

Welcome to the Public Information Centre #2 for
**The City of Kingston Water and
Wastewater Master Plan Updates**



**PLEASE COMPLETE THE SIGN-IN SHEET AND COMMENT FORM.
THE PROJECT TEAM IS AVAILABLE TO ANSWER YOUR QUESTIONS
AND ADDRESS ANY CONCERNS.
YOUR INPUT IS VALUED!**



PROJECT BACKGROUND



Utilities Kingston finalized a Master Plan for Water Supply in 2007 and a Sewage Infrastructure Master Plan in 2010.

To account for current population growth plans and any changes to the servicing systems, Utilities Kingston is undertaking updates to both plans.

The Study is using the Master Planning Process as defined in the Municipal Engineer's Association's (MEA) Class Environmental Assessment (EA) Process

The updates will identify infrastructure strategies for water and wastewater servicing within the City of Kingston's urban area and within the satellite community of Cana, based on planned growth to 2036 and Beyond.



PROJECT OBJECTIVES

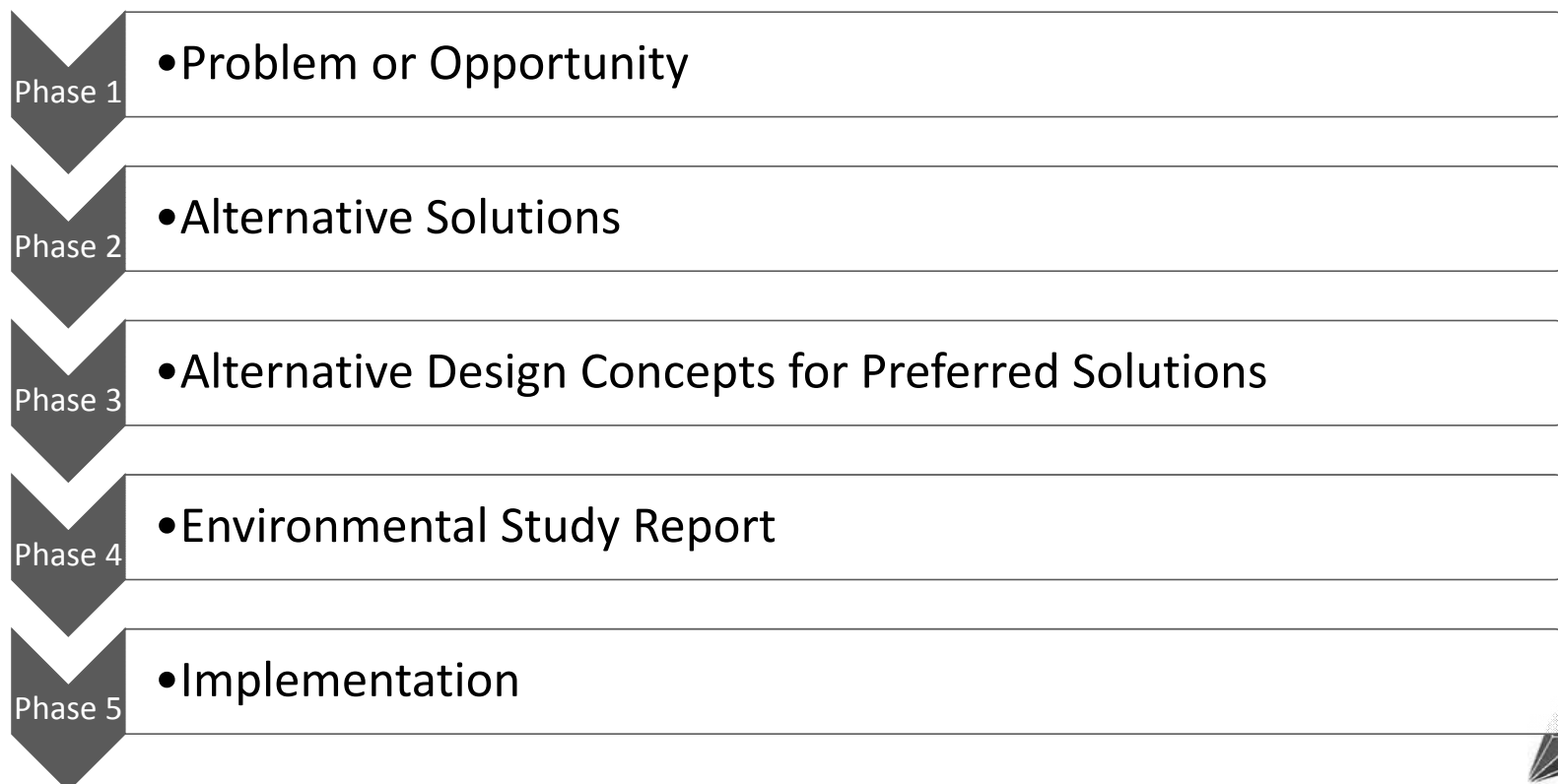
- Producing an infrastructure implementation 'roadmap' to satisfy the existing and future servicing needs
- Optimizing the use of the existing infrastructure
- Identifying efficient approaches for servicing existing and new development
- Evaluating the servicing alternatives to prioritize the recommended capital works
- Updating the Pollution Prevention Control Plan (PPCP)
- Completing facility condition and risk assessments to complement the alternatives evaluation process



CLASS ENVIRONMENTAL ASSESSMENT (CLASS EA) PROCESS

The Ontario Environmental Assessment Act, R.S.O., 1990 (the EA Act) requires that projects corresponding to a given class of undertakings (e.g. municipal road, transit, water and wastewater projects) follow an approved Class EA process.

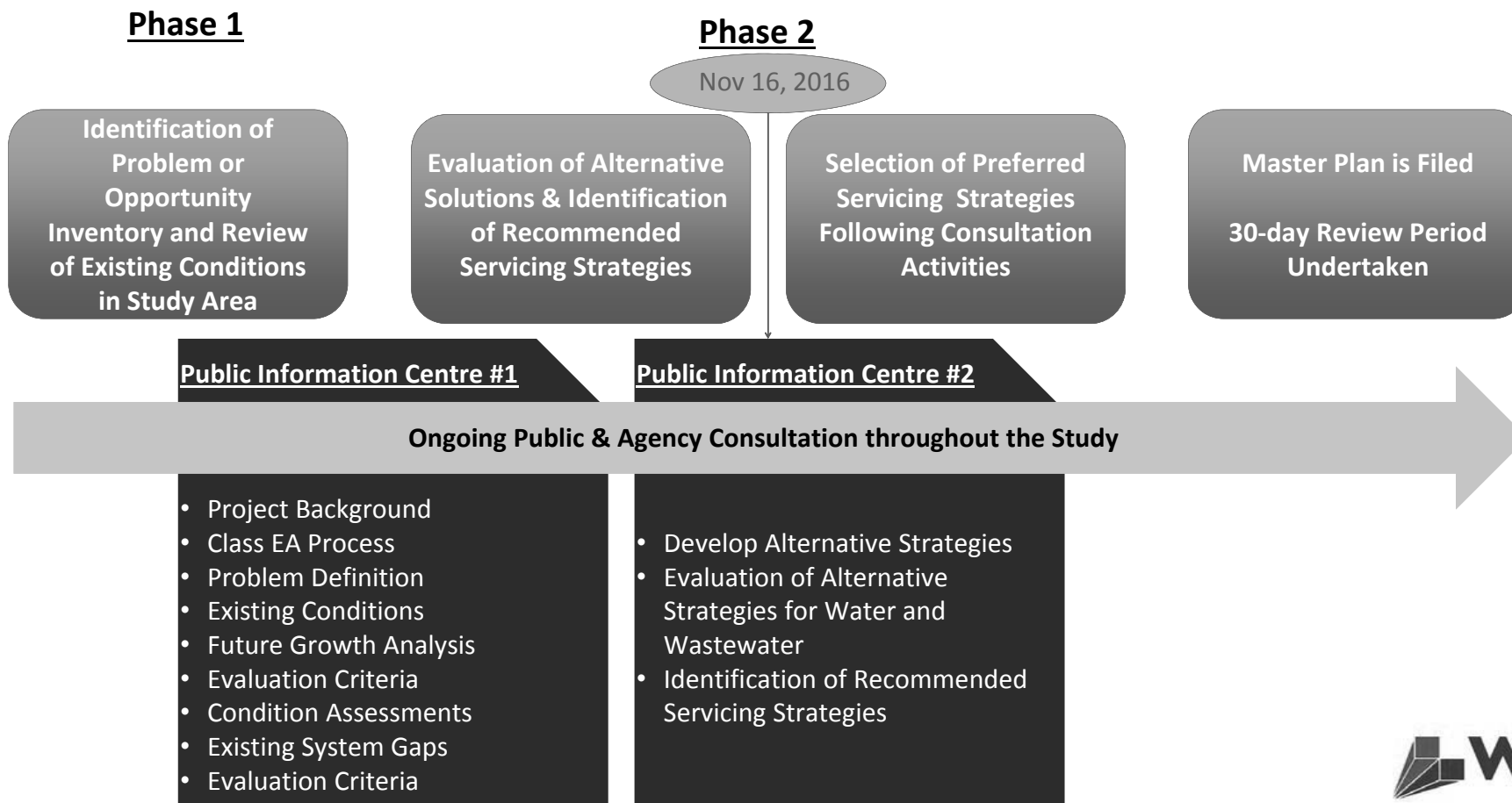
The Class EA planning process as documented in the MEA Municipal Class EA document includes the following five phases:



