HAMILTON WATER
WATER IS LIFE

General Issues Committee
November 27, 2015
Item 5.2

Hamilton
Public Works

Public Works
Hamilton Water

2016 Operating and Capital Budget

November 27, 2015

Providing services that bring our City to life!

Presentation Overview

- Community
- People
- Processes
- Finance

1. Program Overview
2. Sectional Update
3. Clean Harbour Program
4. SERG
5. Hamilton Water Priority Programs
6. Staff Complement
7. Operating Budget

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Program Overview

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Program Overview

- Serves 490,000 residents and businesses in Hamilton
- Over $9.76 billion in infrastructure (replacement value)
- Operates 170 different facilities, many of them 24 hours per day, 365 days per year
- Infrastructure renewal and level of service supported by multi-year business plan
- Program is 100% rate-supported and no reliance on the property tax base to support Hamilton Water operating and capital budgets

Main Pump House

Low Lift Pumping Station

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Inventory of Assets

Water
$2.94 Billion

- 1 water treatment plant
- 21 storage facilities
- 2,013 km of mains
- 25 water pumping stations
- 4 communal systems
- 2 surge tanks
- 12,118 hydrants
- 19,885 valves and chambers
- 143,826 water meters

Wastewater
$4.7 Billion

- 2 wastewater treatment plants
- 9 CSO tanks
- 72 pumping stations
- 20 wastewater control gates
- 22,177 maintenance holes
- 1,270 km of sewer lines
- 488 km of interceptors + trunk
- 139,588 sewer laterals

Stormwater Minor/Major Systems
$2.12 Billion

- 1,113 km of storm sewers
- 16,665 manholes

- Capital planning
- Storm water major systems managed by Operations Division

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Sectional Update

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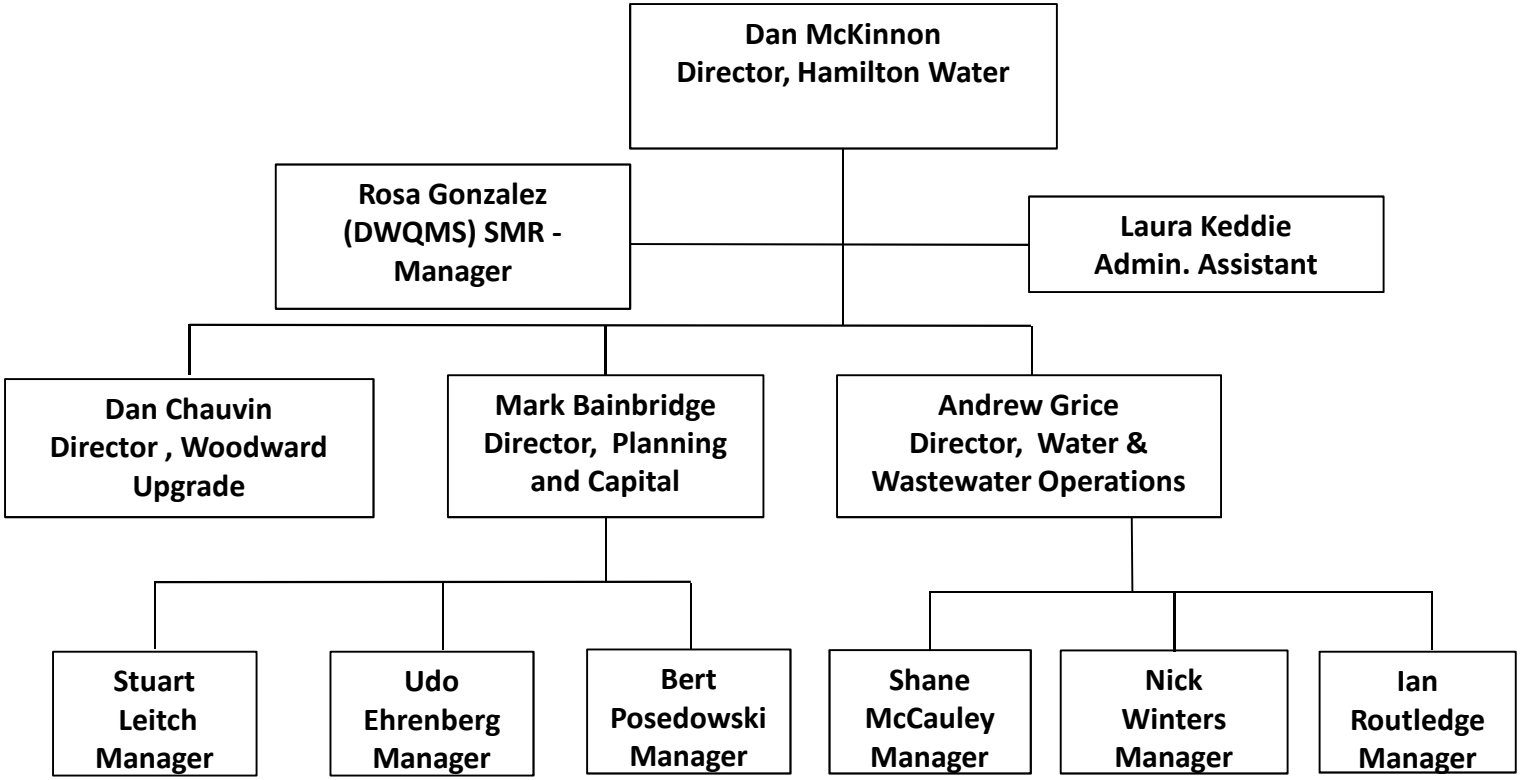
Staff Complement – Organizational Chart



Complement (F.T.E.)	Management	Other	Total	# of Staff / Management
2015	11.0	282.27	293.27	25.66
2016	11.0	287.0	298.0	26.09
Change	0	4.73	4.73	

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Compliance and Regulations

Rosa Gonzalez
Manager, Compliance & Regulations

45.0 FTE
$5.5M Annual Operating Budget

- Environmental Monitoring & Enforcement
- Compliance Support Group
- Environmental Laboratory

2015 Accomplishments

- Facilitated the successful outcome for the Corporate Internal Water Supply Compliance/ Conformance Review
- Implemented the discharge permit process under the new Sewer Use Bylaw
- Maintained Laboratory accreditation and MOECC licensing for drinking water testing

2016 Outlook

- Full implementation of Learning Management Database to all Hamilton Water staff including reporting capabilities
- Validation of 2 new instruments ICP/MS (trace metals analysis) and GC/MS (volatile organics)
- Infor data population and implementation of automated work order management plan

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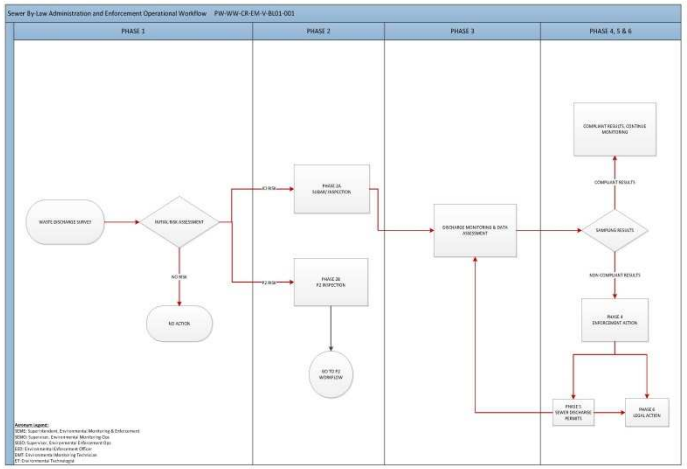
Compliance and Regulations - Process Improvement



Event: New Workflow – Environmental, Monitoring and Enforcement Group Implementing new operational workflow for permits and inspection processes

Date: Q1 2015

Benefit: Consistent streamlined approach; provided staff with training and clear directions.

Event: Continuous Improvement – Compliance Support Group

Date: Q3 2015

Benefit: Operational challenges and emerging issues meetings were incorporated into the Hamilton Water continuous improvement process.

Environmental Monitoring & Enforcement Master Plan Roadmap 2014 - 2018

	2014				2015				2016				2017				2018			
	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4
By-Law Administration	PW Report & Final Enactment of 14-090		Part 1 Tickets																	
Monitoring & Enforcement	Influent Trending and Investigations Plan								Storm Water Monitoring Program Development											
Policies & Procedures	Standardization of workflows and operating procedures								QA/QC and Procedural Auditing											
	Document Management Plan																			
	Implementation of SUB Administration and Enforcement Strategy																			
Cost Management	New Rates via F&C By-law		Develop an ongoing rate structure review model																	
Data Management	Hansen Module Development			Hansen testing and Release		Hansen Database Population														
People/Resources	Staff Training of SUB Administration and Enforcement Strategy																			
			Staff Training - Hansen																	
	Performance Accountability Implementation				New Performance Accountability Process															
	Leadership Training																			

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Compliance and Regulations - Alerts & Upcoming Pressures

- New MOECC wastewater inspection process
- MOECC pilot drinking water self-reporting inspection may become a new requirement
- Hauled Sewage Receiving Station Construction
- Changes to O.Reg. 169 and O.Reg. 170 testing for chemical parameters in treated drinking water
- Corrosion control monitoring program
- New laboratory instrumentation requires validation and method development

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Drinking Water Quality Management System

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Drinking Water Quality Management System

2015 Milestones Overview

- Conducted Standard of Care Training for new members of Council (required under Safe Drinking Water Act)
- Re-signing of Council Commitment and Endorsement of DWQMS Operational Plan
- Submission of Annual Drinking Water Report to MOECC and made available to the public (O.Reg. 170/03, Section 11) by February 28, 2015
- Submission of Annual DWQMS Summary Report to the members of Municipal Council and made available to the public (O.Reg. 170/03, Schedule 22) by March 31, 2015
- DWQMS External System/Re-accreditation audit completed in Spring 2015
- Eight newly trained DWQMS Internal Auditors (Hamilton Water Staff)

2016 Milestones Forecast

- DWQMS External System Surveillance audit scheduled for Spring 2016
- Submission of Annual Drinking Water Report to MOECC and made available to the public (O.Reg. 170/03, Section 11) by February 28, 2016
- Submission of Annual DWQMS Summary Report to the members of Municipal Council and made available to the public (O.Reg. 170/03, Schedule 22) by March 31, 2016

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Planning & Capital

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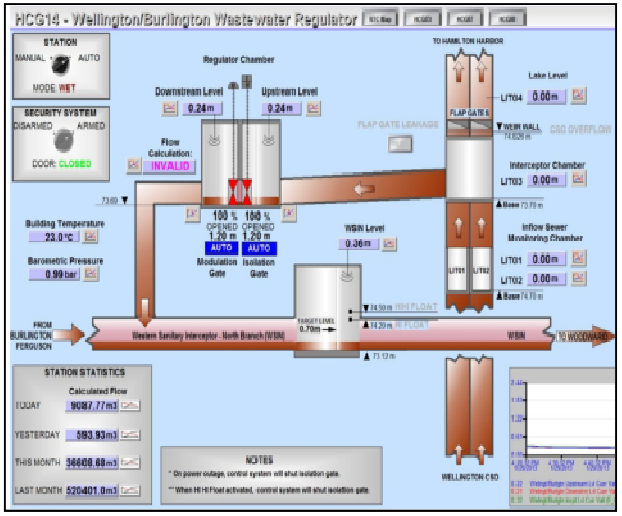
Infrastructure Planning & Systems Design (IP&SD)



Udo Ehrenberg, P. Eng
Manager, Infrastructure Planning & Systems Design

13 FTE
$2.3M Annual Operating Budget

- Water Planning
- Wastewater Planning
- Stormwater Planning
- Geomatics

2015 Accomplishments

- Mike Urban Sewer Modelling (15 plus ~20 locations)
- WaterCAD modelling (60 to date plus ~40 locations)
- Form-1 DWS Alteration Approvals (25 to date)
- Development Application Reviews (257 to date)
- Start Flooding Master Servicing Study RFP
- Clearance of underground capacity for Annual Road program
- Major Capital Water Coordination Working Group
- Form 1 & Development Applications Workshop

Development Applications dominated this year as a troublesome process

2016 Outlook

- Master Plans & GRIDS – Flooding, Citywide Water/Wastewater/Stormwater
- Flooding and Drainage Master Servicing Study
- Schedule C Class EA for Old Dundas Road Sewage PS Emergency Overflow

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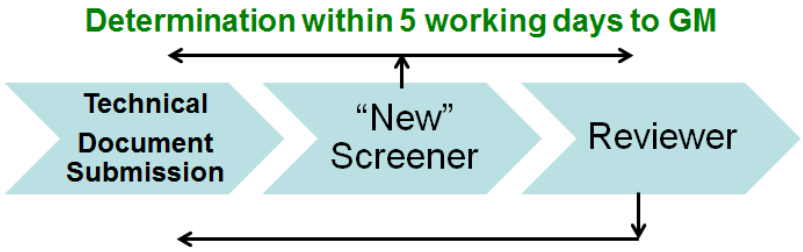
IP&SD - Process Improvement

Event : Development Application Review and Approval – Form 1
Date : 16 November (Stakeholder Workshop) + 11 internal sessions
Description : Undertaking Continuous Improvement related to Roles and Responsibilities, KPI of days to complete a review, refresh the development industry on expectations, provide examples/check lists/templates

Benefit : The addition of a "Screener" immediately reduced the duration of the time to determine completeness of a submission from ~15 working days to ~ 5. The addition of the Screener will increase the quality and completeness of submission such that the Technical Reviewer's time us used more effectively.



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IP&SD - Alerts & Upcoming Pressures

- Climate Change – potential for future severe rainfall events
- Hamilton Water is participating in the Corporate Climate Change Working Group, member of the National FloodNet User Group, Flooding and Drainage Master Servicing Study, Rural Runoff Working Group and Urban Runoff Working Group.

Resource Outlook

Year Required	Job Title	Need
2016	Senior Project Manager, Stormwater	Stormwater mandate
2016	Project Manager, Stormwater	Stormwater mandate
2016	Student	Project support

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Sustainable Initiatives

Bert Posedowski, P.Eng
Sustainable Initiatives

7 FTE
$1.2M Annual Operating Budget

- Government Grant Funding
- Sourcewater Protection
- Harbour Remediation
- Facility Asset Management

2015 Accomplishments

- Executed a $200M Green Infrastructure Fund (GIF) Contribution Agreement
- Initiated Phase I of W/WW Facility Asset Management Program
- Conducted hydrogeologic investigation and groundwater based supply assessments for Lynden, Greensville and Freelton
- Support HHRAP and other environmental stewardship initiatives

2016 Outlook

- Develop a new W/WW Facility Asset Management Program
- Grow the RMO/RMI office to meet legislative requirements (Clean Water Act)
- Complete the Lynden EA and initiate the New Greensville Well EA study
- Pursue funding for Dundas WWTP Upgrades under the New Building Canada Fund

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Sustainable Initiatives

Updates on Well System

Greensville - The Mid-Spencer/Greensville Rural Settlement Area Subwatershed study is expected to be concluded in Q2 of 2016. Once finalized, the Division plans to initiate a Municipal Class EA to identify a new water well supply to supplement the existing Greensville municipal well.

