Niagara Region's Use of Value Engineering for Water & Wastewater Projects

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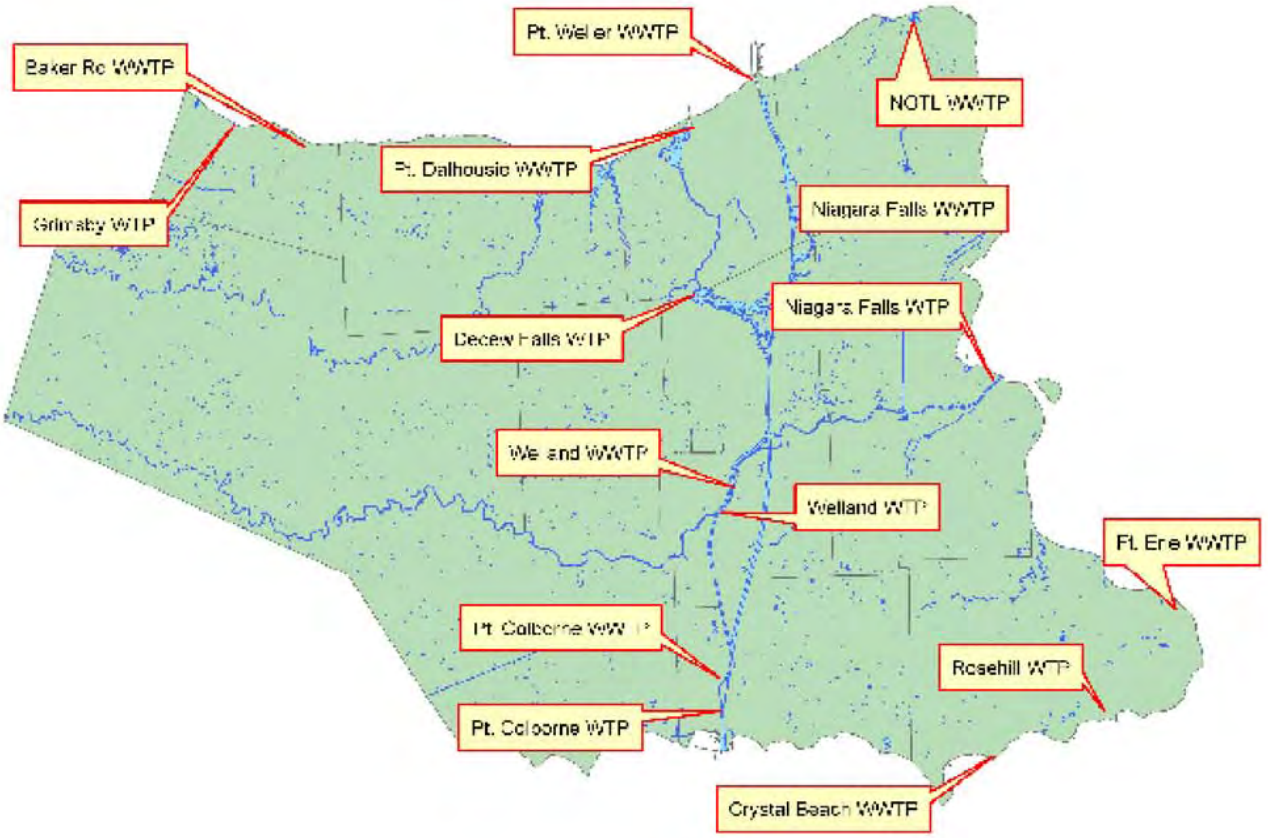
CSVA Conference – Markham, Oct. 26th / 04

Niagara Region

Overview

- Why VE
- 2 sample projects
- Key benefits
- Go – Forward VE application
- Don't leave



Water & Wastewater Facilities

Value Engineering in Niagara

- Sporadic over 10 years
  - NOTL pumping station
  - Ft. Erie conversion of F/M to storm sewer
  - Others – accidental
- Last 2 years
  - New manager of Eng. Projects
  - Past experience
  - Policy to do VE on categories of projects
  - Council approval . Report Dec. 2003
    - $10 m. plus projects
    - $5 – 10 m. projects
    - Implemented in 2003

