# Halifax Water Integrated Resource Plan (IRP)

# **Technical Conference #4**

# Wednesday, 21<sup>st</sup> March, 2012: Gordon R. Snow Centre, Fall River.

This meeting was mainly concerned with the financial aspects/costs of the Plan.

Meeting began with a note that demand reduction is important, especially as regards waste-water. This will require new information from pilot projects, pubic education, feasibility studies and a review of the business case.

## **Background Reminder:** Scope of the Project:

Three systems:	Drinking Water Waste Water Storm Water	(not including private wells) (not including private septic tanks) (not including lot drainage)
Three "Drivers":	Asset Renewal Regulatory Requ Growth	irements
<b>General Situation:</b>		
Asset Renewal: Drinking Wa Waste Water Storm Water Regulatory complian Drinking Wa Waste water	ater: - in good - needs r - needs r - in OK - in OK - in com - some t - Harbou to seco - regulat sensitiv - in com looked	I shape but 34 years old and needs refurbishment enewal shape pliance treatment plants not in compliance now ir Solution plans likely to require upgrading ndary treatment ions for plants discharging into limited and we water bodies (10) anticipated. ed monitoring for overflows likely pliance (storm water quality may have to be at in the future).
Growth: Drinking Wa Waste Water Storm water:	nter: - system :: - needs r : - growth	has some capacity to accommodate growth nost work because of growth and overflows will have low impact.

# Plan Options:

## Wall chart: Draft Resource Plans V20 (Mar 15, 2012) (attached) shows:

28 Plans - based on several variables:

- Timing
- Funding
- Level of technology/treatment proposed
- placed in "Bundles" on depending on criteria/priorities

## Capital Espenditures under Plan 1 (30 years)

Drinking Water	-	\$	508.5m
Waste Water	-	\$1	,552.6m
Storm Water	-	\$	47.3m

Additional Charts provided a breakdown of costs and benefits for each Plan, as well as expenditure requirements over time and allocation to Regulatory Compliance, Asset Renewal and Growth

Plans will be evaluated on the basis of:

- 30 year net present value & 30 year net present value
- changes in operating costs
- end of period infrastructure value
- environmental and health benefits
- level of service
- institutional capacity (availability of operating resources)

## **Findings to Date:**

- future capital requirements will be higher than present expenditure levels
- Drinking water system needs mostly asset renewal as the system is in compliance with regulations and has capacity for growth.
- Wastewater system needs the most capital expenditure for all three drivers: compliance, asset renewal and growth
- Stormwater system has lower capital requirements

Full Power Point presentation (with more dollar figures) can be found at:

## www.halifax.ca/hrwc/documents/TC4PresentationV12.pdf

source Plan Matrix source Plans - Summary			Bundle I - (HHSP to CCME, limit of treatment (10 WWTFs), modified RWWFP + RWWFP overflow control)						Bundle II - (HHSP to CCME, limit of treatment (10 WWTFs), modified RWWFP + enhanced overflow control)						Bundle III - (HHSP to CCME, limit of treatment (8 WWTFs), full RWWFP + RWWFP overflow control)						Bundle IV - (HHSP to CCME, limit of treatment (8 WWTFs), full RWWFP + enhanced overflow control)							
			1	2	3 4	5	6	7	8	9	10 1 B	1	12 13	14	15	16	17	18 1	19	20	21	22 23	24	4 25 NS	26	27	28	
Draft Resource Plans V (elements and variations) light shaded cells remain as defined for th	'20 (Mar 15, 2012) ne Initial Plan	Implementation Timing Variations	Technology or Level of Service Variations	L PLAN	ESSIVE COMPLIANCE FOCUS	ESSIVE ASSET RENEWAL ESSIVE COMPLIANCE & AGGRES	RENEWAL ESSIVE CURRENT COMPL. RATE FUTURE COMPL.	KATE ASSET KE NEWAL RATE CURRENT COMPL. 10 M FUTURE COMPLIANCE	TUM ASSET RENEWAL CURRENT WWTF COMPL. URRENT O/F COMPL. RATE EJTURE WW COMPL. RATE ASSET RENEWAL	L PLAN	ESSIVE COMPLIANCE FOCUS	ESSIVE ASSET RENEWAL ESSIVE COMPLIANCE & AGGREE	RENEWAL ESSIVE CURRENT COMPL.	RATE FUTURE COMPL. RATE ASSET RENEWAL RATE CURRENT COMPL. MUM FUTTURE COMPLIANCE	HUM ASSET RENEWAL URRENT WYTF COMPL. URRENT O/F COMPL. RATE EVLURE WW COMPL. ESSIVE ENERGY MGMT	L PLAN	ESSIVE COMPLIANCE FOCUS	ESSIVE ASSET RENEWAL	ESSIVE CORRELATION & AGOING RENEWAL ESSIVE CURRENT COMPL.	KATE FUTURE COMPL. RATE ASSET RENEWAL RATE CURRENT COMPL.	1UM FUTURE COMPLIANCE 1UM ASSET RENEWAL	CURRENT WWTF COMPL. URRENT O/F COMPL. RATE FUTURE WW COMPL. RATE ASSET RENEWAL ESSIVE ENERGY MGMT	L PLAN ESSIVE COMPLIANCE FOCUS	ESSIVE ASSET RENEWAL	ESSIVE COMPLIANCE & AGGRES	RENEWAL ESSIVE CURRENT COMPL. RATE FUTURE COMPL. RATE ASSET RENEWAL	RATE CURRENT COMPL. 1UM FUTURE COMPLIANCE 1UM ASSET RENEWAL	CURRENT WWTF COMPL. URRENT O/F COMPL. RATE FUTURE WW COMPL. RATE ASSET RENEWAL ESSIVE ENERGY MGMT
Objective	Variables	A B C	_	INITIA	AGGRE	AGGRE	ASSET AGGRE MODE	MODE	MINIM MOD G MODE MODE	INITIAL	AGGRE	AGGRE	ASSET	MODE MODE MINIM	MININ MOD C MODE MODE AGGRE	INITIAL	AGGRE	AGGRE	AGGRE	MODE MODE	MINIM	MOD G AGG C MODE AGGRE	AGGRE	AGGRE	AGGRE	ASSET AGGRE MODE MODE	MINIM	MOD G AGG C MODE MODE AGGRE
1 Meet current Nova Scotia Environment (NSE) WWTF permit to operate requirements	The time frame to implement the current compliance requirements may vary due to feasibility of implementation, availability of internal resources, and affordability. For purposes of the IRP, three time horizons are under consideration: short (3 years); medium (5 years); long (7 years) - these variables will influence the alternative Resource Plans (i.e. 1A, 1B, 1C).	2 3 years 5 years 7 years	N/A	1C	1A	1C 1A	1A	18	18	1C	1A	1C 1.	A	1A 1E	18	1C	1A	1C	1A 1/	A	1B	18	1C 1A	10	C 1A	1A	18	18
2 Meet current NSE WSP permit to operate requirements	None. This will be a requirement of any alternative Resource Plan.	ongoing	N/A	x	x	x x	x	x	x	x	x	x >	ĸ	x x	x	x	x	x	x x	x	x	x	x x	x	x x	x	x	x
3 Meet current overflow compliance requirements	The time frame to implement the current compliance requirements may vary due to specific requirements once the federal regulations are released, feasibility of implementation, availability of internal resources, and affordability. For purpose of the IRP, three time horizons are under consideration: short (10 years); medium (20 years); long (30 years) - these variables will influence the alternative Resource Plans (i.e. 3A, 3B, 3C).	2 5 years 10 years 15 years	N/A	зc	ЗА	3C 3A	а за	3B	ЗA	ЗC	ЗА	3C 3.	A	3A 3E	ЗА	3C	ЗА	3C	3A 3/	IA	3B	ЗА	3C 3A	30	C 3A	A 3A	3B	ЗA
