



**Watson & Associates
Economists Ltd**

Development Charge Background Study – Transportation Overview

Consultation Committee, October 3, 2013

Transportation Background Study

- Vision for Transportation in Burlington
 - Go Your Way: a sustainable and integrated transportation system that provides safe and efficient options for multi-modal travel
 - Focus on multi-modal approach – active transportation and transit
- Future travel demand forecasts
 - Transportation Demand Model (Emme)
 - Variation of Halton Model refined for Burlington (for TMP)
 - 2021 and 2031 horizons

What has changed?

2009 DC

- Services related to highway:
 - Arterial roads under the City's jurisdiction that services a non-local function. Some exceptions for collector roads that serve an arterial function.
 - Intersection improvements
 - Sidewalks and multi-use paths on Regional or City roads.
 - Signals – traffic and pedestrian crossing
 - Streetlighting

New for 2014 DC:

- Expansion of service definition to include transit infrastructure within the right-of-way, e.g. transit shelters and transit pads
- Active Transportation – walking, cycling, etc., as a mode of transportation

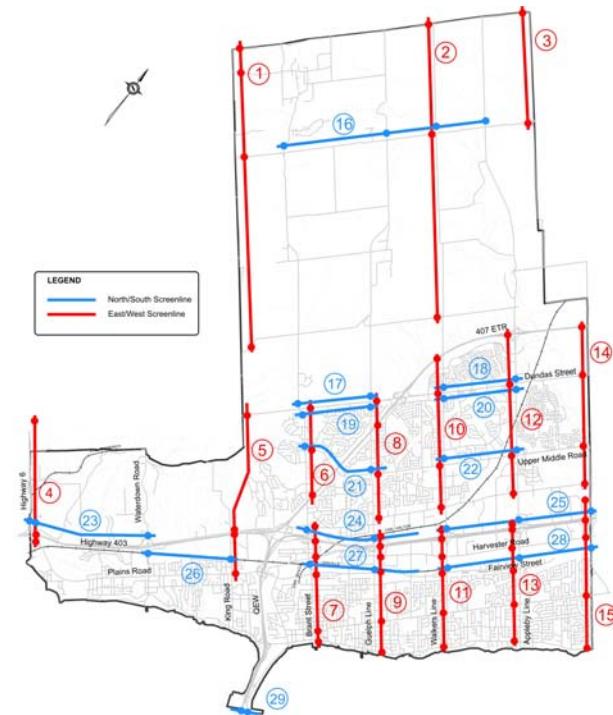
Screenlines

- Approach to screenline analysis has not changed
- Screenline definitions have changed.
 - includes screenlines in rural Burlington
 - provides more consistency with calibration screenlines in travel demand model

2009 DC - BOPTS



2014 DC – TMP screenlines



A screenline is an imaginary line spanning a major element of the transportation network (i.e. road or railway), regional boundary, municipal boundary or natural boundary.

Screenlines

2009 DC

- 2006 and 2021 horizons
- 2021 network includes Regional and Provincial improvements to 2021

Table 6: East-West Network Deficiencies

East-West Screenlines	2006			2021		
	V/C Ratio		Arterial Lane Deficiency	V/C Ratio		Arterial Lane Deficiency
	EB	WB		EB	WB	
West Boundary Screenline	0.75	0.98	0	0.63	0.99	0
Waterdown Road Screenline	0.69	0.95	0	0.57	0.94	0
Indian Creek Screenline	0.66	0.93	0	0.60	0.92	0
Brant Street South Screenline	0.66	0.94	0	0.65	0.95	0
Brant Street North Screenline	0.25	0.54	0	0.21	0.64	0
Guelph Line South Screenline	0.62	0.80	0	0.66	0.88	0
Guelph Line North Screenline	0.27	0.72	0	0.24	0.74	0
Walkers Line South Screenline	0.69	0.84	0	0.70	0.86	0
Walkers Line North Screenline	0.41	0.63	0	0.39	0.68	0
Appleby Line South Screenline	0.64	0.76	0	0.65	0.80	0
Appleby Line North Screenline	0.30	0.58	0	0.28	0.65	0
Burloak Drive South Screenline	0.62	0.69	0	0.61	0.77	0
Burloak Drive North Screenline	0.29	0.49	0	0.39	0.53	0
Bronte Creek South Screenline	0.79	1.00	1	0.79	0.94	0
Bronte Creek North Screenline	0.85	1.06	1	0.84	1.01	1
Peak Direction Average	0.82			0.85		