MUNICIPAL CLASS EA FLOW CHART



Master Plans are conducted under the framework of the MEA Municipal Class EA process. The Master Plan Updates will complete Phases 1 and 2. All Schedule A and A+ projects identified in the Master Plan Updates can be implemented upon the finalization of the study. For projects identified through the Master Plans Updates requiring Schedules B and C Municipal Class EA's, additional project specific Class EA's will need to be undertaken.



Problem Statement

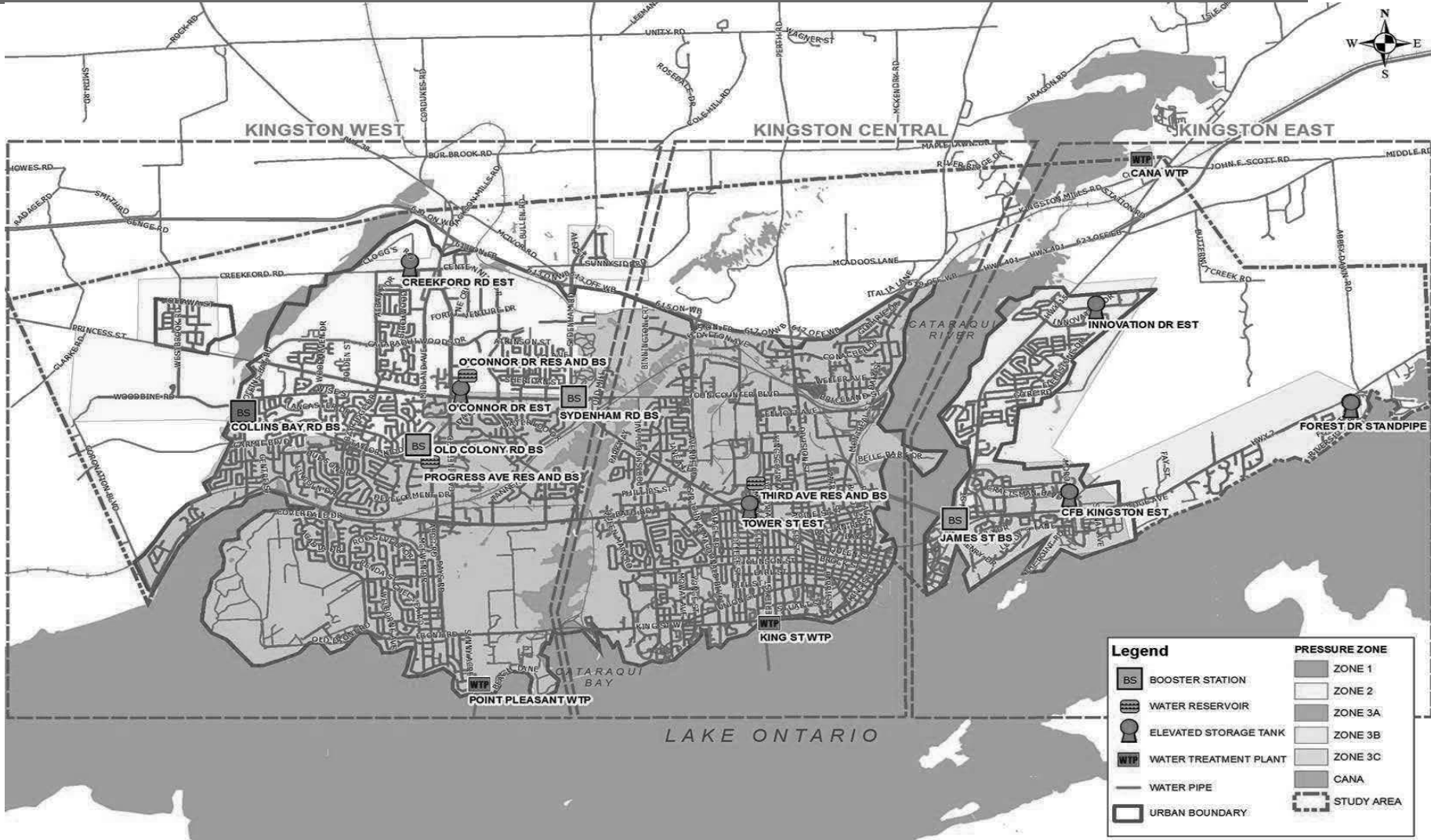
To plan for water and wastewater integrated infrastructure and pollution control to safely and reliably service the existing and projected residential and employment population, with a focus on intensification within the current urban and serviced boundary, while minimizing impacts on the natural, cultural and social features to ensure service excellence in the City of Kingston.

Study Area

The Study Area being considered for these Master Plan Updates includes the water and wastewater servicing within the City of Kingston's urban area and within the satellite community of Cana.