4 Meet future WWTF effluent requirements	There is some minor variation in the time frame for implementing the CCME requirements depending on the class of facility and whether the works are coordinated with CSO management. For the IRP, two time horizons are considered related to CCME compliance: medium (20 years) and long (30 years). Nutrient management will likely be required earlier than the CCME requirements. For the IRP, three time horizons are considered: short (10 years), medium (20 years); and long (30 years). "Toxics" management as an emerging trend not yet seen in Canada is not likely to be prominent until later in the planning horizon of the IRP, if at all. Enhanced nutrient management will make significant gains on toxics management, therefore, for this iteration of the IRP, no implementation horizon is proposed for toxics. These variable time lines will influence the alternative Resource Plans (i.e. 4A, 4B, 4C).	- Nutrient - Nutrient - Nutrient management (10 years) (20 years) (30 years) - CCME WWTF (20 years) (20 years) (30 years) - CCME WWTF - CME	I - HHSP WWTF upgrades to secondary treatment using BAF technology (Halifax, Dartmouth, Herring Cove)     Enhanced nutrient removal for WWTFs on sensitive receivers with upgrade to limit of technology (Aerotech, Beechville-Lakeside- Timberlea, Fall River, Frame, Middle Musquodobi, Mil Cove, North Preston, Springfield Lake, Uplands, Wellington) - RWWFP program excluding the Beechville- Lakeside-Timberlea and Springfield Lake diversions	4C-1	4A-1 4	4C-1 4A-	1 48-1	4C-1	1 48-1	4C-1	4A-1	4C-1 4A	4-1 4	4B-1 4C-	L 4B-1	4C-2	4A-2	4C-2 4	A-2 4B	3-2 .	4C-2	48-2	4C-2 4A-2	2 4C-	-2 4A-	2 48-2	4C-2	48-2
	A secondary variation is related to the technology solution to be used to address advanced wastewater effluent requirements. Two options are proposed with the details outlined to the right under sub-items 1 and 2. This will further influence the alternative Resource Plans (i.e. 4A1, 4A2, 4B1, 4B2, 4C1, 4C2).	2	<ol> <li>I-HHSP WWTF upgrades to secondary treatment using BAT technology (Halifax, Dartmouth, Herring Cove)</li> <li>Enhanced nutrient removal for WWTFs on most of the sensitive receivers with upgrade to limit of technology (Aerotech, Fall River, Frame, Middle Musquodobit, Mill Cove, North Preston, Uplands, Wellington)</li> <li>RWWFP program</li> </ol>																									
5 Meet future NSE/Health Canada drinking water quality requirements	None. Halifax Water has an existing Water Quality Master Plan that is proposed for implementation over the 5 year time horizon. This will remain constant for all alternative Resource Plans.	5 years	N/A	x	x	x x	x	x	x	x	x	x >	×	x x	x	x	x	x	x x	x	x	x	x x	x	x	x	x	x
6 Meet future regulations for overflow volume and frequency	Two variations are being considered. Varaiation 1 is to implement the RWWFP Prefered Alternative according to the schedule proposed by the RWWFP. The second variation is an enhanced overflow control program (CSO and SSO) designed to acheieve a higher level of overflow control.	As per RWWFP Schedule	1 Implement RWWFP Preferred Alternative for Overflow Control																									
	A sectionary variation is the choice of technology base to address overhow abatement. The choice of technology based on maintaining the current level of overflow management will be dictated by the preferred alternatives from the RWWFP. For the enhance overflow control program (CSO and SSO), the technology is assumed to be additional storage for the purposes of estimating cost premiums for the additional LOS. Specific detailed implementation projects would include options analysis specific to the sewershed and overflow requirements.		2 Implement Enhanced Overflow Control	6-1	6-1	6-1 6-1	1 6-1	6-1	. 6-1	6-2	6-2	6-2 6	-2	6-2 6-	6-2	6-1	6-1	6-1	6-1 6-	i-1	6-1	6-1	6-2 6-2	2 6-2	2 6-2	2 6-2	6-2	6-2
7 Meet future stormwater quality compliance requirements	None. This will be a requirement of any alternative Resource Plan with an assumed implementation time line of 30 years.	30 years	N/A	x	x	x x	x	x	x	x	x	x	x	x x	x	x	x	x	x x	x	x	x	x x	x	x x	x	x	x