Table 7: North-South Network Deficiencies

North-South Screenlines	2006			2021		
	V/C Ratio		Arterial Lane Deficiency	V/C Ratio		Arterial Lane Deficiency
	NB	SB		NB	SB	
Skyway Screenline	0.40	0.67	0	0.49	0.79	0
New Street West Screenline	0.24	0.29	0	0.24	0.33	0
New Street East Screenline	0.42	0.66	0	0.27	0.55	0
CNR Burlington West Screenline	0.50	0.51	0	0.66	0.74	0
CNR Burlington Centre Screenline	0.80	0.61	0	0.91	0.69	0
CNR Burlington East Screenline	0.64	0.60	0	0.74	0.61	0
QEW Burlington West Screenline	0.59	0.64	0	0.62	0.72	0
QEW Centre Screenline	0.80	0.65	0	0.87	0.61	0
QEW East Screenline	0.69	0.42	0	0.80	0.55	0
North of Dundas Street Burlington West Screenline	0.48	0.53	0	0.47	0.55	0
North of Dundas Street Burlington Centre Screenline	0.51	0.49	0	0.57	0.53	0
North of Dundas Street Burlington East Screenline	0.29	0.29	0	0.26	0.39	0
South of Dundas Burlington West Screenline	0.74	0.74	0	0.66	0.76	0
South of Dundas Burlington Centre Screenline	0.55	0.52	0	0.65	0.60	0
South of Dundas Burlington East Screenline	0.29	0.37	0	0.29	0.41	0
Upper Middle Road West Screenline	0.60	0.49	0	0.71	0.55	0
Upper Middle Road East Screenline	0.59	0.43	0	0.68	0.55	0
Peak Direction Average	0.61			0.67		

Source:
2009 DC Update Transportation
Study Final Report



Screenlines

2014 DC

- 2006 and 2031 horizon
- 2031 network includes Regional and Provincial improvements to 2031

v/c ratios ≥ 0.80 shown in yellow and v/c ratios ≥ 0.9 shown in red.



