Aberdeen Access from the South Appendix A

Aberdeen City Council, Aberdeenshire Council, Nestrans

Technical Report on Growth and ASAM3b Iteration

TECHNICAL REPORT ON GROWTH AND ASAM3B ITERATION 3

Description:

Aberdeen Access from the South Appendix A

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1 FORECAST MEDIUM AND LONG TERM MATRICES AND DEVELOPMENT CONTENT

1.1 Overview

1.1.1 Introduction

This Chapter details the assumptions, along with the methodology for developing the linkage between the Aberdeen Access from South S-Paramics model (AAFSPM) developed by JMP Consulting and the higher tier Aberdeen Sub Area Model (ASAM3b).

The content of this note is based on information available at time of writing and may be subject to further changes dependent on further data supply, analysis and findings.

1.1.2 Background

JMP Consulting undertook a study examining access to Aberdeen from the south and produced a final report in November 2006 “Aberdeen South Access Study – Final Report”.

On the 1st December 2005 the Scottish Transport Minister announced a preferred alignment corridor for the Aberdeen Western Peripheral Route (AWPR) with an additional new spur road to Stonehaven. The announcement presented a configuration of the AWPR sufficiently different from that previously considered to warrant this updated study.

In a further ministerial announcement on 2nd May 2006 the Minister announced the preferred alignment for the AWPR and the Stonehaven spur.

In addition to the new AWPR alignment from the A90 (T) at Charleston to the south of the City, the Minister announced an additional new spur road that would join the AWPR to the A90(T) at Stonehaven.

1.1.3 ASAM3b

ASAM3b is a higher tier TRIPS traffic model which can be used to provide future year ‘cordon’ demand forecasts for input to more detailed local models around areas of specific concern.

ASAM3b uses expected land use changes across Aberdeen & Aberdeenshire in tandem with Trip End and demand models to calculate the growth in traffic over time. Due to the course zone definition, the model does not isolate detailed trip rates for each specific development, however, the demand model does generate the total level of (traffic) trips originating and destinating in each development area.

ASAM3b has been developed for the purpose of providing future year forecasts within the north east area and has been considered fit for purpose on a number of studies, it should be considered as the most reliable source of forecast information. ASAM3b will take account of combined new residential to new employment trips and vice versa whereas if treated on an individual development by development basis every trip would occur as a new trip which is unrealistic.

In light of the information received to date, it is the considered opinion of SIAS Limited that limited development growth other than that already contained within ASAM3b should be added to the AAFSPM, as this would in effect be double counting the growth in the future year models and will not be consistent with other studies.

1.1.4 ASAM3b Coverage

ASAM3b (Aberdeen Sub Area Model) is a strategic model which was developed to serve and provide a forecasting tool for Aberdeen and Aberdeenshire. The area which ASAM3b covers is shown in Figure 1.1.