Lynden - The municipal Class EA study to secure a second water supply continues. The EA is anticipated to be completed toward the later half of 2016. Design and construction of the second water supply will commence immediately following completion of the EA.

Freelton - A servicing study completed in 2015 identified the need for additional well capacity to meet future needs. A study looking at options will begin in 2016.

Carlisle - A Municipal Class EA study to supplement water storage in the community has been put on hold while the City concentrates on the implementation of a water conservation program. The earliest the EA study can be expected to resume is 2018.

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Sustainable Initiatives - Alerts & Upcoming Pressures

New Building Canada Fund (Dundas WWTP)

The Division is preparing an application for Federal and Provincial funding under the New Building Canada Fund. The application will target an upgrade to the Dundas WWTP, - Plant A.

The Dundas WWTP was originally constructed in 1962. Later, in 1977 a capacity increase to the WWTP took place and was constructed as a parallel plant (Plant B). Plant A is now nearing the end of it's service life and an upgrade is recommended within the next 3 to 5 years.

The plant flow discharges into the environmentally sensitive area of Cootes Paradise Marsh which makes it an excellent funding candidate.

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Sustainable Initiatives - Alerts & Upcoming Pressures

- The asset management business unit is currently developing policies, procedures and computer infrastructure for a new W/WW Facility Asset Management Program. The delivery of asset management services under this new program.

- Legislative requirements under the Clean Water Act to establish a RMO/RMI office and to meet the obligations imposed under three separate Source Protection Plans.

Resource Outlook

Year Required	Job Title	Need
2018	Project Manager, W/WW Planning	AM Program
2018	Project Manager, Source Protection Planning	RMO/RMI Office

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Capital Delivery

Stuart Leitch, P. Eng.
Manager, Capital Delivery

9.6 FTE
$1.6M Annual Operating Budget

2015 Accomplishments

- Managed 44 complex, multidiscipline Capital Projects valued at $70.1M. Some of our major projects at various phases include:
  - WTP Process Upgrades Study
  - Highland Garden Park Pumping Station
  - WTP Filter GAC Replacement
  - Old Ancaster Road Pumping Station
  - Wastewater Outstation Odour Control
  - Twenty Rd Wastewater Pump Station
  - Mill DC013 and Carl FC003 Pumping Station
  - Hillcrest Water Reservoir – Phase 3
  - Stonechurch Water Reservoir Upgrades
  - Decommission Waterdown WWTP

2016 Outlook

- Management of 54 complex, multidiscipline capital contracts throughout 2016, including:
  - 34 in design, 9 under construction and 11 substantially performed

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Capital Delivery 2015 Photo Gallery

HGPPS – Substantial Performance 2015

Highland Rd PS
Warranty Period 2015

Old Ancaster Rd Water PS
Substantial Performance 2015

WTP Process Upgrades
Study 2015
Design 2016

Twenty Rd SPS
Construction 2015

Carbon Filters: Beach Blvd & Upper James
Substantial Performance 2015

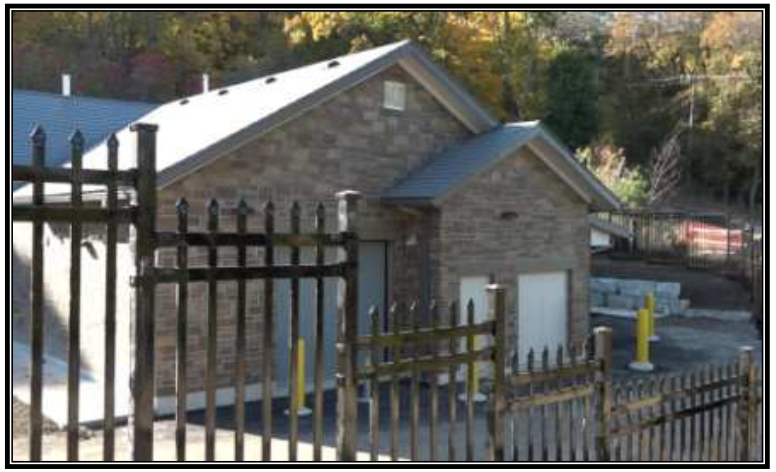
Design Manual - W & WW Outstations 2014 & 2015
CONSISTENCY!

Capital Delivery Highlight – New Highland Gardens Park PS

- City of Hamilton's newest greenfield pumping station, located in Ward 1
- Construction commenced in 2014, substantially performed Oct 2015
- Receives water directly from its big sister, Ferguson Ave PS or from Hillcrest Reservoir located nearby…much needed ***strength for District 3!***

Highlights

- Station capacity 20 MLD or equivalent of filling 133,333 standard bathtubs per day
- Nestled into the toe of the escarpment adjacent Highland Gardens Park



How Did This Project Impact the Community

- Every effort was made to blend the station into the natural environment and community, while ensuring no loss in functionality
- Community was engaged to determine profile and architectural finishes

Capital Delivery Highlight – Highland Rd PS Upgrades (HD007)

- Asset condition and growth/development requirements….rebuilt the station pumping, electrical, structural and civil components
- The project cost approximately $6M and was completed in 2015

Highlights

- Paper presented at 2015 Ontario Water Works Association in Toronto…***share our experiences***
- It was critical to maintain operations at all times during construction….awesome team communication / contingency planning
- No. of seconds station down...***ZERO!!!***

How Did This Project Impact the Community

- This enabled us to meet the growth and development needs for the district…***We're Open for Business***

→ Community
→ People
→ Processes
→ Finance

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Capital Delivery - Process Improvement

Event

Development of an innovative approach to facilitating Water & Wastewater Facility Design standards

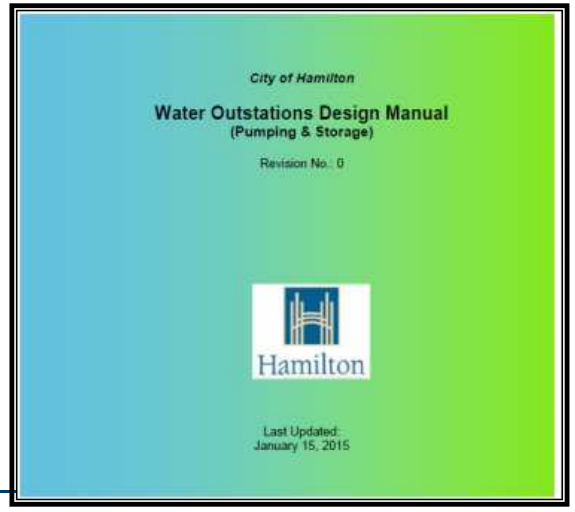
Date

Completed 2014: Water Design Manual for Outstations and Elevated Towers
Completion 2015: Wastewater Design Manual for Outstations and CSO Tanks

Description

The new user-friendly Design Manual provides design preferences by City of Hamilton staff for the following water and wastewater outstations:

- Wells
- Water pumping stations
- Storage tanks including in-ground water storage reservoirs and elevated water storage tanks
- Sewage pumping stations and CSO Tanks



Benefit

- Consistency
- Confidence of a proper design
- Communication enhancements
- Building on lessons learned
- Staff expertise to ensure an efficient project

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Operations

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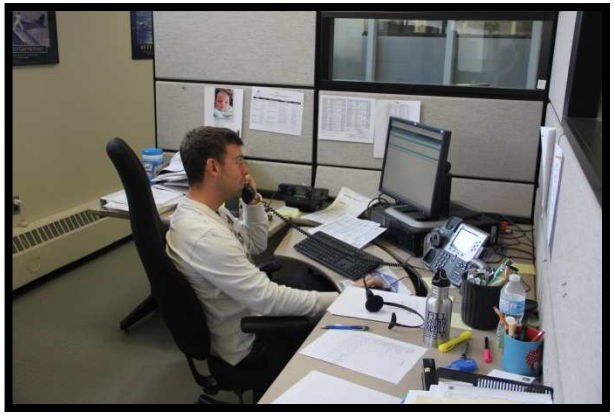
Customer Service & Community Outreach (CS&CO)



Shane McCauley
Manager, Customer Service & Community Outreach

38.0 FTE
$8.3M Annual Operating Budget

2015 Accomplishments

Service Coordination
- Implemented formal meter change out program for residential water meters

Engineering Systems
- Hansen 8 implementation completed

Outreach & Education
- Kicked off Carlisle Water Conservation Program and formed the Carlisle Conservation Committee (C3)

2016 Outlook

Service Coordination
- Call center rationalization

Engineering Systems
- Support integrations with BizTalk

- Continued focus on Carlisle Conservation Program

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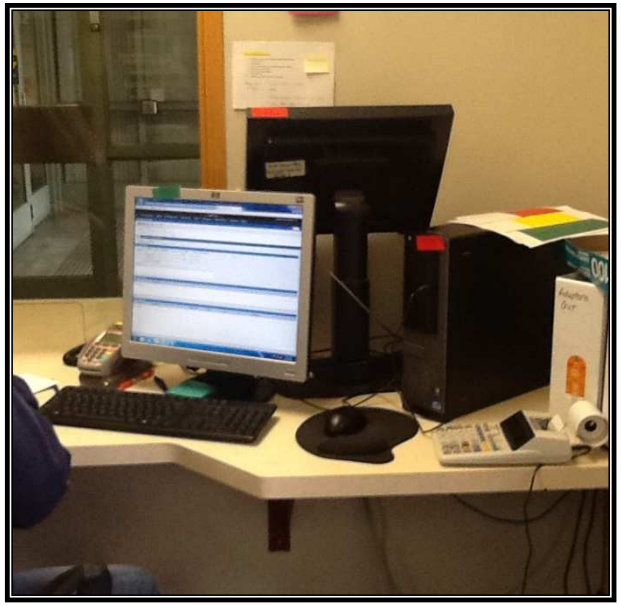
CS&CO - Process Improvement

Kaizen for Customer Service Storefront (330 Wentworth N)

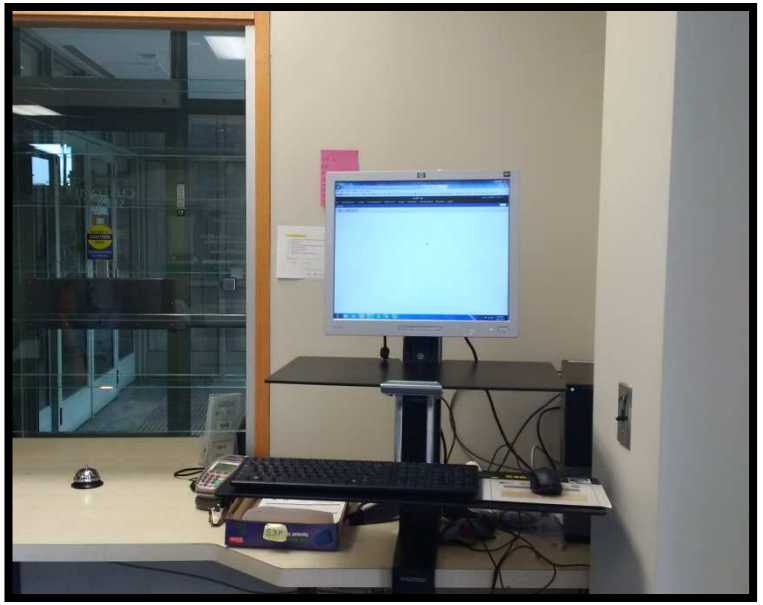
November 25, 2015

To address inefficiencies related to servicing our customers at the storefront.

Benefit : A more customer friendly environment for our visitors
Better working environment for our staff
Increased efficiency in processing customer requests
Positive influence on culture, team work and morale



Before



After

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CS&CO - Alerts & Upcoming Pressures

Protective Plumbing Program (3P)

- Expect to be within budget for 2015
- Potential of $3M in works accrued for 2016

Call Center Rationalization

- Dissolving of Hamilton Water Call Center as part of the Corporate Project
- Minimum of 9 staff directly affected, with 3 being displaced
- Schedule was for Q1 2016 has been delayed with no new projected date

Resource Outlook

Year Required	Job Title	Need
2018	Backflow Technician	Bylaw Enforcement
2018	Outreach Project Manager	Increased community engagement
2018	Spatial Applications Systems Developer	Increased demand for map based applications & data

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Protective Plumbing Program (3P)

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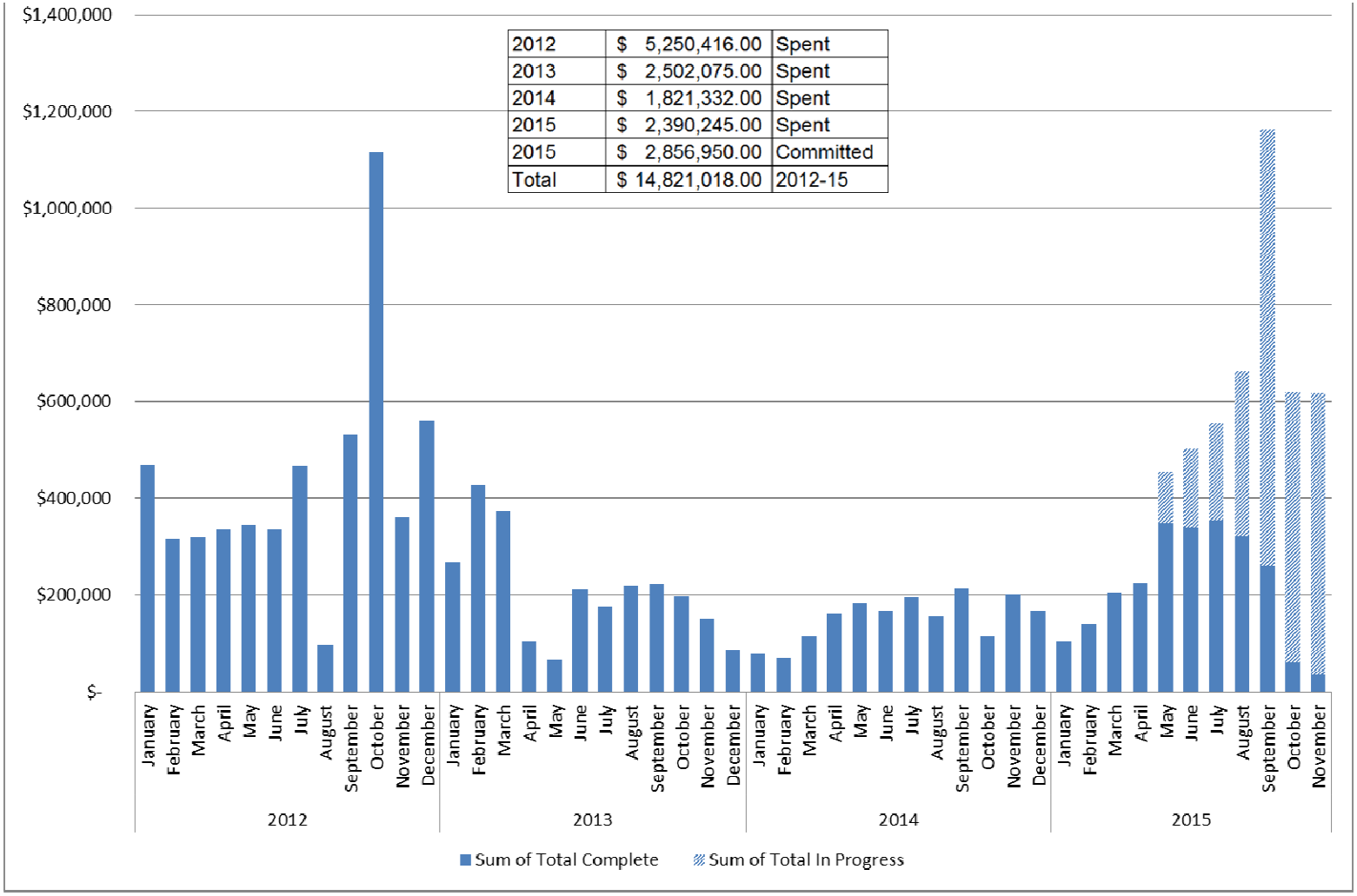
Protective Plumbing Program (3P)

