

nestrans

A90 (T) Laurencekirk Junctions

October 2012

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1. Introduction

- 1.1 Nigel Don MSP met with officers of Aberdeenshire and Angus Councils and Nestrans on 9 January 2012 to discuss safety concerns at the Laurencekirk junctions with the A90 Trunk Road and the possible requirement for grade separation. Nestrans agreed to undertake a review of previous studies in the Laurencekirk area. In particular, as the JMP report entitled Laurencekirk Expansion - A90 (T) Appraisal Report dated March 2010 was based on the Main Issues Report that was then available it was agreed that further work would be undertaken by Nestrans to try and quantify any additional traffic growth that could result from the allocations now contained within Aberdeenshire Council's adopted Local Development Plan and from potential developments within north Angus. It was agreed that this information would be submitted to Transport Scotland to see if they think it warrants further consideration of junction upgrades on the A90 Trunk Road in the Laurencekirk area.
- 1.2 Sections 2 to 5 of this report summarise information that was thought to be of interest within the review of previous studies when considering the need for further upgrade of the Laurencekirk junctions. Any comments relating to the work within these studies are given in italics and highlighted to identify them as being comments and differentiate them from the information taken from within the studies, which is again presented here. In some instances further investigation has taken place following on from the review and this is separately headed to ensure that is recognised as being additional information and not taken from within the previous studies.
- 1.3 Section 6 summarises the work undertaken by Nestrans to consider the potential scale of further trip generation in the Laurencekirk area in future years should the full housing and employment land allocations within the Aberdeenshire Council Local Development Plan for the Kincardine and Mearns area be achieved. Consideration is also given to the scale of development within North Angus that might also impact on the A90/A937 junctions.

2. A90 Dundee to Stonehaven Junction Strategy

Background

- 2.1 This report was undertaken by Bear Scotland in August 2008. It should be noted that this is an unpublished report for Transport Scotland TRNMD and views expressed are those of the author(s) and not necessarily those of TRNMD.
- 2.2 This reviewed performance of at-grade junctions of A-class roads with A90 (T) between Dundee and Stonehaven and locations with accident clusters (18 in total).

Points of Interest within Report

- 2.3 Top of the table for accidents over the 15 yr period 1992-2007 were A90/B974 Lurthemuir Junction followed by A90/North Water Bridge Junction. The number and severity of accidents has dramatically dropped in recent years, but this could be attributed to the Edzell Air base closing in 1997 and reduced levels therefore of turning manoeuvres to/from the side roads.

Comment - Note that significant accident record at A90/North Water Bridge Junction has reduced following closure of the Edzell Air Base, but this may become a safety concern in future if there is further development unless junction upgrades are provided.

A planning application has been submitted for the former Air Base site, which proposes 1,000 houses and 100 ha of employment land over the period to 2030.

- 2.4 The only junction with more turning movements than the A90/A937 SW junction at Laurencekirk and more accidents in the last years (2004 – 2006) was the A90/A932 Lochlands Junction. This junction gives the first access to Forfar for northbound vehicles on the A90 trunk road, but there are existing grade separated junctions 2km in either direction should the gap in the central reserve be closed. Angus Council has indicated however that it would only support a closure if accompanied with construction of a grade separated junction.
- 2.5 The A90/A937 South Western Junction in Laurencekirk had second most accidents (2004-2006) and turning movements. In comparison with the A90/A932 Lochlands Junctions however the distance to nearest grade separated junctions is approx 10km to the south at Stracathro and 21km to the north at Stonehaven, meaning that closure of the current gaps in the central reserve is not feasible.

Comment - Note that the A90/A937 south junction had the second most accidents and turning movements within the study area and the considerable distance to nearest grade separated junctions (10km to south, 21km to north) meaning closure of gaps in the central reserve is not feasible.

Traffic Survey Information

- 2.6 The results of a traffic survey at the A90/A937 south west junction on 20 February 2007 are given (*with figures from May 2009 surveys by Bear between 7am-7pm, that are further discussed in section 3 below, given in italics and brackets for comparison*). The survey shows that a significant proportion of the total 4,427 (*3,820*) turning movements that cross or turn on/off the A90 do so via the A937 south leg to/from the Montrose area in the AM and PM peak periods. There were 976 (*745*) from this leg turning right onto the A90 northbound carriageway, with the majority occurring in the AM peak (*161*) and a corresponding 1170 (*1170*) from the A90 southbound carriageway turning left towards Montrose (*with 256 of these in the PM peak*), suggesting that this is commuter traffic. The staggered ahead movement between the 2 side roads was 507 (*437*) towards Laurencekirk and 456 (*416*) from Laurencekirk. The turning manoeuvres between Laurencekirk and the A90 were 567 (*517*) left turn in from A90 northbound carriageway, 14 (*15*) in from A90 southbound carriageway, 103 (*62*) left out to A90 northbound and 436 (*426*) right out to the southbound carriageway. People commuting between Laurencekirk and the north tend to use the A90/A937 northern junction with the report showing 1161 (*1061*) from Laurencekirk left onto the A90 northwards (*158 in the AM peak*) and 1190 (*1113*) turning right from the A90 southbound towards Laurencekirk (*180 in the PM peak*).

Comment - Note the significant commuter movement at the A90/A937 south junction to/from the Montrose area in addition to the turning traffic to/from Laurencekirk, which in the main distributes between the north and south A937 junctions according to direction of travel on the Trunk Road ie majority of traffic to/from the A90 north tend to use the north junction and vice-versa for the south.

Further Investigation following on from report

- 2.7 Looking at the sizes of settlement along the stretch of the A90 within this study (based on the gro-scotland.gov.uk website estimates for 2008) the most similar location in size to Laurencekirk is at Newtonhill, which already has a grade separated junction, that was constructed by Grampian Regional Council in the early 1990s. Population figures for Newtonhill in the 1991 Census results are shown as being 2,139. The population in Laurencekirk in 1991 was 1513, increasing to 1808 by the 2001 Census and 2440 within population estimates for 2008.

Comment - Note that Newtonhill had a grade separated junction with the A90 in the early 1990s when it had a population of just over 2,000 and that the population in Laurencekirk had already exceeded this level by 2008.

- 2.8 The Laurencekirk Expansion – A90 (T) Appraisal Report by JMP states data from the 2001 Census shows that Laurencekirk had 783 houses and a population of 1808 giving a density of 2.31 people per house. Assuming this density at both locations then considering the completions between 2008 and 2012 given in the draft 2012 Housing Land Audit on Aberdeenshire Council's website, there may only now be a couple of hundred more houses in Newtonhill than Laurencekirk as shown in Table 1 below. This position is

likely to be reversed however by 2016 with 200 more houses in Laurencekirk than in Newtonhill should the allocations within the Aberdeenshire Local Development Plan be developed and this difference could increase to 600 more houses in Laurencekirk by 2023 if there is full build out of the allocations within the LDP. The potential growth within Laurencekirk could almost double the size of the settlement between 2008 and 2023.

Place	2008 Population Estimate ¹	No of houses (using density of 2.31/ho)	No of grade sep Jns	HLA 2008-2012 Completions ²	Total Houses by 2012	Houses by 2016 with LDP added	Houses by 2023 with LDP added	2023 populn estimate if 2.31 per house	Estimated % populn +housing growth 2008 to 2023
Forfar	13,430	5814	2	193	6007	6174	6584	15209	13%
Stonehaven	10,760	4658	2	130	4788	5028	5178	11961	11%
Brechin	7,070	3061	2	75	3136	3237	3608	8334	18%
Portlethen	6,740	2918	2	544	3462	3462	3462	7997	19%
Newtonhill	3,080	1333	1	59	1392	1442	1462	3378	10%
Laurencekirk	2,440	1056	0	123	1179	1664	2064	4768	95%

<http://www.gro-scotland.gov.uk/files2/stats/population-estimates/08mye-localities-table1.xls> ¹

<http://www.aberdeenshire.gov.uk/statistics/hla/Draft%20HLA%202012%20v2.2.PDF> ²

Comment - Should the housing allocation within the Local Development Plan be fully taken up, the housing and population within Laurencekirk will further increase. This growth is more significant than that for other existing settlements along the A90 between Forfar and Aberdeen and could potentially see the population of Laurencekirk almost double in size during the period from 2008 to 2023.

3. A90 Laurencekirk Road Safety Review – Traffic Survey Report (June 2009)

Background

- 3.1 Bear Scotland Ltd undertook surveys on behalf of Transport Scotland as the basis for a road safety review at all 3 Laurencekirk junctions with the A90 Trunk Road. The surveys were carried out in May 2009 and 12 hr (7am-7pm) classified turning counts reported for Saturday 9th and Monday 11th May.