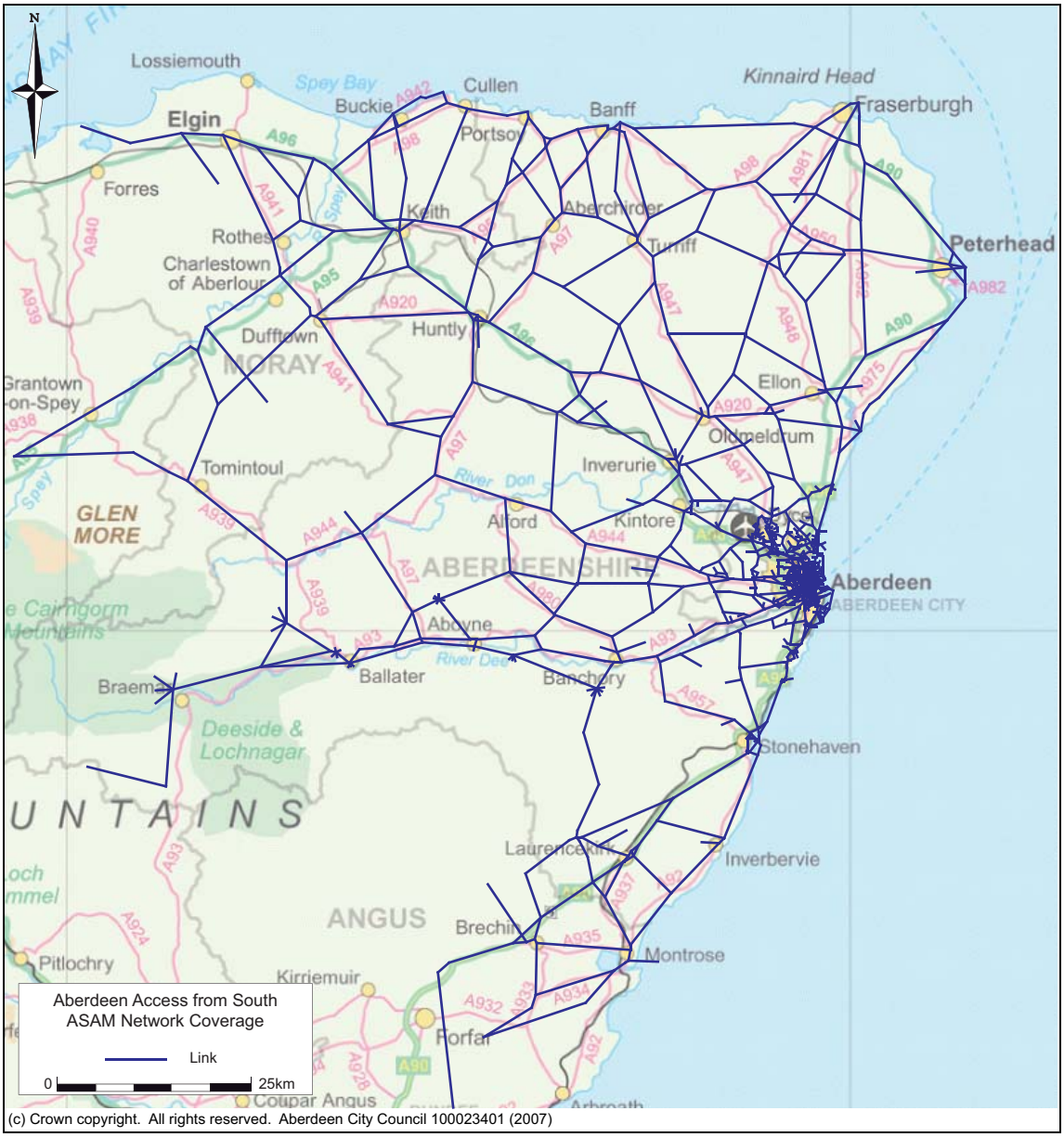

Figure 1.1 : ASAM network coverage

To establish a cordon from which detailed changes could be reflected to the AAFSPM, SIAS provided information illustrating the S-Paramics model boundaries, zonal system and zone numbering.

The purpose of generating or identifying a cordon within a higher tier model such as ASAM3b is to allow results to be extracted focusing on a particular area of interest which can in turn allow information to be fed through to a more detailed model. If the cordon is planned in conjunction with the detailed model, in this instance AAFSPM, a correlation between ASAM3b and AAFSPM zones can be made.

This correlation then allows the travel demand changes occurring between ASAM3b option tests to be represented in some detail within the AAFSPM. Figure 1.2 shows the resultant cordon generated from ASAM3b to supply travel demand information. Figure 1.3 illustrates the AAFSPM boundary.

Figure 1.2 : ASAM3b base cordon for S-Paramics correlation

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Figure 1.3 : AAFSPM model boundary

2 DEVELOPMENT CONTENT

2.1 Introduction

Following review of the base model, attention turned to the development of the future year models. SIAS was provided with development information from Aberdeen City Council for the following developments which were included in the future year models developed by JMP Consulting:

- Peterseat Industry
- Newlands Farm Industry
- Moss-side Industry
- Cairnrobin Industry
- Marywell Development
- Schoolhill Housing

Due to the future impacts of Modern Transport System (MTS) schemes and the Aberdeen Western Peripheral Route (AWPR) it is important that the study is carried out in a manner consistent with the AWPR assessment and makes use of the ASAM3b model to provide the data for the future year growth.

To that end, in order to ascertain if any of the above developments are included in ASAM3b, SIAS undertook liaison with the ASAM3b managing agent (MVA) to discuss the developments that are included within ASAM3b. The developments provided by MVA in the Aberdeen South area were:

- Charleston and Stationfields Housing, Cove
- Cairnrobin and Moss-side
- Cove North
- Schoolhill Housing/Industry
- Loirston, Altens Employment
- Altens East and Doonies

MVA stated that developments not included within the ASAM3b model were:

- Newlands Farm Industry
- Marywell Development

Although the developments provided by the different parties have different names, both account for the Local Plan content, it is considered that the developments are the same and to subsequently include ASAM3b growth plus the listed developments would in fact lead to a double count and a significant overestimate of future year travel demand.

Aberdeen City Council also provided additional information for Altens East and Cove Housing. These are included in ASAM3b growth but were not provided in the original summary sheets.

To this end, SIAS requested a development plan showing the locations of the stated developments, in the ASAM3b model. Figure 2.1 below shows the locations of the developments.

