

QUANTIFYING THE COSTS AND BENEFITS OF ALTERNATIVE GROWTH SCENARIOS

Presenter: John Heseltine, MCIP

Location: George Dixon Centre, Brunswick Street, Halifax

Date: October 10, 2012

One Team. Infinite Solutions



PROJECT OUTPUTS

- PHASE 1 – Research and Problem Definition

Determine data availability and structure approach. Submit Modelling Approach Report

- PHASE 2 – Model Development and Application

Model costs of infrastructure development, operation, and use. Submit Scenario Evaluation Report

- PHASE 3 – Final Assessment and Reporting

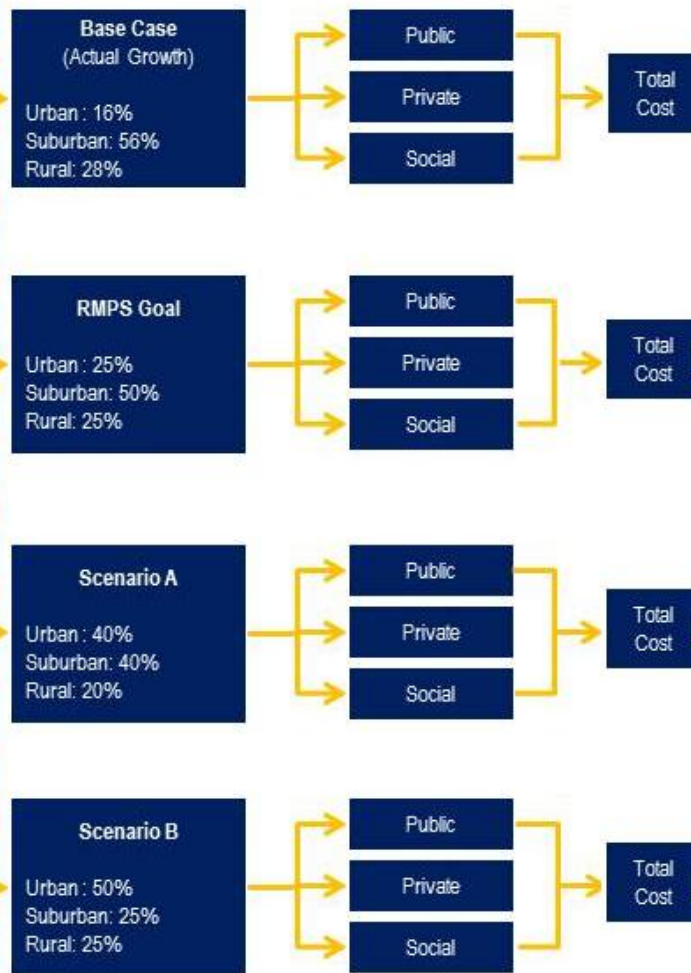
Assess the social costs and benefits of Alternative Scenarios. Submit Project Report

MODELLING APPROACH

Creating the Scenarios



Estimating Scenario Costs*



Deriving Scenario Benefits



* Example Cost Categories

- Public:** infrastructure, services
- Private:** dwelling units, commuting
- Social:** GHG emissions, health, time

