PE1236/V

Planning and Design
Major Transport Infrastructure Projects

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Alison Wilson
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Your ref:
«Yourref»

Our ref:
C2545039

Date:
19 September 2011

Dear Ms Wilson,

CONSIDERATION OF PETITION PE1236

Further to your letter 4 April 2011, the cost refinement exercise has now been completed. For the Public Petitions Committee's information, a copy of the Executive Summary (7 pages) is enclosed. A PDF copy of the Final Report including the Executive Summary (107 pages) will be forwarded on a CD.

Copies of the report have also been supplied to the petitioner Ms Campbell and to local constituency MSP Nigel Don.

I hope this is helpful,

Kind Regards,

Laurence Kenney
MTRIPS: Planning and Design
Transport Scotland

Executive Summary

Purpose of Report

URS Scott Wilson were commissioned in April 2011 by Transport Scotland to undertake a cost refinement exercise for grade separation associated with future development at Laurencekirk. The study brief outlines the scope of work as follows:

- Undertake a desktop study for a grade separated junction at Laurencekirk to accommodate increased traffic flows associated with proposed future developments. Review work previously undertaken, utilising existing Ordinance Survey and geological data. Prepare a brief engineering report which will include plans and costs.

- The purpose of the report is to advise developers and other stakeholders of potential options for improving the junction and approximate associated costs.

The contents of this report are only for the specific purpose as stated in the study brief above. This report should be understood within the context of the study brief and individual elements of the report must not be interpreted out of context.

It should be noted that this report does not indicate a commitment to develop the design further. It reflects the findings of Transport Scotland's Strategic Transport Projects Review (STPR) both in regard to not recommending the construction of a grade separated junction(s) at Laurencekirk and completing ongoing road safety works as set out in STPR Intervention 1 - Strategic Road Safety Plan.

Should developers or others wish to progress the scheme further, the content of this report does not negate the requirement for the full industry-standard design process to be completed as defined in the Design Manual for Roads and Bridges (DMRB).

This report has been informed by information currently available. Should this scheme be progressed further, a detailed information gathering exercise will be required to fully inform the design.

Site Description

The A90 Trunk Road is the main strategic link between Dundee and Aberdeen, with the settlement of Laurencekirk situated approximately 40km south of Aberdeen. The A90 bypasses Laurencekirk to the east side and is dual carriageway standard, with three junctions from the A90, the A90/A937 south junction, the A90/B9120 middle junction and the A90/A937 north junction.

Study Background

Petition (PE1236) by Jill Campbell calls on the Scottish Parliament to urge the Scottish Government to improve safety measures on the A90 by constructing a grade separated junction where the A937 crosses the A90 at Laurencekirk. The Scottish Parliament's Public Petitions Committee has considered the petition on a number of occasions. On 25 January 2011, the Minister for Transport and Infrastructure confirmed that this cost refinement exercise would be undertaken to give better definition for stakeholders as to the scale of funds required to provide infrastructure upgrades on the trunk road network at the A90 Laurencekirk.

Safety Measures

Safety measures were introduced by Transport Scotland in 2005 and again in early 2010, including a 50mph speed limit at the south junction, vehicle activated signs, speed cameras, high friction surfacing and vehicle activated signs. Construction of a new northbound merge is programmed to be constructed this year.

The provision of these safety measures combined with the findings of earlier reports has led Transport Scotland to conclude that no additional interventions are required at the junctions in relation to existing traffic flows.

Proposed Development

Due to significant development proposed within the Aberdeenshire Local Development Plan, concerns have now been raised with regards potential safety implications due to increased traffic volumes on the A90.

Summary of Options

Option 1

South Junction - Grade Separation, 4 no. merges/diverges

North Junction - Grade Separation, 4 no. merges/diverges

Option 2

South Junction - Grade Separation, 4 no. merges/diverges

North Junction - Grade Separation, 3 no. merges/diverges
(no northbound diverge)

Option 3

South Junction - Grade Separation, 4 no. merges/diverges

North Junction - Grade Separation, 2 no. merges/diverges
(no northbound diverge or southbound merge)

Option 4

South Junction - Grade Separation 2 no. merges/diverges
(no southbound diverge or northbound merge)

North Junction - Grade Separation 2 no. merges/diverges
(no northbound diverge or southbound merge)

Options 1 to 4

- Access from Johnston Mains to Johnston Lodge to be upgraded.
- Access to Middleton stopped up (to provide desirable weaving length from north slips) and central reserve gap closed. Existing access upgraded to provide access via Upperton.
- Option 4 only – access to Mill of Thornton stopped up due to inadequate weaving length.