Point of interest within the survey results

- 3.2 The results showed the percentage of large goods vehicles and buses at the 3 junctions over the 12 hour period on the Monday to be approximately 13% at the south junction, 14% at the central and 10% at the north junction.
- 3.3 The week day peak hours were determined as 0700-0800 in the AM and 1700-1800 in the PM, but it is worth noting that the turning manoeuvres in the AM peak in and out of Laurencekirk amounted to 442 two way between 0700-0800, rising to 583 two way between 0800-0900 as shown below.

	South Junction		Central Junction		North Junction		Total
Hr Beg	In	Out	In	Out	In	Out	2-way
0700	75	57	36	58	54	162	442
0800	101	95	69	66	124	128	583
1700	98	114	59	61	186	88	606

Comment - Without information on the queue lengths and waiting times it is difficult to surmise whether the increase in turning manoeuvres to/from Laurencekirk in the hour following the AM peak hour is purely reflective of journey demands in each hour, or whether it is indicative of some peak spreading as a result of difficulties accessing the Trunk road during its busiest hour?

- 3.4 In addition to the turning movements in and out of Laurencekirk, there is a significant turning movement to/from the eastern arm of the A937 (towards Montrose) at the southern junction with the A90 as shown below.

A90 South Junction – A937 (E) to Montrose arm

	Outbound		Inbound		Total
Hour	Right Turn	Ahead	Left Turn	Ahead	2-way
0700-0800	161	33	60	21	275
0800-0900	113	43	76	34	266
1700-1800	65	49	256	52	422

(the ahead movement is also included in the totals to/from Laurencekirk at the south junction above)

Comment – It is worth noting that in addition to the turning movements between Laurencekirk and the A90 Trunk Road that there is a significant additional volume of

commuter traffic from the Montrose area using the A90/A937 south junction to access the A90 Trunk Road and travel to/from areas north of Laurencekirk.

3.5 The main road flows on the A90 Trunk Road on Monday 11 May 2009 during the peak hours were:

	0700-0800 AM Peak			1700-1800 PM Peak		
Location	northbd	southbd	2-way	northbd	southbd	2-way
N of north jn	1663	429	2092	604	1312	1916
S of north jn	1506	381	1887	524	1135	1659
N of central jn	1498	370	1868	523	1142	1665
S of central jn	1484	387	1871	554	1167	1721
N of south jn	1509	397	1906	558	1173	1731
S of south jn	1383	364	1747	534	973	1507

Further Investigation following on from report

3.6 Aberdeenshire Council provided a copy of information from Transport Scotland from the permanent automatic traffic counter that is located on the A90 Trunk Road between the central and north junctions to Laurencekirk for 2009 and 2010. This data gives hourly northbound and southbound traffic flows each day from January to December 2009 and from January 2010 – April 2011.

3.7 Looking at the flows from the permanent counter on the day of the Bear Survey, namely Monday 11 May 2009 shows a reasonable correlation between the surveyed flows and that recorded by the automatic traffic counter

	0700-0800 AM Peak			1700-1800 PM Peak		
Date	northbd	southbd	2-way	northbd	southbd	2-way
11 May 2009	1551	398	1949	538	1179	1717

3.8 However, looking at the flows from the permanent automatic traffic counter on the same day the following year, namely 10 May 2010, along with weekday averages for the entire 2009 and 2010 to Apr 2011 data (excluding top and bottom outliers) and from a classified count by Aberdeenshire Council on 31 May 2011, it can be seen that the northbound flow in the AM peak on the day of the weekday turning count survey in May 2009 may be higher than average.

	0700-0800 AM Peak			1700-1800 PM Peak		
Date	northbd	southbd	2-way	northbd	southbd	2-way
10 May 2010	1293	439	1732	561	1136	1697
Wk day av 2009	1251	412	1663	555	1226	1781
Wk day av 10/11	1239	411	1650	549	1199	1748
31 May 2011	1242	416	1658	530	1157	1687

- 3.9 The average, minimum and maximum data for individual week days from the permanent counter for January 2010 to April 2011 were therefore investigated and this showed that higher than average weekday flows occur on Monday AM peak northbound and Friday PM peak north and southbound.

AM peak 07:00-08:00 between Jan 2010 – April 2011

	Northbound			Southbound		
	Average	Max	Min	Average	Max	Min
Mon	1427	1552	1098	403	466	319
Tues	1258	1404	1001	412	483	227
Wed	1219	1308	1055	410	461	353
Thurs	1228	1336	1048	417	562	262
Fri	1066	1148	935	415	589	261

PM peak 17:00-18:00 between Jan 2010 – April 2011

	Northbound			Southbound		
	Average	Max	Min	Average	Max	Min
Mon	538	777	419	1082	1226	883
Tues	526	644	435	1159	1282	1024
Wed	534	755	436	1198	1323	1010
Thurs	527	846	415	1249	1249	877
Fri	633	789	427	1301	1584	711

Comment – It is noted that the turning count given in the Traffic Survey Report for 11 May 2009 having taken place on a Monday has a higher than average weekday northbound flow on the A90 in the AM peak period, but slightly less than average weekday southbound flow in the PM peak.

- 3.10 The 12 hour traffic flows on each of the side roads on 11 May 2009 were:

(note that the minor road ahead movement is only shown outbound from each minor road to avoid double counting if 2-way totals on each minor road had been given):

A90/A937 South Junction

0700-1900	Out to A90	In From A90	Ahead out bound	Total
A937 to Laurencekirk	488	568	416	1472
A937 to A92	762	1185	437	2384
Total turning to/from and crossing A90	1250	1753	853	3856

A90/B9120 Central Junction

0700-1900	Out to A90	In From A90	Ahead out bound	Total
B9120 to Laurencekirk	446	316	171	933
B9120 to south east	134	154	169	457
Total turning to/from and crossing A90	580	470	340	1390

A90/A937 North Junction

0700-1900	Out to A90	In From A90	Ahead out bound	Total
A937 to Laurencekirk	1116	1178	4	2298
A937 to Keilburn Farm	9	8	6	23
Total turning to/from and crossing A90	1125	1186	10	2321

- 3.11 Converting the total turning to/from and crossing the A90 at each location from a 12 hour period to a 24 hour flow using a factor of 1.25 derived from the permanent traffic counter on the A90 adjacent to Laurencekirk, indicates 24 hour flows on the minor roads at the south A90/A937 junction of 4820 (or looking at the 2-way flow on each minor arm separately, including the straight ahead for both gives 2386 on the arm to Laurencekirk and 3500 on the arm towards the A92) and at the north A90/A937 junction of 2900.
- 3.12 The choice between grade separation and at grade solutions is traditionally based upon a range of issues including in particular cost/benefit analysis, environmental considerations and road safety issues. Looking however at the Design Manual for Roads and Bridges Vol 6 section 2 – TA 23/81 Junctions and Accesses : Determination of Size of Roundabouts and Major / Minor Junctions to give an approximate indication of junction type, it is noted at para 5.4.2 “For dual two lane carriageways, major/minor junctions are unlikely to be cost effective where the minor road flow is expected to exceed about 3,000 vehicles AADT 2-way,” It can be seen that this level is exceeded at the A90/A937 south junction on the minor road access to the A92 Montrose area and is approaching this level at the A90/A937 north junction with the surveyed 2009 traffic flows alone. The trip generation assumed within the Transport Assessment for the Blackiemuir Avenue 210 housing development that has since been granted planning permission will bring the 2-way flows at the northern junction to over 3,000 vehicles per day.

Comment – It is noted that the 2-way flows on the minor roads at both the north and south A90/A937 junctions are likely to be in excess of 3,000 vehicles per day at present without any further development and suggests that it may be appropriate to give consideration to an alternative form of junction type.

4. A90 Laurencekirk Road Safety Review (Oct 2009)

Background

- 4.1 This report was prepared by BEAR Scotland Limited on behalf of Transport Scotland to investigate local concerns over traffic safety at the A90 /A937 and B8091 Laurencekirk Junctions. It follows on from the A90 Laurencekirk Traffic Survey Report and identifies all current issues affecting road safety at these locations and provides recommendations for future action.

Point of interest within the report

- 4.2 This study notes that there is a higher proportion of over 60s in Laurencekirk (26.49%) in comparison to Aberdeenshire as a whole (19.16%). This age category is projected to increase within Aberdeenshire by 56% by 2016, using a base year of 2003. The prevalence of right turn accidents is therefore of particular concern at this location given the predicted change in age demographic. The unpublished report entitled 'Dual carriageway at-grade priority junctions', prepared by TRL for Transport Scotland highlights that elderly drivers experience greater problems carrying out right turn movements across traffic flows as their reaction times are lower and visual deterioration more prominent. In this particular section of the A90, three of the five right turn drivers involved in injury accidents were over 60 years of age. The projected increase in the over 60s living in this area may therefore exacerbate this issue over time.