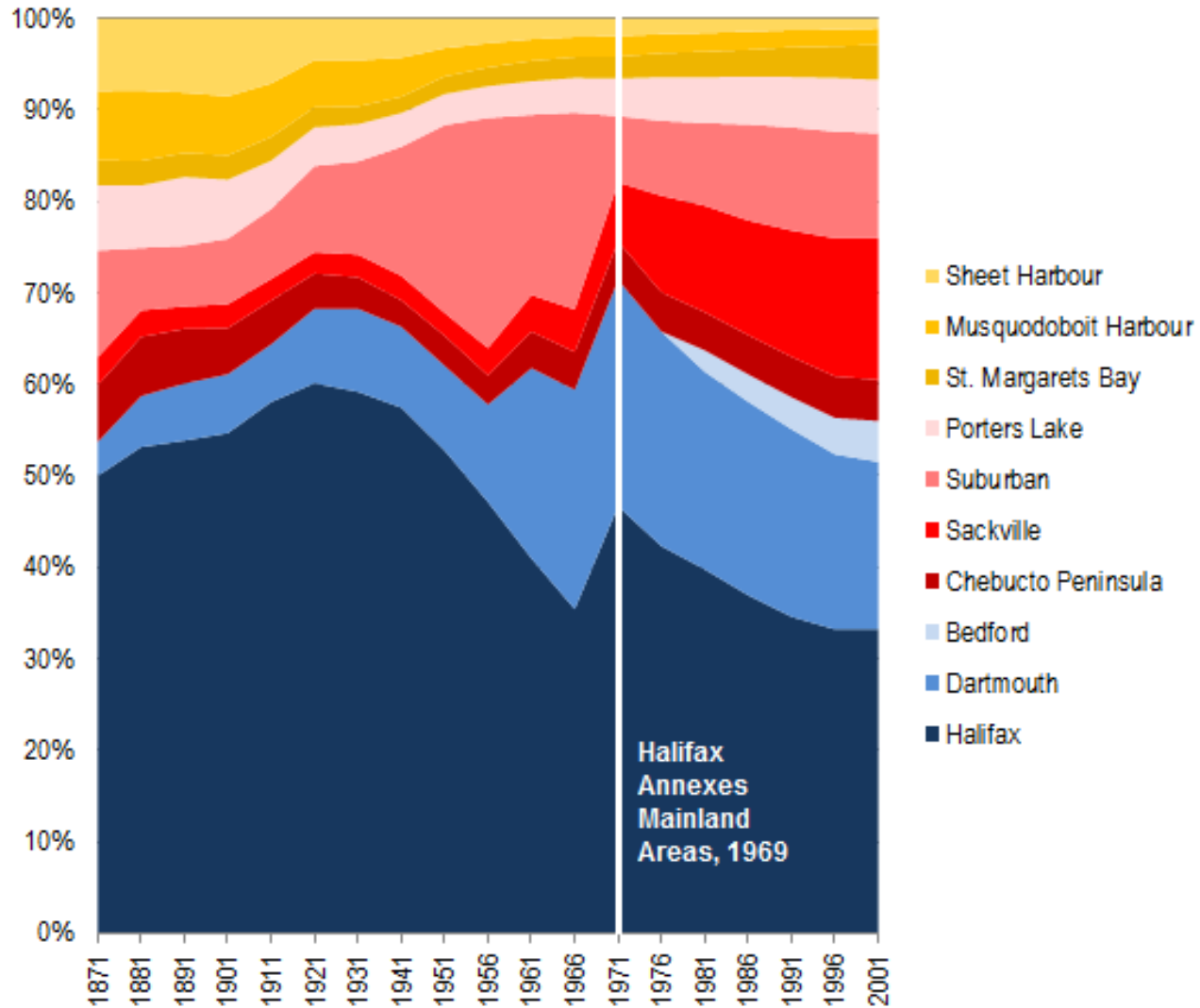
PROJECT OBJECTIVES

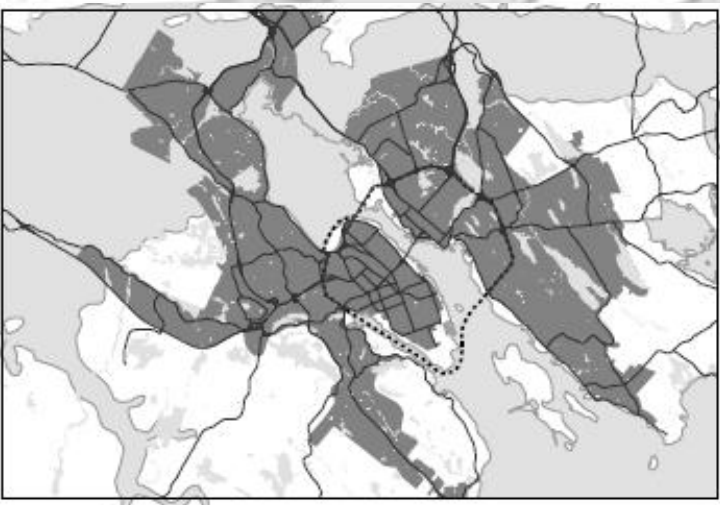
Halifax Regional Municipality is seeking empirical data relating to the cost of Municipal Servicing, and of building and maintaining households, commuting times, as well as greenhouse gas emissions (GHG) and public health costs and benefits. In addition, an assessment is sought of impact on overall quality of life for HRM residents under alternate growth scenarios:

- *Current Regional Plan Growth Goals* – 25% urban, 50% suburban, 25% rural
- *Actual Observed Growth (Post Regional Plan Adoption)* – 16% urban, 56% suburban, and 28% rural
- *Hypothetical Growth Scenario A* – 40% urban, 40% suburban, 20% rural
- *Hypothetical Growth Scenario B* – 50% urban, 30% suburban, 20% rural.