3P Dollars Spent and Committed 2012-2015

As of October 9, 2015

2012	$ 5,250,416.00	Spent
2013	$ 2,502,075.00	Spent
2014	$ 1,821,332.00	Spent
2015	$ 2,390,245.00	Spent
2015	$ 2,856,950.00	Committed
Total	$ 14,821,018.00	2012-15



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Water Distribution & Wastewater Collection (WD&WWC)

Nick Winters
Manager, Water Distribution & Wastewater Collection

87.67 FTE
$19.5M Annual Operating Budget

2015 Accomplishments

- Process Improvement Projects: Inventory Optimization, Workflow Standardization, Vehicle Storage Kaizen, and Utility Locates Project
- Implement Afternoon Shift for Water Distribution Staff
- Develop Water Distribution Control Valve Maintenance & Repair Program

2016 Outlook

- Complete Inventory Optimization and Workflow Standardization Projects & Develop KPIs to Monitor Ongoing Effectiveness
- Begin Hansen 8 Customization to Support Additional Efficiencies within the Section
- Revisit District Metering & Leak Detection Program
- Begin Waterworks By-law Re-write

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WD&WWC - Winter 2015

Service	2009 - 2013 Average	2014	2015
Water Main Breaks	150	277	209
Frozen Service Calls	30	674	1213
Frozen Services (Unique Addresses)	5	197	569
Water Delivery	< 1	204	1863
House to House Connections	0	10	121

- February 2015 was one of the coldest ever recorded by Environment Canada
- Approximately $2.9M spent on service thawing (including restoration costs)
- 225 customers directed to run water in early February (75% success rate in avoiding a frozen service)
- Support from all Sections of Hamilton Water to deliver potable water
- Hansen 8 – launched February 2015

Water Delivery

Water Service Thawing

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WD&WWC - Winter 2016 Strategy

- Outreach – over 800 properties that have experienced a frozen water service will be directed to run their water
- Education – series of videos for home owners highlighting prevention, contractor expectations, and City services
- Frost depth monitoring – accurate data allows trending of ground conditions
- Contracts for service thawing and house to house connections
- Technology – electrical thawing equipment purchased to supplement hot water thawing machines

Educational Video


House to House Connection


Running Water

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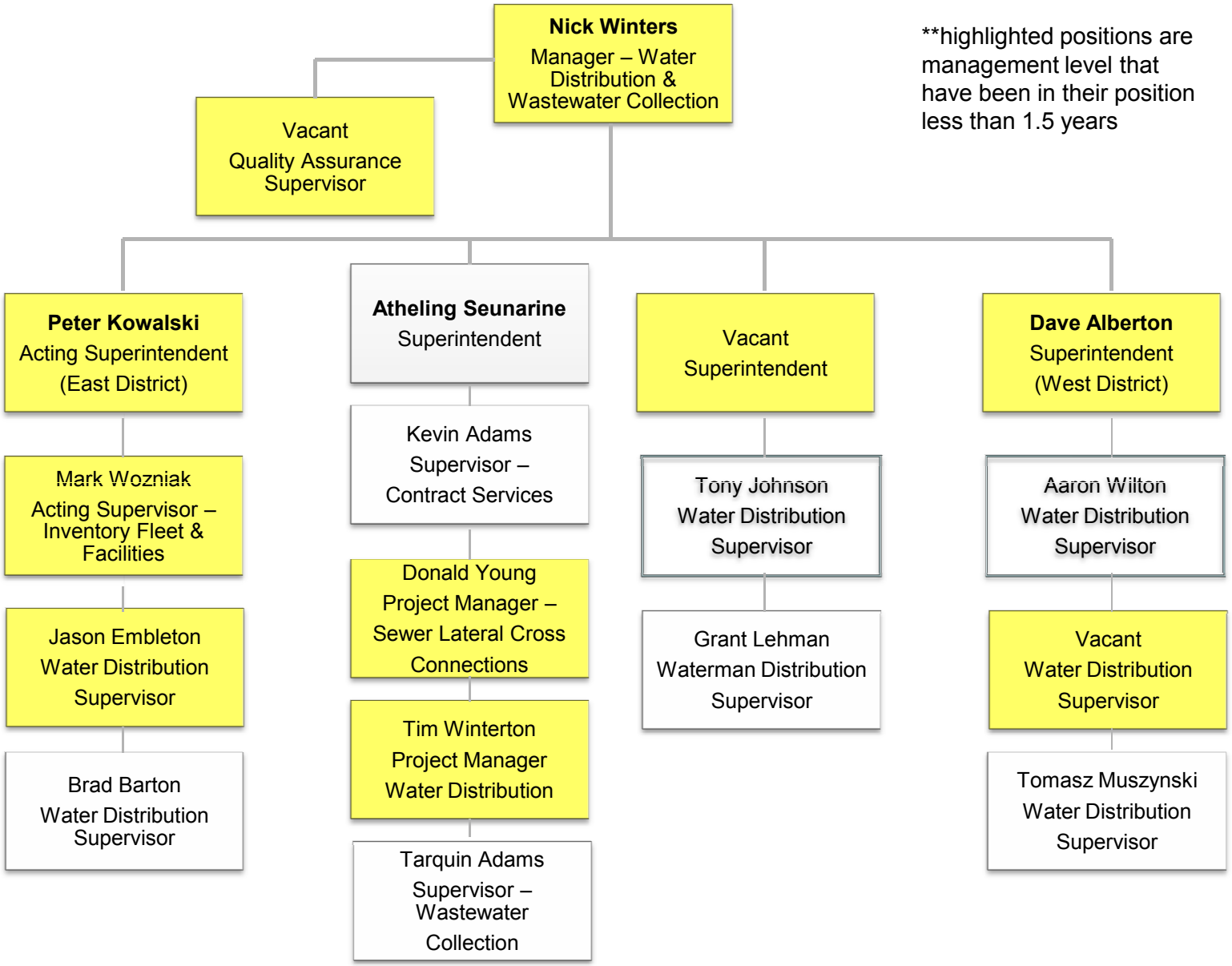
WD&WWC - Staff Complement



**highlighted positions are management level that have been in their position less than 1.5 years

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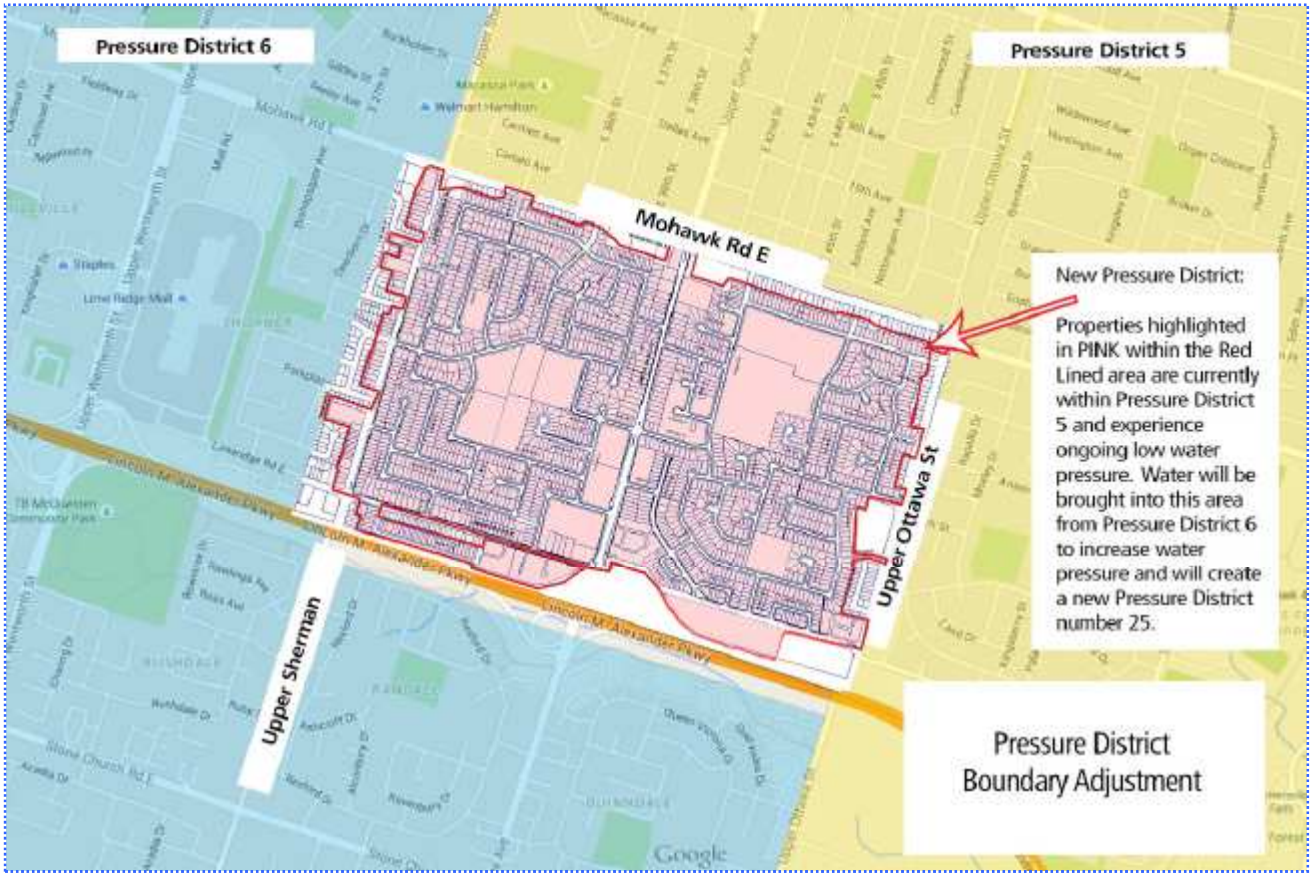
WD&WWC - Pressure District 25



- Historically the area ground elevations: 198m ~ 211m, caused marginal pressures in the area of 240 to 275 kPa (35 to 40 psi).
- On November 28th the pressure in the area was boosted to 415 to 540 kPa (60 to 78 psi).
- Work included installation of 5 new valves and upsizing a section of water main.

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WD&WWC - Process Improvement

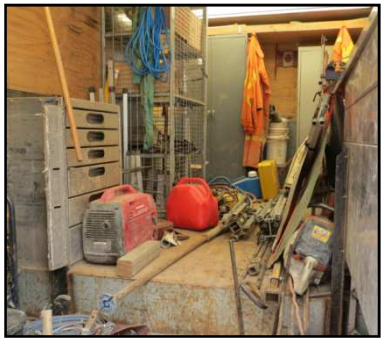
Kaizen for Water Distribution & Wastewater Collection Vehicles

June 26, 2015

To address inefficiencies related to vehicle inventory & storage

Benefit

Standard storage solutions and inventory lists for all vehicles based on specific use. A place for everything, and everything in it's place. Eliminates time wasted searching for tools/inventory and supports easy inventory counts. Engaged & empowered employees.



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WD&WWC - Process Improvement

Process Improvement for Water Utility Locates

July to September, 2015

To address inefficiencies related to utility locate completion and administration.