Value Engineering Projects

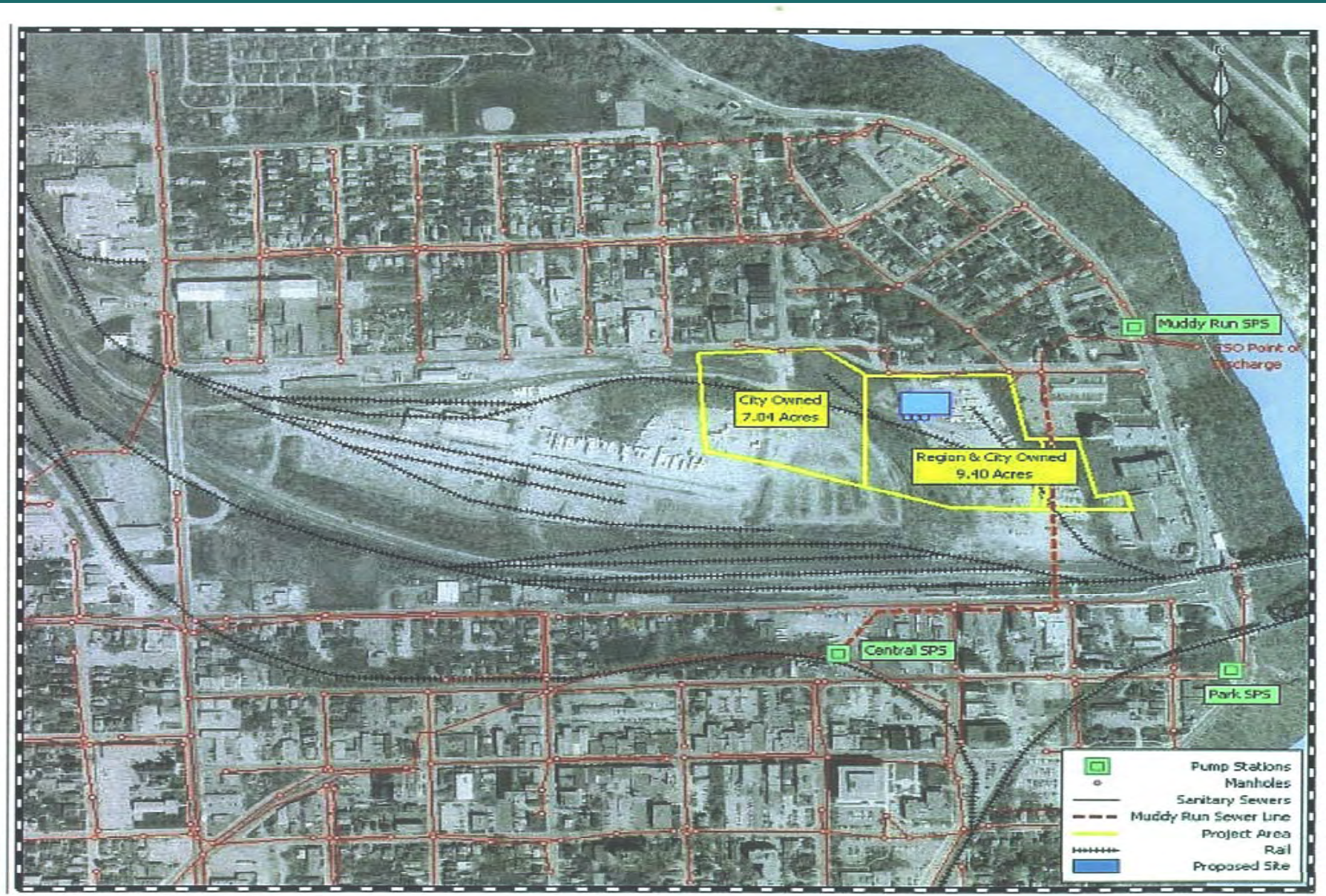
- Combined sewer overflow (CSO) and High Rate Treatment (HRT) project in Niagara Falls
- Water Treatment plant upgrade in Welland
- Secondary Projects
  - Welland CSO/Separation
  - Wainfleet Water & Sewer Servicing
- Cost Ranges from 1 to 1 ½ %