Comment – Given the reported greater problems for elderly drivers carrying out right turn movements at dual carriageway at-grade junctions along with projected increase in over 60s living in Aberdeenshire there is a potential for right turn accidents within this age group at this location to increase over time.

To quantify the current scale of right turns at each of the 3 Laurencekirk junctions I have looked at the May 2009 survey. Due the right/left stagger layout of the side roads at each junction the straight ahead between the minor roads also involves a right turn and over the 12 hour period 0700-1900 this results in 2090 right turn manoeuvres being recorded at the south junctions, 881 at the central junctions and 1190 at the north junctions.

- 4.3 The accident rate for this section of the A90 is 9.42/100m veh km which is slightly higher than the Scottish National Average of 7.90/100m veh km for dual carriageways, sourced through WebSERIS. The overall accident rate for the A90 route is 11.27/100m veh km.
- 4.4 The proposed residential development at Blackiemuir Avenue in Laurencekirk that is noted within the report as being considered has subsequently been approved on 6 June 2011 and permission given for a further 210 dwellings.

Statistics for the A90/A937 South Junction

- 4.5 The Traffic Survey Report shows that 12,720 and 17,825 movements occurred at this junction during surveys on Saturday 9th May 2009 and Monday 11th May 2009 respectively.

- 4.6 A 50mph local limit was introduced on this dual carriageway section of the trunk road in 2005. A speed survey carried out at this junction records mean speeds of 42mph (northbound) and 49mph (southbound) and 85th percentile speeds of 45mph (northbound) and 52mph (southbound). The survey highlights a high proportion of recorded speeds greater than 50mph (32%) for the southbound direction.

Comment – It is noted that almost a third (32%) of recorded speeds in the southbound direction are in excess of the 50 mph limit.

Statistics for the A90/B9120 Junction

- 4.7 The Traffic Survey Report shows that 11,388 and 16,650 movements occurred at this junction during Saturday 9th May 2009 and Monday 11th May 2009 respectively. The national speed limit is in place on this dual carriageway section of the trunk road and a speed survey recorded mean speeds of 61mph (northbound) and 65mph (southbound) and 85th percentile speeds of 69mph (northbound) and 74mph (southbound). The survey highlights a high proportion of recorded speeds greater than 70mph (29%) for the southbound direction.

Comment – It is noted that 29% of recorded speeds in the southbound direction are in excess of the 70 mph limit.

Statistics for the A90/A937 North Junction

- 4.8 The Traffic Survey Report shows that 12,437 and 17,853 movements occurred at this junction during Saturday 9th May 2009 and Monday 11th May 2009 respectively. The national speed limit is in place on this dual carriageway section of the trunk road and a speed survey recorded mean speeds of 68mph (northbound) and 62mph (southbound) and 85th percentile speeds of 77mph (northbound) and 72mph (southbound). The survey highlights a high proportion of recorded speeds greater than 70mph in the northbound direction (44%).

Comment – It is noted that 44% of recorded speeds in the northbound direction are in excess of the 70 mph limit.

Results of Option Analysis within Report

- 4.9 As accidents involving right-turn manoeuvres are the most prevalent at the Laurencekirk junctions the following options were considered:

Closure of central reserve gaps at Laurencekirk

- 4.10 This was not considered to be feasible as there are no suitable alternative routes for diverted traffic of reasonable length (Stonehaven 40km to north and Stracathro 22km to south) and closure could therefore result in a possible migration of accidents from one location to another.

Closure of central reserve gaps with grade separation provision

- 4.11 It was acknowledged that this would remove the potential for right-turn accidents and address the issue of suitable diversion routes and accident migration. However, this proposal is not included in the Strategic Projects

Review list of major infrastructure improvements. Consequently, funding for such a scheme cannot be guaranteed. The accident savings resulting from estimated construction costs of £4M adopted within this study would only provide a first year rate of return of 4.7%, so is not considered to provide best value in relation to accident savings. It should also be noted that closure of any of these junctions may have a significant affect on the surrounding local road network.

Closure of central reserve gaps with Roundabout provision

- 4.12 This would introduce delays to trunk road traffic and conflict with the principles set out in Scotland's National Transport Strategy, which states in paragraph 78 'Our strategic networks are particularly important for connecting our cities, connecting our towns with cities and bringing people and goods to those cities. They are also critical for providing key routes into our wider region, including the Highlands and Islands, to our regeneration areas, to England and global markets to contribute to the accessibility of Scotland as a whole'. The Strategy goes on to state in paragraph 98 that 'we recognise that enhancing connections and improving journey times between and within our major centres of economic growth are vital'. This highlights the importance of the strategic function of trunk roads and the need to minimise delays.

Comment - The introduction of a 50mph speed restriction on the Trunk Road network conflicts with the aim of minimising delays and improving journey times between centres of economic growth. A letter was written to Transport Scotland on 11 Jan 2012 to enquire about their long term policy view as to whether the current 50mph is intended to be a permanent speed restriction on the Trunk Road network, or is merely intended to remain in place as an interim measure in advance of a long term solution being brought forward to remove the need for this limit as was the case at 2 junctions on the A90 at Forfar.

Transport Scotland replied to confirm that the Order that came into force on 4 November 2005 revoked the Temporary 50mph Speed Limit Order that was in force prior to this date and will remain in force for the foreseeable future. Any amendment to the A90/A937 Laurencekirk/ Marykirk junction would however be required to be designed in accordance with DMRB standards, using a mainline design speed of 120 kph and allow an order to be promoted that would revoke the 50mph speed limit and introduce the national speed limit.

Closure of central reserve gaps with Traffic Signal provision

- 4.13 Signalisation of one junction and closure of the remaining central reserve gaps would separate the conflicting manoeuvres, but this proposal would introduce significant delays to trunk road traffic, which goes against the principles set out in Scotland's National Transport Strategy.

Extension of 50mph to cover central and north junctions

- 4.14 As there has been a reduction in accident severity at the A90/A937 southern junction since the introduction of a 50mph speed limit in 2005 an extension of this speed limit to cover the remaining two junctions was investigated.
- 4.15 The Scottish Executive's ETLCD Circular 1/06 is the current guidance for assessing speed limits. It states that 'what the road looks like to road users

should be a key factor when setting a speed limit'. It goes on to say that 'mean speeds should be used as a basis for determining local speed limits. These are underpinned by extensive research demonstrating the well proven relationship between speed and accident frequency and severity, and also reflect what the majority of drivers perceive as an appropriate speed to be driven for the road.

- 4.16 Speed surveys carried out at the A90/B9120 and A90/A937 north junctions have recorded mean speeds at these junctions of 61/66mph and 63/68mph respectively.
- 4.17 Circular 1/06 also warns that 'if a speed limit is set in isolation, or is unrealistically low, it is likely to be ineffective and lead to disrespect for the speed limit. As well as requiring significant, and unavoidable, enforcement costs, this may also result in substantial numbers of drivers continuing to travel at unacceptable speeds, thus increasing the risk of collisions and injuries'. The mean speeds recorded above would suggest that the current national speed limit is suitable for this area. It should also be noted that excessive/inappropriate speed has not been recorded as a causation factor for any of the recent accidents at the A90/B9120 and A90/A937 junctions.
- 4.18 The speed limit introduction at the A90/A937 south junction and the supporting fixed safety cameras has proven effective in reducing the number of serious and fatal accidents. However, injury accidents are still being recorded at this junction, at approximately the same rate as the ten year average. Consequently a speed restriction will not necessarily completely remove an accident problem.

Further Investigation following on from report

- 4.19 It was stated within the report that at present the numbers of injury accidents on this section of the A90 appear to be fairly consistent on an annual basis, despite increased flows of approximately 19% over ten years.
- 4.20 A detailed breakdown of this growth is presented in the letter from Transport Scotland to the Petitions Committee dated October 2009 which gives Annual Average Daily Flows recorded at the permanent traffic counter on the A90 between the central and north junctions to Laurencekirk as follows:

Year	AADF	Yearly Growth	
		%	rate
1999	16549	-	-
2000	16694	0.876	1.0087619
2001	17060	2.192	1.021924
2002	17380	1.876	1.0187573
2003	17613	1.341	1.0134062
2004	18198	3.321	1.0332141
2005	17802	-2.176	0.9782394
2006	19137	7.499	1.0749916
2007	19569	2.257	1.0225741

2008	19752	0.935	1.0093515
Overall 99-2008 growth rate =		1.1935464	

4.21 In order to quantify the level of growth being recorded in the Laurencekirk area this was compared with National Road Traffic Forecasts (NRTF)

	low	central	High
1999-2001	1.013042	1.035103	1.056578
2001-2006	1.069347	1.087405	1.10354
2006-2008	1.023739	1.030834	1.036935
1999-2008	1.109011	1.160282	1.209041

Comment - This indicates that the A90 at Laurencekirk has experienced growth at levels most comparable with high growth traffic forecasts.