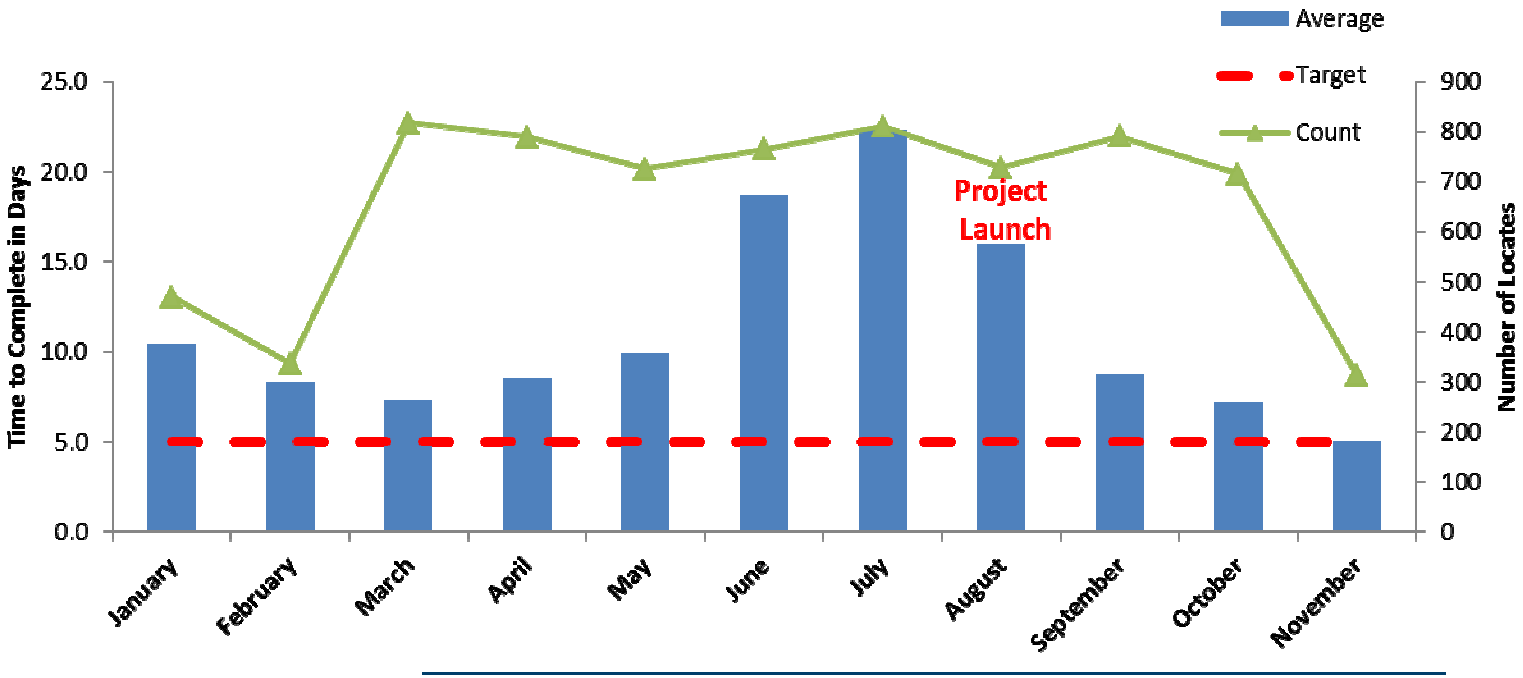
Benefit

Average time to complete

January – July = 12.7 days

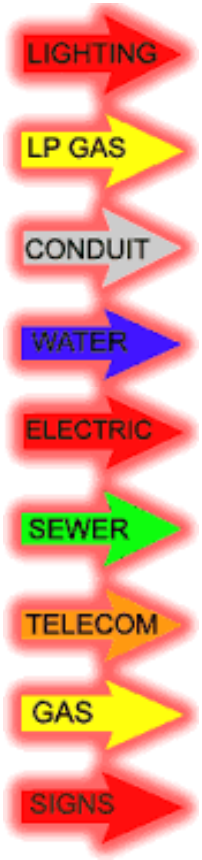
August – November = 9.9 days

22% improvement in processing



WD&WWC - Alerts & Upcoming Pressures

Utility Locates



- Utility locates in Ontario are governed by the Ontario Underground Infrastructure Notification System Act.
- Hamilton Water is participating in a coordinated project to determine the future of utility locates for City infrastructure.
- Utility locates are currently completed by Hamilton Water, Traffic Operations, and Street Lighting.
- Preliminary investigation suggests the potential for savings by consolidating locates under one contract.
- Engineering Services Division is Project Lead.
- More to come in 2016!

Call Before You Dig
ON1CALL
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WD&WWC - Alerts & Upcoming Pressures

- Climate Change (Extreme Cold = Frozen Pipes; Excessive Rainfall = Flooding).
- Spoils Management (becoming more difficult and expensive to dispose of excavated material)
- Retirements & Availability of Licensed Operators (20% Turnover of Positions in WD&WWC in 2015)
- Corrosion Control (Will Create Short-Term Challenges for Operation of the Water Distribution System)

Resource Outlook

Year Required	Job Title	Need
2017	Water Distribution Supervisor	Currently a temporary position needed for afternoon shift.
2017	Technologist/Inspector	Increased uptake in Sewer Lateral Management Program.
2019	Water Distribution Operator (2)	Maintain service levels of growing system.

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Plant Operations

Ian Routledge, P. Eng.
Manager, Plant Operations

78.0 FTE
$38.2M Annual Operating Budget

- Water/Wastewater Plant Operations
- Process Improvements
- SCADA
- Plant Maintenance
- Quality Assurance

2015 Accomplishments

Water and Wastewater Production:

- 83,750 ML drinking water treated (0.5% decrease from 2014)
- 112,300 ML wastewater treated (75% capacity utilization)
- Woodward WWTP – 118 months continuous compliance

Capital Works and Process Improvement:

- Dundas WWTP Inlet Channel Replacement
- SCADA Master Plan Implementation Ph IV & V Completion
- Water Filtration Turbidity Monitoring Upgrade

2016 Outlook

Water and Wastewater Production:

- 83,000 to 85,000 ML treated drinking water
- 110,000 to 115,000 ML treated wastewater
- Integration of Storm Water Stations

Capital Works and Process Improvement:

- Woodward WWTP – dual point addition to lower total phosphorus
- Methane Gas Sphere repainting
- Woodward WWTP North Digester #4 refurbishment

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Plant Operations - Process Improvement

CMMS Maintenance Work Processes Initiative
December, 2014 (ongoing)

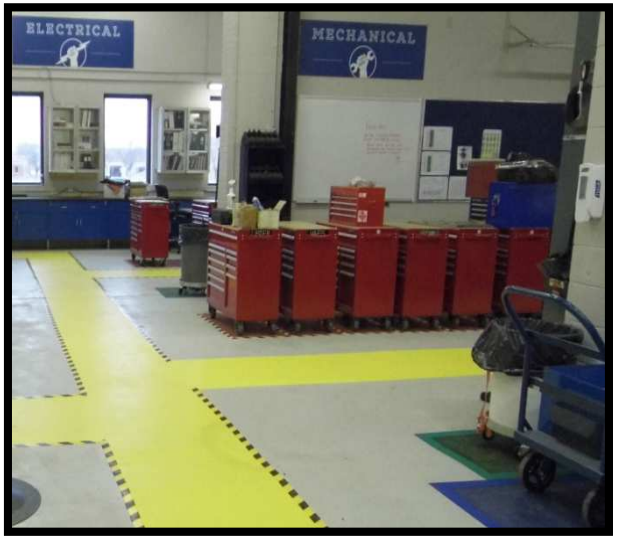
Asset Recompilation, Inventory/Parts Validation, PM task develop/cleanse, establishment of KPI's, Activity Value Analysis and Realignment Skilled Trade Shop.

Benefit: Normalized Monthly Work Flow

Maintenance Shop and CEPT Bldg. KAIZEN's
Oct, 2014 and June, 2015

Systematic Approach for Improvement, focuses on processes and people, looks to eliminate waste.

Benefit: Better inventory of tools and supplies. Reduces Over Production and Processing. Reduces waiting time. Over 50% reduction in acquisition of some tools/equipment.



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Plant Operations - Alerts & Upcoming Pressures

•Maintaining WOD WWTP Compliance and implementation of Tertiary Treatment Process under the Clean Harbour Program.

•WOD WTP Process study to address taste/odor/algae/emerging contaminants and Implementation of Corrosion Control program

• Integration of 13.8 Kv Distribution Power System and increasing Network Complexity at WOD Treatment Site.

•Increasing Automation and Process Control Monitoring of Water and Wastewater Systems.

•Security of Facilities and reduction of liabilities

•Dundas WWTP Asset replacement and facility upgrade

Resource Outlook

Year Required	Job Title	Need
2016	Electrician	Power distribution
2018	SCADA Technician	Process control/monitoring
2018	Data Clerk	Document Control
2020	Operators (5) Instrument Technician (2) Millwright (2)	WOD Tertiary Processes

Plant Operations

Biosolids - Land Application Program – 2015 Summary

- Award of Biosolids Land Application Contract to run until P3 Project is complete
- Hamilton biosolids applied to Agricultural Land and Mine Lands for Reclamation. Excess material is processed through two Canadian landfills.
- In 2015, 69.5% of Hamilton material is going to beneficial re-use (Land Application). 11,500 tne to Landfill.
- 2015 Methane Gas Utilization Impacted by BPU and Cogen unit outages.

Biosolids Production

Year	Wet Tonnes (WT)
2012	37,684
2013	36,468
2014	37,135
2015 (estimated)	37,500

Methane Gas Production

Year	Total Methane Gas Production (m3)	Cogen Gas (m3)	Waste Gas (m3)	BPU (m3)
2012	5.2 M	4.1 M	1.1 M	885K
2013	6.4 M	4.9 M	712K	812K
2014	6.7 M	5.0 M	750K	1,024K
2015 *estimated*	6.5 M	4.1 M	1,550 K	850K

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Woodward Upgrades

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Woodward Upgrade Section

Dan Chauvin, C.E.T., PMP
Director, Woodward Upgrade

8 FTE
$1.2M Annual Operating Budget

- Woodward Upgrade Project
- Biosolids Management Project (P3)
- Project Management Office (PMO)

2015 Accomplishments

GIF Fund Contribution Finalized – March 2015
Engineering assignment proceeding into Detail Design (key review workshops completed),
Key stakeholders engaged specifically, Ministry of the Environment Climate Change, HHRAP Office, Joint Stewardship Board, HUC, PPP Canada ,Hamilton Water Sub-Committee, etc.
Closed RFP for Process Equipment, award expected early December 2015
Closed RFQ for Biosolids P3 Project. Short list to be announced mid December
Expanded 'PMO Service' to support Infrastructure Planning and System Design

2016 Outlook

Tender first of three Woodward Upgrade Construction Projects Main Pumping Station
Issue and award RFP for Biosolids P3 Project
Progress on all Detail Design Activities (workshops, VE, Constructability Reviews, etc
Continue collaboration with key Stakeholders

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Woodward Upgrades - Alerts & Upcoming Pressures

Maintaining aggressive schedule to meet GIF timelines (Substantial Completion by 2021)

Maintain aggressive schedule to meet Biosolids Management Project and associated PPP Canada Agreement timelines

Engagement with the Joint Stewardship Board (JSB)

Adjusting engineering assignment for Woodward Upgrades Project to reflect revised technology and construction schedule

Increasing internal resources

Resource Outlook

Year Required	Job Title	Need
2018	Coordinator	PMO Support

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Hamilton Water Priority Projects

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Woodward Upgrades Project

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Woodward Upgrades Scope

The Woodward Upgrade Project is composed of 5 sub-projects with a construction budget of $340 million providing the following benefits

Hamilton CLEAN HARBOUR PROGRAM
WOODWARD UPGRADE PROJECT

Sub-Project	Benefits
• Tertiary Upgrades	• **Improved Effluent:** Addition of a tertiary treatment process to allow the WWTP to meet stringent HHRAP targets
• Raw Sewage Pumping Station	• **Increased Capacity:** Meet future wet weather capacity needs of 1700 MLD • **Improved Conveyance:** Larger and deeper wet well will assists with mitigating system flooding, provide increased system storage, reduces solids buildup during dry weather flows
• Electrical Upgrades and Stand-by Power	• **Replace aging assets:** Reduces risk by replacing critical assets that have reached the end of its useful life • **Increased Standby Power:** Provide for sufficient standby power to all essential loads • **Energy Efficiencies:** Maximize energy efficiencies wherever possible
• New Chlorine Contact Tank, Outfall and Upgrades to Red Hill Creek	• **Maximizes Plant Hydraulics:** Dedicated discharge location into Red Hill Creek required for tertiary effluent, and dedicates existing outfall for increased treatment of wet weather flows
• Collection System Upgrades	• **Improved Monitoring and Controls:** A series of flow monitoring and control devices will be installed at strategic location allowing for better hydraulic management of wet weather flows within the system as to optimize capacity during each wet weather event

- GIF Funded Project
  - $100 M from the Province of Ontario - $100 M from the Government of Canada

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Woodward Upgrades - Status

- March 2015 – "Contribution Agreement (CA)" finalized between City and Federal government allowing for all eligible incurred costs to be recovered. Key aspects of the CA include but not limited to:
  - Identifies a Project Completion Date of no later than January 31, 2022
  - Requires the establishment of an Agreement and Management Committee
  - Identifies Reporting, Auditing and Evaluation requirements
  - Establishes Communication protocols
  - Establishes payment mechanisms

- June 2015 - Woodward Tertiary Equipment Request for Proposal (RFP) issued which assesses equipment selection and bases award on full Net Present Value accounting for future phases relative to growth

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Woodward Upgrades - Status

- Status of Project as follows:
  Main Sewage Pumping Station sub-project (MPS) - 50% Detail Design phase

  Electrical sub-project (ELU) – 100% Preliminary Design phase
  Woodward Tertiary Equipment Request for Proposal (RFP) issued June 11, 2015 – closed August 6, 2015,

- Overall approach to tertiary equipment selection based the following:
  - Vendor pre-qualification (RFQ), followed by an RFP evaluated Net Present Value (2 phase NPV), award based on $/point of 2-phase NPV, purchase will be for phase 1 equipment only. (Note: Variable costs such as power, chemical, media replacement will be secured through guarantees)
  - Open technology to Membrane or Disc Filters (not typical)
  - Membranes identified as a potential to provide lowest overall NPV over both phases, but may exceed phase 1 budget. Proceeding with RFP, should additional budget be required, seek Council approval at that time.