Screenlines		Existing		2031 Network	
		V/C Ratio		V/C Ratio	
East-West Screenlines		Eastbound	Westbound	Eastbound	Westbound
1	East of West Boundary (Derry Road to 1 Side Road)	0.09	0.39	0.20	0.34
2	West of Walkers Line (Derry Road to 1 Side Road)	0.27	0.59	0.47	0.61
3	West of East Boundary (Derry Road to Britannia Road)	0.67	0.81	0.77	0.85
4	East of Highway 6	0.82	1.05	0.89	0.96
5	East of King Road (Dundas Street to Plains Road)	0.78	1.04	0.93	1.09
6	East of Brant Street (Dundas Street to Highway 407)	0.33	0.59	0.52	0.62
7	East of Brant Street (North Service Road to Lakeshore Road)	0.75	1.01	0.86	1.04
8	East of Guelph Line (Dundas Street to Mainway)	0.34	0.70	0.54	0.73
9	East of Guelph Line (North Service Road to Lakeshore Road)	0.69	0.90	0.78	0.95
10	West of Walkers Line (Hwy 407 to Mainway)	0.32	0.67	0.53	0.68
11	West of Walkers Line (North Service Road to Lakeshore Road)	0.73	0.86	0.85	0.90
12	West of Appleby Line (Highway 407 to Mainway)	0.29	0.64	0.48	0.67
13	West of Appleby Line (North Service Road to Lakeshore Road)	0.68	0.81	0.79	0.85
14	West of Tremaine Road-Burloak Drive (Highway 407 to Mainway)	0.27	0.70	0.48	0.65
15	West of Burloak Drive (North Service Road to Lakeshore Road)	0.65	0.68	0.77	0.75
East-West Screenline (Peak Direction) Average		0.80		0.83	
North-South Screenlines		Northbound	Southbound	Northbound	Southbound
16	North of Britannia Road (Cedar Springs Road to Appleby Line)	0.28	0.21	0.33	0.27
17	North of Dundas Street (Cedar Springs Road to Guelph Line)	0.59	0.50	0.59	0.44
18	North of Dundas Street (Walkers Line to Appleby Line)	0.44	0.57	0.44	0.44
19	South of Dundas Street (Brant Street to Guelph Line)	0.53	0.52	0.43	0.36
20	South of Dundas Street (Walkers Line to Appleby Line)	0.45	0.58	0.59	0.56
21	North of Upper Middle Road (Brant Street to Guelph Line)	0.62	0.50	0.50	0.35
22	North of Upper Middle Road (Walkers Line to Appleby Line)	0.77	0.67	0.83	0.63
23	North of Highway 403-QEW (Highway 6 to Waterdown Road)	0.73	0.76	0.85	0.61
24	North of Highway 403-QEW (Brant Street to Guelph Line)	0.88	0.85	0.93	0.89
25	North of Highway 403-QEW (Walkers Line to Burloak Drive)	0.71	0.63	0.70	0.63
26	CNR (Waterdown Road to King Road)	0.63	0.59	0.50	0.64
27	CNR (Brant Street to Guelph Line)	0.51	0.57	0.58	0.68
28	CNR (Walkers Line to Burloak Drive)	0.48	0.69	0.54	0.78
29	Skyway (QEW to Beach Boulevard)	0.48	0.86	0.62	0.93
North-South Screenline (Peak Direction) Average		0.68		0.69	
Overall Screenline Average		0.65		0.72	

Service Level

- The DC Act requires that the future level of service provided through development charge funds not exceed average levels of service that have been provided in the preceding 10 years unless a compensating deduction is made in the calculation.
- The service level for the transportation system can be measured in terms of *capacity* (volume to capacity ratios) and *quantity* (lane-km per capita).

Service Level - Capacity

- Network capacity measured as volume to capacity ratio for all screenlines
- 2031 network v/c ratio exceeds existing network utilization
- Potential for further reduction in v/c ratios with transit and AT investment – by 2 to 3%

Screenlines	Existing		2031 Network	
	V/C Ratio		V/C Ratio	
East-West Screenlines	Eastbound	Westbound	Eastbound	Westbound
East-West Screenline (Peak Direction) Average	0.80		0.83	
North-South Screenlines	Northbound	Southbound	Northbound	Southbound
North-South Screenline (Peak Direction) Average	0.68		0.69	
Overall Screenline Average	0.65		0.72	

v/c ratios ≥ 0.80 shown in yellow and v/c ratios ≥ 0.9 shown in red.

Service Level - Quantity

- Lane-km of arterial roads measured for 2003, 2013 and 2031.
- Future lane-km of per capita is less than the historic 10-year average

