

# **A96 Dualling Inverness to Aberdeen Preliminary Engineering Assessment**

May 2015

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## I. Introduction

The A96 is the trunk road linking the cities of Inverness and Aberdeen. The 160 kilometre-long road runs from Raigmore Interchange at Inverness to Haudagain Roundabout at Aberdeen and passes through, or close to, various towns and villages along the route including Nairn, Forres, Elgin, Fochabers, Keith, Huntly and Inverurie.

The intention to fully dual the A96 was announced in December 2011 when the Scottish Government published its Infrastructure Investment Plan, which contained the commitment to dual the A96 between Inverness and Aberdeen by 2030, thus completing the dual carriageway network between all Scottish cities.

Transport Scotland appointed Jacobs to undertake a Preliminary Engineering Assessment for the dualling of the A96 between Inverness and Aberdeen.

The Preliminary Engineering Assessment has been progressed in accordance with a Design Manual for Roads and Bridges (DMRB) Stage 1 Assessment.

This Stage 1 Assessment involves:

- Identification of baseline (existing) conditions and constraints;
- Developing and assessing the advantages and disadvantages associated with broadly defined improvement strategies; and
- Developing design strategies for key elements (such as treatment of junctions and accesses, non-motorised users, lay-bys and rest areas) as part of the overall dualling programme.

Improvement strategies are different high-level approaches to providing a dual carriageway between Inverness and Aberdeen, for example a bypass north or south of towns along the existing A96. It is important to note that the improvement strategy options do not represent specific corridors or route alignments. These will be developed further as the design work is progressed.

The A96 Preliminary Engineering Assessment is running in parallel with the A96 Dualling Strategic Environmental Assessment (SEA), which is being undertaken by CH2M HILL on behalf of Transport Scotland.