8 implement optimal level of asset reinvestment (all asset classes)	This is a level of reinvestment-variable objective. As a minimum, HW needs to establish a sustainable (optimal) level of reinvestment to compensate for historical underfunding and to account for future reinvestment needs. The level of investment can be accelerated to provide a more rapid catch up for the historical underfunding. For the IRP, three levels of asset reinvestment per year (using a correlation with asset life) are contemplated: For point assets - minimum (assuming 20% extension of asset! life and defined by 1 / 1.2 x asset life); moderate (assuming the asset life and defined by 1 / 0.8 x asset life); For network/linear assets - minimum (age of assets will increase somewhat over time); moderate (age of assets will remain constant over time); aggressive (age of	Aggressive         Moderate         Minimum           point assets:         point assets:         point assets:         point assets:           1 / 0.8 x asset life         1 / 1 x asset life         1 / 1.2 x asset life           network assets:         network assets:         network assets:           % investment per year         % investment per year           (decreasing asset age over time)         (asset age constant over time)         (increasing asset	N/A r	8C	8C 3	8A 8A	4 8B	8C	88	8C	8C	8A 8.	A	88 80	88	8C	8C	8A	8A 8I	38	8C	88	8C 8C	88	4 8A	88	8C	88
9 Enhance reliability of critical assets	assets will decrease over time). These variable levels of reinvestment will influence the alternative Resource Plans (i.e. 8A, 8B, 8C). The time frame to implement the system security programs and projects may vary due to feasibility of implementation, availability of internal resources, and affordability. For purposes of the IRP, three time horizons are under consideration: short (10 years); medium (15 years); and long (20 years). These	10 years 15 years 20 years	N/A	90	9C	9A 9A	4 9B	90	98	9C	9C	9A 9.	A	98 90	98	9C	90	9A	9A 9I	98	9C	9B	9C 9C	9A	а 9А	. 9В	9C	9B
10 Ensure existing storm system is adequately sized for minor storm conveyance	variaure ume imes will innuence the alternative Resource Plans (i.e. 9A, 9B, 9C). None. This will be a requirement of any alternative Resource Plan with an assumed implementation time line of 10 years. Note this is for the identification of future capital projects for storm system capacity upgrades - these would be phased over the longer term and can be considered as a variable in future IRPs.	10 years	N/A	x	x	x x	x	x	x	x	x	x	x	x x	x	x	x	x	x x	x	x	x	x x	x	x	x	x	x
11 Adapt to future climate change	None. This will be a requirement of any alternative Resource Plan with an assumed implementation time line of 20 years.	20 years	N/A	x	x	x x	x	x	x	x	x	x )	x	x x	x	x	x	x	x x	x	x	x	x x	x	t x	x	x	x
12 Reduce energy consumption, operating costs, and reduce greenhouse gas (GHG) contributions	This is a time variable objective. Implementing the energy efficiency initiatives will reasonably take a number of years however, early implementation of some programs will help illustrate the payback potential for future programs. For the RP, the energy efficiency implementation is planned under three time horizons: short (5 years), medium (7 years), or long (10 years). These variable time lines will influence the alternative Resource Plans (i.e. 12A, 12B, 12C).	5 years 7 years 10 years	N/A	12C	12C 1	12A 124	A 12B	120	12A	12C	12C	12A 12	2A 1	12B 12	12A	12C	12C	12A :	12A 12	28	12C	12A	12C 120	2 124	A 124	A 12B	12C	12A
13 Provide regional water, wastewater, and stormwater infrastructure needed to support planned growth	None. This will be a requirement of any alternative Resource Plan.	Meet moderate growth requirement	N/A	x	x	x x	x	x	x	x	x	x )	x	x x	x	x	x	x	x x	x	x	x	x x	x	x	x	x	x
14 Manage flow capacity allocations	None. This will be a requirement of any alternative Resource Plan.	Meet moderate growth requirement	N/A	x	x	x x	×	x	x	x	x	x	x	x x	x	x	x	x	x	x	x	x	x x	×		x	x	x

Users/WilliaV/Dropbox/DRAFT Documents/IRP - Resource Plans Matrix v20