- RFP, p. 19

SETTLEMENT IN HRM





Rural

Legend

-  Urban (Regional Centre Boundary)
-  Suburban (Urban Settlement Designation)
-  Rural (Other Designations)

BENCHMARK INDICATORS

Indicator	Value	Rank Among CMAs
Population Density in EUA (pop/km ²)	858.8	20 th densest of 33
Urban Density in EUA ([pop+emp]/km ²)	1,380.0	19 th densest of 33
Employment Density in CBD (emp/km ²)	25,754.4	7 th densest of 33
Population Density in CBD (pop/km ²)	3,947.4	10 th densest of 33
Arterial+Collector Lane-km per 1,000 Capita - EUA	3.73	14 th most of 23
Median Home-Work Trip Distance (km) - CMA	6.5	15 th longest of 33
Annual Fuel Usage per Capita - EUA (L/Capita)	1,234	22 nd best of 33
% Commuting to Work as Driver in Own Vehicle	65.1%	4 th best of 33
% Commuting to Work by Public Transit	10.1%	7 th best of 33
% Commuting to Work by Active Modes (bike + walk)	11.1%	3 rd best of 33
Total Transit Expenditures per Capita	\$220	9 th most of 31
* Halifax is the 13 th largest CMA in Canada		

PROJECT GOAL

This RFP will provide the Halifax Regional Municipality with invaluable empirical data to provide the solid support required for making decisions on the policy direction of our future growth as guided by the Regional Plan. This growth will complement the fiscal and environment[al] sustainability of the municipality, while continuing to support the economic prosperity of the overall Region.

- RFP, p. 19

MODELLING PRINCIPLES

- Distribution principles should be the same for all four scenarios
- Modify only if necessary to achieve scenario parameters (e.g., if 75% of development is to be located in the Urban Area some change is required to create necessary development opportunities)
- Outputs are primarily relevant at the Traffic Zone level

PROJECTIONS

- Based on Altus projections for HRM prepared in 2009
- Adjusted to 2011 Census population and dwelling unit numbers and extended to 2031
- Residential population distributed for each scenario using land suitability assessment in GIS
- Will develop related employment estimates using methods employed by/with HRM staff

ADJUSTMENTS TO PROJECTIONS

- Adopted Altus High Projection
- 2011 Census population is higher than Altus Baseline Projection (390,096 v. 385,255 or 1.26%)
- The Shipbuilding contract will add an average of 8,500 jobs and 420 dwelling units per year in Nova Scotia (mostly in HRM)
- High Scenario is a more stringent test of infrastructure