4.22 Based upon Annual Average Daily Flows in 2008 of 19752 on the A90 Trunk Road at Laurencekirk, the predicted growth using National Road Traffic Forecasts to a future year of 2023 in accordance with the latest Local Development Plan period indicates:

	low	Central	high
NRTF rates for 2009-2023	1.138896	1.198526	1.249185
2023 Trunk Road flow	22761	24035	25125
Approx increase in A90 flows (to nearest 100)	3,000	4,300	5,400

5. Laurencekirk Expansion – A90 (T) Appraisal Report (March 2010)

Background

- 5.1 This study was undertaken by JMP Consultants Ltd on behalf of Transport Scotland to look at the impact on the Trunk Road network of 3 potential development locations for housing allowances proposed in Aberdeenshire Council's Main Issues Report for their emerging Local Development Plan.

Points of interest within the report

- 5.2 The study uses the results of the traffic surveys undertaken by Bear in 2009 as commented upon in section 3 of this review.

Development Content

- 5.3 In accordance with the levels being considered within the Main Issues Report for the Aberdeenshire Local Development Plan, the study is based on development allocations of 885 private houses and 20 Ha of employment land. As there are no details of the scale or mix of development within the employment land it is stated that a Business Park development would be assumed to give a robust assessment of trip generation.

Trip Generation

- 5.4 The study calculates the number of people trips that may be generated in the weekday AM and PM peaks for this scale of development by using trip rates derived from the TRICS database under the categories of Residential – houses privately owned and Employment - business park. The trip rates are applied per unit for housing and per 100m² of Gross Floor Area (GFA) for the business park. For the 20 Ha employment allocation being considered within the Main Issues Report a density of 30% usable GFA is assumed, which they state equates to a 6,000m² business park.

*Comment - Converting 20 hectares to squared metres however gives 200,000m² and a 30% usable gross floor area within this would result in 60,000m². The employment trips given within the JMP study therefore represent only **a tenth** of the potential trips that could be generated.*

The trips generated by the employment land allocation have been significantly underestimated within the JMP study ie using the proposed trip generation rate should give 1,649 people trips in the AM peak and 1,306 in the PM peak rather than the 165 people in the AM and 131 in the PM shown in the report.

Mode Share

- 5.5 In order to derive the number of vehicle trips generated by the development the mode share from the 2001 Census for the Laurencekirk area was used.

Housing – Driver Mode Share %

- 5.6 The mode share applied to the people trips generated by the housing was taken as being the method of travel to work or study less those not working or studying or working or studying mainly from home. This resulted in a 47% share for those driving. It was noted that travel to work statistics for Montrose

and Stonehaven showed a rail travel mode share of 3% and 5% respectively. As the Laurencekirk Railway Station was re-opened in 2009, it has been assumed that the mode share by rail that could be achieved in Laurencekirk would not exceed these levels (albeit that it is noted that the frequency of service at these stations is some three times that of Laurencekirk). It was also assumed that the majority of this mode share would derive from a shift away from private car trips. The mode share for drivers amongst the people generated trips calculated for housing was therefore stated as being 44%, although when looking at the table of vehicle generated trips it can be seen that only a 43% driver mode share has been adopted.

Employment - Driver Mode Share %

- 5.7 The mode share applied to the people trips generated by the employment was again taken as being the method of travel to work or study less those not working or studying or working or studying mainly from home and this time those who are students were also discounted to look only at the working population. This resulted in a 61% share for those driving. Although the report states that a 5% allowance for transfer to rail has been made, the mode share for drivers amongst the people generated trips calculated for employment was taken as 57%

Comment – an assumed mode shift to rail for both rail and employment generated trips in line with the rates recorded at Montrose and Stonehaven rail stations, which have a greater frequency of service and larger population bases, may be optimistic and therefore under estimate the number of vehicular trips on the road network in Laurencekirk if it is not achieved.

Generated Vehicle Trips

- 5.8 The number of generated vehicle trips was derived by applying the mode share percentage for those driving to the total generated people trips.

Housing Vehicle Trips

- 5.9 The report applies a 43% vehicle driver rate to the people trips generated by 885 houses. The resultant peak hour 2-way peak hour vehicle trips are **463 AM and, 427 PM**. In looking at the distribution of the vehicle trips it is stated that 10% will be internal trips and the generated trips to the external road network is therefore reduced to **417 AM and 384 PM**.

Comment – a further 10% reduction for internal trips may be excessive given that only a 43% car driver mode share has been applied with 40% walking and cycling, who could be assumed to represent the majority of those travelling to a place of work or study within less than 2km.

Employment Vehicle Trips

- 5.10 The report applies a 57% vehicle driver rate to the people trips generated by a business park. The resultant peak hour 2-way peak hour vehicle trips are shown as being **94 AM and 74 PM**, however as stated previously the business park size was taken as being a tenth of the actual allocated size and the generated trips should therefore be **939 AM and 744 PM**. In looking at the distribution of the vehicle trips it is stated that 30% will be internal trips and the generated trips to the external road network is therefore reduced

within the study to **66 AM** and **52 PM**. It was considered that this would contribute only a nominal amount of additional traffic and further assessment of any employment trips was not undertaken.

*Comment – It is agreed that a 30% reduction for internal trips ie local housing serving the employment land is acceptable, however due to the earlier discrepancy in applying the trip generation rate to the employment land allocation within the Main Issues Report, the impact of the remaining **657 AM** and **521 PM** external trips that could be generated using the proposed rates for a business park of this scale should be investigated.*

Whilst the report states that “employment figures are likely to be an overestimate of actual generation as business park uses have been assumed and there is also uncertainty over likely take up of employment land based on current trends”, not assessing the impact of any generated employment trips at all would seem to be a serious omission as the allocation within the Local Development Plan could be taken up as business park usage and result in significant trip generation to/from the Laurencekirk area. It is highly likely that even using lesser trip rates for industrial or general usage would generate a sufficient level of trips to warrant investigation of their impact at the Laurencekirk/A90 Trunk road junctions.

- Further investigation on vehicle trips generated by housing used within study
- 5.11 As Nestrans does not have a licence to access the TRICS database, in order to see if the trip rates used within the study seemed robust, they have been compared with trip rates within a couple of Transport Assessments that are publically available to view on-line through planning application documentation on Aberdeenshire Council’s website.
- 5.12 Trip rates for the 210 houses development at Blackiemuir Avenue in Laurencekirk, which was approved in 6 June 2011 and the 1,000 houses development for the Newesk village at the former Edzell Airbase that is the subject of a current planning application were used for comparison purposes. Their rates were applied to the 885 houses allocated within the Main Issues Report for Laurencekirk and resulted in the following 2-way peak period trips:
- Blackiemuir Ave rate would give **573 AM** and **651 PM** vehicle trips
Newesk Village rate would give **664 AM** and **681 PM** vehicle trips
- 5.13 Comparing this with the **417 AM** and **384 PM** trips used within the JMP study would suggest that the trip rates assessed were not as robust and may have underestimated the impact at the junctions, particularly in the PM Peak.
- 5.14 The surveys undertaken in 2009 showed **442 AM** and **606 PM** peak hour 2-way flows into/out of Laurencekirk at the 3 junctions with the A90. The JMP report does state that their 483 AM and 436 PM generated trips (*they quote the totals including the 66 AM and 52 PM employment trips later discounted*) compare well with the current movements to and from Laurencekirk and that “as the proposed development is essentially a doubling of the settlement size this is considered a reasonable prediction. The difference in the PM peak is attributed to the fact that as the peak is from 17:00, the mode by car will be

an underestimate as most school pupils, who contribute to the walk share, will have travelled earlier. This is not however considered a significant issue”

Comment – The level of housing generated trips assumed in the study seem low, particularly in the PM peak, when compared with those derived using trip rates from Transport Assessments in support of planning applications at Blackiemuir Avenue in Laurencekirk and Newesk Village at Edzell Woods. Even comparison with the traffic flows observed in 2009, prior to any further development that would almost double the size of Laurencekirk would suggest that the impact of the potential housing generated trips may be underestimated. The difference is particularly noticeable in the PM peak where the development generated trips are on average around 40% (260 vehs) less than may be expected.