CSO / HRT Project Niagara Falls

- Two jurisdictions (Region/City)
- Many Consultants involved
  - Associated / Acres
  - CH2M Hill / Gore & Storrie
  - MacViro
  - Hydromantis
  - George C. Riek (CVS)
- Key Stakeholders
  - Niagara Region
  - City of Niagara Falls
  - Ministry of the Environment
  - Operations/Engineering Staff
- January 2004 to Present

Overflow (Central & Muddy Run P.S.)

HRT – Niagara Falls



Project Schematic

Muddy Run

- Largest CSO by volume.
- Accounts for between 50 to 60% of CSO load to Niagara river.
- 90% control level equates to a treatment rate of 1800 l/s.
- Total annual average CSO discharge of 400,000 cubic metres directly to Niagara river over an average 37 events

Project Characteristics

- Upgrade major Sewage Pumping Station
- Control major CSO (60%)
- Combine 2 project elements
- Meet requirements
  - P. Station satisfying capacity, safety, life-cycle cost needs, (capacity of 800 L/S) (69.1 ML/D 15.3 MIGD/18.2 US MGD)
  - Reduction of CSO per F-5-5 including 50%TSS/30% BOD/90 mg/l for 90% A.A. Flow (storage 25,000m^3 or HRT)
  - Achieve F-5-5 as minimum and flexibility in future (HRT treatment risk)
- Project Base Costs
  - P. station 6.4 m
  - HRT 5.5 m
  - Related (site/piping) 8.4m