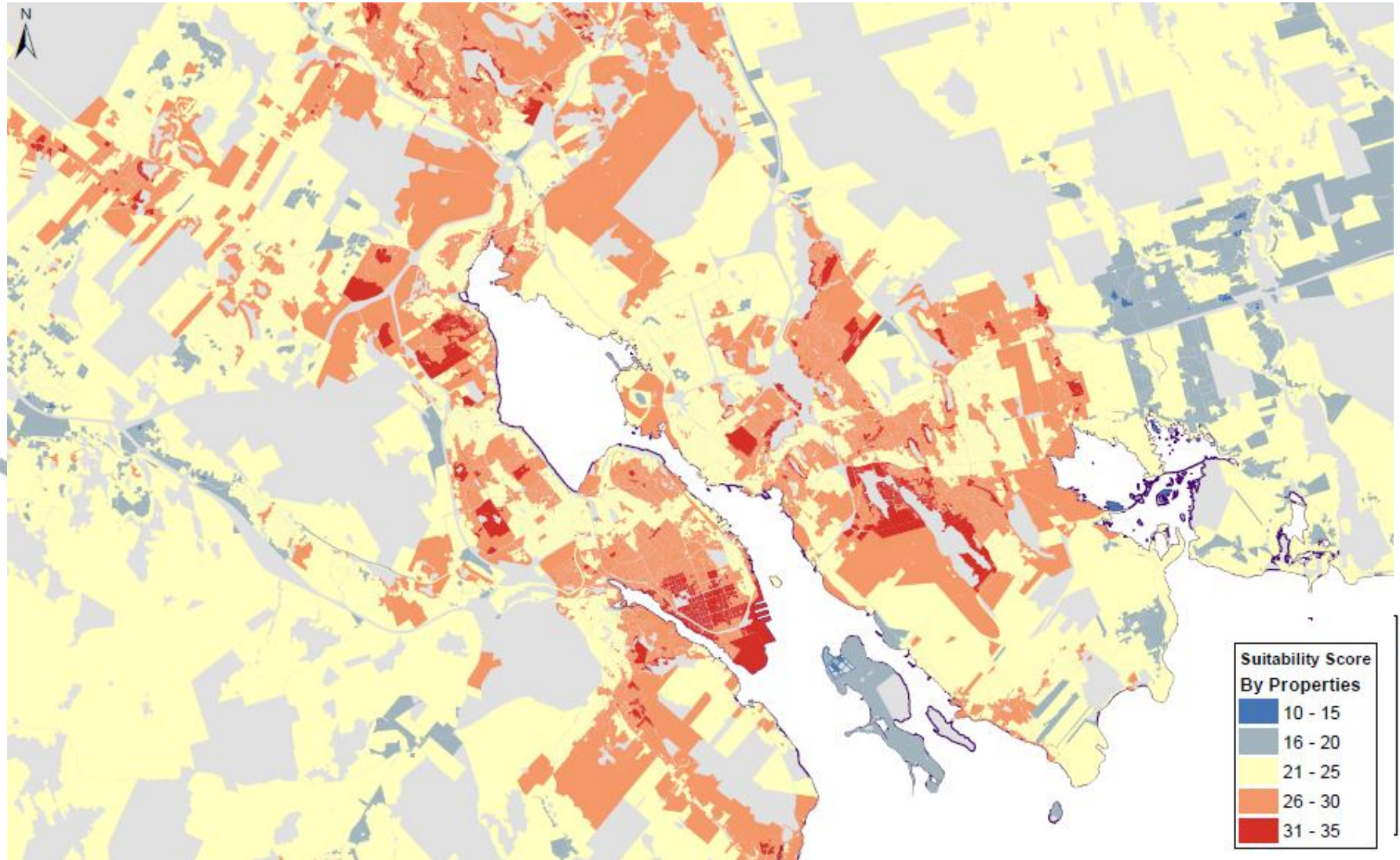
RESIDENTIAL DEVELOPMENT

- *Constraints* – Land subject to absolute constraints is not considered to be developable
- *Vacant Land (Determined from Assessment Roll)* – Vacant land is considered more suitable; however, non-vacant land may be “redeveloped” if assessed value is below threshold relative to zoning potential
- *Compatible Zoning* – Land developed to maximum number of units permitted under existing zone if lot standards are satisfied