Assessment Years

- 5.15 In line with the horizon for the then emerging Aberdeenshire Council Local Development Plan, a future year of 2023 was adopted for the purposes of traffic impact and access option assessment. The report states that traffic levels have been projected from the 2009 survey year to 2023 using NRTF Low Growth projections. Although this is quoted as being 15.2% in the text, the correct low growth rate between these years of 13.9% has been used in the appendices.

Comment – The use of National Road Traffic Forecasts at a Low Growth rate is surprising given the growth rates that have been observed on the A90 at Laurencekirk in the past, which as noted from published Annual Average Daily Flows in section 4 of this review have been recorded as approaching high growth levels between 1999 to 2008. To help quantify the scale that this may have underestimated the performance of the junctions when being assessed in future years, the potential growth achieved by application of both rates was compared. The 13.9% low growth rates used between 2009 to 2023 resulted in only approximately 3,000 extra trips per day on the A90 Trunk Road mainline flows at this location in comparison with an increase of approximately 5,400 extra trips that may more realistically be experienced should the 24.9% high growth rates continue to be achieved throughout this period.

Development Options

- 5.16 The study considered the impact should the 885 houses be developed adjacent to the north, central or south junction and looked at the increased turning flows at each location under each scenario and considered the outcome of preliminary Picady analysis of junction performance and capacity.
- 5.17 Aberdeenshire Council’s Local Development Plan has allocated the development to the north of Laurencekirk. This would make the north junction the busiest of the three Laurencekirk junctions with the A90 and preliminary analysis indicated that the current junction layout would be significantly over capacity in the AM Peak and above practical capacity for the right turn into the A937 in the PM peak

Comment – The north junction is predicted to be over capacity in the AM peak and above practical capacity for the right turn in the PM peak. It should be noted that

this assessment was undertaken without any employment land generated trips being included, with potentially low housing trip generation levels in the PM peak and with low growth forecasts used to the 2023 year of assessment. The analysis may therefore have significantly underestimated the level of impact

- 5.18 The report considered various options at each of the 3 junctions should the development be located to the north of the settlement as follows:

OPTIONS AT NORTH JUNCTION:

Do Nothing

- 5.19 This was deemed unacceptable in terms of safety, capacity, environment and severance.

Northbound Merge Taper

- 5.20 This option would provide adequate capacity for northbound flows. This will not address the right turn movements between Laurencekirk and the A90 southbound carriageway.

Comment - It is noted that a new £300K merge lane was constructed at the northern junction of the A90/A937 at Laurencekirk in March 2012

Northbound Merge Taper with Closed Central Reserve

- 5.21 As the above option, but with the A90 gap closed, which would force all right turning movements to alternative junctions placing increased demand on these locations that will inevitably require an upgrade. This would also increase traffic through Laurencekirk town centre, resulting in detrimental impact on safety, capacity, environmental and severance issues along the High Street and increase journey distances to access the settlement. The farm to the east would require to maintain the ability to turn right.

Partial Grade Separation

- 5.22 North facing partial grade separation would deal with movements to and from the north and accommodate the farm access. All southbound traffic would require to route through Laurencekirk and traffic movements at the south junction would increase.

Full Grade Separation

- 5.23 It is considered that this would address all issues at the north junction.

Close Junction

- 5.24 This option could only be considered against upgrading of either the south or mid junction, but due to the existing constraints on the A937 within the town centre, the resultant significant additional flows are likely to be deemed unacceptable.

OPTIONS AT MIDDLE JUNCTION:

Do Nothing

- 5.25 It is undesirable to have any significant increase in traffic on the link to this junction from the town centre, so to discourage use it is suggested that traffic

calming would be required on residential links to the High Street to encourage routing of traffic to the south and north junctions.

Close Central Reserve Gaps

- 5.26 Traffic would require to re-route to the north or south junctions.

Close Laurencekirk Arm but Maintain Central Reserve Crossing to B9120 East

- 5.27 Reduces number of conflict points at this location, but also reduces the number of junctions serving Laurencekirk and would re-route existing traffic using this junction from Laurencekirk through the High Street.

Grade Separation

- 5.28 The initial view is that it is impractical to grade separate at this location given the proximity to the cemetery and the residential development to the west and a gas pipeline to the east.

OPTIONS AT SOUTH JUNCTION:

Do Nothing

- 5.29 Given the safety record and remedial measures currently in place, Transport Scotland has expressed concerns regarding any material increase at this junction. Should any junctions configuration at the north not deal fully with new development traffic it is unlikely that any significant increase could be accommodated at-grade at the south junction.

Gap Closure

- 5.30 It notes that the most significant turning movements at this junction are between the A937 East and the A90 North. This traffic would require to be re-routed, possibly by an overbridge link to Laurencekirk, but this grade separated crossing would not give direct access to the A90 and would introduce additional vehicles through Laurencekirk, so this option is discounted.

Full Grade Separation

- 5.31 This would maintain access to the A90 from both the A937 east and west and address all current traffic issues at this location. It would have the capacity to accommodate all traffic from an expanded Laurencekirk should the other junctions be closed, but this would result in traffic routing through the village, which would have capacity, environmental, safety and severance implications within the settlement and so is not considered a viable solution to serve development at the north, without modifications to the north junction also being provided.

Conclusions given within Report

- 5.32 Transport Scotland's preferred option, irrespective of the location of the development is stated as being the provision of grade separation at both the north and south junctions, with access to/from Laurencekirk removed at the A90/B9120 junction.

5.33 Transport Scotland has indicated that it would however be prepared to consider a lower cost option of grade separation at the south A90/A937 junction with access to/from Laurencekirk removed at the A90/B9120 junction and provision of a northbound merge lane and closure of the central reserve at the north junction. It is noted however that this is likely to result in a significant increase in traffic through the town and this issue would require detailed consideration by Aberdeenshire Council if this option is progressed. It is also note that the cost may exceed the level of planning gain that could be expected or afforded, particularly if there are contributions required towards other supporting infrastructure (such as education facilities) in Laurencekirk

Comment - A new Mearns Academy is to be built in Laurencekirk. The existing building has capacity for 540 pupils, but current roll is 620. The new Academy is to open August 2014 with an opening capacity of 640 and flexibility to expand to accommodate 840 if the roll continues to climb. It is also noted that the 2001 census showed only 384 students of all ages in Laurencekirk, of which 19 are pre-school age, 163 primary, 138 secondary and 64 further education. This highlights the wider catchment area out with Laurencekirk that travel to the Mearns Academy.

6. Investigation into Potential Future Traffic Growth

6.1 This summarises the work undertaken by Nestrans to try and quantify the potential additional trips in the area of the A90/Laurencekirk junctions should all of the housing and employment land allocations within the Aberdeenshire Council Local Development Plan for the Kincardine and Mearns area be developed in future. Consideration is also given to the scale of development that could potentially occur within North Angus that might also have an impact on the A90/A937 junctions.

Allocations within the Aberdeenshire Council Local Development Plan

6.2 Aberdeenshire Council adopted the Aberdeenshire Local Development Plan on 1 June 2012. The following table summarises the housing and employment land allocations within the Kincardine and Mearns area along with those carried forward from the previous Local Plan. It is noted that the allocation for 220 houses within Laurencekirk carried forward from the previous plan will almost entirely be met by the development at Blackiemuir Avenue, but this allocation is included within the trip generation calculations as planning permission was only granted in June 2011 and the trips generated by this development will therefore comprise part of the estimated growth when compared with the traffic flows surveyed in May 2009.

Settlement	Housing Land (no of houses)			Employment Land (Ha)	
	c/f from prev	2007 - 2016	2017 - 2023	2007-2023	Strategic Reserve 2024-2030
Woodland of Durris	20				
Portlethen				22	
Marywell	120				
Elsick		1845	2200	11.5	5.5
Newtonhill	35	50	20	11.5	5.5
Auchenblae	10	40	40	1	
Drumlithie		15	15	0.5	
Roadside of Kinneff		15	15		
Fourdoun		15			
Laurencekirk	220	485	400	11	16
Gourdon		25	10	3	
Johnshaven	67				
Inverbervie		130	100		
St Cyrus/Lochside	15	65	60	2	
Edzell Woods		150	150	100	
Luthermuir	25	25	25	0.5	
Marykirk	19	15	15	0.5	
Fettercairn		15	15		
Stonehaven		240	150	8	

Table 1

6.3 It is noted that a planning application has been submitted to Aberdeenshire Council for Newesk Village, a mixed use housing and employment development that in addition to the above allocations for Edzell Woods of 300 houses to 2023 and 100 hectares employment land also has a further 700 houses from 2024 to 2030. This application is still to be determined, but the

additional impact should the further 700 houses be granted is separately considered hereafter.