  - Total $20.3 m

Summary of Alternatives

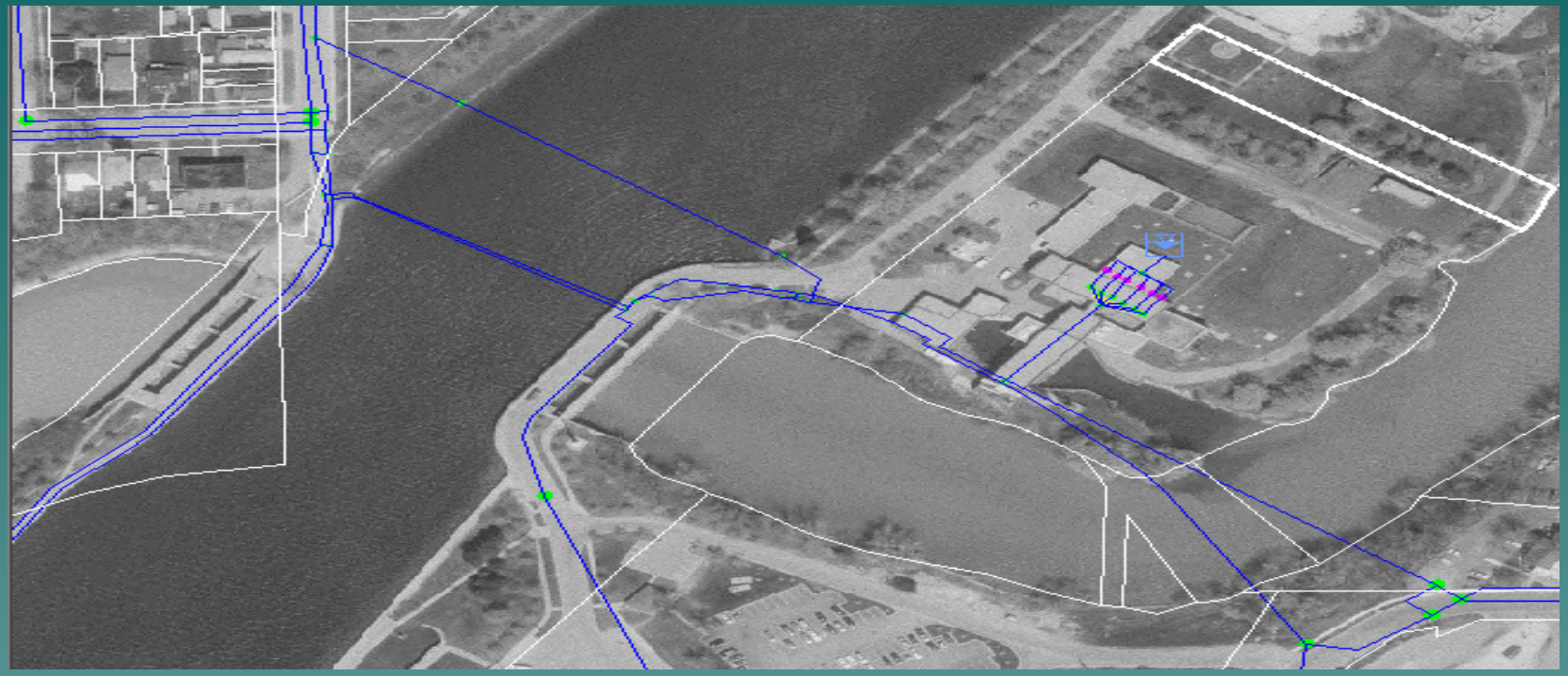
Altern. No.	*Brief Description*	*Value*	*Approx. Construction Cost*[a]
Baseline	Design Concept.	Does not fully meet Region's Performance Objectives	**$20,300,000**
A1	Least Cost Modification of baseline project. PS and HRT at Central site.	Will meet Region's Performance Objectives and may meet F-5-5	**$19,600,000**
A2	Modification of baseline project plus expansion to add value. HRT at Central site; PS at Muddy Run.	Will meet Region's Performance Objectives and may meet F-5-5, but more risk of not meeting than for Alternative A1	$23,500,000[a]
B	Treat CSO at the Stanley Avenue WWTP.	Will meet both Region's Performance Objectives and the intent of F-5-5 and may meet intent of F-5-1.	**$22,800,000**
C	Provide 25,000 m^3 storage at new Central PS site; do not add any other value.	Will meet both Region's Performance Objectives and the intent of F-5-5 and may meet intent of F-5-1.	$26,000,000
D	Consolidate all pump stations into one by constructing deep tunnel to store and convey CSOs to WWTP for treatment.	Will meet both Region's Performance Objectives and the intent of F-5-5 and may meet intent of F-5-1.	$30,000,000 to $40,000,000