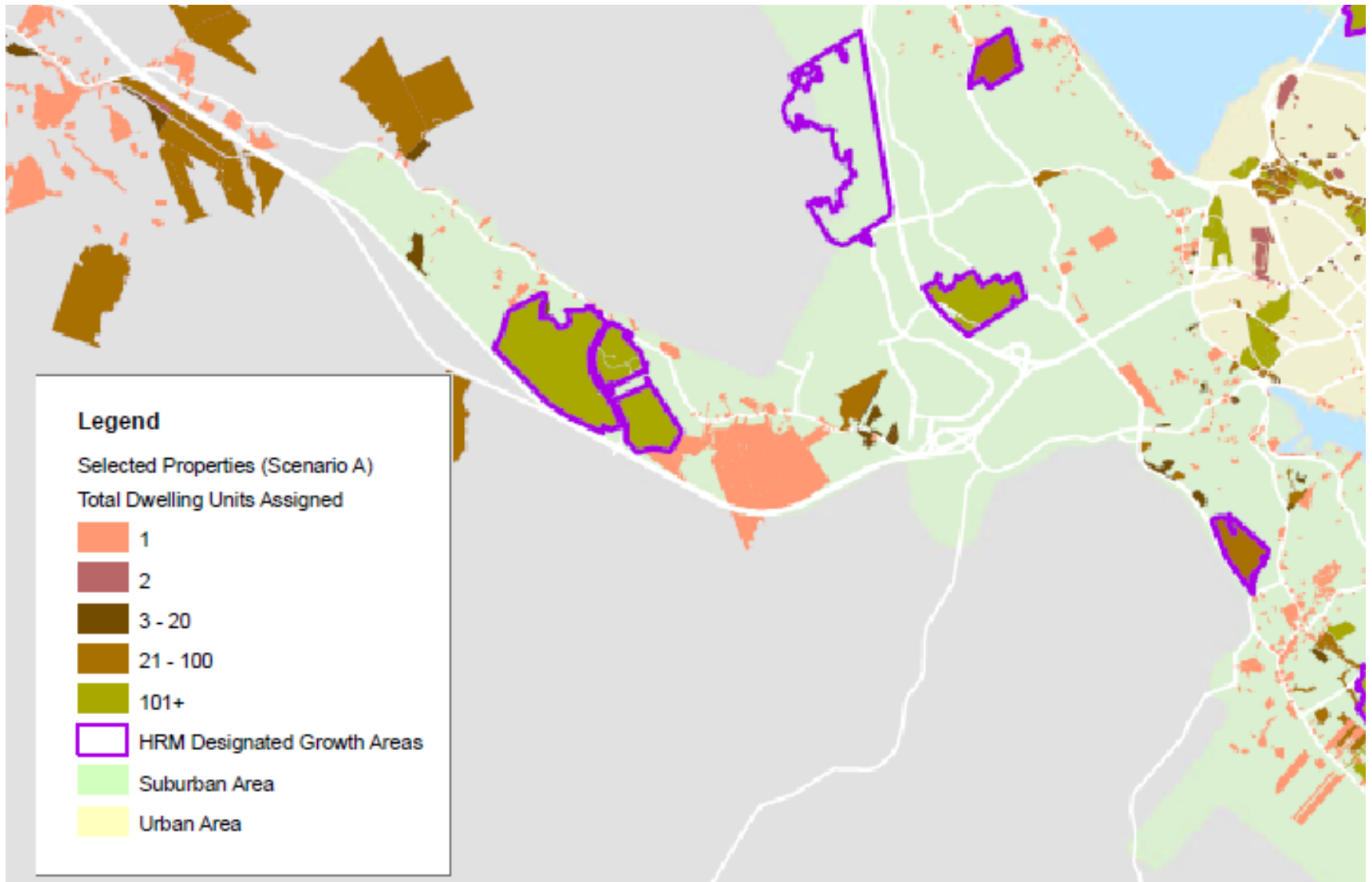
GROWTH AREA SUITABILITY FACTORS

Factor	Weight
Proximity to Established Growing Neighbourhood	3.5
Area has been Specifically Planned for Development	6.7
Affordable Cost of Housing	9.6
Community Stress Index (Composite of Socioeconomic and Crime Data)	5.8
Neighbourhood Stability (Measured by Lack of Turnover in Census Tract)	5.8
Overall Neighbourhood Satisfaction Score (2010 Citizen Survey by Council District)	1.0
Quality Waterfront Access	9.3
Availability of Piped Water and/or Sewer Services	8.0
Closest Arterial or Collector Roadway - but not "Too Close"	3.2
Closest Major Interchange - but not "Too Close"	7.5
Closest Well-Connected Transit Stop	1.1
Closest Well-Connected Transit Terminal	1.1
Nearest Community Facility/Centre (Sportsplex, Arena, Field, Playground)	7.1
Nearest Open Space, Green Space, Trails, Formal and Regional Parks	2.2
Nearest Library / University / Arts / Cultural Facility	2.6
Nearest Elementary, Junior High, and High School	13.5
Nearest Healthcare Facilities	3.2
TOTAL WEIGHTS	100.1

SUITABILITY SCORES



SUITABILITY SCORES



DWELLING UNIT ASSIGNMENT

- Units are assigned to the Urban Area first
 - Required number of units are assigned to most “attractive” property in accordance with development capacity determined from zoning
- Remaining units are assigned to the Suburban Area
 - Same process. If apartment units remain, they are assigned until number is exhausted. Remaining units are assigned to single and semi sites
- Rural Areas by the same process as Suburban