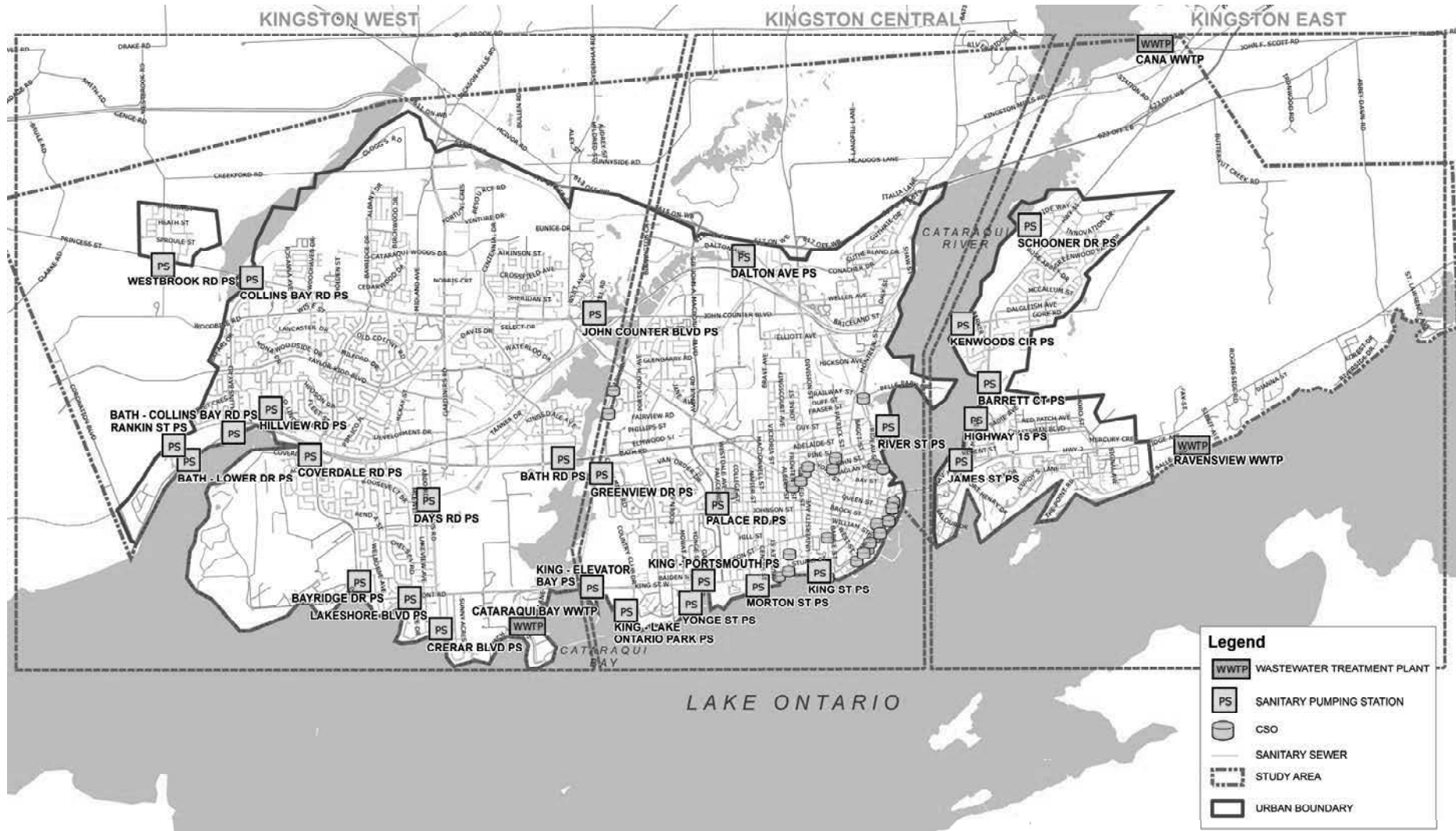


EXISTING WATER SYSTEM



The Map Illustrates how the Existing Water System is Configured (i.e. Pressure Zones) and the Location of the Facilities

EXISTING WASTEWATER SYSTEM



The Map Illustrates How the Existing Wastewater System is Configured and the Location of the Facilities

PLANNING PROJECTIONS AND FUTURE DEVELOPMENT - RESIDENTIAL



Urban Residential Growth (Cumulative)						
Year	2015	2021	2026	2036	Full Build-Out	Ultimate
Additional Water Demand (m3.day)	0	4,682	8,149	13,376	21,857	46,604
Additional Wastewater Flows (m3/day)	0	6,290	10,919	15,717	26,329	61,217

- Additional wastewater flows include infiltration



The Map Illustrates the Locations of the Projected Residential Growth within the City of Kingston between 2021 to 2036, Full Build Out and Ultimate

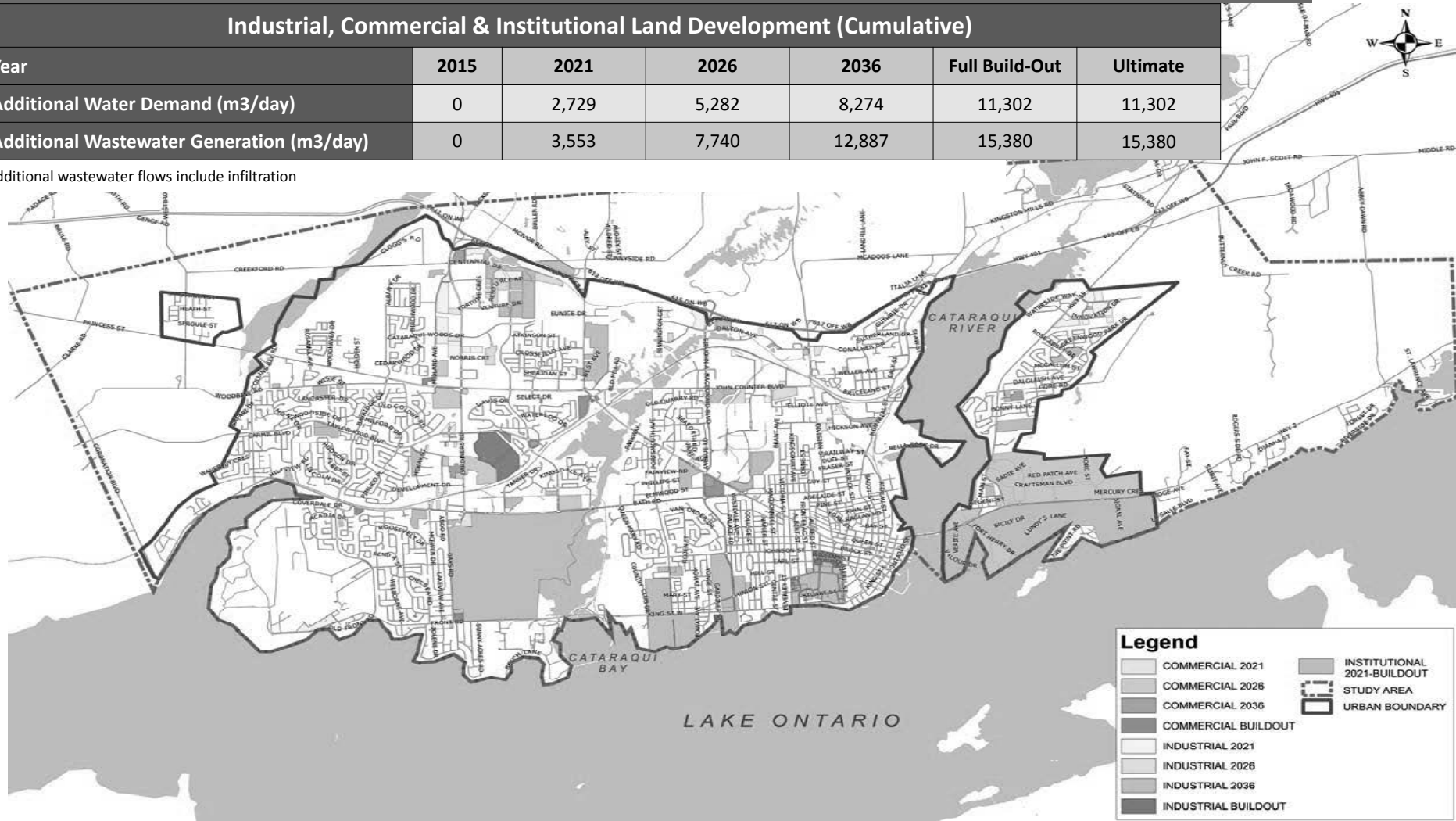


PLANNING PROJECTIONS AND FUTURE DEVELOPMENT: INDUSTRIAL, COMMERCIAL & INSTITUTIONAL



Industrial, Commercial & Institutional Land Development (Cumulative)						
Year	2015	2021	2026	2036	Full Build-Out	Ultimate
Additional Water Demand (m3/day)	0	2,729	5,282	8,274	11,302	11,302
Additional Wastewater Generation (m3/day)	0	3,553	7,740	12,887	15,380	15,380

- Additional wastewater flows include infiltration



The Map Illustrates the Locations of the Projected Industrial, Commercial & Institutional Growth within the City of Kingston between 2021 to 2036, Full Build Out and Ultimate




WASTEWATER UPDATE

- During the last PIC and agency consultation, public input was provided regarding the wastewater generation rates.
- After review of the comments, alterations to the wastewater generation were implemented to make an effort to address the main comments
- These efforts reduce the overall wastewater generation into the system
- As the wastewater generation was reduced the gap result were revised.
- These results have been presented again to show these initial gaps.
- These changes, however did not effect the demand projections for the water system.