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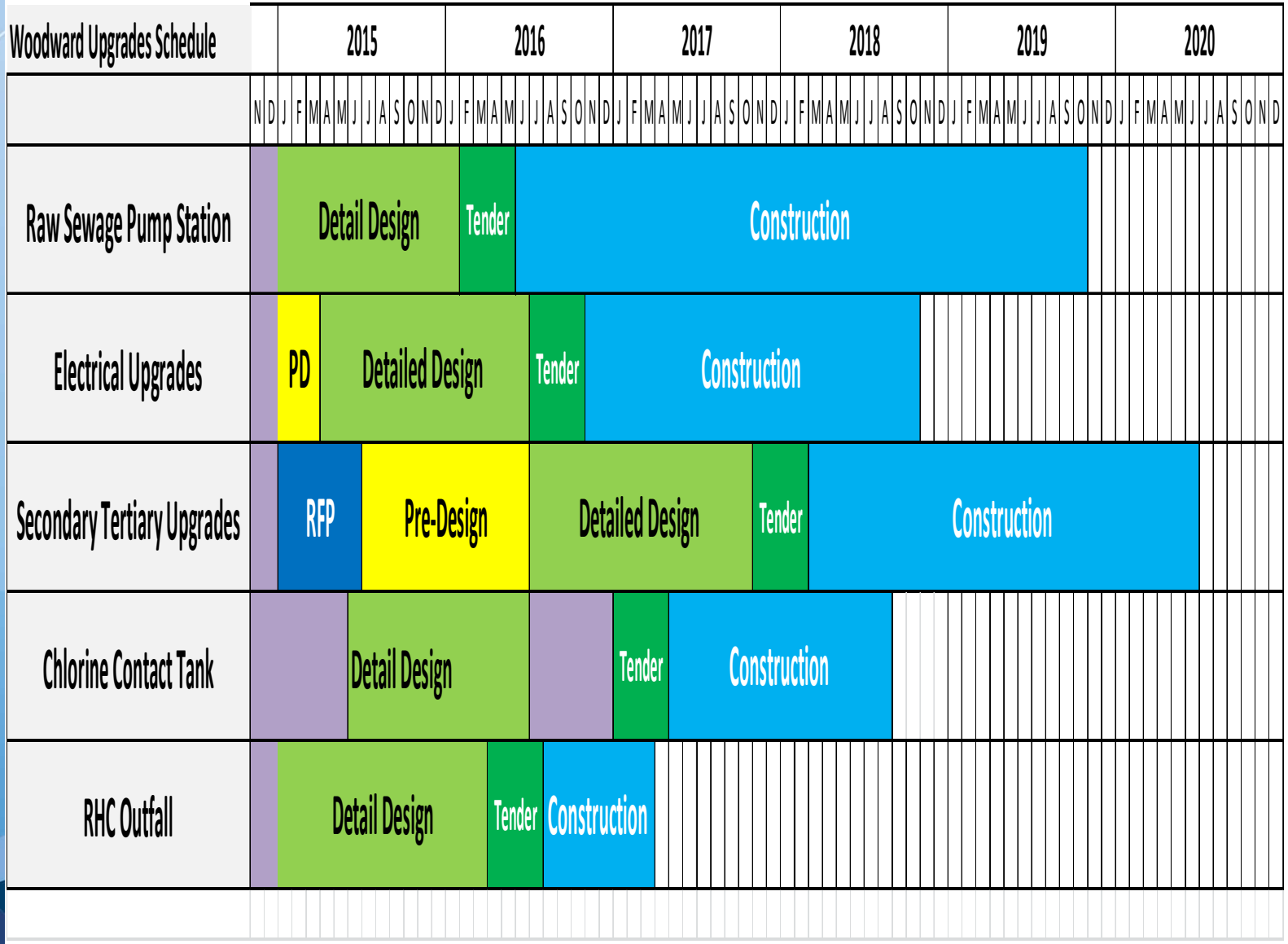
WOODWARD UPGRADE PROJECT

Woodward Upgrades - Schedule



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Biosolids

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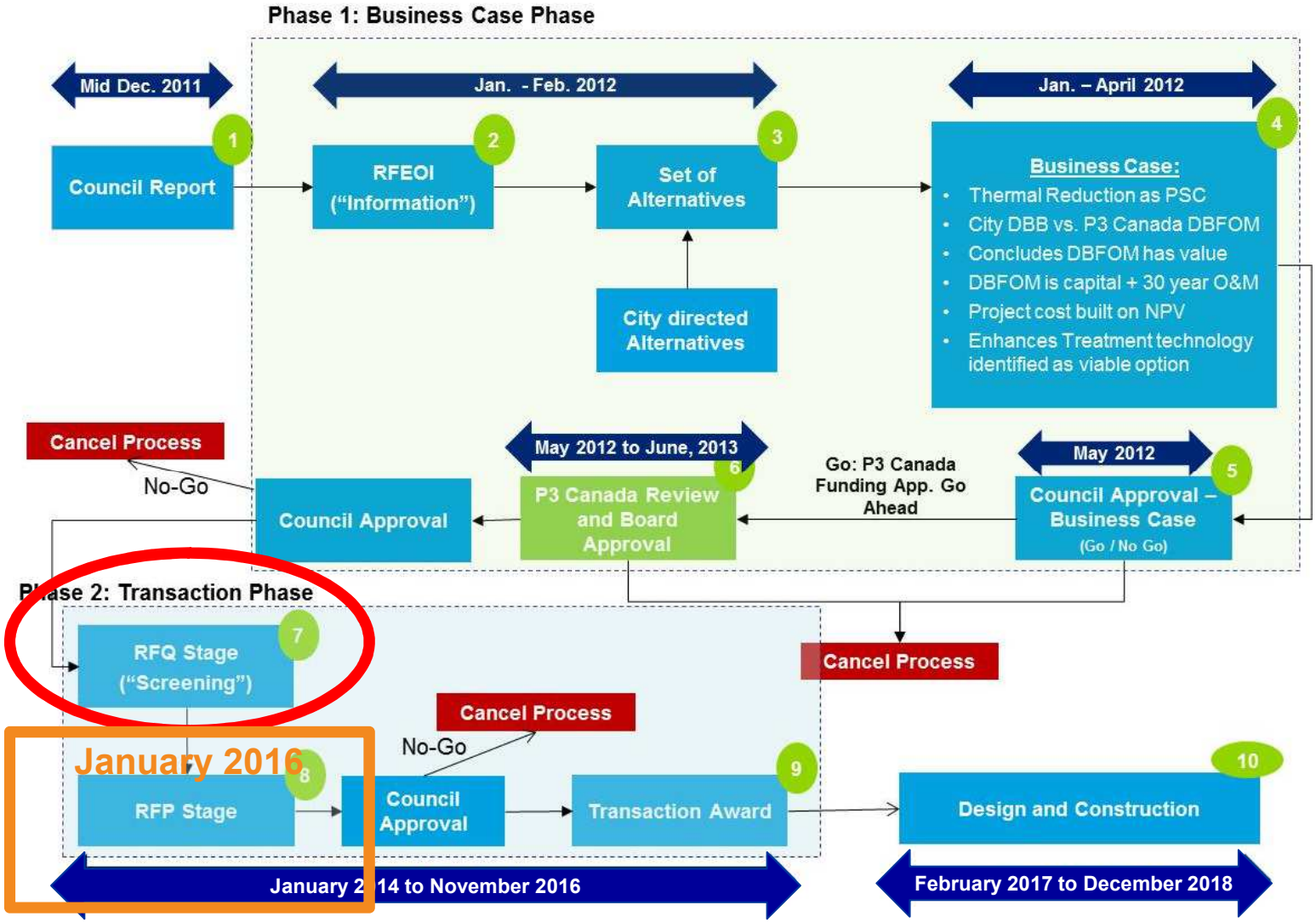
Biosolids - Private / Public Partnership - P3 Canada – Road Map



Key Milestones

- In 2011 Council directed staff to pursue P3 Funding while at the same time requesting that Enhanced Treatment alternatives be considered.
- The City applied for and were subsequently screened-in for P3 Canada funding, structured as a 30 year Design, Build, Finance, Operate and Maintain (DBFOM) project delivery model.
- To satisfy the P3 Canada funding requirements, a formal Business Case was developed and structured to accommodate a wide range of technology
- Business Case completed and approved by Council and City re-applied for Round 4 (procedural) as directed.
- Project team has been working with PPP Canada to help understand the structure and approach of the City's Business Case.
- Recommendation sent to PPP Canada Board for final approval in June 2013 with approval announced December 2013. Funding agreement signed April 2014.

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Biosolids - Private / Public Partnership - P3 Canada

Objective: The Biosolids Management Project's objective is to retain a Biosolids Management Partner ('Project Co.') to process and manage the City's biosolids over a 30 year term in the most sustainable manner possible.

Highlights:

- DBFOM (Design-Build-Finance-Operate-Maintain) Project Delivery Model;
- Proposed Term is 30 years;
- Site restricted to the Woodward Avenue WWTP;
- Technology open to Thermal Reduction or Enhance Treatment;

Payments:

- There are no payments until project becomes operational ('Substantial Completion')
- At Substantial Completion 25% of Construction Costs will be paid as funded by P3 Canada (up to a limit of $22.9M)
- City pays remaining 75% of Construction Costs + all Operating and Maintenance Costs over the 30 year operating term, subject to compliance with performance requirements
- City's Affordability Cap is set at $111 million NPV (City portion)
- Total contract price = Affordability Cap (City) + Substantial Completion Payment (P3 Canada)

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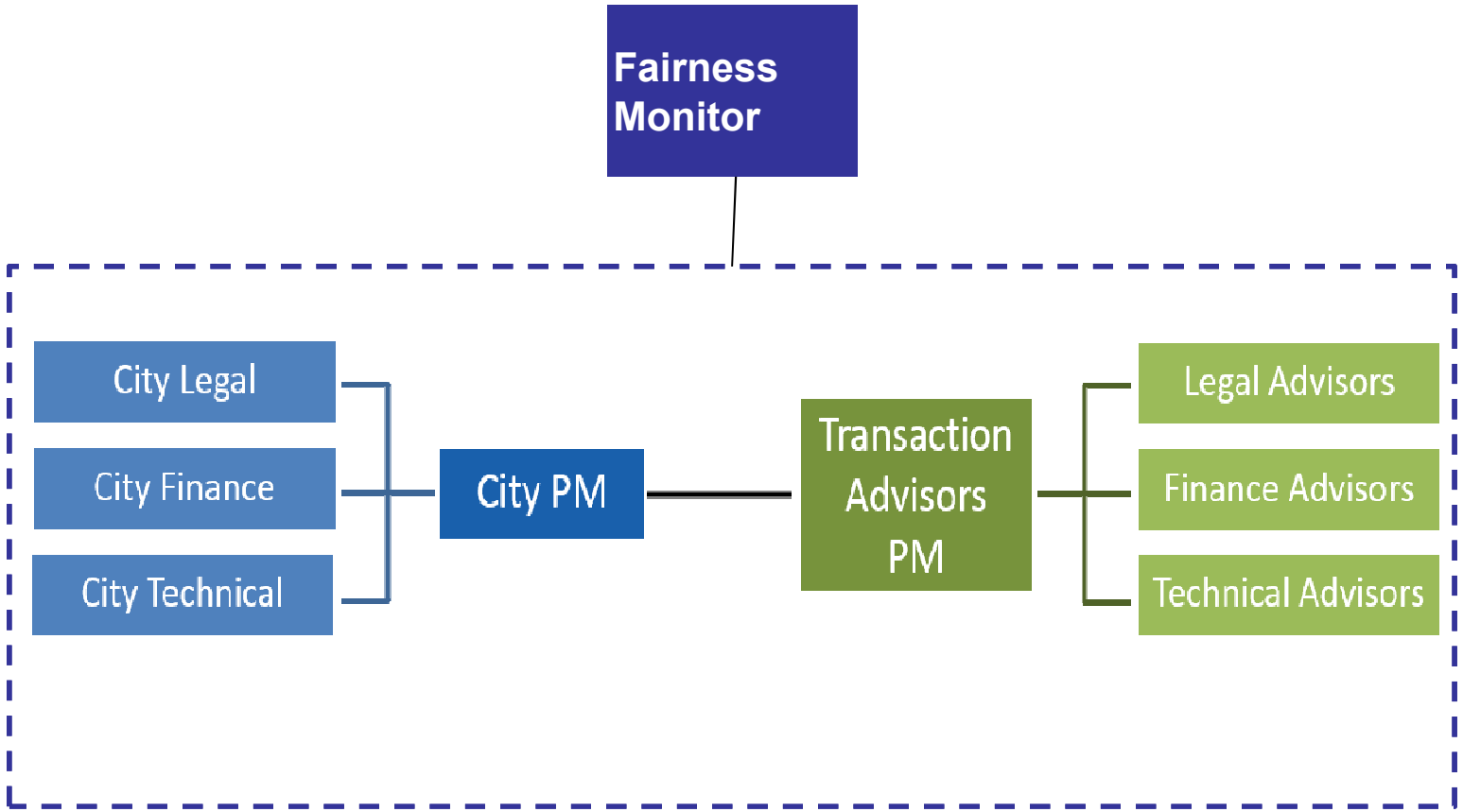
Biosolids - Private / Public Partnership - P3 Canada

Contract Development Team Structure



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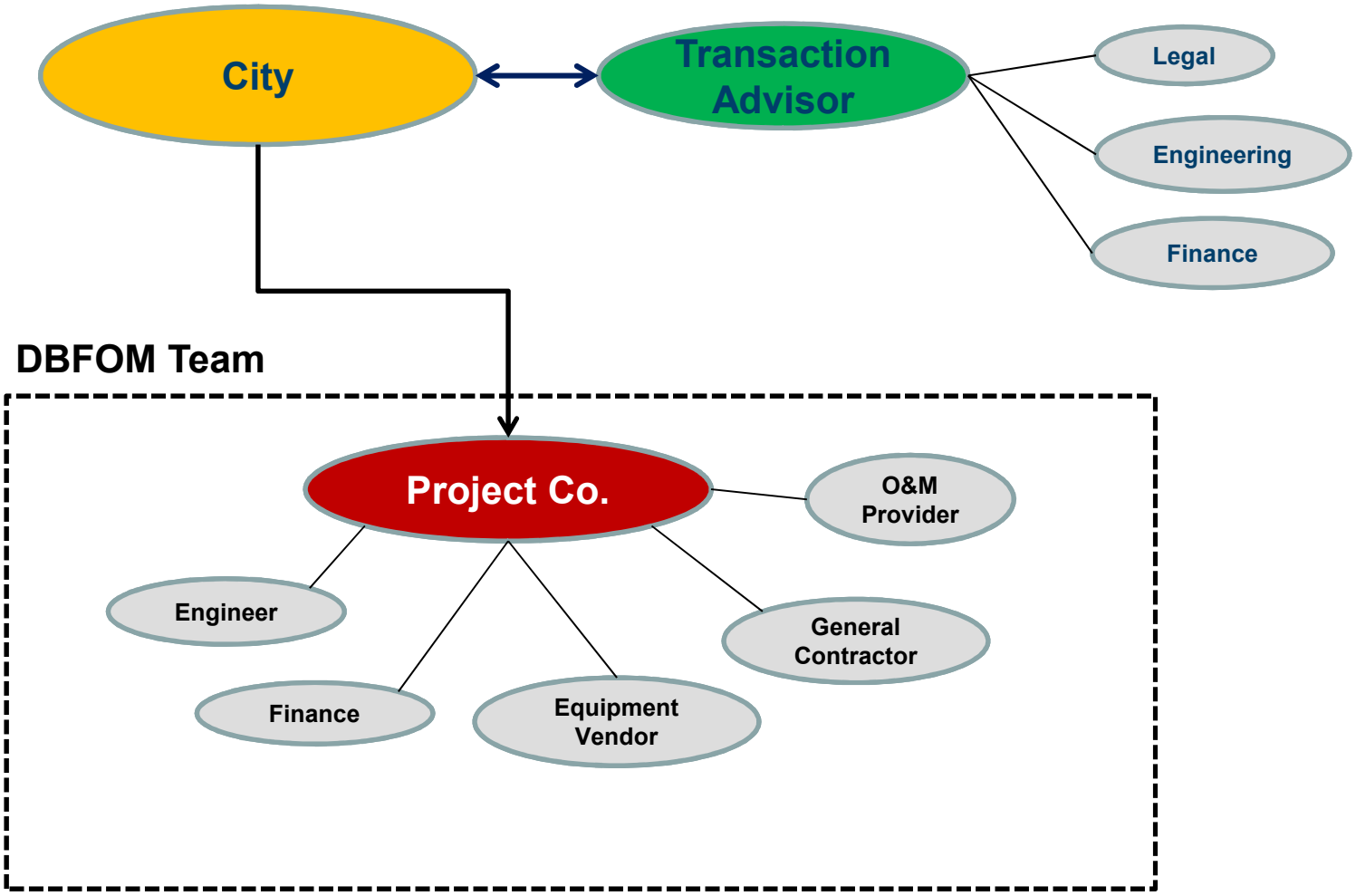
Biosolids - Private / Public Partnership - P3 Canada

Design-Build-Finance-Operate-Maintain (DBFOM) - Structure



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Biosolids - Private / Public Partnership - P3 Canada

Highlights

- RFQ Issued in late April 2015
- Structure of RFQ is unique:
  - Includes criteria on Technical and Financial capacity and track record (typical)
  - Includes Technology criteria (not typical)
    - Structured to ensure an open and fair evaluation that aligns with City's objectives as outlined in its Biosolids Master Plan
    - Allows market to 'decide' on technology that best suits City's objectives
  - Includes a Preliminary Project Summary (not typical)
    - Contains a list of key deal terms to be included in the RFP / Project Agreement
      - Details on Affordability Cap
      - Details on RFP evaluation Criteria (P3 Canada required 75%:25% weighting of Price : Technical Score)
    - Ensures that risk allocation and performance requirements will be the same regardless of technology
    - Allows market to 'decide' on technology that best suits the City's key deal terms

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Next Steps…

- Interest in market remains high – 100+ proponents at bidders meeting and formal teams identified through CCM's.