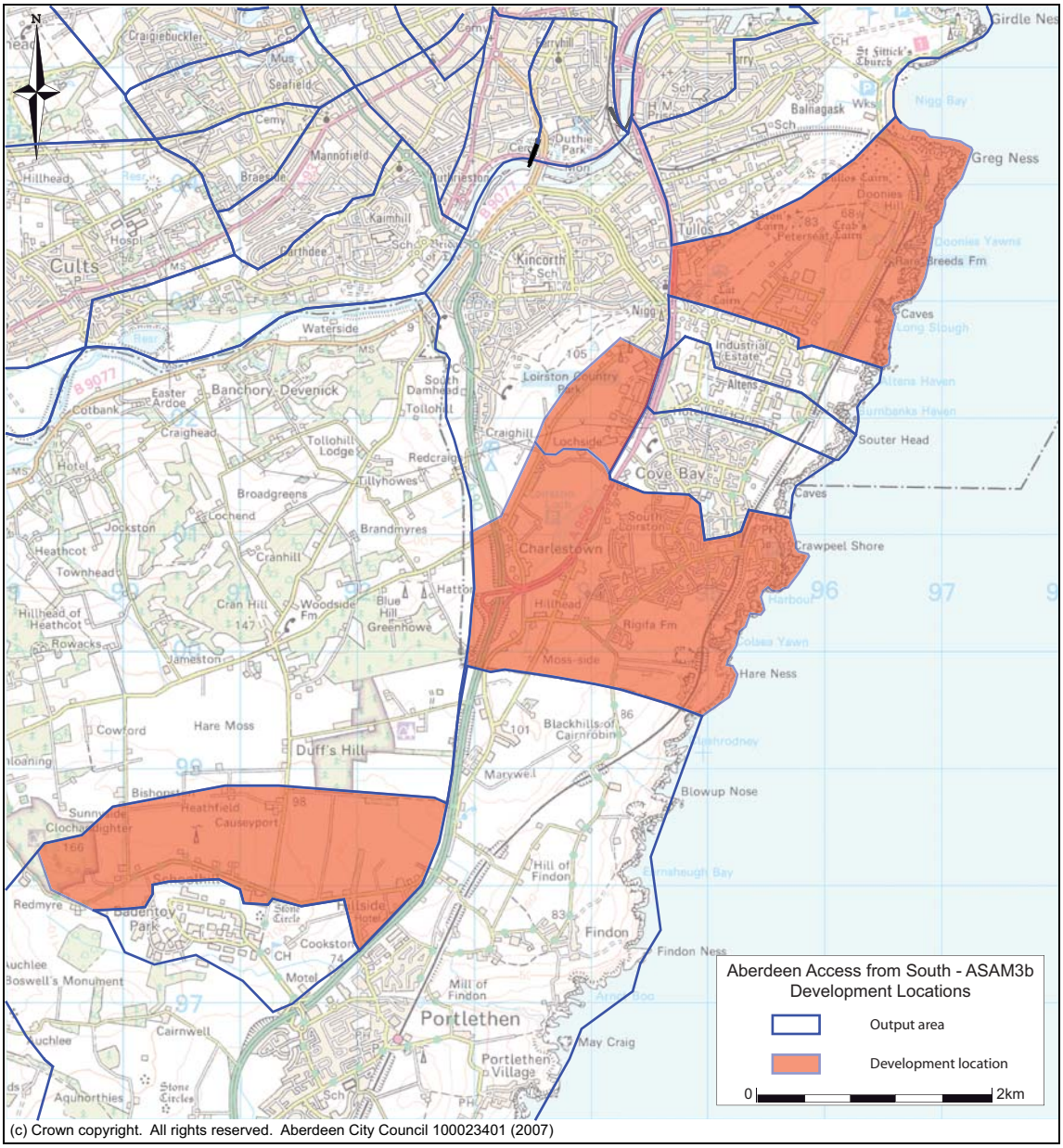

Figure 2.1 : ASAM3b development locations

Figure 2.2 shows the locations of the Aberdeen City Council provided developments.