# A96 Dualling Programme: Preliminary Engineering Assessment

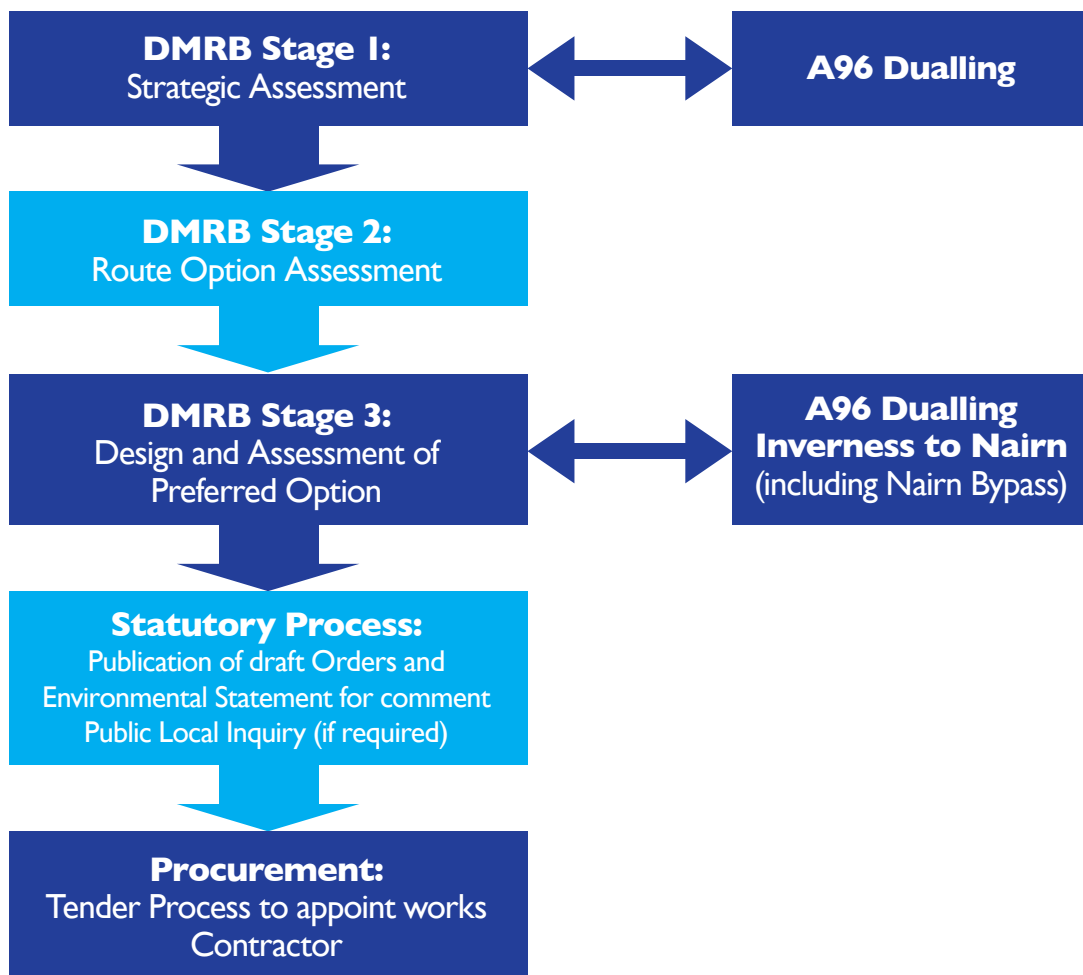
## 2. Scheme Assessment Process

Transport Scotland carries out a rigorous assessment process to establish the preferred line for a trunk road improvement.

The three-stage assessment process, based on the standard of good practice set by the Design Manual for Roads and Bridges (DMRB), covers environmental, engineering, traffic and economics. Throughout this process, Transport Scotland consults with a large number of people and interested bodies.

Following the Strategic Assessment (Stage 1) of dualling the A96, the dualling programme will be divided into sections (i.e. individual projects within the overall dualling programme) for further assessment at Stages 2 and 3.

The A96 Inverness to Nairn (including Nairn Bypass) scheme is currently at a more advanced stage of development with DMRB Stage 2 complete and the preferred option announced in October 2014.