[a]Costs for A2 have been corrected from the original "Powerpoint" presentation to include the cost of the upgraded (two 13 m dia vortexes) HRT facility.

Welland WTP Upgrade Project

- Existing water plant serving Welland and Pelham 102 ML/D (85 actual) capacity
- Upgrade needed to meet MOE inspection recommendations (CT or UV) and 10 year growth/demand needs
- Base project to satisfy increased demand of 90 to 107 ML/D
- Cost - $21.4 million

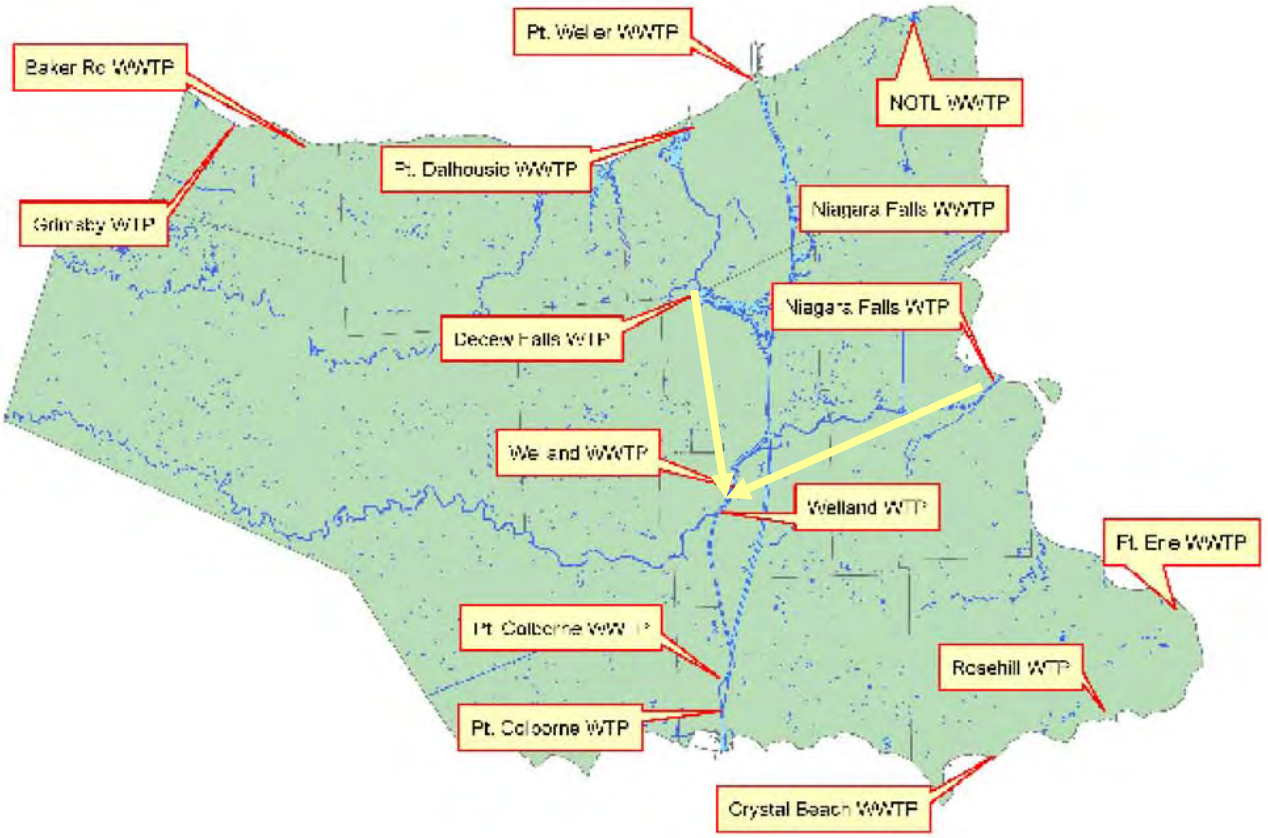
Welland Water Treatment Plant



- Located on Merritt Island at the intersection of the Old Welland Canal and the Welland River
- The original plant (1910) history of nearly 100 years
- Several additions and upgrades (1925 - 1990's)
- Conventional water treatment plant (gross cap.109.1 ML/d) with 2 process streams.

Alternatives

- 3 major options
  - 1. Upgrade Welland WTP (baseline)
    - Capital $21.4 m
    - Life cycle (20 yr) $177 m
  - 2. Decommission Welland and interconnect to both DeCew Falls/Niagara Falls
    - Capital $25.2 m
    - Life cycle $183 m
  - 3. De-rate Welland WTP with interconnection to Decew Falls (to 2026)
    - Capital $25m (20-29m)
    - Life cycle $174 – 197 m



Water & Wastewater Facilities

Key Issues

- Existing plant since 1926
  - (replacement ??)
- Located on Merritt Island
  - (value as park, major cultural site etc.)
- Costs are 30% plus/minus
- Removing plant, major impact on other capital projects and plant capacities
- Internal idea sharing and/or conflicts
- Plant in community
  - (political and labour issues)

Future VE

- Used on Welland CSO and Separation Project
- Wainfleet Servicing (preliminary stage)
  - Class Environmental Assessment
  - $29m Sanitary
  - $19m Water
  - No public acceptance (need?)
  - Options not fully explored
  - Don’t believe your data
  - Don’t trust you
  - Look at other options
- Need
  - More data
  - Technical confidence
  - Meetings with customers / residents
  - VE exercise will help

Is VE Useful to Niagara

- Yes
  - Three successful projects
    - Project better meets need
    - All stakeholders involved
    - Buy in
    - Realistic base project & cost
    - Serious alternatives developed
    - Costs more confident
    - Improved design
    - Lessons for this project applied to others
  - Different Projects
    - Wainfleet class EA
    - Partial VE on some
    - Apply to Master Plan Projects
- Re-visit in two years

Thank You