WASTEWATER LEVEL OF SERVICE (LOS)

Wastewater Treatment

Good:  Wastewater Treatment Plants Rated Average Daily Flow Capacity \geq Average Daily Flows
Wastewater Treatment Plants Rated Peak Flow Capacity \geq 10yr Storm Flows

Gap:  The Average Daily Flow Capacity or Peak Flow Capacity is Exceeded

Pumping Stations


Good:  Dry Weather Flows & 10yr Storm Flows are Less Than the Pumping Stations Firm Capacity



Review:  10yr Storm Flows are Greater Than the Firm but Less Than the Peak Capacity


Gap:  10yr Storm Flows are Greater Than the Pumping Station Peak Capacity

(Firm Capacity = Largest Pump Out of Service) (Peak Capacity = All Pumps in Operation)

Gravity Sanitary Sewers

Good:  Hydraulic Grade Line (HGL) from the 100yr Storm is More Than 2m Below the Finished Ground
Dry Weather Flow is Less Than the Sewer Capacity

Review:  Hydraulic Grade Line (HGL) from the 25yr Storm Flows and Larger, is within 2m of the Finished Ground
 HGL from the 10yrs Storm Flows and Larger, is between 0.3m of the Obvert of the Pipe and 2m of the Finished Ground
Dry Weather Flows $>$ 85% of the Sewer Capacity but $<$ 99% of the Sewer Capacity

Gap:  HGL from the 10yrs Storm Flows and smaller, is within 2m of the Finished Ground
Cannot Convey the Dry Weather Flows Without Surcharging.

Forcemain

Good:  Velocity in Pipe is Less Than 2m/s

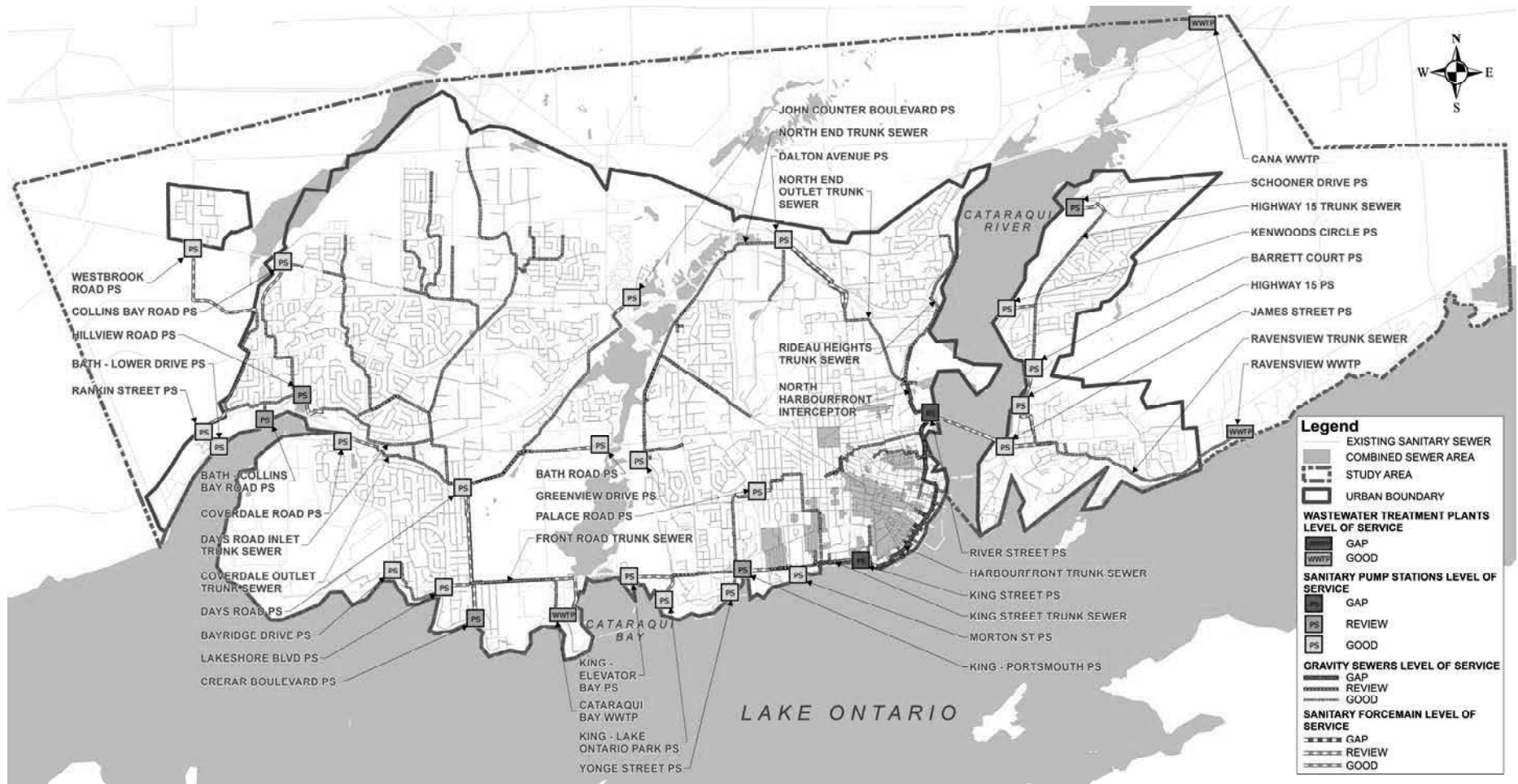
Review:  Velocity in Pipe is Greater Than 2m/s and Less Than 3m/s

