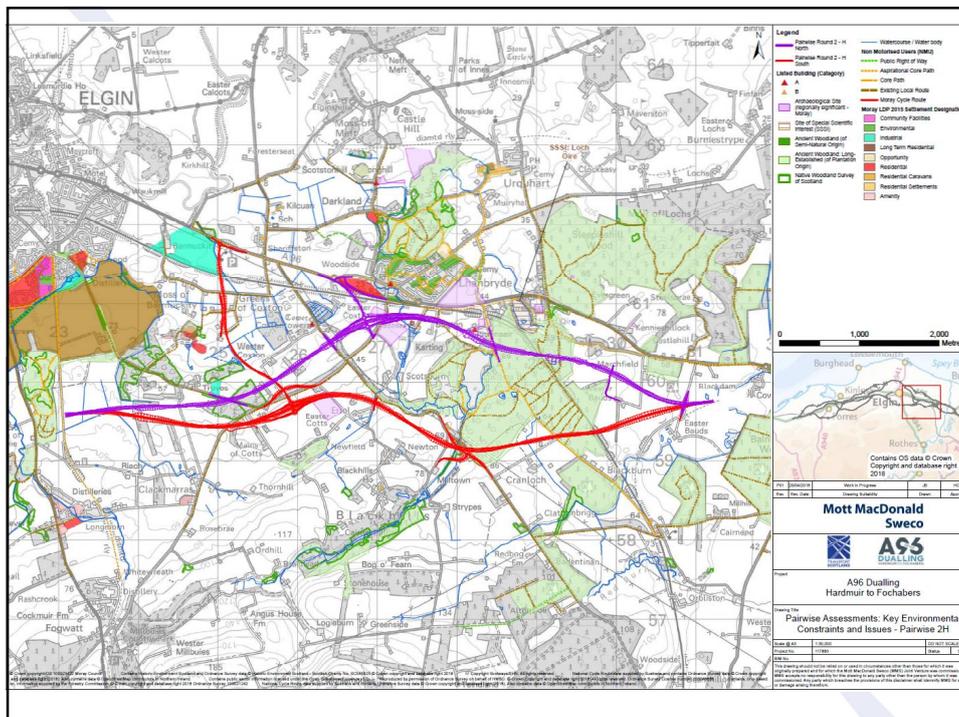
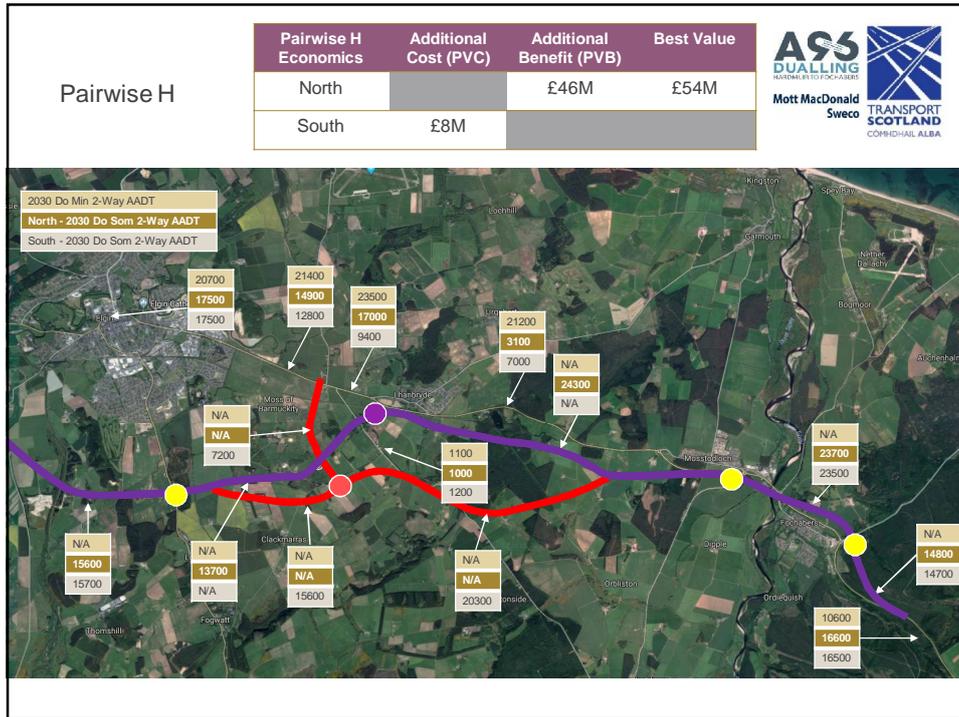