Middle Junction

- A – "Left in, left out" westbound. Laurencekirk access stopped up.
- B – Both B9120 accesses stopped up with link road provided from north junction to B9120.
- C – Both B9120 accesses stopped up with B9120 overbridge provided.

All Options

All central reserve openings and direct accesses will be closed between Oatyhill and Upperton, inclusive, other than the "Left-in, left out" middle junction option.

Option 5

South Junction - Grade Separation, 4 no. merges/diverges

North Junction - Left in, left out at A937 Laurencekirk and Keilburn accesses.
Burnside access stopped up.
Link roads from Burnside to Keilburn and Keilburn to Upperton required for right turns off the A90, via Upper Powburn.

Middle Junction

- A – "Left in, left out" westbound. Laurencekirk access stopped up.
  Access from Johnston Mains to Johnston Lodge upgraded
- B – Both B9120 accesses stopped up with new link road from south junction to B9120 (Johnston Lodge will be accessed from this).
- C – Both B9120 accesses stopped up with B9120 overbridge provided.
  Access from Johnston Mains to Johnston Lodge upgraded.

All central reserve openings and direct accesses will be closed between Oatyhill and Upperton, inclusive, other than the "Left-in, left out" north and middle junction options.

Figures 3.1 to 3.5 represent schematic layouts of the five options considered. Refer also to Appendix A, Figures A4-A8 for layout plans of each.

Scheme Cost Summary

A90 Laurencekirk Junctions - Scheme Option Costs excluding VAT

Option	South Junction	North Junction	Associated Roadworks	Total Scheme Cost [1]		
				Middle Junction Options		
				A	B	C
				Left In / Left Out at eastbound B9120, Laurencekirk access stopped up	Both accesses stopped up with link road connecting the B9120	Both accesses stopped up with B9120 overbridge
1	Grade Separation 4 merges/diverges	Grade Separation 4 merges/diverges	Johnston Mains to Johnston Lodge access upgraded Central reserve openings & direct accesses stopped up from Oatyhill access to Middleton access, inclusive	£ 25,205,700	£ 28,209,900	£ 28,781,700
2	Grade Separation 4 merges/diverges	Grade Separation 3 merges/diverges (no northbound diverge)	As Option 1	£ 24,787,100	£ 27,791,300	£ 28,363,200
3	Grade Separation 4 merges/diverges	Grade Separation 2 merges/diverges (northbound merge & southbound diverge)	As Option 1	£ 24,400,200	£ 27,404,600	£ 27,976,300
4	Grade Separation 2 merges/diverges (southbound merge & northbound diverge)	Grade Separation 2 merges/diverges (northbound merge & southbound diverge)	As Option 1 + Mill of Thornton access stopped up	£ 23,807,300	£ 26,811,400	£ 27,383,500
5	Grade Separation 4 merges/diverges	Left In / Left Out at Laurencekirk & Keilburn accesses.	Johnston Mains to Johnston Lodge access upgraded (Options 5A & 5C only) Central reserve openings & direct accesses stopped up from Oatyhill access to Middleton access, inclusive New link road from Burnside to Keilburn & upgraded link from Keilburn to Upperton	£ 13,540,200	£ 15,860,400	£ 17,116,500

Notes:
1. "Total Scheme Cost" consists of: Construction Costs, Land & Property Costs, Preparation & Administration (incl. design fees) and On Site Supervision & Testing
2. In order to reflect a competitive tendering process, costs include a Class 1 imported fill rate of £11/m3, which is 75% of an obtained quarry rate of £14.69/m3.