### 3. Sifting Process

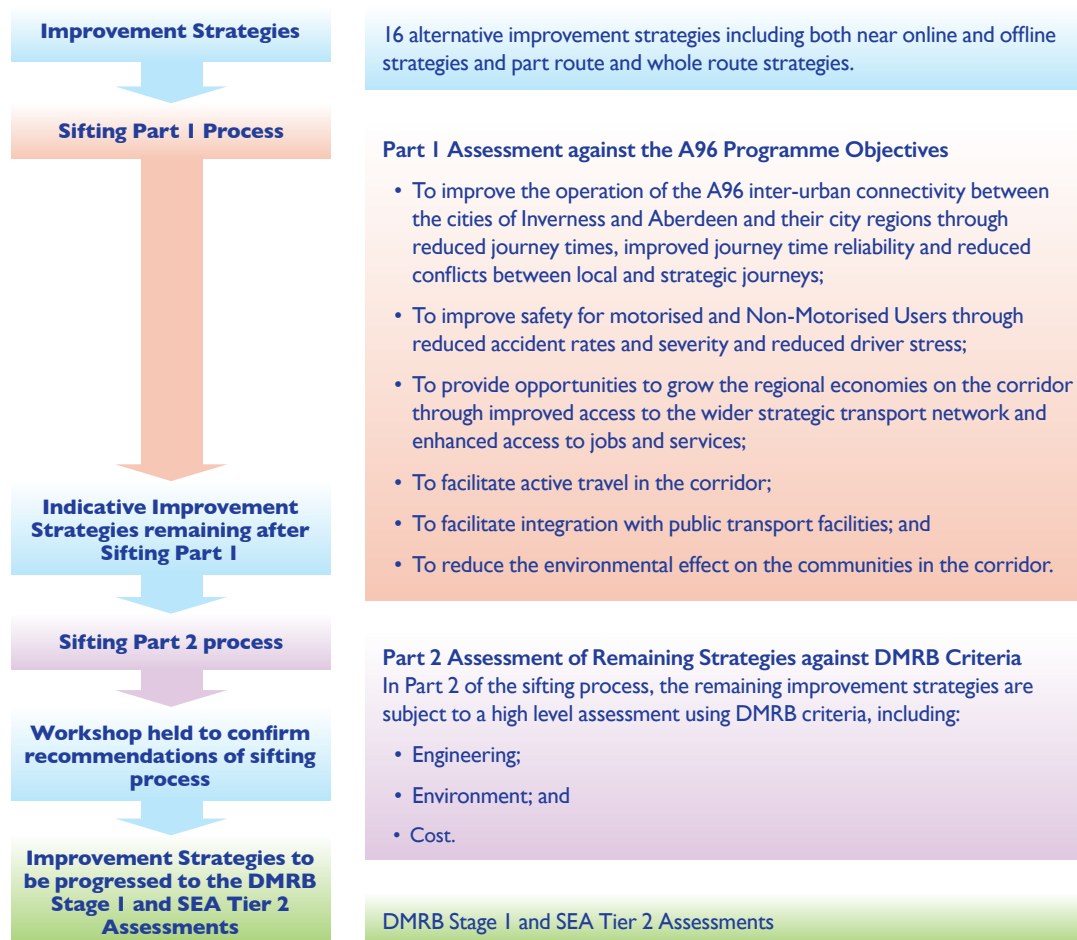
Prior to the DMRB Stage I Assessment, a sifting process was undertaken to identify and assess a wide range of broadly defined improvement strategies for providing a dual carriageway between Inverness and Aberdeen. This process identified which improvement strategies should be taken forward to the DMRB Stage I and SEA Tier 2 Assessments.

Sifting Part 1 was based on whether or not each improvement strategy met the programme objectives. Those improvement strategies which satisfied all, or in some cases most, of the six programme objectives continued through the process to Sifting Part 2. Sifting Part 2 comprised an assessment of the improvement strategies to identify which were significantly less advantageous than others and therefore were sifted out and removed from further consideration.

#### Methodology

The sifting methodology involved a two-part assessment of the improvement strategies: Sifting Part 1 against the programme objectives, and Sifting Part 2 against DMRB criteria and general deliverability.

The assessment also included a workshop to present the findings and seek agreement on which options merited further assessment.



# A96 Dualling Programme: Preliminary Engineering Assessment

## Improvement Strategies

The process of generating improvement strategy options primarily focused on identifying broadly different strategies which could meet the dualling programme objectives.

It is important to note that each improvement strategy should be considered as a high level approach to providing a dual carriageway between Inverness and Aberdeen and not as a specific improvement corridor or route. Sixteen alternative improvement strategies were identified which included both near online and offline strategies and part route and whole route strategies.



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## Sifting

Improvement Strategy Options B, C, D, E, N and P were assessed as satisfying all the Dualling Programme Objectives and, as such, proceeded to Part 2 of the sifting process. Those improvement strategies which successfully passed Sifting Part 1 were subject to a more detailed assessment in Sifting Part 2. In Sifting Part 2, the improvement strategies were assessed at a

high level against DMRB criteria for engineering, cost and environmental factors. As a result of the findings of this assessment, Options B, C, D and N were taken forward to the DMRB Stage 1 Assessment.

Options E and P were not recommended to proceed due to the significant engineering and cost disadvantages associated with the tunnelling required for both of these options.

## Workshop

The sifting process was the subject of a review at an independently facilitated workshop. The objective of the workshop was to review and challenge the sifting exercise and thereafter agree those improvement strategies that were clearly not feasible and/or desirable to progress further to the DMRB Stage I Assessment. The workshop participants included representatives from Transport Scotland, the A96 Dualling Strategic Environmental Assessment consultant CH2M HILL and the A96 Dualling Preliminary Engineering Assessment consultant Jacobs.