CAPACITY BY AREA

Area	Singles & Semis	Multiple Unit	TOTAL
Urban	448	35,025	35,473
Suburban	29,109	37,486	66,595
Rural	193,818	17,738	211,556
TOTAL	223,375	90,249	313,624

Observations

- There is limited capacity for additional single family development in the Urban Area (properties may be redeveloped but won't add units)
- There is surprising capacity for multiple unit development in the Suburban Area
- There is almost unlimited development potential in the Rural Area

HOUSING GROWTH ALLOCATION

Area	Current Regional Plan Growth Goals		Observed Growth (Post RMPS Adoption)		Hypothetical Growth Scenario A		Hypothetical Growth Scenario B		Cap.
	Share	Hshlds	Share	Hshlds	Share	Hshlds	Share	Hshlds	
Dwelling Units									
Urban	25%	13,744	16%	8,796	40%	21,990	50%	27,488	35,473
Suburban	50%	27,488	56%	30,786	40%	21,990	30%	16,495	66,595
Rural	25%	13,744	28%	15,393	20%	10,995	20%	10,995	211,556
TOTAL	100%	54,976	100%	54,976	100%	54,976	100%	54,976	313,624
Area	People	Share	People	Share	People	Share	People	Share	
Population									
Urban	118,818	24.5%	107,837	22.3%	137,251	28.3%	150,144	31.0%	
Suburb	223,249	46.1%	229,379	47.4%	212,780	43.9%	202,296	41.8%	
Rural	142,117	29.4%	146,966	30.4%	134,152	27.7%	131,740	27.2%	
TOTALS	484,184	100.0%	484,182	100.0%	484,183	100.0%	484,180	100.0%	

LABOUR FORCE ESTIMATES

	2009	2031	2009-2031
Population 15-64	319,386	401,223	81,837
Participation Rate	69.4%	69.7%	0.3%
Labour Force	221,515	279,832	58,317
Unemployed	7.0%	5.2%	-1.8%
HRM Employed Labour Force	206,605	265,301	58,696
Outside Commuters	9,420	9,900	480
Total Commuters	216,025	275,291	59,266

NON-RESIDENTIAL DISTRIBUTION

- Established Approaches
 - Based on the share of employment in each traffic zone according to 2006 Census figures
 - Based on the share of non-residential building permits issued by HRM in each traffic zone.
- Future Allocation
 - Long-term trend (2001 to 2006 Census)
 - Short-term trend (building permits from 2006 Census)
 - Assumptions concerning population-employment relationship under each scenario
 - Combination of the above

MUNICIPAL SERVICE DELIVERY

Service	Agency	Key Features	Other	Funding
Water	Halifax Water	1,307 km of mains	100% metered	\$0.413 per m ³
Wastewater	Halifax Water	~1,000 km sanitary/300 km combined sewers	83% connected, 100% treated	\$1.169 per m ³
Stormwater	Halifax Water	~700 km storm/300 km combined		Wastewater charge
Transportation	HRM	1,778.4 km HRM	4,347.1 km total	General revenue
Transit	Metro Transit			Fares, Gas Tax, Transit Tax
Solid Waste Management	HRM	Otter Lake Landfill, composting and recycling	8 collection areas	Tipping fees, General revenue
Fire and Emergency	HRM	57 stations: 17 professional	40 volunteer	General revenue
Police	HRP/RCMP	3 HPL stations/6 RCMP		General revenue
Community Facilities and Parks	HRM	Extensive and varied	Facilities are community managed	User Fees, General revenue
Libraries	HPL	13 branch libraries	Central library under construction	General revenue

OTHER SERVICE DELIVERY

Service	Agency	Key Features	Other	Funding
Provincial				
Highways	NSTIR	All 100 series highways	Burnside Connector, Highway 113	General revenue
Harbour Bridges	Halifax Harbour Bridges	100,000 crossings/day	Potential third crossing	Tolls
Schools	HRSB/CSAP	144 schools/52,001 students	83% capacity	General revenue/Municipal contribution
Private				
Electricity	NS Power	Follows development	Regulated pricing	User fees
Communications	Aliant/Eastlink	Follows development		User fees
Natural Gas	Heritage Gas	Market driven	Regulated pricing, environmental benefits	User fees