Gap:  Velocity in Pipe is Greater Than 3m/s



REVISED WASTEWATER SYSTEM GAPS

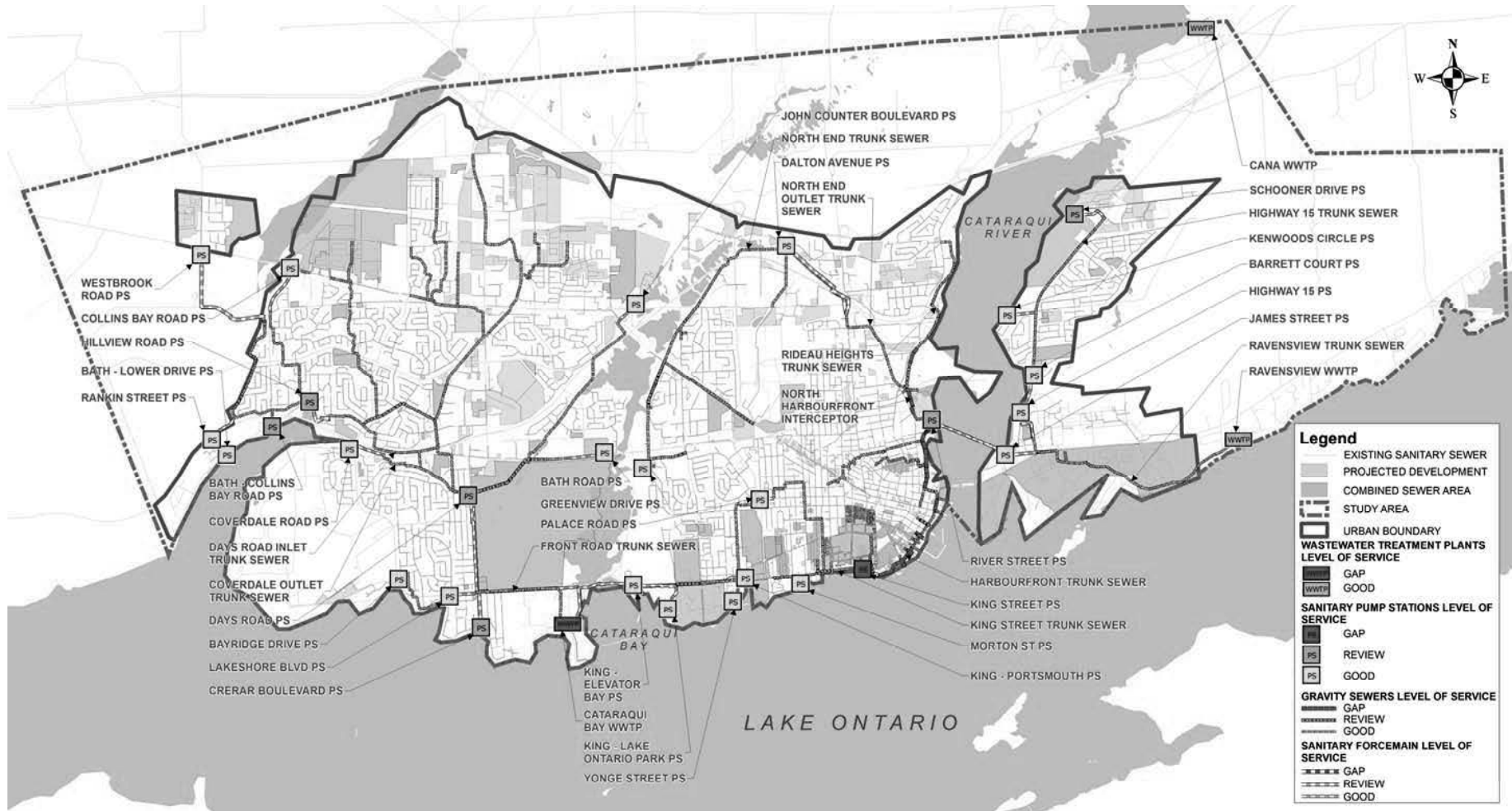
Wastewater System Gaps 2015



Identified Issues in the LOS indicate that additional analysis is required. The LOS indicated is based on Existing Capacities and is Subject to Change Based on Alternatives (i.e. Increase in Upstream Capacity may Result in Downstream Gap)

REVISED WASTEWATER SYSTEM GAPS

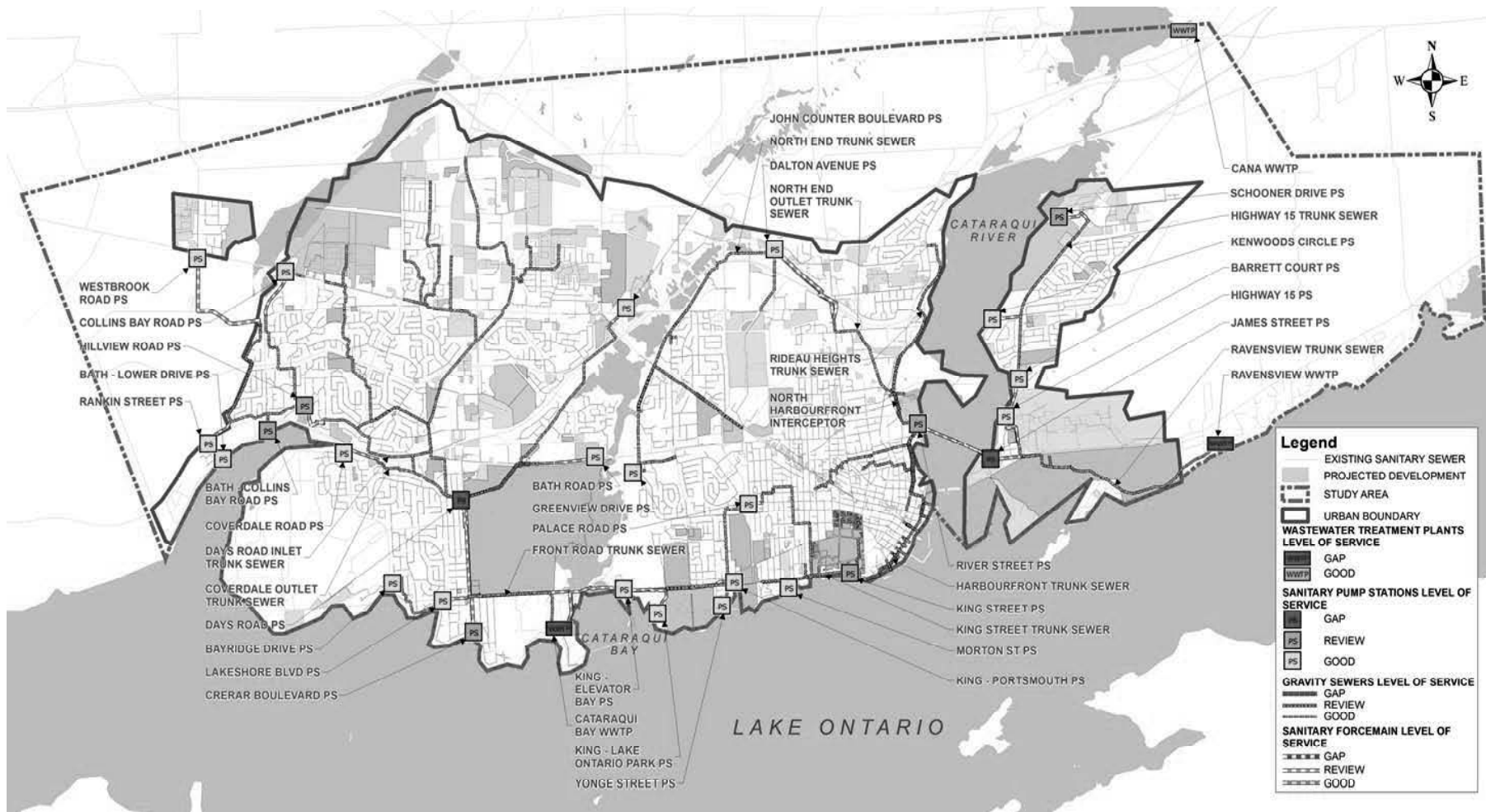
Wastewater System Gaps 2036



Identified Issues in the LOS indicate that additional analysis is required. The LOS indicated is based on Existing Capacities and is Subject to Change Based on Alternatives (i.e. Increase in Upstream Capacity may Result in Downstream Gap)