Trip Generation Rates

6.4 In order to estimate the number of trips that may be generated by the development allocations, the trip generation rates used within the JMP study of March 2010, as reviewed in section 5, were considered alongside trip rates from Transport Assessments (TA) in support of planning applications at Blackiemuir Avenue in Laurencekirk and Newesk Village at Edzell Woods.

Housing Trip Rates

6.5 The vehicle trip rate for housing within the JMP study was considered to be low in comparison with the rates from the other TAs, given that it assumes only a 44% mode share for car drivers and this gave significantly less trips than the existing flows in the PM peak within Laurencekirk despite the scale of development almost doubling the size of the existing settlement. It was therefore considered reasonable to apply the higher mode share for drivers from the 2001 Census for the working population (ie excluding students) that are more likely to be travelling in the peak periods and as has been taken in the Newesk Village TA at levels applicable to the ward in which this application is located. A maximum 5% reduction from 61% down to 56% drivers for mode shift to rail has however again been allowed for and the resultant trip rate when applying this mode share to the people generated trip rates within the JMP study has been used for all developments of 250 houses or more. The slightly higher trip rates from the Blackiemuire Ave TA, which was for 210 houses were considered to be more appropriate for smaller developments and have been applied to all development allocations that are smaller in size than 250 houses. Full comparison of the various trip rates can be seen in Table 2 below with the rates used within this study highlighted.

Housing Trip Generation Rates	AM		PM		
	IN	OUT	IN	OUT	
JMP Study					
People trip rates (from TRICS)	0.207	1.01	0.692	0.43	
Vehicle trips (44% driver mode share)	0.091	0.444	0.304	0.189	
Vehicle trips (56% driver mode share)	0.116	0.566	0.388	0.241	(Use for dev >250 ho)
Blackiemuir Ave TA	0.165	0.483	0.467	0.269	(Use for dev <250 ho)
Newesk Village TA					
Vehicle trips from TRICS	0.16	0.59	0.53	0.24	
Vehicle trips (People rates from TRICS with 72% driver mode share)	0.18	0.569	0.463	0.328	

Table 2

Employment Land Trip Rates

6.6 In accordance with the methodology of the JMP study, it has been assumed that all employment land will be of business park use with a 30% usable Gross Floor Area. Table 3 below also compares the employment rates within the JMP study and the Newesk Village TA. The trip generation rates for the business park given within the JMP study have been used to estimate the trip generation of all allocations within the Local Development Plan.

Employment Trip Generation Rates JMP Study	AM		PM		
	IN	OUT	IN	OUT	
business park/100m ² (57% mode)	1.328	0.239	0.163	1.077	(use for all employment allocations)
Newesk Village TA – (people trips from TRICS with 72% driver mode share)					
business park	1.458	0.191	0.263	1.225	
general industry	0.407	0.201	0.231	0.384	
The Newesk Village TA also gives the following TRICS rates for vehicles per 100 sq m GFA					
business park	1.64	0.25	0.24	1.23	
general industry	0.65	0.24	0.24	0.65	
storage and distribution	0.298	0.443	0.583	0.391	

Table 3

The resultant potential number of trips that could be generated by the housing and employment allocations within the Aberdeenshire Council Local Development Plan are as shown below in tables 4 and 5 respectively:

Settlement	Housing 2007-2016				Housing 2017-2023			
	AM In	AM Out	PM In	PM Out	AM In	AM Out	PM In	PM Out
Woodland of Durris	3	10	9	5				
Marywell	20	58	56	32				
Elsick	214	1044	716	445	255	1245	854	530
Newtonhill	14	41	40	23	3	10	9	5
Auchenblae	8	24	23	13	7	19	19	11
Drumlithie	2	7	7	4	2	7	7	4
Roadside of Kinneff	2	7	7	4	2	7	7	4
Fourdoun	2	7	7	4				
Laurencekirk	82	399	274	170	46	226	155	96
Gourdon	4	12	12	7	2	5	5	3
Johnshaven	11	32	31	18				
Inverbervie	21	63	61	35	17	48	47	27
St Cyrus/Lochside	13	39	37	22	10	29	28	16
Edzell Woods*	25	72	70	40	25	72	70	40
Luthermuir	8	24	23	13	4	12	12	7
Marykirk	6	16	16	9	2	7	7	4
Fettercairn	2	7	7	4	2	7	7	4
Stonehaven	40	116	112	65	25	72	70	40

Table 4

* Note that should the application for a further 700 houses from 2024 to 2030 that is beyond the period of the Local Development Plan, but is the subject of a current planning application, be granted this could generate the following further trips:

Housing	Housing 2024 - 2030			
	AM In	AM Out	PM In	PM Out
Edzell Woods	116	338	327	188

Settlement	Employment 2007-2023				Strategic Reserve Employment 2024-2030			
	AM In	AM Out	PM In	PM Out	AM In	AM Out	PM In	PM Out
Portlethen	876	158	108	711				
Elsick	458	82	56	372	219	39	27	178
Newtonhill	458	82	56	372	219	39	27	178
Auchenblae	40	7	5	32				
Drumlithie	20	4	2	16				
Laurencekirk	438	79	54	356	637	115	78	517
Gourdon	119	21	15	97				
St Cyrus/Lochside	80	14	10	65				
Edzell Woods	1073	1238	1592	1302				
Luthermuir	20	4	2	16				
Marykirk	20	4	2	16				
Stonehaven	319	57	39	259				

Table 5

Trip Distribution

6.7 For the purposes of estimating the distribution of the trips generated by the housing and employment allocations within the Local Development Plan reference has been made to the 2001 Census data ward based travel to work origin and destination information for car drivers as travel to work data from the 2011 Census is not going to be available until at least late 2013. This has been used to work out a trip distribution from each site for housing or to each site for employment and determine whether trips are likely to travel to/from, or pass through the Laurencekirk study area. The census data also contains the level of internal trips that have been recorded within each ward and so the remaining origin and destination proportions between wards that have been used should give a fair reflection of the external trip proportions only. Full details on the ward data taken to represent each allocation and the resultant percentage of trips through the study area are given in Appendix 1

Estimated additional trips within study area from LDP allocations

6.8 Appendix 2 contains the results from applying the trip distributions mentioned in 6.7 above and detailed in Appendix 1 to the potential number of trips generated by the housing and employment allocations within the LDP as shown in tables 4 and 5 above. The additional trips were not assigned specifically to the 3 separate A90 Laurencekirk junctions, rather a total turning onto or off the A90 from the Laurencekirk area to the north west or A937/B9120 areas to the south east have been given. The resultant trips within the Laurencekirk area are however calculated under the separate allocations for future year housing and employment and their respective time period categories. The total additional trips for the housing and employment allocations in Laurencekirk were also identified separately from the other allocations within Kincardine and Mearns as well as a final cumulative trip generation being given. The final estimated trip generation totals within the study area under each of these categories are summarised in tables 6 to 8 below:

Trips generated by LDP Allocations - excluding Laurencekirk:

	AM peak 0700-0800				PM peak 1700-1800			
	Straight ahead on A90	Turning onto/off A90	Ahead Cross A90	Total	Straight ahead on A90	Turning onto/off A90	Ahead Cross A90	Total
2007-2016 Housing	72	66	6	144	79	72	6	157
2017-2023 Housing	66	50	4	119	70	54	4	128
subtotal	138	116	9	263	149	126	11	285
Employment	241	393	6	639	270	456	6	732
subtotal to 2023	379	509	15	903	419	582	16	1017
Strategic Reserve Employment to 2030	18	22	0	41	18	22	0	41
TOTAL	397	531	15	943	437	604	16	1057

Table 6

Trips generated by Laurencekirk allocation within LDP

	AM peak 0700-0800				PM peak 1700-1800			
	Straight ahead on A90	Turning onto/off A90	Ahead Cross A90	Total	Straight ahead on A90	Turning onto/off A90	Ahead Cross A90	Total
2007-2016 Housing		336	8	344		311	7	319
2017-2023 Housing		194	5	198		180	4	184
subtotal	0	530	12	542	0	491	11	503
Employment		151	13	164		151	13	164
subtotal to 2023	0	681	25	706	0	642	24	667
Strategic Reserve Employment to 2030		220	19	239		220	19	239
TOTAL	0	901	44	945	0	862	43	906

Table 7

Overall trips generated by all allocations within LDP for Kincardine & Mearns

	AM peak 0700-0800				PM peak 1700-1800			
	Straight ahead on A90	Turning onto/off A90	Ahead Cross A90	Total	Straight ahead on A90	Turning onto/off A90	Ahead Cross A90	Total
2007-2016 Housing	72	402	13	488	79	383	14	475
2017-2023 Housing	66	244	8	317	70	234	8	312
subtotal	138	645	22	805	149	617	22	787
Employment	241	544	19	804	270	607	19	896
subtotal to 2023	379	1189	40	1609	419	1224	41	1683
Strategic Reserve Employment to 2030	18	242	19	279	18	242	19	279
TOTAL	397	1432	59	1888	437	1467	59	1963

Note Newesk application being considered and could add the following further trips:

ph 3 700 houses at Edzell 2024-3030	161	46	0	207	183	52	0	235
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Table 8

6.9 Tables 6 – 8 predict significant growth within the area of the Laurencekirk junctions and the A90 Trunk Road, with up to around 1,600 extra vehicles per hour in both the AM and PM peaks by 2023 should the full development allocations for the Kincardine & Mearns area within Aberdeenshire Council's Local Development Plan be achieved.