- 7 RFQ Submissions received in Sept with evaluations to be completed by Nov/Dec

- RFP and Project Agreement to be released in Dec '15 / Jan'16

- Interim Biosolids Management RFP closed October 21st, currently being evaluated

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Randle Reef

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Randle Reef Sediment Remediation Project

Objective:

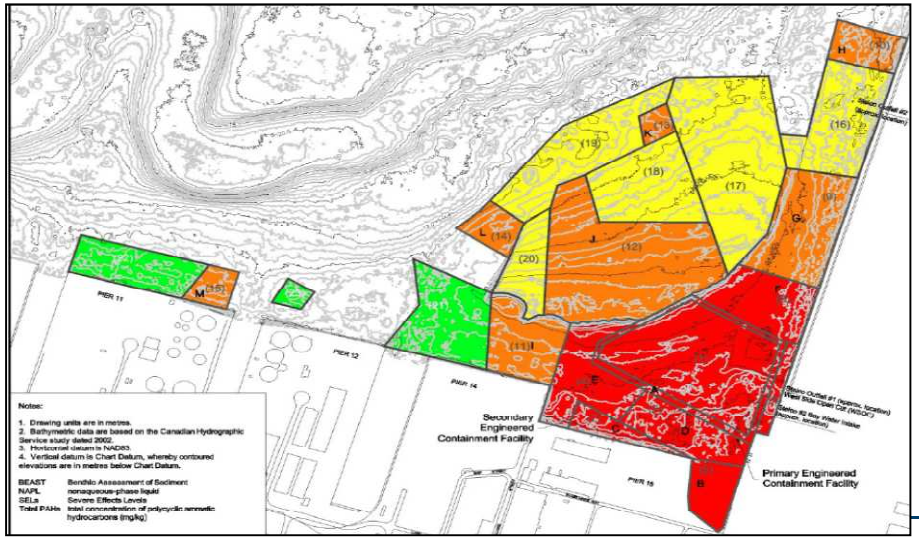
- Isolate environmental exposure to Randle Reef Contamination
  - Securely contain Priority 1 and Priority 2 contaminated sediments
  - Either contain or cap Priority 3 contaminated sediments.

Method:

Stage 1 – Construction of the ECF.

Stage 2 – Dredging, depositing and/or capping contaminated sediments.

Stage 3 – Draining, capping and finishing as a future marine terminal.



Randle Reef Project Funders	
Environment Canada	$46.3M
Ministry of Environment	$46.3M
City of Hamilton	$14M
City of Burlington	$4.3M
Hamilton Port Authority	$14M`
US Steel Canada	$14M
Total Project Cost	**$138.9 M**

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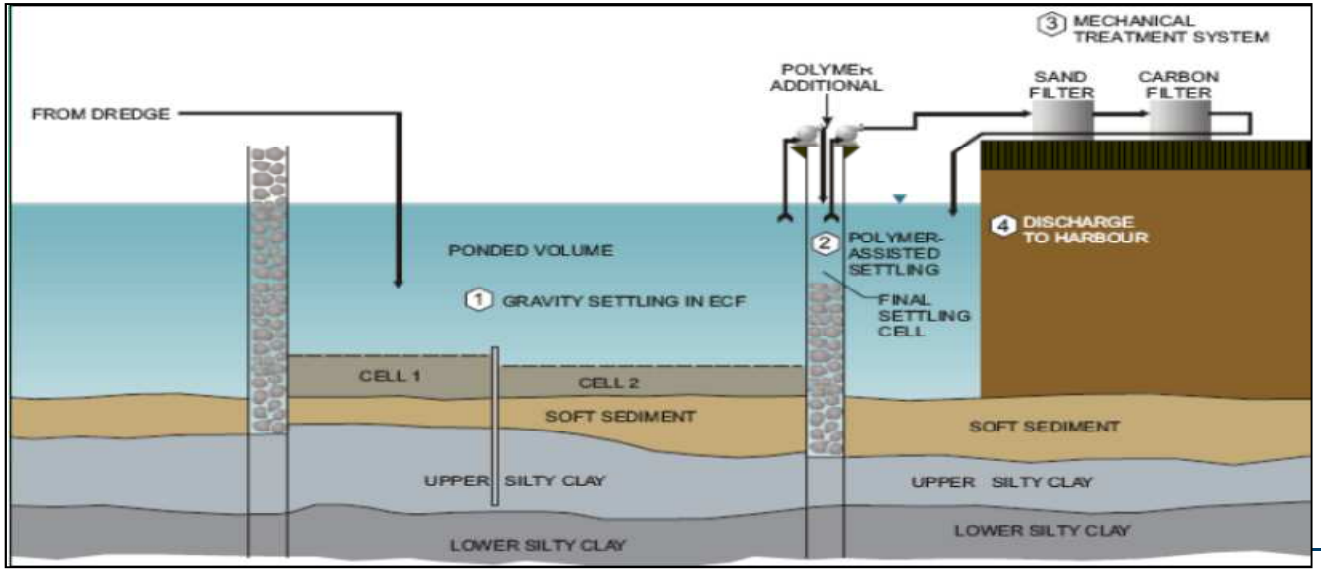
Randle Reef Sediment Remediation Project

Tasks completed prior to 2015

Environmental Assessment	Comprehensive Study Report 2012
Detailed Design	Design Study Specs and Tender Drawings
Peer Review	Third Party review Report of Design Integrity
Value Engineering	Analysis of efficiency opportunities
Cash Flow Schedule	Confirmed City payment schedule
Signed Partnership Agreements	Legal Agreement with Environment Canada
Test Pile Driving	Exploration of bed resistance for bidders
Monitoring Plan	Environmental Monitoring Plan for Construction
Design Adjustments	Changes made to match scope with bid intelligence



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Randle Reef Sediment Remediation Project

2015 Activity

Amended Partnership Agreements Signed

- Design and cashflow adjustments to remedy failed tender in 2014.
- Legal amendment signed April 28th 2015 to reflect adjustments.

Stage 1 Construction Procurement Re-initiated

- ECF Construction Engineers contract re-issued May 8th 2015.
- ECF Construction Tender re-issued May 8th 2015
- Pier 15 Construction Tender Issued May 15, 2015

Steel Production and Fabrication

- Steel order placed with USS April 29th, 2015
- Steel shipped for fabrication to Iuka Mississippi (Outer Wall)
- Steel Shipped for fabrication to Cambridge ON (Inner Wall)
- All steel products to be shipped back to Hamilton in 2015 for construction

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Randle Reef Sediment Remediation Project

Stage 1 Award

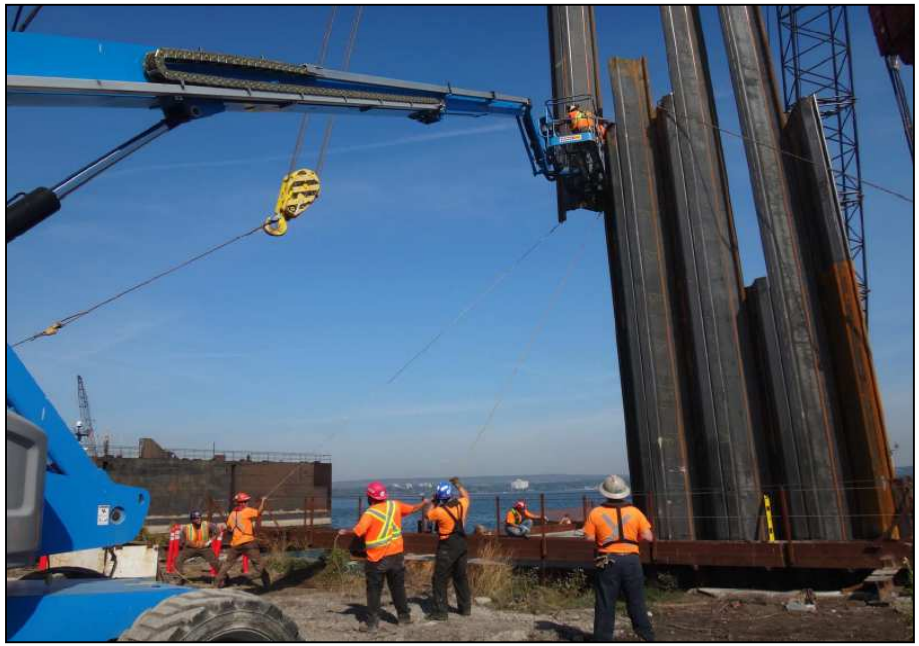
- All Stage 1 contracts awarded July 16, 2015

  ECF Construction - McNally International
  Pier 15 Construction - Dean Construction Co.
  Construction Engineer - Riggs Engineering

- Project staging areas are paved and fenced
- Sheet Pile Walls begin to be installed in 2015 for Pier 15 replacement

Community Liason Committee

- Established – first meeting September 30, 2015



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Randle Reef Sediment Remediation Project

Next Steps – 7 year Project

Pier 15 Replacement	**- Completion Q1 2016**
Stage 1 ECF In-Water Work	**- Start April 2016**
Stage 2 & 3 Procurement	**- 2017**
Stage 2 Dredging Work	**- 2018 start**
Stage 3 Capping & Landscaping	**- 2020 Start**
Project Completion Target	**- Q3 2022**

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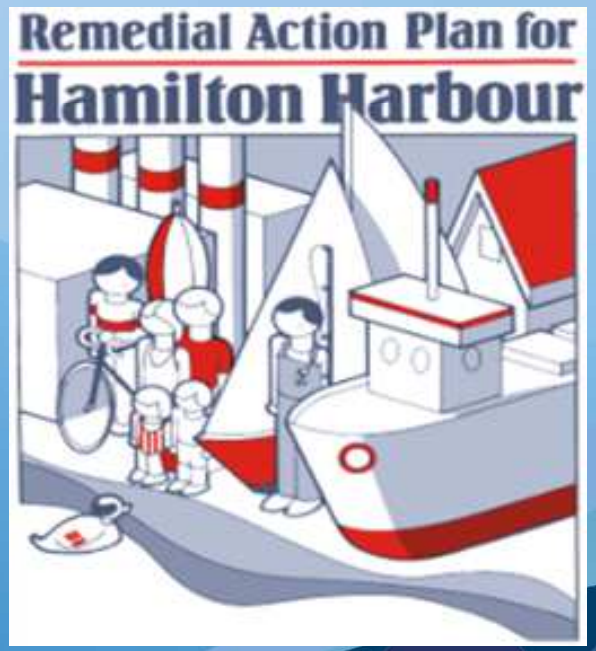
Hamilton Harbour Remedial Action Plan



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Hamilton Harbour Remedial Action Plan

- Hamilton Harbour RAP began in 1985 due to degraded Harbour conditions.
- Hamilton Harbour AOC designated in 1987 under the GLWQA).
- Bay Area Implementation Team (BAIT) assembled stakeholders to implement actions.
- Point source actions regarding municipal and industrial contributions are either complete or in progress to address remedial measures.

  - Improved industrial emissions
  - CSO control tanks
  - Sediment Remediation
  - Beach management
  - Wastewater Treatment improvements

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Hamilton Harbour Remedial Action Plan

- A New focus is now needed on Non-point sources of pollutants that are spread throughout the watershed.
- Focus on control of Suspended Solids (erosion) and Phosphorus (nutrient).

- New working teams have been set up for Rural and Urban watershed issues.

- Workshops are being held and watershed action recommendations are expected to start being reported early in 2016.

- Watershed Issues of concern include:
  - Construction site sediment control
  - Erosion
  - Climate Change
  - Rural road maintenance
  - Resources and Funding
  - Public Education
  - Rural Land use
  - Development Impacts

Watershed Actions are the next steps necessary to address the delisting goals we have already Invested hundreds of millions to accomplish.

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SERG

SERG
STORM EVENT
RESPONSE GROUP

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SERG

Rosedale Area - 2009

Sandalwood Ave- 2009

SERG Initiatives

- SERG Information Report & Presentation (Public Works Committee, Aug. 31, 2015)
- Inspections, System Monitoring/Modelling, Rehabilitation and Studies
- Capital Program & Expenditures
- Property Mitigation Measures
- Operations and Maintenance
- Communication / Education / Outreach
- New Stormwater Management Techniques
- Independent Community Panel
- Climate Change Working Group
- FloodNet and McMaster University
- Climate Change and Adaptation
- Insurance Bureau of Canada and MRAT
- Citywide Flooding and Drainage and Master Servicing Study

SERG
STORM EVENT
RESPONSE GROUP

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Open For Business

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City of Hamilton Development Applications

Building permits in the City of Hamilton have once again exceeded $1B.

Hamilton Water staff review development applications for water, wastewater, stormwater and sourcewater servicing requirements.

There have been 360 Development Applications processed by Hamilton Water Staff as of November 24, 2015.

Not open for rural ICI development business

IP&SD added a screener to improve Process efficiency.

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City of Hamilton Development Applications

Hamilton Water has initiated a Process Improvement action focused on the Development Applications process.