## Results

Following the sifting assessment, four improvement strategies progressed to the DMRB Stage I Assessment as summarised below:

- **Option B: Existing A96 Corridor with offline bypasses**

This improvement strategy option broadly follows the corridor of the existing A96, with the exception of offline bypasses of settlements.

- **Option C: Offline from Huntly to Blackburn**

This improvement strategy option was developed to provide a more direct line from Huntly to Blackburn, bypass Inverurie and avoid a number of sections of poor road alignment on the existing A96.

- **Option D: Offline from Glens of Foudland to north-west of Inverurie**

This improvement strategy option was developed to provide a more direct line between a section of the A96 from the Glens of Foudland to north-west of Inverurie.

- **Option N: Offline from the east of Nairn to the south of Fochabers**

This improvement strategy option was developed to provide a more direct line from the west of Forres to the south east of Fochabers and removes the need to travel the longer length of existing A96 via Forres and Elgin. Option N avoids the Natura sites at the western end of this strategy.

Of the four improvement strategy options to be assessed, Option B provides a strategy for the full dualling between east of the A96 Inverness to Nairn (including Nairn Bypass) scheme and Aberdeen. The remaining three options only cover part of the dualling and therefore would need to be delivered in combination with Option B.



DMRB Stage I Improvement Strategies.

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## 4. Stage I Assessment

The DMRB Stage I Assessment has been developed according to assessment reporting guidance in the Design Manual for Roads and Bridges (DMRB). Typically this stage of reporting is the first element of a three-stage assessment process. A DMRB Stage I Assessment is a preliminary assessment and usually involves a broad, strategic approach to developing and assessing indicative improvement strategies to allow the identification and consideration of the environmental, engineering, economic and traffic advantages, disadvantages and constraints associated with the broadly defined improvement strategies.

In addition to the Preliminary Engineering Assessment, Transport Scotland has appointed CH2M HILL to undertake a Strategic Environmental Assessment (SEA) to assess the route-wide constraints, issues and opportunities associated with A96 corridor transport intervention and improvement options, in accordance with the requirements of the Environmental Assessment (Scotland) Act 2005. A two-tier SEA approach is being delivered, which is summarised in the A96 Dualling Programme Strategic Environmental Assessment, Tier 2 Environmental Report, Non-Technical Summary brochure.

The DMRB Stage I report provides a general description of the existing conditions along the existing

route and within the A96 corridor as well as providing an overview of the sifting process used to identify the improvement strategies being assessed in the Stage I Report.

The Stage I Report includes an assessment of the engineering and environmental conditions and constraints such as road alignment, junctions, structures, topography, drainage and land use. The engineering assessment includes a description of, and consultation on, the emerging design strategies for junctions; Non-Motorised Users (NMUs), which includes pedestrians, equestrians and cyclists; lay-bys; and rest areas. The environmental assessment is provided by the SEA team and includes cross references to the SEA Environmental Report.

The traffic and economic assessment provides an overview of baseline traffic characteristics, including traffic composition, speeds and journey times in addition to road traffic accident data and a brief assessment of the predicted benefits of the A96 Dualling.

A copy of the DMRB Stage I Report is available from the Transport Scotland website at <http://www.transportscotland.gov.uk/project/a96-dualling-inverness-aberdeen/preliminary-engineering-services-pes>



A96 near Huntly (looking westbound).

Photo courtesy of Lorne Gill, Scottish Natural Heritage.



## 5. Stage I Assessment Key Engineering Issues

In order to understand the constraints to the A96 Dualling Programme, a thorough review of the existing corridor has been undertaken to identify the present engineering, environmental, traffic and economic features to provide an understanding of how the dualling programme may positively or negatively impact these features. As part of the assessment each improvement strategy has been assessed in relation to the existing constraints.