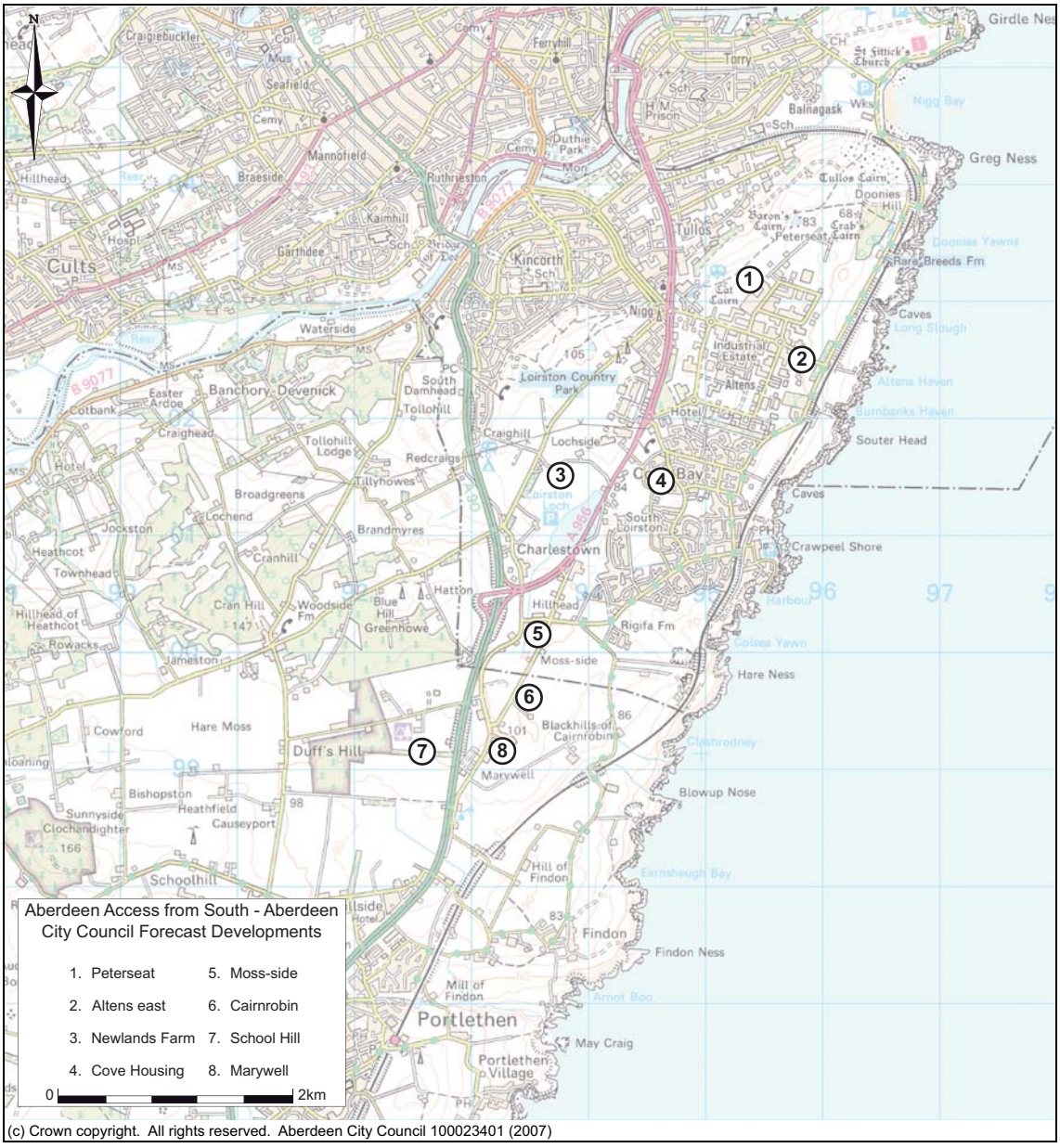

Figure 2.2 : Aberdeen City Council forecast developments

SIAS has interpreted the correlation between the developments and these are described below:

- Peterseat is ASAM zone 63
- Newlands Farm is ASAM zone 70
- Moss-side is ASAM zone 72
- Cairnrobin and Marywell are ASAM zones 146
- Schoolhill is ASAM zone 153

3 ASAM3B DEVELOPMENT GROWTH

3.1 2011 Growth

Table 3.1 summarises the 2012 AM development vehicle trips as supplied by Aberdeen City Council for the 2.5 hr peak period, compared with the number of future development trips included in ASAM3b. It was agreed with Aberdeen City Council that trip forecasts for Schoolhill were overestimated during the original study in light of the emerging development content and forecasts have been revised accordingly.

Table 3.1 : 2012 AM development trips

Development	Aberdeen City Council Development Data 100% Trips	2012 Development Phase (%)	2012 Trips	ASAM3b Zone Growth 2012 (multiply by 2.09 period factor)	%'age of ACC Forecast
Forecast Development					
Peterseat Industry	1385	25%	346		
Newlands Farm Industrial	178	25%	45		
Schoolhill Housing / Industry	1350	33%	446		
Mosside Industry	790	25%	198		
Cairnrobin	1304	25%	326		
Marywell	96	100%	96		
ASAM3b Zone					
Zone 146				646	
Zone 72				285	
Zone 153				627	
Zone 70				52	
Zone 63				514	
Total Trips	5103		1457	2124	**146%**

Table 3.1 shows that ASAM3b provides a robust medium term vehicle trip forecast compared to Aberdeen City Council estimates with a predicted 2124 in ASAM3b and 1457 from Aberdeen City Council.

Table 3.2 summarises the 2012 PM development trips as supplied by Aberdeen City Council for the 2.5 hr peak period.