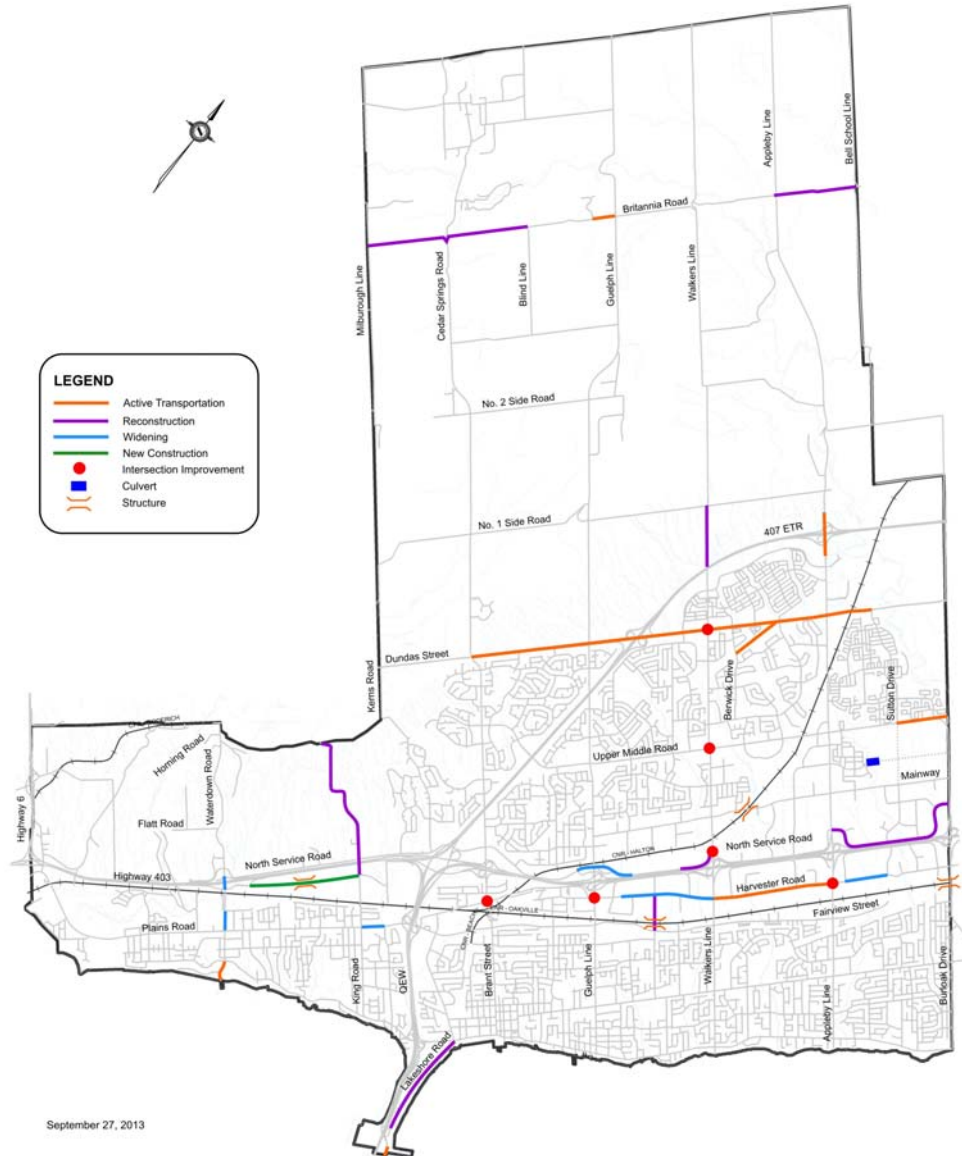
	Arterial Lane-km	Population	Lane-km per 1000 population
2003	Arterial = 408.0 lane-km	156,470 ^a	2.61
2013	Arterial = 395.4 lane-km	178,413 ^a	2.22
Historic Average			2.42
2031	Arterial = 400.0 lane-km	186,169	2.15

a. Inter-Censal Year Population Calculation (Watson)

On July 1, 2010, four arterial roads were uploaded to Halton Region resulting in a reduction in the overall lane-km per capita in 2013 compared to 2003:

- Upper Middle Road – Guelph Line to Appleby Line
- Brant Street – Fairview Street to QEW
- Guelph Line – Fairview Street to Harvester Road
- Appleby Line – Fairview Street to QEW

2031 Transportation Network



Benefit to Existing Deductions

- A benefit-to-existing development deduction is applied when proposed improvements provide a benefit to existing traffic.
- A percentage allocation of the extent to which the improvement benefits existing development or new growth was determined for each class of improvement

Improvement Type	Proposed B-to-E Deduction	Remarks
Resurfacing existing road	100%	Same as 2009 DC Update
Reconstructing existing road (no lane expansion)	60-100% dependent on capacity increase, intersection improvements and usage by heavy trucks	Same as 2009 DC Update
Road widening	cost of repaving existing lanes (plus cost of rehabilitating existing structure if widening over a major structure)	Same as 2009 DC Update
New road alignments	0%	Same as 2009 DC Update

Benefit to Existing Deductions (cont.)