The following key engineering issues have been identified during this review:

- The combination of the current single carriageway alignment, roadside properties and density of junctions and accesses constrains an online widening upgrade of the existing A96. This means it may be more suitable to develop the proposed dual carriageway alignment locally offline within the A96 corridor and retain the existing A96 as part of the side road network as opposed to online widening of the existing road.
- There are extensive areas of flood risk at Forres, Elgin, Fochabers and Inverurie.
- The existing A96 at Fochabers is constrained by the town, the Gordon Castle Estate and the layout of the existing road.
- The Baxters factory and the Old Toll house / electricity sub-station constrain the potential route options to the west of the River Spey.
- A major structure will be required for the crossing of the River Spey and its floodplain with the river designated as a Special Area of Conservation (SAC). This will require careful consideration as activity within the SAC is strictly regulated under European Environmental legislation, and there will be restrictions on the form and construction of the structure.
- Topography is likely to constrain route options in various locations and notably between Fochabers and Keith, Keith and Huntly, as well for the bypass corridors to the north and south of Inverurie and sections of offline improvement strategy options at Option C, Option D and Option N.
- Utilities are present along the route including national transmission high pressure gas mains, Scottish Hydro Electric transmission overhead lines, the Blackhillock sub-station and proposed extension, and the new sub-station proposed for the Beatrice Onshore Transmission Works.
- Huntly Rail Overbridge cannot be readily extended to accommodate a dual carriageway cross section below it.
- The A96 between Oyne and the Inveramsay Rail Bridge is particularly constrained due to the proximity of the Aberdeen to Inverness railway line which runs parallel to the south side of the A96 and the settlement at Pitcaple which the A96 passes through.
- The existing bypass at Inverurie is constrained on both sides of the road by residential properties as well as by the available cross-section under the Upperboat Overbridge.



A96 near Pitcaple (looking westbound).

## 6. Junction and Access Strategy

### Existing Provision

Along the length of the existing A96 between Inverness and Aberdeen, there are approximately 600 junctions and accesses, excluding junctions and accesses on the approach to, and within, the main urban centres of Nairn, Elgin, Forres and Keith. The junctions provide important access to adjacent roads, villages, community facilities and properties. As the existing A96 is predominantly single carriageway, the junctions and accesses are generally at-grade junctions with the A96, with the exception of the grade separated junctions (junctions with slip roads and over bridge or underpass) on the dual carriageway sections at the junction with the A9 at Inverness (Raigmore Interchange) and two grade separated junctions at Kintore (Tavelty Junction and Gauchhill Junction). At-grade junctions involve two or more roads converging at the same level; typically, the major road has priority over minor road(s). Conversely, grade separated junctions are designed to segregate the minor road and major road at different levels, eliminating the conflict with the major road caused by right turning movements or straight ahead crossing movements from the minor road.

Evidence shows there is a correlation between an increase in the frequency of junctions/accesses and higher accident numbers on rural all-purpose roads, such as the A96. Approximately half of all personal injury accidents on the A96 in the five-year period from 2008 to 2012 occurred at or near a junction which compares with the national average for Non Built-up Trunk Roads of less than 30 per cent.

### Proposed Design Principles and Standards

The A96 Dualling will be designed as a DMRB Category 7A (high standard) All Purpose Dual Carriageway. The Junction and Access strategy will rationalise the junction locations along the route and, where possible, only permit grade separated junctions and isolated left in left out junctions.

Grade separation will improve the safety of vehicles joining and leaving the A96 dual carriageway by eliminating right-turn manoeuvres across the road and providing acceleration and deceleration lanes, known as merges and diverges respectively.