TRANSPORT SCOTLAND
CÒMHDHAIL ALBA

H South is more expensive mainly because:

- **Structures costs** - additional £3m; (2 additional structures)
- **More earthworks** - additional £5m; (200,000m³ import required)
- **More utility diversion** requirements - additional £2m







Pairwise H – Air Quality & Noise



Topic	H North	H South	Preference
Air Quality (Opening Year)	<ul style="list-style-type: none"> Approx. 500 receptors with minor beneficial change Approx. 100 receptors with minor adverse change 	<ul style="list-style-type: none"> Approx. 500 receptors with minor beneficial change Approx. 40 receptors with minor adverse change 	No preference
Noise & Vibration (Opening Year)	<ul style="list-style-type: none"> Approx. 350 dwellings with significant adverse traffic noise impacts (40 major) Approx. 140 dwellings with significant beneficial traffic noise impacts (70 major) 	<ul style="list-style-type: none"> Approx. 270 dwellings with significant adverse traffic noise impacts (50 major) Approx. 890 dwellings with significant beneficial traffic noise impacts (140 major) 	H South

Pairwise H – People & Communities



Topic	H North	H South	Preference
People & Communities	<ul style="list-style-type: none"> Amenity affected on 8 NMU routes, of which 3 would have increased journey length Loss of approx. 9ha woodland used by community at Threapland 	<ul style="list-style-type: none"> Amenity affected on 9 NMU routes Demolition of 2 derelict former dwellings Loss of approx. 11ha woodland used by community at Threapland 	H North
Agriculture, Forestry & Sporting	<ul style="list-style-type: none"> Loss of approx. 81ha agricultural land of which none is prime land Adverse effects on 15 farm/forest units (3 major – 2 agricultural, 1 forestry) 	<ul style="list-style-type: none"> Loss of approx. 91ha agricultural land of which approx. 1ha prime land Adverse effects on 14 farm/forest/equestrian units (3 major – 2 agricultural, 1 equestrian) 	H North

Pairwise H – Policy, Materials & Visual Effects



Topic	H North	H South	Preference
Policies & Plans	<ul style="list-style-type: none"> Minor land take from LDP industrial site at Troves and housing site at Lhanbryde 	<ul style="list-style-type: none"> Minor land take from LDP industrial site at Barnuckity 	H South
Materials	<ul style="list-style-type: none"> Materials required for road pavement (8.7km mainline & 6.6km side roads) and structures (deck area 7,100m²) Bulk earthworks 1.8Mm³ (incl. export 0.2Mm³) 	<ul style="list-style-type: none"> Materials required for road pavement (8.5km mainline & 6.1km side roads) and structures (deck area 7,600m²) Bulk earthworks 2.1m³ (incl. import 0.2Mm³) 	H North
Visual	<ul style="list-style-type: none"> Significant adverse visual effects on isolated residential receptors and key recreational routes particularly in and around Loch Na Bo 	<ul style="list-style-type: none"> Significant adverse visual effects on isolated residential receptors, particularly within the eastern section where route is mostly on embankment and next to the junction link road 	H North