Summary of Advantages and Disadvantages

ADVANTAGES	DISADVANTAGES
Option 1 – A £25,205,700 – B £28,209,900 – C £28,781,700	
South Junction 4 no. merges/diverges	
(i) Full range of movement on and off A90 – no additional trips through Laurencekirk. (ii) Minimal impact on Gauger Burn Development land (iii) Safety improved with existing at-grade junctions removed (iv) No major utilities conflicts (v) No watercourse crossings or interface with existing culverts (vi) Weaving length from previous junction, west of Oatyhill (Mill of Thornton), is within DMRB standards (1010m approx.) (vii) Weaving length to middle junction within DMRB standard (1078m approx.)	(i) Structure costs higher than a 2 slip road alternative
North Junction 4 no. merges/diverges	
(i) Full range of movement on and off A90 - no additional trips through Laurencekirk (ii) Safety improved with existing at-grade junctions removed	(i) Structure costs higher than a 2 or 3 slip road alternative (Options 2, 3 & 4) due to span increase over slip roads (ii) Gas Main in close proximity to west side slip acts as constraint to the design (iii) Both north facing slips cross the zone of influence of the gas main and although this is near the ends of the tapers, some form of protection is likely to be required (iv) Encroaches into north development land and protected area P3 (v) Structure clash with existing culverts under the A90 (vi) Numerous existing watercourses and culverts act as constraints to the design elements and require to be culverted/extended (vii) Detention basin locations constrained by utilities, existing culverts and watercourses and topography. (viii) New culvert required for link roads to Burnside & Keilburn
Option 2 – A £24,787,100 – B £27,791,300 – C £28,363,200	
South Junction 4 no. merges/diverges	
As Option 1, South Junction	As Option 1, South Junction
North Junction 3 no. merges/diverges	
(i) Majority of movements catered for on and off A90. Approximately 300 AADT (based on predicted traffic flows from the JMP and WSP Reports) vehicles precluded from turning left off A90 (northbound diverge) will be required to travel through Laurencekirk via south junction. Improved movements over 2 slip, Option 4. (ii) Safety improved with existing at-grade junctions removed (iii) Structure cost slightly lower than the 4 slip road Option 1 (iv) Proximity of west side (northbound) slip road to gas main improved over Option 1	(i) Slightly decreased movements over Option 1, northbound diverge, although only approximately 300 AADT (based on predicted traffic flows from the JMP and WSP Reports) (ii) Structure costs higher than a 2 slip road alternative (Options 3 & 4) due to span increase over slip roads (iii) Although Gas Main near west side (northbound) slip unlikely to be a major constraint to the design, its position requires to be confirmed and works in close proximity monitored As Option 1,North junction (iii) to (viii)
Option 3 – A £24,400,200 – B £27,404,600 – C £27,976,300	
South Junction 4 no. merges/diverges	
As Option 1, South Junction	As Option 1, South Junction
North Junction 2 no. merges/diverges	
(i) Structure cost lower than the 4 slip Option 1 or 3 slip Option 2 (ii) Safety improved with existing at-grade junctions removed (iii) Proximity of west side (northbound) slip road to gas main improved over Option 1	(i) Northbound diverge and southbound merge movements precluded – 770 AADT assumed to be rerouted through Laurencekirk and south and middle junctions (310 northbound diverge, 460 southbound merge) As Option 1,North Junction (iii) to (viii) As Option 2, North Junction (iii)
Option 4 – A £23,807,300 – B £26,811,400 – C £27,383,500	
South Junction 2 no. merges/diverges	
(i) Structure Costs lower than 4 slip Options 1, 2 & 3 (ii) Weaving length to middle junction within DMRB standards (2110m approx.) As Option 1, South Junction (ii), (iii), (iv), (v)	(i) Full range of movement not catered for - northbound merge and southbound diverge excluded – 4100 AADT movements precluded (1950 northbound merge, 2150 southbound diverge). All vehicles assumed to reroute through Laurencekirk and north junction (ii) Weaving length to next junction west of Oatyhill (Mill of Thornton) is not within DMRB standards (870m approx.) due to increased diverge slip road length. This leads to stopping up of Mill of Thornton access (see '**Other**' category on next page)
North Junction 2 no. merges/diverges	
(i) Structure cost lower than the 4 slip Option 1 or 3 slip Option 2 (ii) Proximity of west side (northbound) slip road to gas main improved over Option 1	(i) Northbound diverge and southbound merge movements precluded – 770 AADT assumed to be rerouted through Laurencekirk and south junction (310 northbound diverge, 460 southbound merge) As Option 1,North Junction (iii) to (viii) As Option 2, North Junction (iii)
Option 5 – A £ 13,540,200 – B £15,860,400 – C £17,116,500	
South Junction 4 no. merges/diverges	
As Option 1, South Junction	As Option 1, South Junction
North Junction 'left in/left out'	
(i) Minimal roadworks required (ii) No interface with utilities (iii) Safety improved over current situation since right turns are removed, although not improved to the same extent as Options 1-4. (when current proposals for northbound merge are constructed, safety will be further improved over existing). (iv) Only 1 new culvert required, for access to Burnside (v) No severance of north development land or protected area P3 (vi) No structure required over A90 (vii) No interface with existing watercourses or culverts other than culvert at Burnside (viii) No drainage detention basins required	(i) Right turn movements southbound into Laurencekirk precluded – 3000 AADT. Access gained via south junction, with travel through Laurencekirk (ii) Right turn movements from Laurencekirk onto A90 precluded – 450 AADT. Access gained via south junction, with travel through Laurencekirk (iii) Right turn movements from Keilburn and Burnside onto A90 precluded – 4 AADT. Access gained via upgraded access track to Upperton (iv) Although right turns are removed, left turns are still possible and with the layout being at grade rather than grade separated, therefore safety is not improved to the same extent as Options 1-4