This activity has the following objectives:

- Mapping of the process flow
- Identification of opportunities or issues
- Improve communication
- Improved tracking and monitoring

2015 Accomplishments:

- New Hamilton Water process map created
- New pilot screening process implemented
- Re-distribution of staffing resources for high demand periods
- Improved Communication on prioritization
- Preliminary performance review and target setting

2016 Goals:

- Develop key service level agreements
- Implementation of IT tools for coordination of applications
- Reporting based on data driven metrics
- Resource and level of service planning

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Alerts & Upcoming Pressures

Rural Sewer Servicing Technical Reviews

A large volume of rural development applications are proposing the use of tertiary sewage treatment systems. These systems are regulated under the building code for certain discharge parameters. The MOECC requires treatment systems be designed for other discharge parameters but the MOECC currently has no supporting regulations.

Tertiary treatment systems are not currently tested and certified to meet the requirements of both the Ontario Building Code and the MOECC. Tertiary treatment systems are a newer technology and their performance in colder climates is not well proven. Tertiary treatment systems require more operation and maintenance relative to a traditional septic system. Tertiary treatment system performance can be influenced by changes to input volume and temperature.

Legislation and certified testing is not available to staff to guide them in the approval of these products. Use of these products without proper legislation and testing exposes the environment to risk, neighbouring properties to risk and the City to risk. Staff recommends that the City develop it's own policies on the use of tertiary treatment systems to reduce risk and to provide consistency and transparency to the development application process.

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After Action Review

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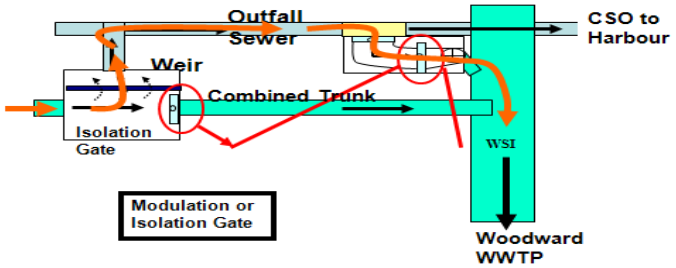
After Action Review

Real Time Control

Total Capital Investment of $11.5M that has captured an estimated 801,528 m3 of CSO in the first 22 months of operation.

Parameter	2013 (Modeled Estimate)	2014 (Modeled Estimate)	Total (Modeled Estimate)
Total Suspended Solids	44,500 kg	28,432 kg	65,725 kg
Total Phosphorous	120 kg	321 kg	441 kg
Ammonium Nitrogen	130 kg	126 kg	256 kg



Real Time Control – Burlington St & Wellington St

Hamilton CLEAN HARBOUR PROGRAM
Real Time Control Project

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After Action Review

Windermere Basin

Before

After

- Approximate $20M investment
- The Basin was previously almost void of vegetation and nearly the only fish present were Common Carp.
- Since completion of the project in 2012, Windermere Basin has become a more healthy and diverse environment.
- The increases in Common Tern usage, numbers of breeding birds, diversity of fish and native vegetation coverage will contribute to the delisting of Hamilton Harbour as an Area of Concern.

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After Action Review

- After the Basin enhancement project, there is now native wetland vegetation present and turtles use the Basin.
- In recent years, over 600 Common Tern nests have been noted on site, compared with less than 100 before construction.
- 178 species of birds have been noted at the site, with 20 species breeding in the area.
- It is estimated that over 1000 birders have visited Windermere Basin in 2015.

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After Action Review

At least 15 species of fish have been identified in the wetland and overall fish population has increased.

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After Action Review

Primaries

$48M, CSIF Funding (2/3 of cost was provided by the Province and Federal Govt.)
Substantial Performance –2013

Benefits:

- Management of wet weather flows through upgrades to the primary treatment process at Woodward WWTP in order to satisfy the Ministry of Environment Procedure F-5-5 which establishes limits for discharge of combined sewage during wet weather events.
- Improve water quality in the harbour and help to provide a natural environment consistent with the objectives of the HHRAP program and vision of the local community.

Highlights:

New primary clarifier influent and effluent channels to improve hydraulics and treatment efficiency

Two new Primary Clarifiers and chemical addition to achieve high rate primary treatment up to 1300 million litres per day (MLD) from 614 MLD

New Chlorine Contact Tank for chlorination/de-chlorination of sewage bypasses and secondary effluent

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After Action Review

Secondary Bypass Event

October 28, 2015

Flow received at the Woodward WWTP exceeded the secondary treatment capacity of 614 ML/D .

Bypass Duration	Total Volume	Historical Treatment Level	Improved Treatment Level	Benefits
10 hours	74.73 ML	Preliminary Treatment	Full Primary Treatment	- 50% reduction in suspended solids (8400 kg TSS) - 50% reduction in BOD (4000 kg BOD)

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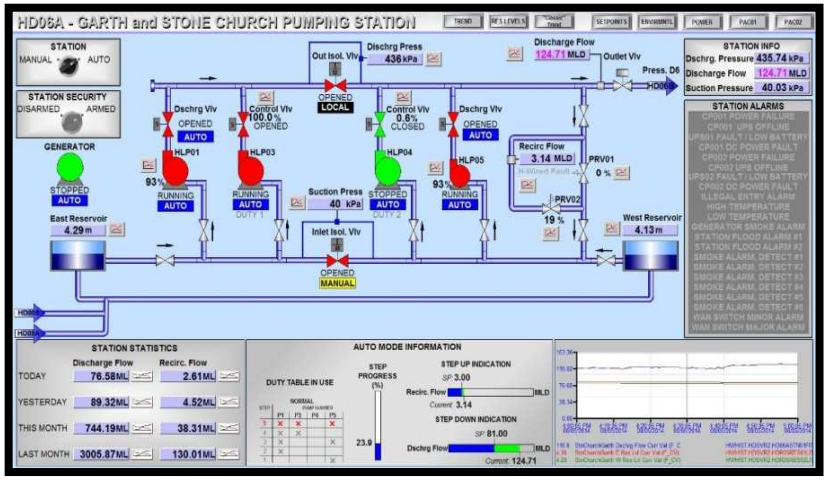
SCADA Master Plan

- Monitor, supervise and control the water and wastewater systems
- Ensure quality of service to residents and industries in Hamilton
- Protect the environment
- Ensure compliance with regulations
- Operate 24 hours a day, 365 days a year



Benefits:

- Mitigation of risk
- Data availability
- Improved Cyber Security
- Common technology platform
- Operational integrity & confidence
- Replacing obsolete equipment and software
- Physical separation of servers and fibre to reduce risk and single failure point

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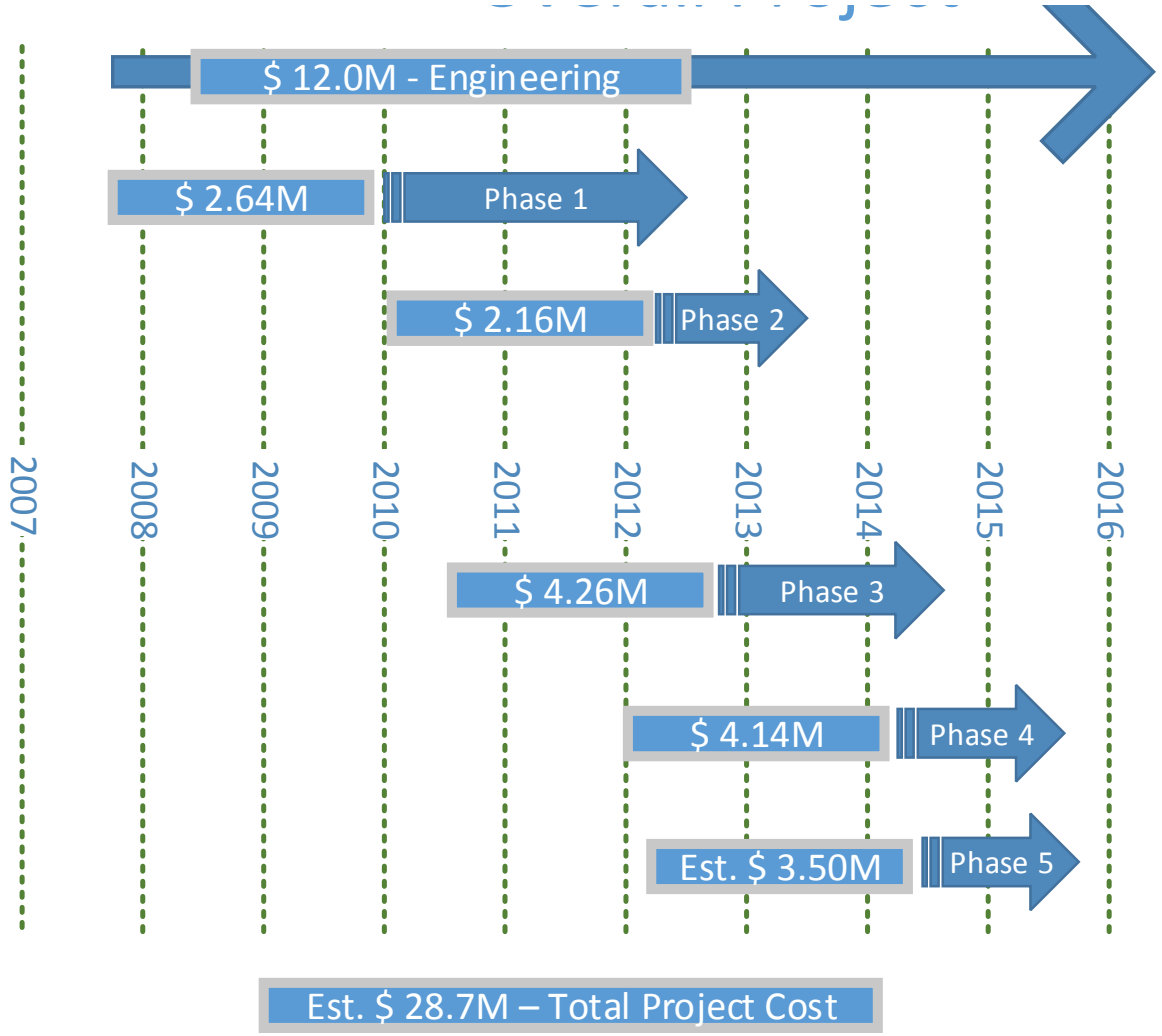
Project Cost



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Production Numbers

THE PROJECT BY THE NUMBERS:	Qty.
Physical Servers	45
Virtual Servers	20
I/O Count	9,500
iFix Server I/O	50,000
Km of Fibre Installed	185
No. of HMI Screens	900
Total PACs in System	195
Contract Drawings	2,370
Pages of Standard	1,400
No. of Instruments Added/Replaced	125
Digital Document Storage	1.2 TB

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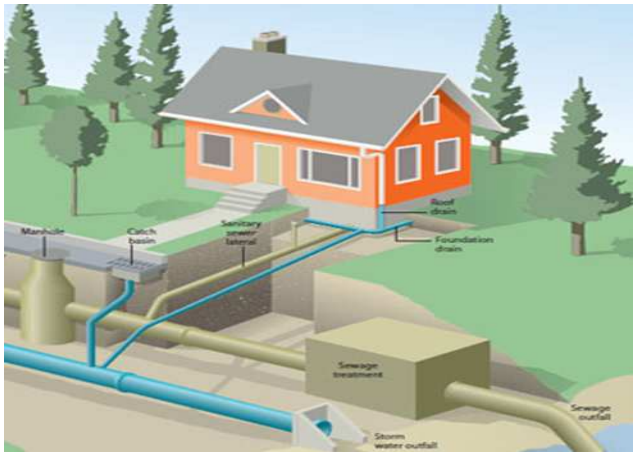
After Action Review

Sewer Lateral Cross Connection Control Program

- 2 Staff - Project Manager and Project Coordinator now dedicated to program as of September 2015.
- Doubled the project's CCTV sewer inspection orders in 2014/2015. 60 km of storm sewer inspections ordered, with approx. 45% complete.
- 69 dye-tests & lateral inspections completed from 2014 to present. 70 additional potential cross connections identified, requiring further investigation.
- E-Coli sampling of 600 strategic locations in Upper Ottawa outfall catchment beginning winter 2015/2016
- Despite limited staff and contractor resources, 29 cross connections confirmed with 21 corrected in 2015.



Before Correction

After Correction

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Staff Complement

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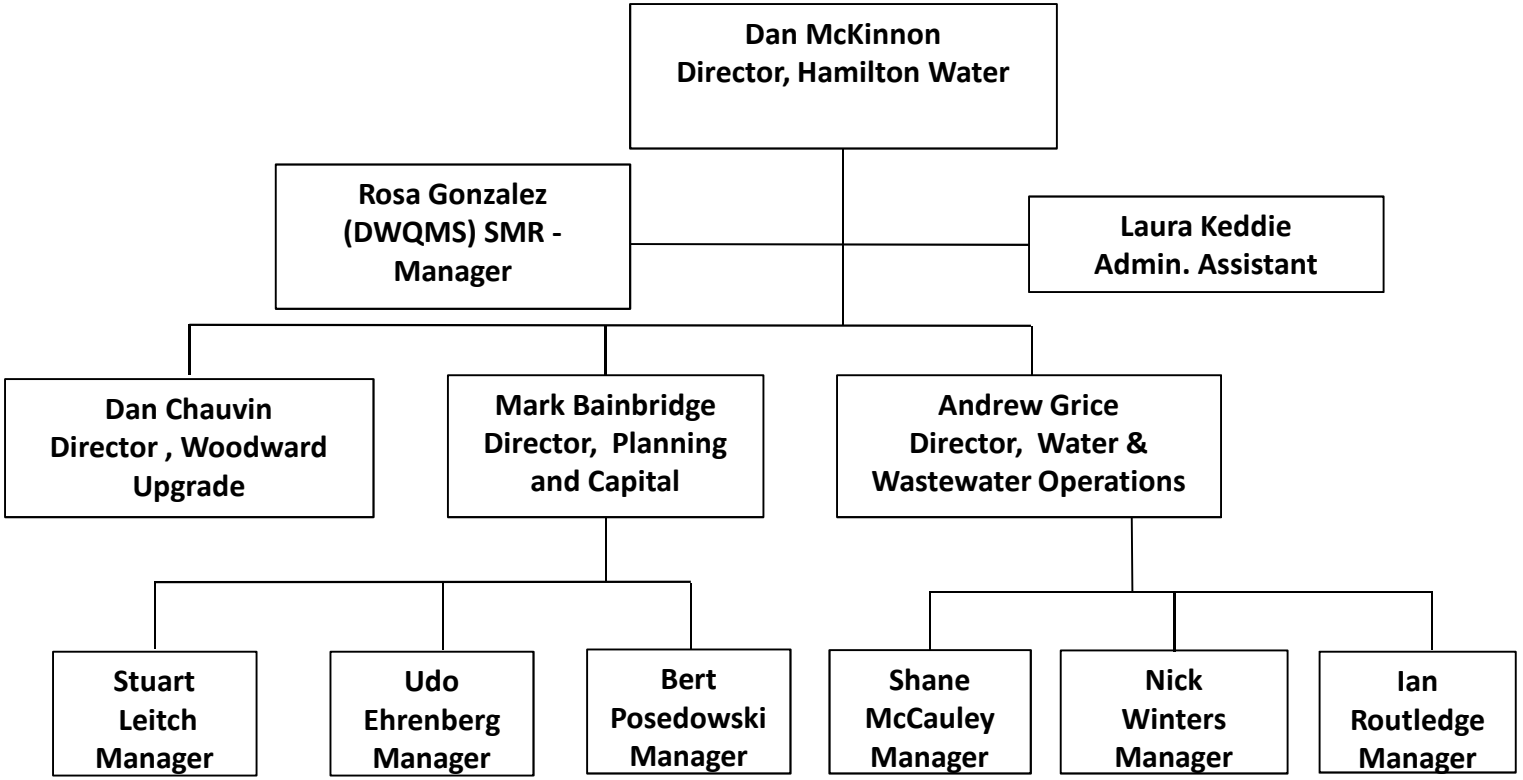
Staff Complement – Organizational Chart