Pairwise H – Communities & People: Summary



Topic	Preference	Reasons
Air Quality		
Traffic Noise	H South	Fewer significant noise increases and more noise decreases predicted
People & Communities	H North	Less effect on NMUs and woodland used by the community and avoids demolition of (derelict) dwellings
Agriculture	H North	Less requirement for agricultural land
Policies & Plans	H South	Less impact on designated LDP development sites
Materials	H North	Due to less materials requirement for structures and avoids requirement for earthworks import
Visual	H North	Less significant adverse effects on visual amenity
Overall – Communities & People	H North	Clear Preference for H North which has greater effects on noise & development land but less effect on land used by the community, agriculture, materials & visual amenity

Pairwise H – Cultural Heritage, Landscape & Nature Conservation



Topic	H North	H South	Preference
Cultural Heritage	<ul style="list-style-type: none"> Predicted significant effects on setting of scheduled monuments at Bogton Stone Circle and Coxton Tower (also Category A listed) and on Pittensair House (A Listed) Direct effect on 3 regionally important archaeological sites 	<ul style="list-style-type: none"> Predicted significant effects on setting of scheduled monument / Category A listed building at Coxton Tower and on Category B listed Loch na Bo Croft Direct effect on 1 regionally important archaeological site 	H South
Landscape	<ul style="list-style-type: none"> Significant adverse effects from contrast with landscape pattern, woodland removal and imposition on Loch na Bo area 	<ul style="list-style-type: none"> Significant adverse effects from contrast with landscape pattern, woodland removal and imposition on intricate spaces and buildings around Arckelling and Milltown 	H North
Nature Conservation	<ul style="list-style-type: none"> Loss of approx. 10ha ancient woodland and approx. 6ha native woodland Severance/disturbance to key woodland habitat between Loch na Bo and Loch Oire and within 250m of Loch Oire SSSI 	<ul style="list-style-type: none"> Loss of approx. 7.5ha ancient woodland and approx. 1ha native woodland 	H South

Pairwise H – Geology & Water



Topic	F North	F South	Preference
Geology, Soils, Contaminated Land & Groundwater	<ul style="list-style-type: none"> Risk of effects on hydrogeology and private water supplies, including to Coxtan Tower, Wester Coxtan, Wester Marchfield & Loch Oire SSSI 	<ul style="list-style-type: none"> Risk of effects on hydrogeology and private water supplies, including at Hallowood 	No preference
Road Drainage & Water Environment	<ul style="list-style-type: none"> No significant effects 	<ul style="list-style-type: none"> No significant effects 	No preference

Pairwise H – Natural & Cultural Environment: Summary



Topic	Preference	Reasons
Cultural Heritage	H South	Fewer setting effects on scheduled monuments and listed buildings
Landscape	H North	Slightly less effect on sensitive undulating landscape
Nature Conservation	H South	Avoids potentially greater habitat severance effects and has less woodland loss
Geology, Soils, CL & Groundwater		No material difference in effects
RDWE		No significant effects to water environment
Overall – Natural & Cultural Environment	H South	Clear Preference for H South which has lower cultural heritage effects and avoids most sensitive part of key woodlands important for nature conservation

Pairwise H - Summary



Topic		Preference		Comments
		North	South	
Environment	Communities & People	H (N)		Clear Preference for H North which has greater effects on noise & development land but less effect on land used by the community, agriculture, materials & visual amenity
	Natural & Cultural Heritage		H (S)	Clear Preference for H South which has lower cultural heritage effects and avoids key woodlands with importance for nature conservation
Engineering (cost)		H (N)		Clear Preference for H North as cost is £16M less. H North lies close to existing transport corridor and has greater opportunity for design development and mitigation
Traffic / Economic (NPV)		H (N)		Clear Preference for H North as it provides best value with higher traffic flows and has Elgin East Junction located close to the existing A96.
Overall Preference		H (N)		H North is Clear Preference

Pairwise Round 2 Outcome



All Route Options