Summary of Advantages and Disadvantages (continued)

Middle Junction - All Options (unless stated otherwise)

Sub Option A – "left in/left" out westbound, Laurencekirk access stopped up

ADVANTAGES

(i) No major changes to infrastructure
(ii) Improvement on safety over existing due to closure of junction
(iii) Improvement on safety over existing due to Central Reserve closure
(iv) No additional land is required
(v) No visual detriment

DISADVANTAGES

(i) Access retained onto A90 from B9120, increasing accident risk compared to closure
(ii) ***Applies to Options 1 & 2 only*** - Northbound right turns off A90 onto B9120 require to travel to north junction (via A90 for Option 1 & via A937 through Laurencekirk for Options 2) and u-turn back onto A90 – 130 AADT
(iii) ***Applies to Options 3, 4 & 5 only*** - Northbound right turns off A90 onto B9120 require to exit at south junction and along existing road (A937, south of A90, to B9120 via West Bradieston), a detour of approx. 12km – 130 AADT
(iv) ***Does not apply to Option 4*** - Northbound right turns onto A90 from B9120 require to turn left then u-turn at south junction back onto A90 – 50 AADT
(v) ***Applies to Option 4 only*** - Northbound right turns onto A90 from B9120 require to travel south via West Bradieston to the A937 and south junction (12km detour), then through Laurencekirk and onto A90 at north junction – 50 AADT
(vi) Access to/from Laurencekirk/A90 gained via north or south junctions, requiring access through Laurencekirk – 1000 AADT
(vii) ***Applies to Options 1 & 2 only*** - Straight through to/from Laurencekirk/B9120 gained via north or south junctions requiring access through Laurencekirk – 560 AADT
(viii) ***Applies to Options 3, & 5 only*** - Straight through to/from Laurencekirk/B9120 gained via south junction, requiring access through Laurencekirk and 12km detour along existing road for vehicles from Laurencekirk to B9120 (B9120 to Laurencekirk can turn left onto A90 and exit south junction) – 560 AADT
(ix) ***Applies to Option 5 only*** - Straight through to/from Laurencekirk/B9120 gained via south junction, requiring access through Laurencekirk and 12km detour along existing road– 560 AADT
(x) Pedestrian at grade access across A90 retained

Sub Option B – both accesses stopped up, link road from grade separated junction to B9120

(i) ***Applies to Options 1 to 4 only*** - Northbound right turns off A90 onto B9120 do not require to u-turn via north junction back onto A90 (or to take 12km detour for Option 3 & 4)
(ii) ***Applies to Options 1 to 4 only*** - Northbound right turns onto A90 from B9120 do not require to turn left then u-turn back onto A90 at south junction (or take 12km detour for Options 3 & 4) instead travelling north via new link road and north junction – very little increase to journey length
(iii) ***Applies to Option 5 only*** - Northbound right turns off A90 onto B9120 require to exit at south junction and travel along new 1.7km link road – 130 AADT – length of journey comparable with existing and around 3km shorter than Options 1-4.
(iv) Improvement on safety over existing due to Laurencekirk junction closure
(v) Improvement on safety over existing due to B9120 closure
(vi) Improvement on safety over existing due to Central Reserve closure
(vii) ***Applies to Option 5 only*** - Only 1 new culvert required for link road compared to 3 required for Options 1-4
(viii) ***Applies to Option 5 only*** - Although link road in close proximity to oil pipeline near middle junction, the remaining length is much more remote than that associated with Options 1-4
(ix) ***Applies to Option 5 only*** - *Access to Johnston Lodge obtained via this link road rather than having to provide a detour and upgrade existing access at Johnston Mains.*