Complement (F.T.E.)	Management	Other	Total	# of Staff / Management
2015	11.0	282.27	293.27	25.66
2016	11.0	287.0	298.0	26.09
Change	0	4.73	4.73	

Staff Complement

- Community
- People
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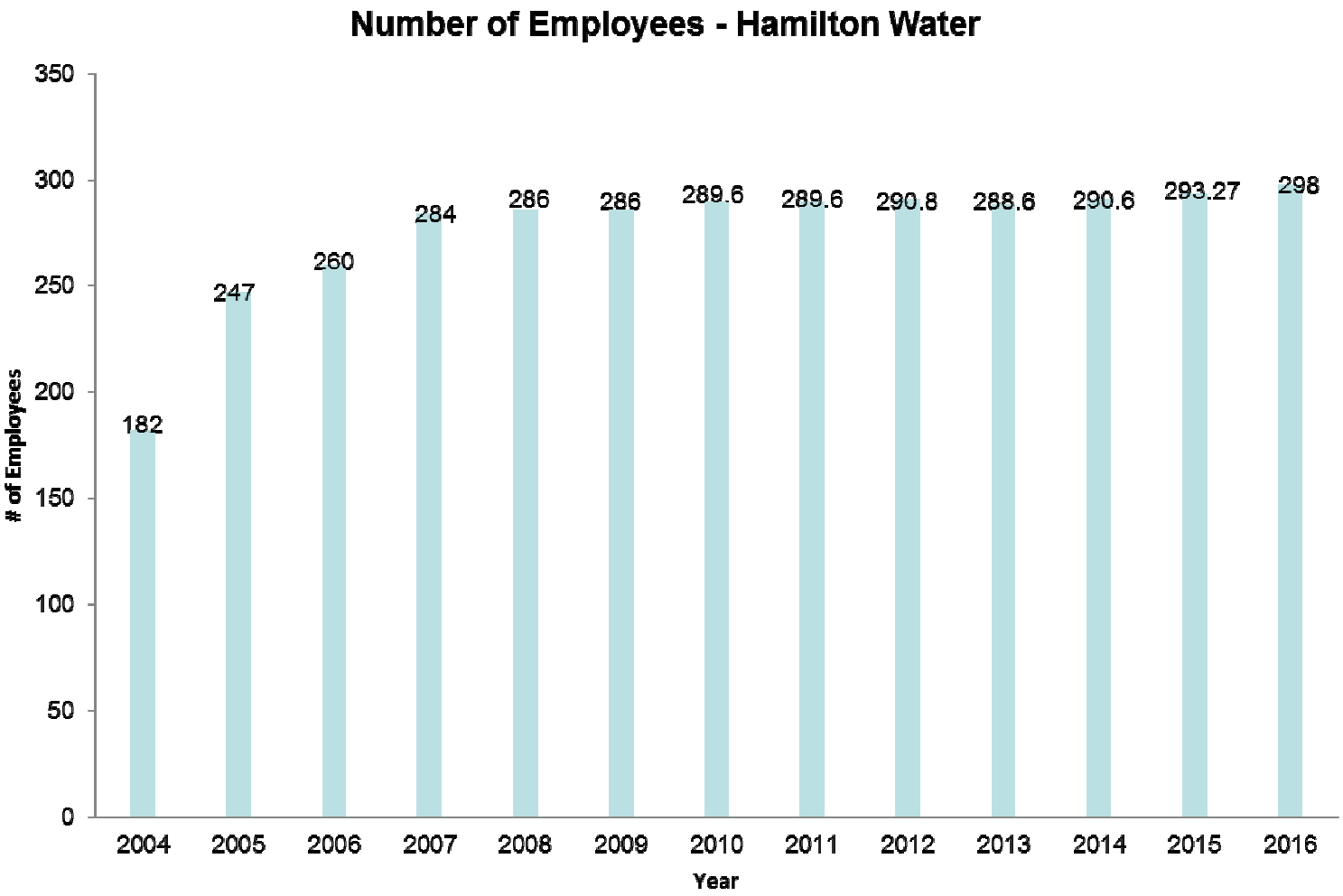
- Finance



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Resourcing Outlook

Section	Year 1 (2016)	Year 2 (2017)	Year 3 (2018)	Year 4 (2019)	Year 5 (2020)
Compliance & Regulations	0	0	0	0	0
IP&SD	3.0	0	0	0	0
Sustainable Initiatives	0	0	2.0	0	0
Capital Delivery	0.4	0	0	0	0
CS&CO	0	0	3.0	0	0
WD&WWC	0.3	2.0	0	2.0	0
Plant Operations	1.0	0	2.0	0	9.0
PMO	0	0	1.0	0	0
Total	**4.7**	**2.0**	**8.0**	**2.0**	**9.0**
			25.7		

Rate Support Staffing By Dept. ID

- Community
- People
- Processes
- Finance

HAMILTON WATER

2016 RATE SUPPORTED STAFFING SUMMARY

Dept.ID	Dept.ID Description	2015 APPROVED	2015 RESTATED	2016 MAINTENANCE	2016 PROGRAM CHANGES	2016 REQUESTED	2016 REQUESTED vs. 2015 RESTATED
510200	Director Hamilton Water	3.00	3.00	3.00	0.00	3.00	0.00
510203	WWW Operations Director	2.00	2.00	2.00	0.00	2.00	0.00
510205	Woodward Upgrades	8.00	8.00	8.00	0.00	8.00	0.00
510210	Customer Service & Community Outreach	6.00	6.00	6.00	0.00	6.00	0.00
510220	Service Co-ordination	23.00	23.00	23.00	0.00	23.00	0.00
510230	Engineering Systems & Data Collection	9.00	9.00	9.00	0.00	9.00	0.00
510240	Compliance & Regulations	6.00	6.00	6.00	0.00	6.00	0.00
510250	Laboratory Services	26.33	26.00	26.00	0.00	26.00	0.00
510260	Environmental Monitoring & Enforcement	13.00	13.00	13.00	0.00	13.00	0.00
510270	Water Distribution (WD) & Wastewater Collection (WWC)	7.00	6.00	6.00	0.33	6.33	0.33
510275	WD & WWC Contracts	7.67	7.67	7.67	0.00	7.67	0.00
510280	WD & WWC Construction	32.00	33.00	33.00	0.00	33.00	0.00
510285	WD & WWC Maintenance	22.00	22.00	22.00	0.00	22.00	0.00
510290	WD & WWC Operations	19.00	19.00	19.00	0.00	19.00	0.00
510300	WWW Planning & Capital Director	2.00	2.00	2.00	0.00	2.00	0.00
510305	Sustainable Initiatives	7.00	7.00	7.00	0.00	7.00	0.00
510310	Plant Operations & Maintenance	14.00	14.00	14.00	0.00	14.00	0.00
510320	Plant Maintenance	25.00	25.00	25.00	1.00	26.00	1.00
510330	Plant Operations	39.00	39.00	39.00	0.00	39.00	0.00
510340	Capital Delivery	9.60	9.60	9.60	0.40	10.00	0.40
510350	Infrastructure Planning and System Design	13.00	13.00	13.00	3.00	16.00	3.00
	Total RATE Supported Staff	293.60	293.27	293.27	4.73	298.00	4.73

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Complement Request for 2016

Senior Project Manager – Water/Wastewater Planning (1 FTE)

- Development of all new SERG related projects in response to extreme wet weather events
- Flooding and Drainage Analysis and Design
- Servicing Strategy related to Secondary Planning
- Stormwater and Watershed Master Planning
- Flooding and Drainage Complaints
- Development and Stewardship of Citywide Computer Models for Storm Sewer Systems both piped and overland

Project Manager –Watershed Management (1 FTE)

Responsible for providing stormwater management services, sub watershed analysis, computer modelling, flood mitigation, lead Climate Change & low Impact development initiatives and fulfil the role of stormwater co-ordinator as recommended by the Independent Community Panel (ICP).

Student Enhancement (1.73 FTEs)

Assist with the facilitation of Divisional initiatives / projects.

Maintenance Electrician – Plant Operations (1 FTE)

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Operating Budget

2016 Budget Pressures

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	2016		
	Gross $ (000s)	Net $ (000s)	FTEs
Contracted Services - WD&WWC $ 2.5M, BioSolids $1M (notes 1 & 2)	3,580	3,580	0.00
Mat'l & Supply - Repairs/Maintenance-Plant/WD&WWC (note 3)	860	860	0.00
Bldgs & Grounds - Utility costs - Hydro - guideline 6.0% increase over 2015 forecast actuals (note 4)	684	684	0.00
Staffing Complement – 4.73 staff (note 5)	430	132	4.73
Totals	5,554	5,256	4.73

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Cost Categories

COST CATEGORY	2015 Restated	2016 Base Budget	$ Change	% Change
Employee Related Costs	$32,558,530	$33,175,750	$617,220	1.9%
Materials and Supply	8,400,340	9,320,450	920,110	11.0%
Vehicle Expenses	1,256,150	1,136,020	-120,130	-9.6%
Building and Ground	14,742,300	15,464,600	722,300	4.9%
Contractual	17,811,910	19,482,280	1,670,370	9.4%
Agencies and Support Payments	2,734,500	2,724,500	-10,000	-0.4%
Reserves / Recoveries	5,634,840	8,524,690	2,889,850	51.3%
Cost Allocations	5,197,550	5,038,960	-158,590	-3.1%
Financial	2,573,740	2,583,340	9,600	0.4%
Capital Financing	92,844,920	94,894,920	2,050,000	2.2%
TOTAL EXPENDITURES	**$183,754,780**	**$192,345,510**	**$8,590,730**	**4.7%**

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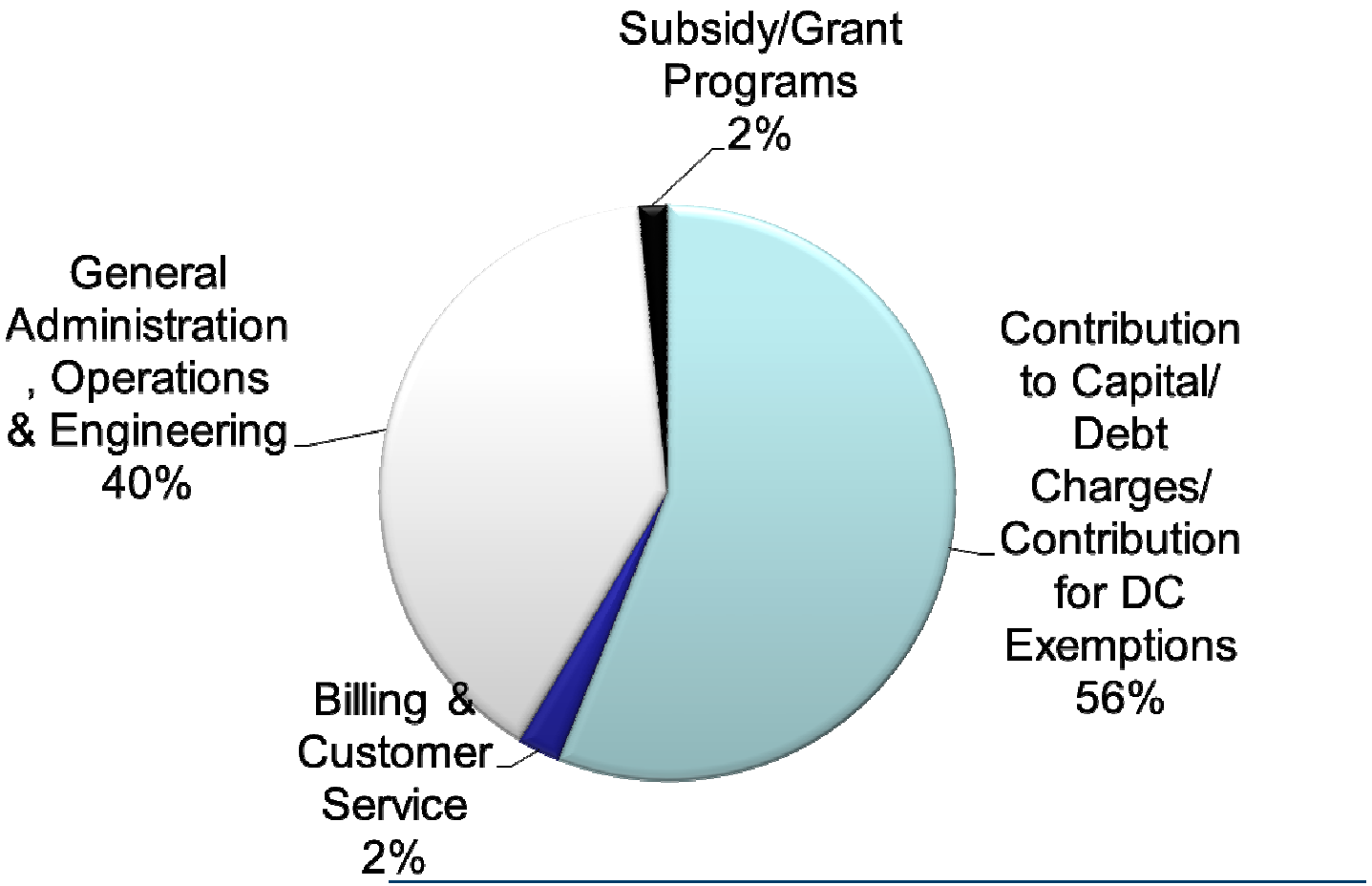
Proposed 2016 Operating Budget

Recommendation:

That the 2016 Water, Wastewater and Stormwater Management Rate Supported Operating Budget in the amount of $192,345,510 be approved as per Appendix "A" to FCS15073



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New Pumping Station

3 Dimensional View

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Questions ?

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