The following principles are proposed for the junction strategy for the A96 Dualling:

- There should be no gaps in the central reserve;
- All junctions should be grade separated where possible;
- Number of direct accesses and junctions to be minimised including through rationalisation where possible;
- Any new crossings of the A96 as part of new grade separated junctions shall be made accessible to Non-Motorised Users;
- The landscape and visual impact of any new junction shall be minimised through sensitive design and environmental mitigation; and
- Junctions with A, B and C class roads shall be assessed for provision of a grade separated junction. Unclassified roads and accesses shall be rationalised and an alternative connection provided unless particular site specific considerations can be demonstrated.

A complete assessment of the existing junctions and accesses will be undertaken during the future stages of design.

If you have any concerns regarding your future access arrangements, please be assured we will work closely with you during the future stages of design to ensure any adverse impacts due to the dualling are minimised.

## 7. Non-Motorised User (NMU) Strategy

Non-Motorised Users (NMUs) include pedestrians, cyclists and equestrians and may be recreational users and active travellers, including daily commuters. The A96 Dualling Programme will be developed taking into account the programme objective of promoting active travel. Suitable provision for NMUs is, therefore, an important part of the A96 Dualling Programme.

Details of current NMU facilities have been obtained from various local authorities and stakeholders, allowing NMU baseline plans to be developed. The locations of NMU facilities within different sections of the scheme vary considerably, as some NMU facilities are in close proximity to the existing A96 whilst others are more remote.

The NMU facilities comprise core paths, which include rights of passage by foot, horseback and cycle; Rights of Way; the National Cycle Network (NCN) Route 1; three of Scotland's Great Trails; the Isla Way; and informal NMU routes.

### NMU Strategy

An emerging NMU strategy, for which consultations are ongoing, is being developed as part of the engineering assessment.

The main principles of crossing the A96 are:

- There will be no NMU at-grade crossings of the proposed A96;
- NMU crossing points in close proximity to each other will be combined into a single crossing point;
- NMU crossing points will make use of other grade separated crossing facilities such as junction overbridges/underpasses and accommodation works overbridges/underpasses; and
- Crossing points solely for the use of NMUs will be provided where site specific requirements can be demonstrated.

NMU facilities will be developed as the dualling programme moves forward to more detailed stages of design development in consultation with local communities and interest groups.

All facilities developed as part of the A96 Dualling Programme will take account of the needs of disabled people.



Speyside Way information board in Fochabers car park near the road bridge crossing the River Spey.

## 8. Lay-bys and Rest Areas

### Existing Provision

**Lay-bys** are paved parking areas adjacent to carriageways that are used for short-term or emergency stops while maintaining mainline traffic flows. On the A96 there are two different types of lay-bys:

- Parking lay-bys – paved areas adjacent to the main carriageway for road users making short-term stops for both resting and emergency break-downs; and
- Bus lay-bys – similar to parking lay-bys allowing buses to stop and pick up or drop off patrons in relative safety.

There are over 100 lay-bys and bus stops along the existing A96.

**Rest areas** can be provided on rural trunk roads as places where drivers can safely pull off the road and stop, mitigating the accident risk associated with driver fatigue. While lay-bys provide relatively safe stopping areas for short durations, rest areas are more suitable for longer stops. Rest areas often include toilets and picnic areas and can also include many of the facilities normally associated with a service area. The provision of rest areas is of particular importance to commercial vehicles travelling a route as they are more likely to require a safe area to make longer duration stops. There are currently no recognised publicly owned rest areas on the existing A96 route.

### Strategy

**Lay-bys:** All parking lay-bys to be provided as part of the A96 Dualling will be Type A with merge taper layout as defined by the Design Manual for Roads and Bridges (DMRB). Examples of the Type A with merge taper lay-by can be found on the dual carriageway between Inverurie and Aberdeen and contain an island to separate parked from moving vehicles. In addition, Transport Scotland's *Roads for All: Good Practice Guide for Roads* includes additional design requirements for lay-bys not specified within the DMRB that enhances safety and accessibility for disabled people.