Table 3.2 : 2012 PM development trips

Development	Aberdeen City Council Development Data 100% Trips	2012 Development Phase (%)	2012 Trips	ASAM3b Zone Growth 2012 (multiply by 2.33 period factor)	%'age of ACC Forecast
Forecast Development					
Peterseat Industry	1519	25%	380		
Newlands Farm Industrial	178	25%	45		
Schoolhill Housing / Industry	1550	33%	512		
Mosside Industry	914	25%	229		
Cairnrobin	1341	25%	335		
Marywell	282	100%	282		
ASAM3b Zone Growth					
Zone 146				664	
Zone 72				292	
Zone 153				606	
Zone 70				58	
Zone 63				563	
Total Trips	5784		1783	2183	**122%**

Table 3.2 shows that ASAM3b provides a robust medium term trip forecast compared to Aberdeen City Council estimates with a predicted 2183 in ASAM3b and 1783 from Aberdeen City Council.

3.2 2027 Growth

Table 3.3 summarises the 2027 (Aberdeen City Council information) and the 2027 ASAM3b Growth in the 2.5 hr AM peak period.

Table 3.3 : 2027 AM development trips

Development	Aberdeen City Council Development Data 100% Trips	2027 Development Phase (%)	2027 Trips	ASAM3b Zone Growth 2027 (multiply by 2.09 period factor)	%'age of ACC Forecast
Forecast Development					
Peterseat Industry	1385	100%	1385		
Newlands Farm Industrial	178	100%	178		
Schoolhill Housing / Industry	1350	100%	1350		
Mosside Industry	790	100%	790		
Cairnrobin	1304	100%	1304		
Marywell	96	100%	96		
ASAM3b Zone					
Zone 146				1894	
Zone 72				341	
Zone 153				1112	
Zone 70				73	
Zone 63				815	
Total Trips	5103		5103	4235	**83%**

Table 3.4 summarises the 2027 (Aberdeen City Council information) and the 2027 ASAM3b Growth in the 2.5 hr PM peak period.

Table 3.4 : 2027 PM development trips

	Aberdeen City Council Development Data 100% Trips	2027 Development Phase (%)	2027 Trips	ASAM3b Zone Growth 2027 (multiply by 2.33 period factor)	%'age of ACC Forecast
Forecast Development					
Peterseat Industry	1519	100%	1519		
Newlands Farm Industrial	178	100%	178		
Schoolhill Housing / Industry	1550	100%	1550		
Mosside Industry	914	100%	914		
Cairnrobin	1341	100%	1341		
Marywell	282	100%	282		
ASAM3b Zone Growth					
Zone 146				1987	
Zone 72				340	
Zone 153				1083	
Zone 70				82	
Zone 63				904	
Total Trips	5784		5784	4396	**76%**

It can be seen from Tables 3.3 and 3.4 that the comparison between the total trips forecast by Aberdeen City Council and the ASAM3b content are close. In addition, but not included in the above summary tables SIAS has added the Newlands Farm and Marywell developments to the S-Paramics model for the medium and long term assessments.

Also, where ASAM3b has business parks forecasts, the built in assumption is that there will only be 70 – 75% occupancy at any one time, as it is very unusual for every industrial unit on a business park to be occupied at the same time.

The development vehicle trips forecast in 2012 and 2027 appear robust in ASAM3b, and these will form the basis of the growth in 2012 and 2027 for the S-Paramics model.

4 ASAM3B APPLICATION TO PARAMICS

4.1 Correlation of ASAM Base to Paramics Base

Table 4.1 demonstrates that a good initial correspondence exists between the predicted travel demand for the cordon in ASAM3b and AAFSPM in the AM peak. Taking the supplied ASAM3b peak hour travel demand matrices and applying a peak period factor (calculated from 2004 count data) shows that whilst the AM is comparable, there is a difference of some 27% in the PM.

Table 4.1 : AAFSPM to ASAM3B total vehicles matrix comparison

	S-Paramics 2.5 hr	ASAM3B 1 hr	Survey Factor	ASAM3B 2.5 hr	Diff	%'age Diff
AM	31475	13348	2.098	28007	-3468	-11%
PM	40496	12661	2.337	29585	-10911	-27%

There are a number of possible reasons for the discrepancies, the AAFSPM is naturally more detailed and refined than ASAM3b. The AAFSPM has some 70 zones whereas for the same area the ASAM3b model has only 40 zones leaving the ASAM3b model potentially lower on short distance intra-zonal trips.

In addition to the matrix total comparison, key routes were assessed for total flows on either an inbound or outbound direction dependant upon the most critical tidal flow and peak period. Table 4.2 shows the results.