REVISED WASTEWATER SYSTEM GAPS

Wastewater System Gaps Full Build Out

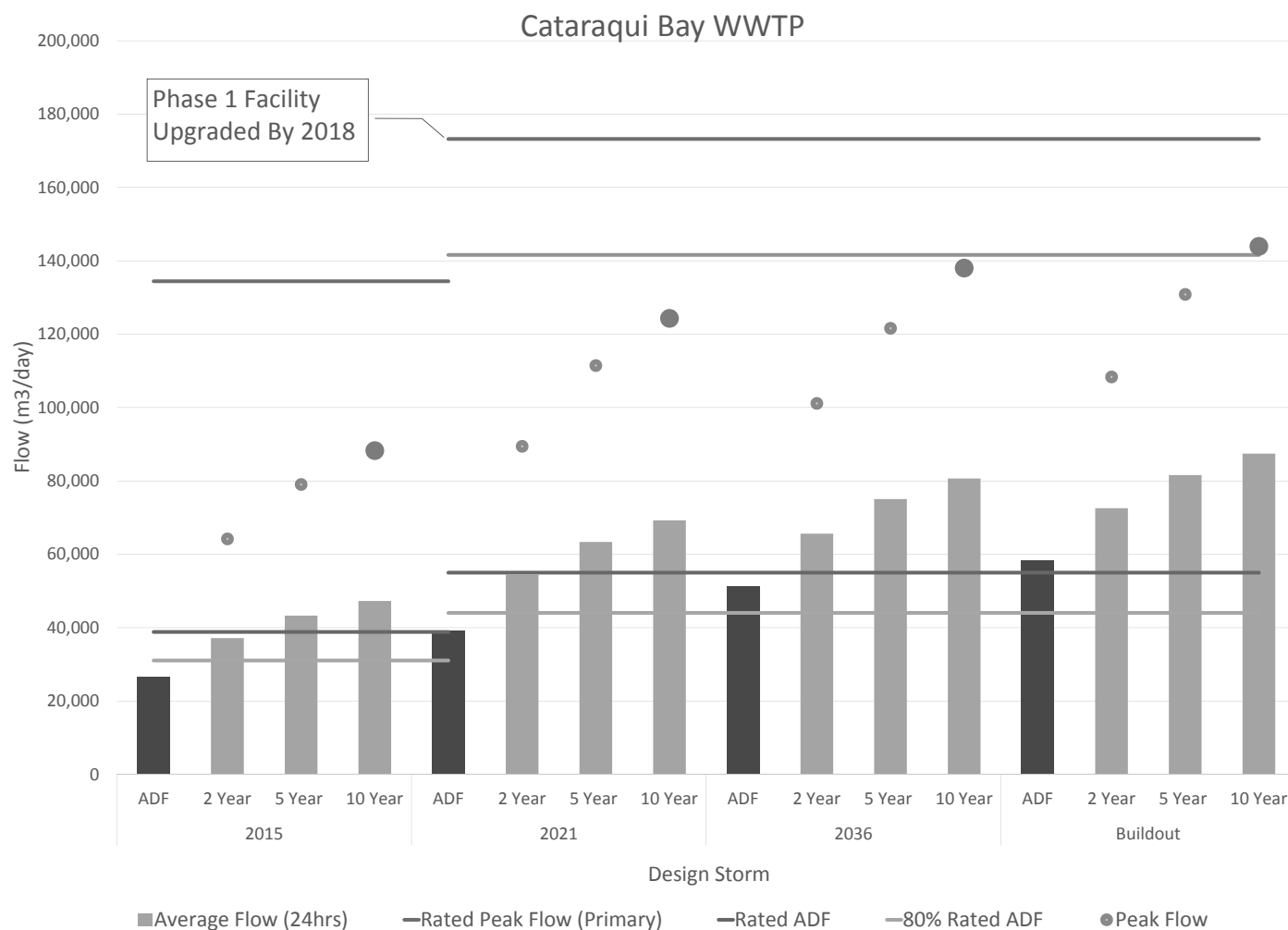


Identified Issues in the LOS indicate that additional analysis is required. The LOS indicated is based on Existing Capacities and is Subject to Change Based on Alternatives (i.e. Increase in Upstream Capacity may Result in Downstream Gap)

WASTEWATER TREATMENT SYSTEM

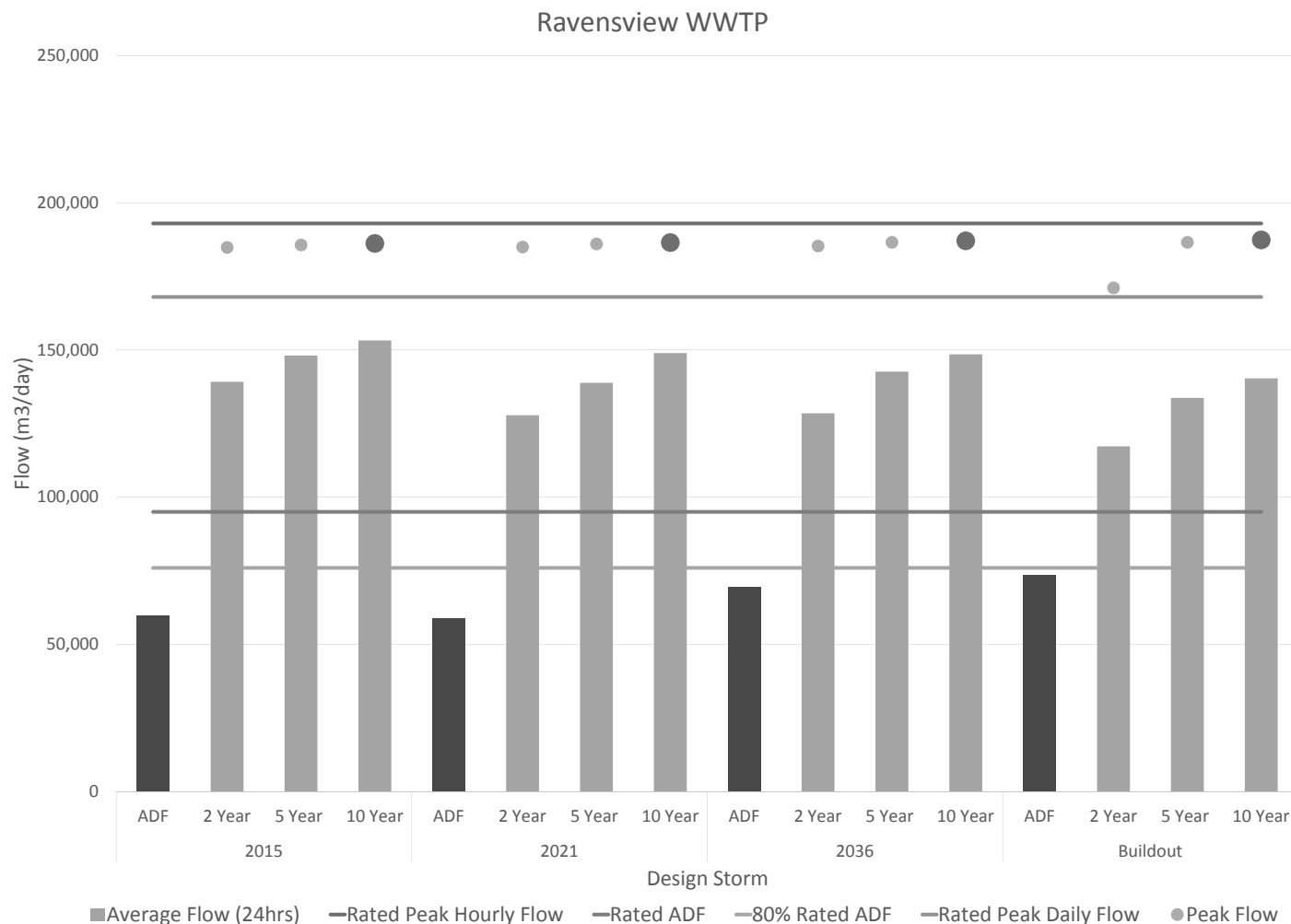


- Kingston west wastewater treatment system at its current capacity has sufficient capacity today but reaches its current rated average daily flows and just about reaches its peak flow (primary) by 2021 for the desired LOS (10yr). The facility upgrades by 2018 provide sufficient capacity up to approximately 2036. Phase 2 of the updates is currently scheduled for 2036.
- Generally capacity upgrades are triggered when a system reaches approximately 80% of current functional capacity as there is typically a timing issue between the identification of the need and the implementation of the upgrades.