A strategy has been developed to provide a consistent approach to lay-by design and location along the A96. The general principles to be followed include:

- Identify demand for short-term stopping along the route;
- Identify proposed locations of lay-bys based on demand with respect to the DMRB and with consideration of local environmental sensitivities; and
- Check spacing does not exceed maximum recommended space of 2.5km in each direction.

**Rest areas:** The strategy for provision and spacing of rest areas shall take into account bypassed towns, local amenities and possible provision of parking facilities in towns. This shall be considered through consultation and agreement with the Local Authorities and communities. Principles to be followed are:

- Rest areas are provided, as a minimum, every 45km and no more than 30 minutes driving time apart;
- Close liaison with the local authorities regarding both rest area locations and rest area provisions, to minimise the impact on the services currently provided or proposed within local communities; and
- Consultation with the Scottish Freight and Logistics Advisory Group (SCOTFLAG) and the Regional Transport Partnerships to ensure that the rest areas developed correlate well with commercial vehicle drivers' requirements and demands along the route.

## 9. Stage I Assessment Recommendations and Findings

The four broadly defined improvement strategies, Options B, C, D and N, are all recommended to be taken forward for further assessment at DMRB Stage 2 (i.e. route option assessment).

Based on the findings of the DMRB Stage I Assessment, a potential grouping of schemes has been considered for the next stage of design and assessment (i.e. DMRB Stage 2 Assessment).

The three offline improvement strategies, Option C, Option D and Option N, cover part of the length of the proposed dualling programme and must be delivered in combination with Option B. In these cases, the offline improvement strategy replaces the equivalent geographic section of Option B. The geographic relationship between the four improvement strategies is shown in the figure below. To allow the appropriate comparison of route corridor options developed from the four improvement strategies, the offline strategies need to be directly compared against the equivalent geographic section of Option B.



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a – The A96 Inverness to Nairn (including Nairn Bypass) scheme is currently at a more advanced stage of development. The preferred option for this scheme was announced in October 2014.

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The figure on page 13 shows that Option N overlaps with the sections from west of Forres to east of Fochabers. Similarly, Option C overlaps from the west of the Glens of Foudland to Kintore with Option D also overlapping from the Glens of Foudland to Inverurie. The remaining central section comprises a section from east of Fochabers to the west of the Glens of Foudland.

It is, therefore, proposed to progress the next stage of design (DMRB Stage 2) of the A96 Dualling Programme as three geographic sections in addition to the Inverness to Nairn (including Nairn Bypass) section which is being taken forward separately.

The three sections are proposed on the basis of Western, Central and Eastern Sections.

- The Western Section extends from the tie-in of the Inverness to Nairn (including Nairn Bypass) scheme to the east of Nairn to Fochabers (approximately 46km).
- The Central Section extends from east of Fochabers to east of Huntly (approximately 31km).
- The Eastern Section extends from east of Huntly to the proposed junction with the Aberdeen Western Peripheral Route (approximately 42km).

During the DMRB Stage 2 Assessment, route options will be developed and assessed for each section. This will include an engineering, environmental, traffic and economic assessment of the potential impacts of each option to inform a preferred option choice. The completion of the DMRB Stage 2 Assessment and the identification of preferred options for each section would inform subsequent stages of assessment, promotion and construction.



## 10. Feedback

We welcome your comments and feedback. Please take your time to consider the information presented and provide any comments you may have by email or post to Transport Scotland by the deadline date of 22 June 2015.

Please email your comments to:  
[a96dualling@transportscotland.gsi.gov.uk](mailto:a96dualling@transportscotland.gsi.gov.uk)

Alternatively, post to:

A96 Dualling Team  
Transport Scotland  
Buchanan House  
58 Port Dundas Road  
Glasgow  
G4 0HF

For more information on the proposals for the A96 Dualling, please visit the project page on the Transport Scotland website at:

[www.transportscotland.gov.uk/a96dualling](http://www.transportscotland.gov.uk/a96dualling)



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