Improvement Type	Proposed B-to-E Deduction	2009 DC B-to-E Deduction	Remarks
Active Transportation Projects - bicycle lane, multi-use paths, sidewalks			
<ul style="list-style-type: none"> widening existing road to accommodate bike lane 	10%	Projects excluded from 2009 DC.	Propose that all AT projects have 10% B-to-E deduction.
<ul style="list-style-type: none"> sidewalk and multi-use paths in areas where development is not complete 	10%	Local contribution or 50%	Propose that all AT projects have 10% B-to-E deduction.
<ul style="list-style-type: none"> sidewalks and multi-use paths in areas of new development 	0%	0%	Local service.
<ul style="list-style-type: none"> new sidewalks and multi-use paths in existing areas 	10%	(not explicitly stated)	Propose that all AT projects have 10% B-to-E deduction.
<ul style="list-style-type: none"> new sidewalk and multi-use paths on Regional roads 	10%	0%	Propose that all AT projects have 10% B-to-E deduction.
<ul style="list-style-type: none"> new pedestrian crossing structures 	10%	(not explicitly stated, but 50% applied on Cumberland pedestrian crossing)	Propose that all AT projects have 10% B-to-E deduction.

Benefit to Existing Deductions (cont.)

Improvement Type	Proposed B-to-E Deduction	Remarks
Intersection improvements at existing intersections	5% (some exceptions)	Same as 2009 DC Update
Traffic management (includes minor improvements/modifications to signals)	50%	Same as 2009 DC Update
New Traffic signal	5%	Same as 2009 DC Update
Pedestrian crossing signal	5%	Was 50% in 2009 DC Update For 2014 DC, treat pedestrian signals in the same manner as traffic signals. Therefore, reduced B-to-E from 50% to 5%.
Priority measures for transit	50%	Same as 2009 DC Update
Freeway interchange	0%	Same as 2009 DC Update
Rail grade separation structures	based on delay savings and exposure index	Same as 2009 DC Update

Other City Initiatives

- Official Plan (OP) review – *Growing in Place* – to address the challenges and opportunities for building the City of Burlington over the next 20 years.
- Recent initiative by the Burlington Economic Development Corporation to create a Prosperity Corridor along the QEW → still much work to be done to endorse and receive approvals on the land use targets for this area.
- Transportation Master Plan (TMP) envisages a sustainable and integrated transportation system that provides safe and efficient options for multi-modal travel and increased accessibility.
- Additional transportation needs will be identified through the above studies. A sustainable and multi-modal transportation system will require further investment in active transportation and transit infrastructure beyond what the City is doing today.
- Until these studies have clear endorsement from Council, it is too early to presume the outcome of the studies and to incorporate any infrastructure needs into this transportation background study. ***This study will address the transportation infrastructure needs that have been endorsed by City of Burlington Council.***

Non-Residential Approach

NFPOW and WAH Employment

- NFPOW and WAH employment included in AECOM transportation model used by Cole to determine increase in need for service
- Transportation Model sensitivity run conducted to attempt to isolate NFOW and WAH traffic volumes did not produce conclusive and reliable results
- Recommended approach is to utilize Halton Region approach, whereby non-residential gross floor area assumption applied to NFPOW and WAH employment for calculation purposes

Non-Residential Approach

Non-Residential Charge Differentiation

- City's existing bylaw differentiates charges between Retail and Non-Retail types for Transportation Services only
- Retail development based on NAICS Code definition
- Higher retail charge reflects greater demand for services relative to other non-residential development types based on trip generation and trip length characteristics