Level of predicted growth

6.10 In order to quantify the scale of this potential growth, the percentage increase since the 2009 traffic surveys has been calculated and then compared with the level of annual growth that would be predicted using National Road Traffic Forecasts.

6.11 In the surveys undertaken in May 2009 the recorded 2-way flows on the A90 Trunk Road to the north of the north A937/A90 Laurencekirk junction and to the south of the south A937/A90 Laurencekirk junction in the AM and PM peak hours were:

	May 2009 2-way flows	
	0700-0800	1700-1800
North of north junction	2092	1916
South of south junction	1747	1507

6.12 The generated trips calculated in Appendix 2 were used to calculate the increase in 2-way flows in the peak hours on the A90 north of the north junction and south of the south junction under the separate allocations for housing and employment and their respective time period categories. The total additional trips for the housing and employment allocations in Laurencekirk were again also identified separately from the other allocations within Kincardine and Mearns and then a final cumulative trip generation is given. The final estimated growth on the Trunk Road both north and south of Laurencekirk under each of these categories between 2009 to 2023 are summarised in tables 9 to 11 below, with Table 12 showing the growth that would otherwise have been predicted using National Road Traffic Forecasts:

Housing 2007-2023

	AC LDP excluding Laurencekirk		AC LDP allocation for Laurencekirk		Total K&M LDP allocation	
	0700-0800	1700-1800	0700-0800	1700-1800	0700-0800	1700-1800
North of north junction	209	234	407	378	617	612
% increase from 2009	10.0	12.2	19.5	19.7	29.5	31.9
South of south junction	163	176	122	113	285	290
% increase from 2009	9.3	11.7	7.0	7.5	16.3	19.2

Table 9

Employment 2007-2023

	AC LDP excluding Laurencekirk		AC LDP allocation for Laurencekirk		Total K&M LDP allocation	
	0700-0800	1700-1800	0700-0800	1700-1800	0700-0800	1700-1800
North of north junction	586	517	108	86	694	603
% increase from 2009	28.0	27.0	5.2	4.5	33.2	31.5

South of south junction	588	634	158	125	747	760
% increase from 2009	33.7	42.1	9.1	8.3	42.7	50.4

Table 10

Housing and Employment 2007-2023

	AC LDP excluding Laurencekirk		AC LDP allocation for Laurencekirk		Total K&M LDP allocation	
	0700-0800	1700-1800	0700-0800	1700-1800	0700-0800	1700-1800
North of north junction	795	751	515	463	1311	1215
% increase from 2009	38.0	39.2	24.6	24.2	62.7	63.4

South of south junction	751	811	280	239	1031	1049
% increase from 2009	43.0	53.8	16.0	15.8	59.0	69.6

Table 11

Increased flow predicted on A90 Trunk Road using NRTF forecasts

	Low Growth		Central Growth		High Growth	
	0700-0800	1700-1800	0700-0800	1700-1800	0700-0800	1700-1800
North of north junction	291	266	415	380	521	477
South of south junction	243	209	347	299	435	376
% increase from 2009	13.9%		19.9%		24.9%	

Table 12

6.13 The above tables show that even without any further development within Laurencekirk itself, the cumulative impact of the other allocations could result in around 40% more trips in each of the peak hours than was observed in 2009, of which approx 10% growth can be attributed to trips generated by housing allocations and 30% to employment. This level of generated trips more than surpasses the predicted growth even at high growth levels within the National Road Traffic Forecasts which equated to 24.9% between 2009 and 2023. It also exceeds the number of trips predicted to be generated by the allocations for Laurencekirk.

6.14 The growth in traffic as a result of potential development within Laurencekirk in accordance with the allocation within the Local Development Plan could result in an increase of almost 25% in the peak hours on the A90 to the north of the settlement and 16% growth on the A90 to the south. The majority of growth on the A90 north of Laurencekirk can be attributed to trips generated by the housing allocation, whereas on the A90 south of the settlement the trips generated by the employment allocation are slightly greater than that generated by the housing allocation.

- 6.15 In looking at the overall growth within the study area should the entire housing and employment allocations for the Kincardine & Mearns area within the Local Development Plan be achieved by 2023 it can be seen that around 64% potential trip growth is predicted.

Impact of Development within the North Angus Area

Housing Trips

- 6.16 Angus Council are in the process of developing their Local Development Plan, with the anticipated date for publication and adoption estimated as being winter 2014. It was therefore recommended that assumptions on the scale of potential development within the North Angus area be based meantime on the allocations within the 2011 housing land audit as the 2012 audit is still at the draft consultation stage. The 2011 housing land audit indicates 350 effective sites in the period from 2011 to 2018, comprising of 193 houses in Montrose and 157 in the Brechin area. There is also potential for additional land to be required in the North Angus area, but as the Main Issues Report will discuss options and phasing there has been no assumption made in advance of having a formal decision on future land supply, albeit it is noted that an indicative range of 290 to 490 further homes was mentioned.
- 6.17 Using the People Trip Rates from the JMP study discussed in chapter 5 and applying driver mode shares calculated from the SCROL (Scotland's Census Results On Line) website table CAS218 for those working, but not full time students, which showed 48% for Montrose and 57% for Brechin, gives the following trip generation rates:

Housing Trip Generation Rates	AM		PM	
	IN	OUT	IN	OUT
JMP Study				
People trip rates (from TRICS)	0.207	1.01	0.692	0.43
Vehicle trips (48% driver mode share)	0.099	0.485	0.332	0.206
Vehicle trips (57% driver mode share)	0.118	0.576	0.394	0.245

- 6.18 Applying the above rates to the 350 effective sites for 2011 to 2018 gives the following potential trips:

Housing Trip Generation	AM		PM	
	IN	OUT	IN	OUT
Montrose – 193 houses	19	94	64	40
Brechin – 157 houses	19	90	62	38
Total generated trips	38	184	126	78

Employment Land Trips

- 6.19 Within the housing land audit there is a 7.3ha site of employment land with no constraints identified at Brechin business park. There are also 3 existing employment land sites identified within Montrose, namely 4.78ha at Broomfield and 5.57ha at Forties Road/Brent Ave both of which are effective with no constraints and 10ha at Montrose Airfield that is allocated though not yet effective. There is also development potential on both sides of Montrose

Port and a draft development masterplan has been published for South Montrose.

- 6.20 In accordance with the methodology of the JMP study, it has been assumed that all employment land will be of business park use with a 30% usable Gross Floor Area. The trip generation rates for the business park given within the JMP study have been used with relevant driver mode shares for each area from Census data applied to estimate the trip generation of all the identified employment land sites within Montrose and Brechin, with the exception of the Montrose Port area as Angus Council intimated that this is unlikely to have a significant additional impact on the A90/A937 junction.

Employment Trip Generation Rates	AM		PM	
	IN	OUT	IN	OUT
Business park/100m ²				
Montrose (48% mode)	1.118	0.201	0.137	0.907
Brechin (57% mode)	1.328	0.239	0.163	1.077

- 6.21 Applying the above rates to the listed employment land sites gives the following potential trips:

Employment Trip Generation	AM		PM	
	IN	OUT	IN	OUT
Montrose 20.35 ha => 61,050m ² GFA	683	123	84	554
Brechin 7.3 ha => 21,900m ² GFA	291	52	36	236
Total generated trips	974	175	120	790

Trip Distribution

- 6.22 To estimate the distribution of the trips generated by the housing and employment land reference has again been made to the 2001 Census data ward based travel to work origin and destination information for car drivers. Unfortunately the data previously obtained only provides details on journey numbers at ward level for those originating or terminating within Aberdeen City and Aberdeenshire Council areas. The total number of car drivers travelling within Angus itself is not contained within this table and so as a rough guide to the total number of trips starting or ending within the Angus area, data from the SCROL website for numbers of drivers in work, but not full time students was taken. Full details are given at the end of Appendix 1, but this resulted in estimated trip distributions between Angus and the Aberdeen City and Aberdeenshire Council areas of 5.7% for housing and 2.6% for employment land. It is recognised that these distributions are rough estimates for indicative purposes only at this stage. The resultant numbers travelling via the A90 may also be overestimated as some journeys may route via the A92.