Table 4.2 : AAFSPM to ASAM3B total vehicles on key movements

Location	O or D	S-Paramics 2.5 hr	ASAM3B 1 hr	Survey Factor	ASAM3B 2.5 hr	Diff	%'age Diff
A90 South	AM Origin	4272	2117	2.098	4442	170	4%
	PM Destination	4240	1856	2.337	4337	97	2%
Anderson Dr	AM Destinations	2599	1311	2.098	2750	151	6%
	PM Origins	2193	896	2.337	2094	-99	-5%
Gt S'thn Rd	AM Destinations	1817	791	2.098	1660	-157	-9%
	PM Origins	2443	1014	2.337	2370	-73	-3%
Market Street	AM Destinations	2145	936	2.098	1965	-180	-8%
	PM Origins	2167	1044	2.337	2439	272	13%

Table 4.2 provides some confidence that the main movements within the AM and PM peaks correspond well within the AAFSPM and ASAM3b.

It is difficult to take variations at ASAM3b zone level and apply these to the AAFSPM as at this detailed level the total trips occurring between Origin/Destination pairs may not be the same between the two models i.e. ASAM3b could have a O/D pair with 100 trips whereas AAFSPM could have this O/D pair as 500 trips, if ASAM3b varies under the forecast scenarios by 100% then the impact on the AAFSPM could be significant.

It is important to develop the correspondence between zones. Each AAFSPM zone was assigned against the relevant ASAM3b zone with the resultant aggregated to represent sectored movements.

For this reason and to remove any scaleability problems the ASAM3b variation has been applied at sector level. Figure 4.1 shows the basic sectors by which the ASAM3b matrix variation has been applied to the AAFSPM. This detailed sector level was used to derive light and heavy vehicle matrix changes.