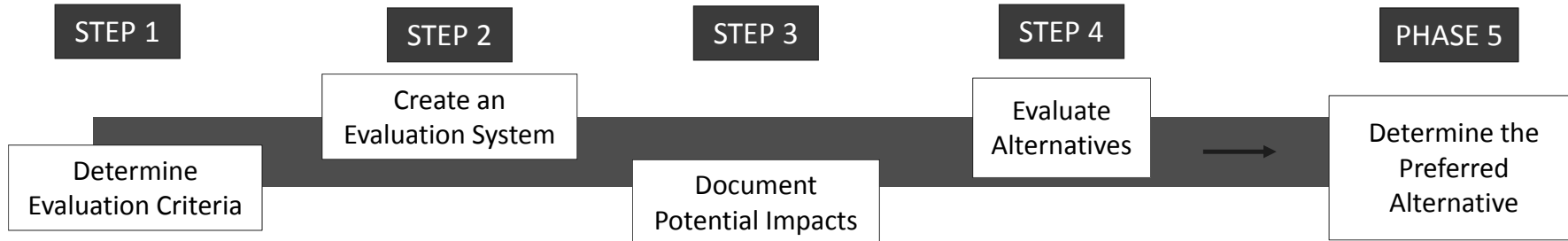


WASTEWATER TREATMENT SYSTEM

- Kingston east wastewater treatment system has sufficient capacity for average daily flow and peak flow capacity up to 2036 and full build out.
- Generally capacity upgrades are triggered when a system reaches approximately 80% of current functional capacity as there is typically a timing issue between the identification of the need and the implementation of the upgrades; however the Plant never reaches this level.



STUDY APPROACH



Evaluation Criteria

Natural and Physical Environment

- Impacts to Wildlife and Vegetative features along which new infrastructure is to be implemented
- Impacts to water course(s) in or along which new infrastructure is to be implemented.

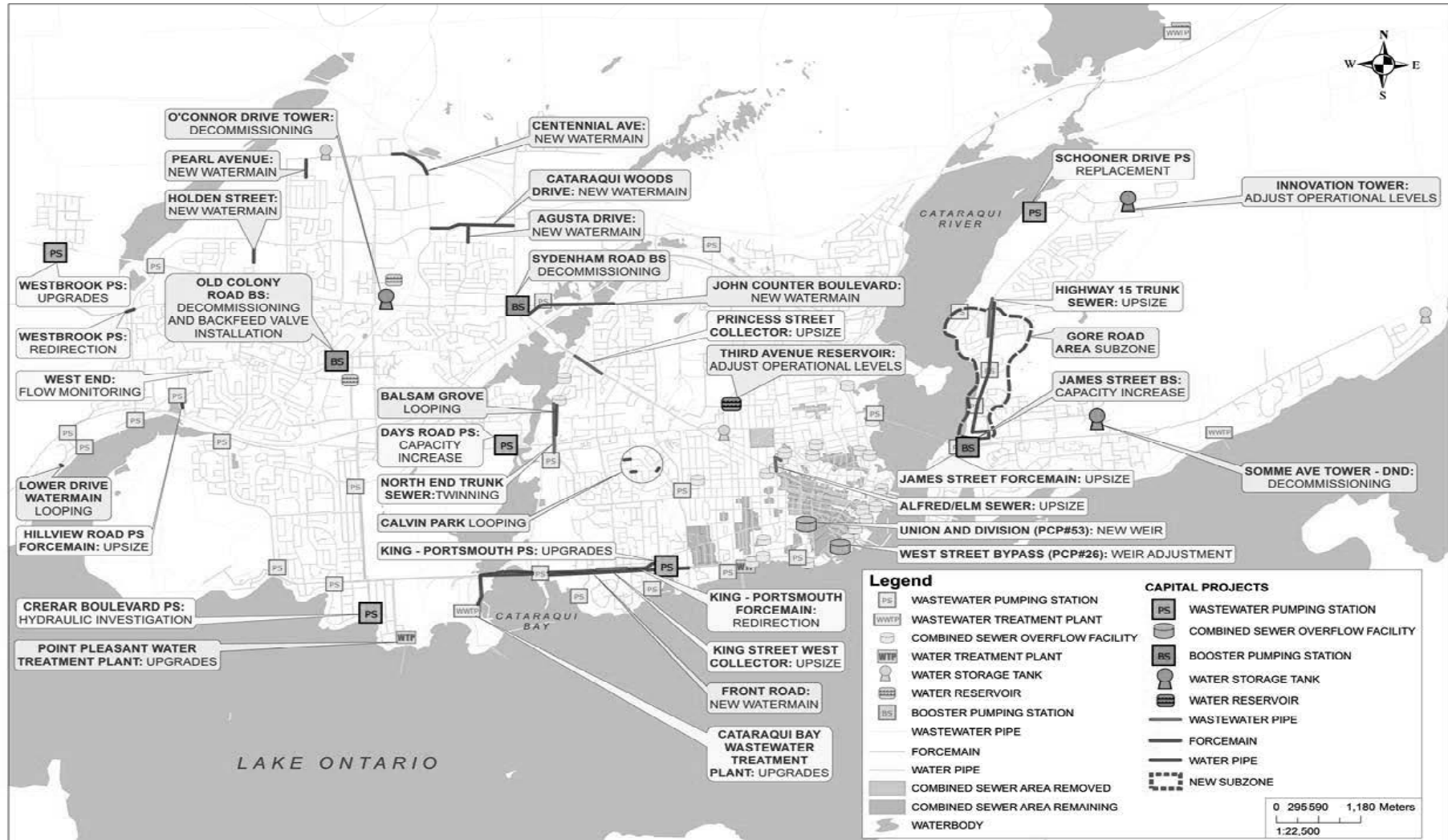
Social and Cultural Environment

- Number of people disrupted in the community
- Recent Disruptions to communities by new linear infrastructure works
- Traffic Disruption
- Social Disruption