(i) ***Does not apply to Option 5*** - Northbound right turns off A90 onto B9120 require to travel to north junction (via A90 for Option 1 & via A937 through Laurencekirk for Options 2, 3 & 4) and travel back along new 1.5km link road – 130 AADT
(ii) Access to/from Laurencekirk/A90 gained via north or south junctions, requiring access through Laurencekirk – 1000 AADT
(iii) Straight through to/from Laurencekirk/B9120 gained via north junction (via south junction for Option 5), requiring access through Laurencekirk – 560 AADT
(iv) Construction of new 1.5km (1.7km for Option 5) link road
(v) 3 (only 1 for Option 5) new culverts required for link road
(vi) Link road in close proximity to oil pipeline – should be avoidable but requires confirmation
(vii) Severance of existing field
(viii) Pedestrian at grade access across A90 retained
(ix) ***Applies to Option 5 only*** - Northbound right turns onto A90 from B9120 require to travel south via new link road then u-turn at south junction onto A90, an increased journey length of 3.5km compared to Options 1-4 – 50 AADT

Sub Option C – both accesses stopped up, overbridge provided

(i) Straight through to/from Laurencekirk/B9120 retained via new overbridge – 560 AADT
(ii) Improvement on safety over existing due to Laurencekirk closure
(iii) Improvement on safety over existing due to B9120 closure
(iv) Improvement on safety over existing due to Central Reserve closure
(v) Pedestrian safety across A90 improved by way of utilising new bridge

(i) Northbound right turns off A90 onto B9120 require to exit at south junction, travel through Laurencekirk and over the new bridge – 130 AADT
(ii) Northbound right turns onto A90 from B9120 require to cross the new bridge, travelling north through Laurencekirk and onto A90 at the north junction – 50 AADT
(iii) Access to/from Laurencekirk/A90 gained via north or south junctions, requiring access through Laurencekirk – 1000 AADT
(iv) Construction of new overbridge and associated road realignment and earthworks – high construction costs
(v) Interface with oil pipeline - requires protection slab and liaison with BP to determine acceptable solution
(vi) Severance of land for earthworks
(vii) Visual intrusion
(viii) Disruption to A90 and local roads during construction
(ix) Noise, vibration and other environmental impacts during construction
(x) Access to cemetery from B9120 stopped up due to steep gradients to the realigned B9120; access gained via Laurencekirk
(xi) Severance of protected area P3 on north west side of A90 in order to provide a desirable gradient for the regraded housing access tie-in with the realigned B9120

Other

(i) Increased safety with central reserve and direct access closures between Oatyhill and Upperton
(ii) ***Applies to Options 1 to 4 only*** - Increased safety with central reserve and direct access closure at Middleton
(iii) ***Applies to Option 4 only -*** Increased safety with central reserve and direct access closure at Mill of Thornton

(i) Access to Johnston Lodge stopping up - although safety improved, access amended via B9210 and upgraded track at Johnston Mains - reroute of +1km min., +5km max, dependant on middle junction option
(ii) Access to Mains of Haulkerton stopping up - although safety improved, access amended via either north junction/Laurencekirk or Mill of Conveth further north - reroute of +1km or +5km respectively
(iii) Access to Upperton stopping up - although safety improved, access amended via Upper Powburn - reroute of +4km
(iv) ***Applies to Options 1 to 4 only*** - Access to Middleton stopping up - although safety improved, access amended to upgraded track from Upperton, via Upper Powburn - reroute of +6km
(v) ***Applies to Option 4 only -*** Access to Mill of Thornton stopping up - although safety improved, access to Mill of Thornton requires to be gained via existing road at Mill of Barnes – reroute of +1.5km