	Population including Inst.	Employment incld. NFPOW/WAH
2013-2031 Population/Employment Growth	7,756	10,454
Allocation	43%	57%
Trip Rates	0.534	0.600
Trips	4,142	6,272
Allocation	40%	60%
Average Allocation	41%	59%

	Retail incld. NFPOW/WAH	Non-Retail incld. NFPOW/WAH
2013-2031 Employment Growth	3577	6,877
Allocation	34%	66%
Trip Rates	0.977	0.391
Trips	3,495	2,689
Avg. Trip Length	6.5	10.6
Veh-km	22,720	28,503
Allocation	44%	56%
Average Allocation	26%	33%

MEMORANDUM

To:	Consultation Committee	Fax	<input type="checkbox"/>
From:	Andrew Grunda, / Jamie Cook	Courier	<input type="checkbox"/>
Date:	October 1, 2013	Mail	<input type="checkbox"/>
Re:	Burlington DC Growth Forecast Comparisons	e-mail	<input checked="" type="checkbox"/>

The following tables provide a growth forecast comparison between the previous 2004 and 2009 DC Background Studies for the City of Burlington against actual Census data, as well as the current 2014 DC Background Study. Key observations include:

- The 2004 DC Study forecasted slightly lower population and households in 2006 and 2011 than was recorded by 2006 and 2011 Census. It should be noted however, that during the 2006 and 2011 period, forecasted Persons Per Unit (PPU's) were almost identical to the 2011 Census PPU actuals. (Refer to figure 1)
- The 2009 DC Study forecasted similar 2011 population estimates as the 2011 Census, but projected slightly lower housing units. Accordingly, our forecasted PPU was slightly higher than the Census during the 2011 period. (Refer to figure 1)
- Between the 2004 and 2009 DCs, the population forecast for the 2021 period was reduced from 184,500 in 2004 to 182,030 in 2009, but was increased slightly to 182,540 as per the 2011 Halton Best Planning Estimates (BPE). However, the housing forecast for the 2021 period has increased during each DC update (74,000 in 2004, 73,560 in 2009, and 75,535 in 2011 BPE). This increase in the number of households by 2021 is partially as a result of the shift in unit mix towards higher density units, as well as result of the City's aging population (i.e. higher population decline in existing households). As a result, the average PPU in the year 2021 has steadily declined from 2.49 to 2.41 when comparing the 2004 DC Study to the 2014 DC Study. (Refer to Figure 2)

SERVICES

- | | | | |
|--|--|---|---|
| ▪ Demographics, Pupil Forecasting, Industrial/Commercial Forecasts | ▪ Development/Education Development Charge Policy | ▪ Financial Analysis of Municipal Restructuring Options | ▪ Fiscal Impact of Development |
| ▪ Land Needs and Market Studies | ▪ Long Range Financial Planning for Municipalities | ▪ Municipal Management Improvement | ▪ OMB Hearings – Financial, Market, Demographic |
| ▪ School Board Planning and Financing | ▪ Servicing Cost Sharing | ▪ Tax Policy Analysis | ▪ Waste Management Rate Setting, Valuation and Planning |

- Both the 2004 and 2009 DC studies had forecasted a higher employment figures for 2011 than the 2011 Census actual (84,120 employees¹ in the 2004 DC Study and 80,510 employees in the 2009 DC Study, compared with 76,400 in 2011 Census). (Refer to figure 1)
- The DC employment forecast for the 2021 period, based on Halton 2011 BPE, has decreased from 98,730 employees in the 2004 DC Study, to 91,330 employees in the 2009 DC Study and 84,755 employees in the 2014 DC Study. (Refer to Figure 2)
- This decrease in the total number of jobs that were forecasted for Burlington by 2021 is largely a result of the recent economic slowdown. As previously mentioned, the 2004 and 2009 DC Studies had projected significantly higher employment figures for 2011 than what had actually materialized, according to Statistics Canada data. Accordingly, the 2004 and 2009 DC Studies had a higher 2021 employment forecast, largely because the 2011 employment base estimates were higher than Census period actuals.