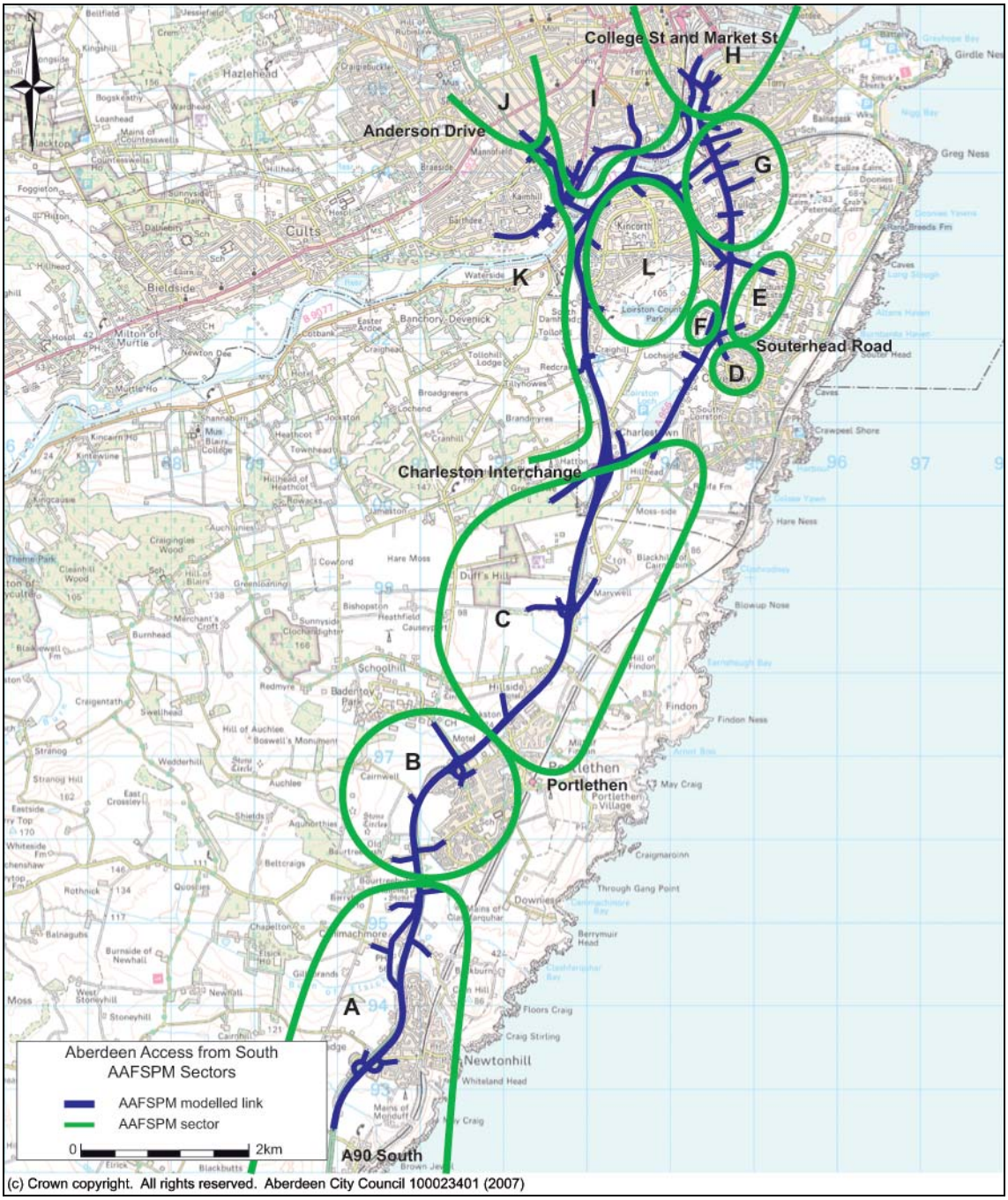

Figure 4.1 : Sectors

Figure 4.1 shows that a total of 12 sector movements have been identified in order to produce matrix changes.

The application of growth from the ASAM3b cordon to the AAFSPM matrices should achieve the same measure of absolute growth across the matrix total. This is based on the assumption that Local Plan developments have been correctly applied within the higher tier model and resultant absolute growth should be accurate. Percentage growth can be misleading where the cordon totals show levels of variation (Table 4.3).

Table 4.3 shows the ASAM3b and AAFSPM matrix total comparisons for the AM and PM 2.5 hour peak periods with growth applied to 2008, 2012 and 2027.

Table 4.3 : Matrix growth (ASAM3B cordon and AAFSPM)

YEAR	Forecast Scenario		AM ASAM3B Total Veh	AM AAFSPM Total Veh	AM Total Growth Diff (AAFSPM-ASAM3B)	PM ASAM3B Total Veh	PM AAFSPM Total Veh	PM Total Growth Diff (AAFSPM-ASAM3B)
2004	*Base*	*Matrix Total*	*28007*	*31475*		*29585*	*40496*	
2008	Reference Base	Matrix Total	29182	32650		30877	41788	
		Abs Diff to Base	1175	1175	0	1292	1292	0
		Percentage Diff to Base	104.2%	103.7%	-0.5%	104.4%	103.2%	-1.2%
2012	No AWPR	Matrix Total	30748	34217		32599	43510	
		Abs Diff to Base	2741	2742	0	3014	3014	0
		Percentage Diff to Base	109.8%	108.7%	-1.1%	110.2%	107.4%	-2.7%
2012	With AWPR	Matrix Total	29219	32687		31458	42369	
		Abs Diff to Base	1212	1212	0	1873	1873	0
		Percentage Diff to Base	104.3%	103.9%	0%	106.3%	104.6%	-1.7%
2027	With AWPR	Matrix Total	31619	35087		33857	44768	
		Abs Diff to Base	3612	3612	0	4272	4272	0
		Percentage Diff to Base	112.9%	111.5%	-1.4%	114.4%	110.5%	-3.9%

Table 4.3 shows that in 2012 with no MTS and AWPR influence, in the AM peak, growth of around 2741 vehicles is anticipated within the ASAM3b cordon (9.8%). When this is applied within the AAFSPM growth of some 2742 is delivered within the S-Paramics model matrices (8.7%).

In the PM peak with no MTS or AWPR growth of around 3014 vehicles is anticipated within the ASAM3b cordon (10.2%). When this is applied within the AAFSPM growth of some 3014 is delivered within the S-Paramics model matrices (7.4%).

Table 4.3 shows that good correlation between absolute growth in all model forecast year scenarios has been achieved in the AM and PM peaks.

AWPR forecast trips have been extracted as absolute numbers from ASAM3b and applied at sector level to the S-Paramics network. Sector values have been disaggregated relative to the demand weight of zones within each sector.

The origin and destination growth has also been checked at sector level within AAFSPM to ensure consistency with the absolute changes within ASAM3b. Tables 4.4 to 1.10 demonstrate the sector level growth in AAFSPM.

Table 4.4 : AM 2012 no MTS of AWPR sector growth

AM	2012 Origins	Abs Diff to 2004	%'age Diff to 2004	2012 Destinations	Abs Diff to 2004	%'age Diff to 2004
A	5576	367	7%	2243	165	8%
B	2640	254	11%	2894	169	6%
C	1514	604	66%	1532	746	95%
D	1460	-166	-10%	194	41	27%
E	1052	4	0%	4270	242	6%
F	394	26	7%	846	26	3%
G	2105	209	11%	4354	668	18%
H	3460	147	4%	3596	-360	-9%
I	4016	810	25%	4432	537	14%
J	2364	127	6%	2894	295	11%
K	5032	257	5%	2453	142	6%
L	2351	101	4%	2032	70	4%
Z	2251	0	0%	2476	0	0%
Total	34216	2741		34216	2741	