Estimated additional trips within study area from North Angus

- 6.23 Applying the above trip distributions to the potential number of trips generated by the housing and employment sites identified within the 2011 housing Land audit indicates that the following additional trips may be added to the A90 in the vicinity of the Laurencekirk junctions:

Estimated Additional Trips from north Angus by 2018	AM		PM	
	Sbd on A90 from AC/ACC	Nbd on A90 to AC/ACC	Sbd on A90 from AC/ACC	Nbd on A90 to AC/ACC
	Montrose – 193 houses	1	5	4
Brechin – 157 houses	1	5	3	2
Montrose 20.35 ha => 61,050m ² GFA	18	3	2	14
Brechin 7.3 ha => 21,900m ² GFA	7	1	1	6
Total generated trips	27	14	10	24

- 6.18 The total estimated additional trips for this scale of development within north Angus by 2018 would only result in a minimal increase on the A90 Trunk Road in the Laurencekirk area. Comparing the above figures with the 2-way flows surveyed in May 2009 on the A90 Trunk Road south of Laurencekirk suggests around a 2% increase in the peak hours. Should the trips from Montrose however route northwards to the A90 via the A937, this could increase the 2-way flows observed on the A937 during the 2009 survey by 10% in the AM peak hour and 5% in the PM peak hour.
- 6.19 The additional trips from potential development sites within the north Angus area calculated above are rough approximations only, in advance of a Local Development Plan with specific allocations being adopted and in the absence of ward level origin and destination census data within the Angus area. They are indicative however of further potential traffic growth within the area of the Laurencekirk junctions with the A90 Trunk Road, regardless of whether any further development takes place within Laurencekirk itself.
- 6.20 In conclusion, although the build out rate and exact employment land uses of the approved allocations within the Aberdeenshire Local Development Plan for the Kincardine and Mearns area and the actual contents of the Angus Local Development Plan are unknown, the above calculations based on stated assumptions indicate a potential scale of trip generation that could take place within the area of the A937/A90 junctions. This scale of predicted increase in traffic flow in future years is well in excess of that considered within previous studies commissioned by Transport Scotland and indicates that further consideration of junction upgrades on the A90 Trunk Road in the Laurencekirk area at the earliest opportunity may be warranted.

7. Summary of Findings and Conclusions

- 7.1 Nestrans has reviewed previous studies in the Laurencekirk area and undertaken further work to try and quantify any additional traffic growth in this area as a result of the confirmed allocations now contained within Aberdeenshire Council's adopted Local Development Plan and from potential developments within north Angus, which may not have been considered to date. This work has been undertaken to allow a case to be put to Transport Scotland in support of constructing a grade separated junction at the earliest opportunity.
- 7.2 In the course of undertaking this work, Nestrans and Aberdeenshire Council were asked by the Public Petitions Committee to provide an update on the outcome of this work in relation to petition PE1236, which 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. A copy of the response provided, which summarises this work, can be found on the petition website under submission 'KK' at:
- <http://www.scottish.parliament.uk/GettingInvolved/Petitions/PE01236>
- 7.3 It is noted that at the time of a review of at-grade junctions of A-class roads with the A90 between Dundee and Stonehaven in 2008, the A90/A937 south west junction at Laurencekirk was second in turning movements and accidents between 2004 and 2006 only to the A90/A932 Lochlands junction. This junction, which gives the first access to Forfar for northbound vehicles on the A90, has existing grade separated junctions around 2km in either direction should the gap in the central reserve be closed, whereas the distance to the nearest grade separated junctions from the A90/A937 south west Laurencekirk junction is approximately either 10km to the south at Stracathro, or 21km to the north at Stonehaven.
- 7.4 The population of Laurencekirk has already exceeded the level that existed in Newtonhill in the early 1990s when it had a grade separated junction constructed by Grampian Regional Council. Should the housing allocation within the adopted Aberdeenshire Council Local Development Plan for Laurencekirk be developed then Laurencekirk could potentially double in size and population by 2023, resulting in significant growth in comparison with other existing settlements along the A90 between Forfar and Aberdeen. In addition to the traffic growth within Laurencekirk however it should be noted that the majority, around 60%, of the turning movements recorded in 2009 at the A90/A937 south west Laurencekirk junction were to and from the southern A937 road to the Montrose area.
- 7.5 The introduction of a 50 mile per hour speed restriction on the A90 Trunk Road network at the A90/A937 south junction at Laurencekirk conflicts with the Scottish Government's aims within the National Transport Strategy of minimising delays and improving journey times between centres of economic growth. Nestrans therefore enquired whether the current restriction is an interim measure in advance of a longer term solution being brought forward

as was the case at two junctions on the A90 at Forfar. Transport Scotland has however confirmed that the 50mph Speed Limit Order which became permanent in 2005, revoking the previous temporary order, will remain in force for the foreseeable future.

7.6 The traffic forecasts used in a previous study commissioned by Transport Scotland and undertaken by JMP in 2010 to assess the potential impact on the A90 Trunk Road network at Laurencekirk as a result of allowances being made within the Local Development Plan for Aberdeenshire Council have in Nestrans view been underestimated and therefore have undermined the case for consideration of junction upgrades. Specific significant examples of this which have been highlighted within this review include:

- Annual Average Daily Traffic Flows published between 1999 and 2008 for the A90 adjacent to Laurencekirk showed that traffic growth had been experienced at almost High National Road Traffic Forecast levels, yet only Low NRTF rates were used within the study, which over a 14 year period could result in around 2,400 less trips per day than may be expected.
- Employment land appears to have been taken as one tenth of the 20 hectare allocation within the Main Issues Report thus vastly underestimating the trip generation potential. The adopted Local Development Plan now allocates 27 hectares of employment land within Laurencekirk consisting of 11 hectares in the period to 2023 with a further 16 hectares strategic reserve for the period 2024-2030.
- The report did not assess the impact of any employment generated trips at all given the uncertainty of likely take up and land usage, but this seems a significant omission given the scale of land allocated for employment that could be developed in line with the Local Development Plan. Applying the proposed rates and land usage assumptions given within the report to a 20 hectare site, the generated traffic that has been discounted would have amounted to 657 external trips in the AM peak hour and 521 in the PM peak
- The level of housing generated trips assumed in the study seem low in the PM peak in comparison with those derived using trip rates from Transport Assessments in the Laurencekirk and Edzell areas and in comparison with flows surveyed in 2009 prior to any further development that could potentially double the size of the settlement. The difference in the PM peak meant that generated trips were around 40% less (260 vehicles) than may be expected
- No allowance is made for trips generated by allocations other than within Laurencekirk. Nestrans has looked at the allocations within the Aberdeenshire Local Development Plan for the entire Kincardine and Mearns area and made an assumption on development potential in the nearby north Angus area that may also impact on the A90/A937 junctions. This indicated that even without any further development in

Laurencekirk itself, the cumulative impact should all other allocations within the LDP for the Kincardine and Mearns area be developed by 2023 could amount to around a 40% increase in trips in each of the peak hours in comparison with flows surveyed in 2009. This is considerably more than is forecasted even using NRTF high growth, which would equate to 24.9% growth between 2009 and 2023 and is well in excess of that obtained with the 13.9% growth factor used within the JMP study.

- 7.7 The work undertaken by Nestrans has highlighted that previous predictions for future traffic levels in the Laurencekirk area have been significantly underestimated and that this growth can not be solely attributed to development within Laurencekirk.
- 7.8 The 2009 surveys indicate that flows on the minor A937 road from the Montrose area at the south junction with the A90 Trunk Road and the A937 from Laurencekirk at the north junction have exceeded the 3,000 2-way Annual Average Daily Traffic levels that the Design Manual for Roads and Bridges Vol 6 section 2 – TA 23/81 states are unlikely to be cost effective for dual 2 lane carriageway, major/minor junctions.
- 7.9 It is hoped that the comments raised within this review will be looked at by Transport Scotland and that further consideration will be given to the provision of junction upgrades on the A90 Trunk Road in the Laurencekirk area at the earliest possible date.