¹ Employment figures exclude Work at Home and No Fixed Place of Work employment.

**Figure 1
City of Burlington Comparison of Forecast Population & Households to Actual Census Data
2004 & 2009 Development Charges Background Study**

2004 Study				2009 Study			
Population (Including Institutional)	Households	Persons Per Unit (PPU)		Population (Including Institutional)	Households	Persons Per Unit (PPU)	
2006	163,800	63,104	2.60	2006	164,415	63,255	2.60
2011	172,300	67,127	2.57	2011	175,779	68,779	2.56
2021	184,500	74,000	2.49				
2004 Study: Employment				2009 Study: Employment			
Population (Including Institutional)	Households	Persons Per Unit (PPU)		Population (Including Institutional)	Households	Persons Per Unit (PPU)	
2011	175,800	68,160	2.58	2011	175,779	68,779	2.56
2021	182,026	73,560	2.47				
2004 Study: Employment				2009 Study: Employment			
2006 Estimate as of 2004 Study		78,031		2006 Actual	Census	73,055	2006 (Census Less 2004)
2011 Estimate as of 2004 Study		84,122		2011 Estimate	Watson & Associates	76,405	2011 (Watson Forecast Less 2004)
2021 Estimate as of 2004 Study		98,734		2011 Actuals	Census	76,395	2011 (Watson Forecast Less 2009)
2009 Study: Employment				Census: Employment			
	Excluding Work @home and NFPoW				Excluding Work @home and NFPoW		
2006 Estimate as of 2009 Study		73,055		2006 Actual	Census	73,055	2006 (Census Less 2004)
2011 Estimate as of 2009 Study		80,509		2011 Estimate	Watson & Associates	76,405	2011 (Watson Forecast Less 2009)
2021 Estimate as of 2009 Study		91,327		2011 Actuals	Census	76,395	
Difference				Difference			
	Excluding Work @home and NFPoW				Excluding Work @home and NFPoW		

Note: At the time the DC forecast was prepared, detailed information regarding Census employment by sector was not available and accordingly, had to be estimated. In our opinion, further review is required to test the accuracy of the 2011 employment breakdown by sector. Further to this, at the time the DC forecast was prepared, information regarding no fixed place of work and work at home employment were also not available and had to be estimated.

Figure 2
Summary of Forecast Population & Households
2004 , 2009 & 2014 Development Charges Background Study

Population

	2004 Study	2009 Study	2014 Study
2011	172,300	175,800	175,779
2021	184,500	182,026	182,540

Households

	2004 Study	2009 Study	2014 Study
2011	67,127	68,160	68,779
2021	74,000	73,560	75,535

PPU

	2004 Study	2009 Study	2014 Study
2011	2.57	2.58	2.56
2021	2.49	2.47	2.42

Employment (Less Work at Home and No
Fixed Place of Work)

	2004 Study	2009 Study	2014 Study
2011	84,122	80,509	76,405
2021	98,734	91,327	84,755

Figure 3

2004 DC

	Total	W@Home	Total Less W@H
2004	82,135	6,586	75,549
2006	84,788	6,757	78,031
2009	88,767	7,013	81,754
2011	91,257	7,135	84,122
2014	94,992	7,318	87,674

2009 DC

	Total	W@Home	Total Less W@H
2006	79,865	6,810	73,055
2009	85,480	7,304	78,176
2011	87,991	7,482	80,509
2019	98,036	8,193	89,843

Employment (Less W@Home and NFPOW)

	2004 DC	2009 DC	2014 DC ¹
2006	78,031	73,055	73,055
2011	84,122	80,509	76,405

Census

	Total Employment	Total Employment (Less W @ Home)	Total Employment (Less W @ Home and NFPOW)
2006	87,854	81,044	73,055
2011	91,180	84,550	76,395

1. Total excludes both work at home and no fixed place of work employment to be consistent with DC comparisons