Service	Measure				Percentage of Trend or Rank			
	RMPS Goals	Post RMPS Trend	Scenario A	Scenario B	RMPS Goals	Post RMPS Trend	Scenario A	Scenario B
Water and Wastewater								
- All improvements (\$000s)	\$459,516	\$505,008	\$385,932	\$387,922	91.0%	100.0%	76.4%	76.8%
Transportation								
- Local Road Construction (\$000s)	\$20,940	\$23,040	\$19,200	\$17,920	90.9%	100.0%	83.3%	77.8%
- Regional Road Improvements (\$000s)	\$9,212	\$10,364	\$7,120	\$3,804	88.9%	100.0%	68.7%	36.7%
- Additional Vehicle Trip Time (hours)	28,198	26,511	26,376	25,646	106.4%	100.0%	99.5%	96.7%
- Additional Vehicle Trips Distance (kms)	971,087	990,724	923,010	901,377	98.0%	100.0%	93.2%	91.0%
- Transit Use Increase (% of 2009)	5,876	5,800	6,113	6,017	101.3%	100.0%	105.4%	103.7%
- Active Transportation Increase (% of 2009)	9,530	9,255	9,828	9,970	103.0%	100.0%	106.2%	107.7%
Other Public Services								
Solid Waste Management								
- Solid Waste Haulage (kms)	13,536	15,068	13,114	11,356	89.8%	100.0%	87.0%	75.4%
- Compost Haulage (kms)	17,082	18,677	16,567	13,891	91.5%	100.0%	88.7%	74.4%
- Recyclables Haulage (kms)	13,591	15,187	13,158	11,519	89.5%	100.0%	86.6%	75.8%
- Recycling Depots (kms)	42,253,736	45,861,113	36,084,609	38,317,831	92.1%	100.0%	78.7%	83.6%
Fire and Emergency (minutes travel)	182,177	183,930	174,676	171,431	99.0%	100.0%	95.0%	93.2%
Police (kms to stations)	416,770	425,275	388,406	369,572	98.0%	100.0%	91.3%	86.9%
Community Facilities and Parks								
- Community Facilities (minutes travel)	578,213	601,980	546,759	527,108	96.1%	100.0%	90.8%	87.6%
Libraries								
- User Travel Distance (kms to branches)	397,456	416,692	358,274	341,732	95.4%	100.0%	86.0%	82.0%
- Catchments Classified A/B/C/U	3/3/2/6	4/1/3/6	4/3/1/6	4/3/1/6	3	4	2	1
Schools								
- User Travel Distance (kms to all school types)	663,680	671,250	632,129	625,189	98.9%	100.0%	94.2%	93.1%
- Elementary (% under/over capacity)	49.5%/11.0%	51.6%/9.9%	47.3%/9.9%	48.4%/12.1%	3/3	4/1	1/1	2/4
- Junior High School (% under/over capacity)	34.2%/15.8%	36.8%/13.2%	39.5%/13.2%	39.5%/13.2%	1/4	2/1	3/1	3/1
- High School (% under/over capacity)	13.3%/20.0%	6.7%/13.3%	13.3%/20.0%	13.3%/13.3%	3/3	1/1	3/3	3/1
Health Care	370,793	395,300	323,779	301,884	93.8%	100.0%	81.9%	76.4%
Private Utilities								
Electricity and Communications	\$5,209.8	\$6,445.9	\$4,545.9	\$4,011.0	80.8%	100.0%	70.5%	62.2%
Natural Gas	\$12,806.3	\$11,709.3	\$14,139.2	\$14,787.0	109.4%	100.0%	120.8%	126.3%

OVERALL COSTS AND REVENUES

Scenario	Cumulative Costs to 2031	Savings Relative to Trend	Estimated Municipal Revenues	Benefits Relative to Trend
RMPS Goals	\$8,875,620	(\$456,140)	\$1,373,662	\$13,225
Post RMPS Trend	\$9,331,760	\$0	\$1,360,437	\$0
Scenario A	\$7,952,947	(\$1,378,813)	\$1,368,388	\$7,951
Scenario B	\$7,571,922	(\$1,759,838)	\$1,370,732	\$10,295

THANK YOU



Stantec

102 – 40 Highfield Park Drive
Dartmouth, Nova Scotia
B3A 0A3

Ph: 902-481-1477

john.heseltine@stantec.com