Table 4.5 : PM 2012 no MTS of AWPR sector growth

PM	2012 Origins	Abs Diff to 2004	%'age Diff to 2004	2012 Destinations	Abs Diff to 2004	%'age Diff to 2004
A	2042	136	7%	5979	388	7%
B	3684	169	5%	3679	265	8%
C	1376	785	133%	1254	554	79%
D	717	61	9%	1330	-59	-4%
E	3242	100	3%	908	-50	-5%
F	1188	26	2%	653	28	5%
G	4419	147	3%	3634	995	38%
H	3501	-130	-4%	3900	-333	-8%
I	6032	1080	22%	5718	388	7%
J	2229	36	2%	2684	-437	-14%
K	8765	534	6%	8686	1173	16%
L	2824	71	3%	2116	101	5%
Z	3492	0	0%	2968	0	0%
Total	43510	3014		43510	3014	

Table 4.6 : AM 2012 with MTS and AWPR sector growth

AM	2012 Origins	Abs Diff to 2004	%'age Diff to 2004	2012 Destinations	Abs Diff to 2004	%'age Diff to 2004
A	4370	-839	-16%	1686	-392	-25%
B	2447	61	3%	2802	77	4%
C	1951	1041	114%	1526	740	114%
D	1242	-384	-24%	217	64	31%
E	1143	95	9%	4494	466	12%
F	395	27	7%	844	24	8%
G	2106	210	11%	4339	653	22%
H	2880	-433	-13%	2946	-1010	-14%
I	3057	-149	-5%	3830	-65	-2%
J	2431	194	9%	1981	-618	-22%
K	4112	-663	-14%	2110	-201	-11%
L	2352	102	5%	2027	65	10%
Z	2251	0	0%	2476	0	0%
AWPR	1951	1951	-	1408	1408	-
Total	32687	1212		32687	1212	

Table 4.7 : PM 2012 with MTS and AWPR sector growth

PM	2012 Origins	Abs Diff to 2004	%'age Diff to 2004	2012 Destinations	Abs Diff to 2004	%'age Diff to 2004
A	1415	-491	-26%	4997	-594	-14%
B	3610	95	3%	3536	122	8%
C	1353	762	129%	1315	615	37%
D	718	62	9%	1428	39	5%
E	3646	504	16%	1109	151	16%
F	1188	26	2%	654	29	18%
G	4518	246	6%	3517	878	41%
H	3244	-387	-11%	3335	-898	-13%
I	4382	-570	-12%	5497	167	5%
J	2152	-41	-2%	1999	-1122	-35%
K	8187	-44	-1%	7792	279	10%
L	2823	70	3%	2121	106	8%
Z	3492	0	0%	2968	0	0%
AWPR	1640	1640	-	2102	2102	-
Total	42369	1873		42369	1873	

Table 4.8 : AM 2027 with MTS or AWPR sector growth

AM	2027 Origins	Abs Diff to 2004	%'age Diff to 2004	2027 Destinations	Abs Diff to 2004	%'age Diff to 2004
A	4546	-663	-13%	1721	-357	-23%
B	2591	205	9%	2894	169	8%
C	2396	1486	163%	2457	1671	256%
D	1429	-197	-12%	199	46	23%
E	1229	181	17%	4698	670	17%
F	401	33	9%	847	27	10%
G	2162	266	14%	4457	771	26%
H	3119	-194	-6%	3020	-936	-13%
I	3338	132	4%	4109	214	5%
J	2286	49	2%	2053	-546	-20%
K	4558	-217	-5%	2234	-77	-4%
L	2377	127	6%	2040	78	12%
Z	2251	0	0%	2476	0	0%
AWPR	2404	2404	-	1882	1882	-
Total	35087	3612		35087	3612	

Table 4.9 : PM 2027 with MTS or AWPR sector growth

PM	2027 Origins	Abs Diff to 2004	%'age Diff to 2004	2027 Destinations	Abs Diff to 2004	%'age Diff to 2004
A	1463	-443	-23%	5212	-379	-9%
B	3713	198	6%	3664	250	16%
C	2300	1709	289%	2003	1303	78%
D	784	128	20%	1414	25	3%
E	3682	540	17%	1100	142	15%
F	1192	30	3%	660	35	21%
G	4495	223	5%	3616	977	46%
H	3318	-313	-9%	3453	-780	-11%
I	4904	-48	-1%	5813	483	13%
J	2169	-24	-1%	2081	-1040	-33%
K	8281	50	1%	7857	344	12%
L	2838	85	3%	2143	128	10%
Z	3492	0	0%	2968	0	0%
AWPR	2138	2138	-	2782	2782	-
Total	44768	4272		44768	4272	

Similar to the way in which ASAM3b growth is applied, as the AAFSPM feeds from ASAM3b, the model does not isolate detailed trip rates for each specific development, however, the sectoring process does generate the total level (traffic) trips and applies them across the correct sectors of origin and destination for each development.