Technical Suitability & Financial Considerations

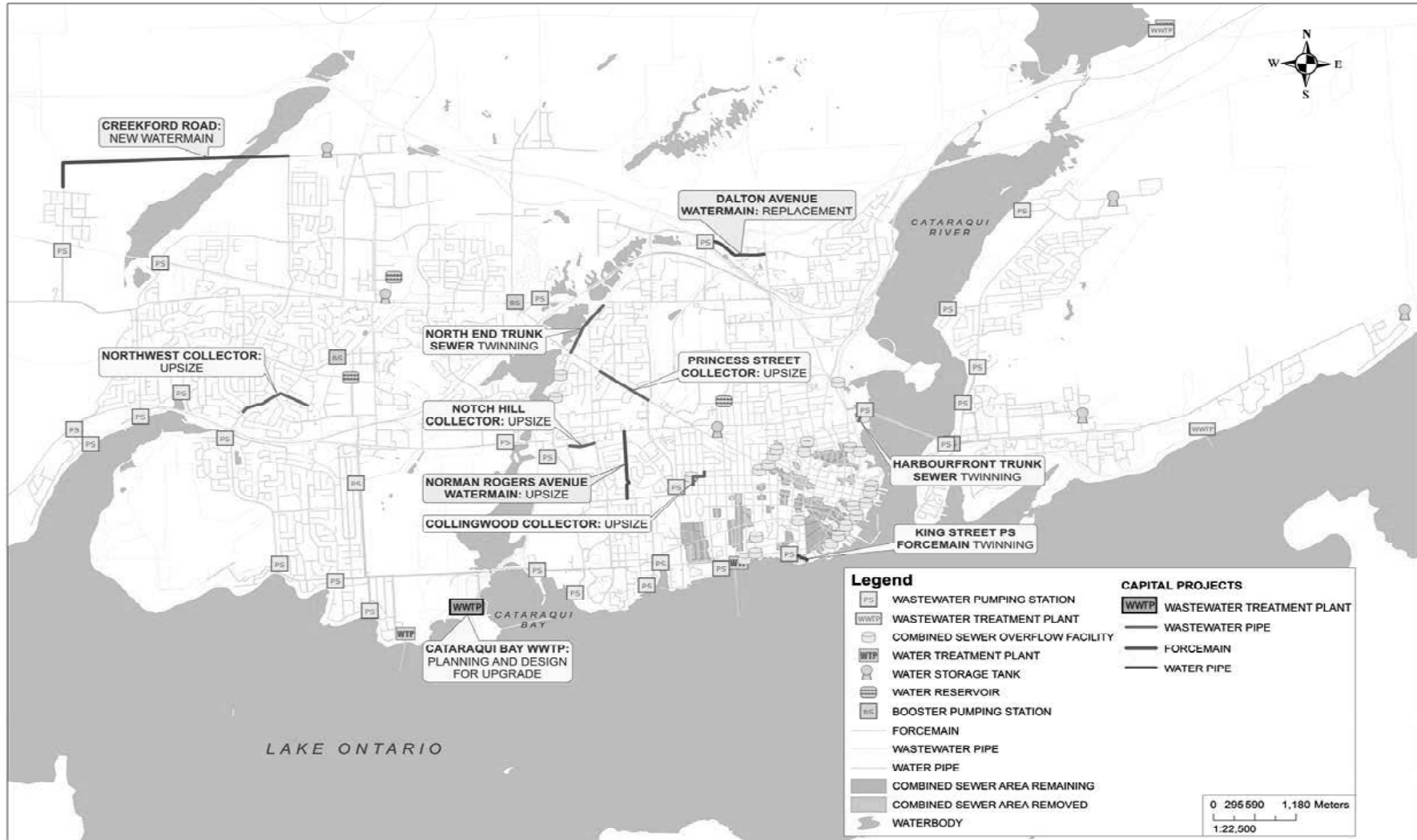
- Capacity of Existing Infrastructure
- Approximate amount and ease of construction of new required infrastructure
- Full Build Out Capacity
- Operational / Maintenance Costs
- Capital Costs (incl. Constructability Risk)

RECOMMENDED WATER AND WASTEWATER ALTERNATIVES



2016-2021

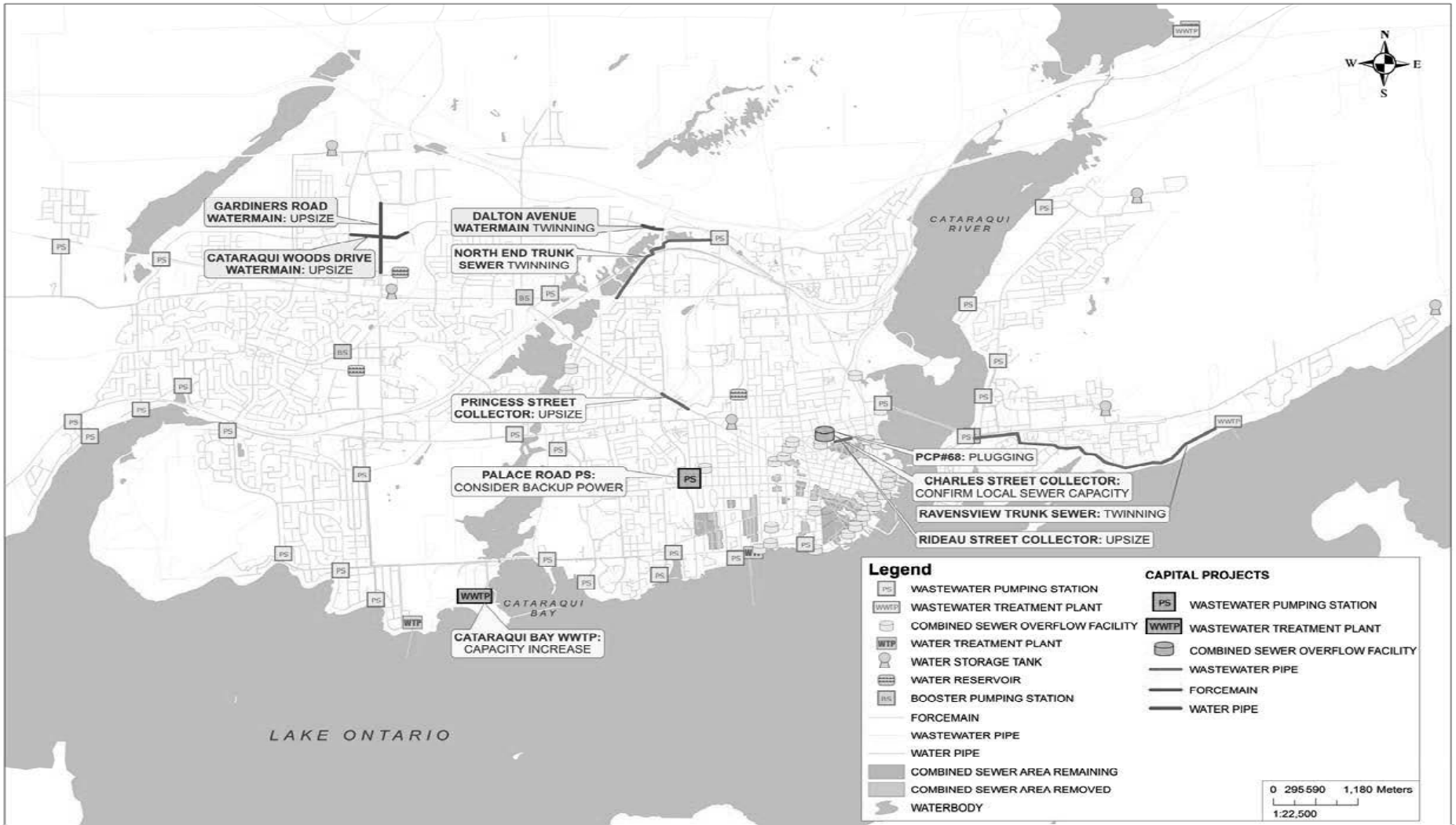
RECOMMENDED WATER AND WASTEWATER ALTERNATIVES



2022 - 2026

RECOMMENDED WATER AND WASTEWATER ALTERNATIVES

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2027 - 2036

RECOMMENDED WASTEWATER PROJECTS



Capital Improvement Recommended Projects

Year	Project Title	Why was this considered	What was considered	Recommended
by 2021	Westbrook PS - Flow Redirect	Sections of the downstream sewer do not meet LOS by 2021 due to development	Upsizing Collins Bay collector or Redirecting the flow to High Gate Dr Collector	Redirecting the Flow to High Gate Dr Collector
by 2021	King St. West Collector - Upsize	A section of the King St West Collector does not meet LOS in 2015 and decreases to 2036 due to development	Upsizing of Collector	Upsizing King St West Collector
by 2021	Hillview Road PS - Forcemain Upsize	The Hillview forcemain does not meet LOS in 2015 and decreases to 2036 due to development	Upsizing Forcemain	Upsizing Forcemain
by 2021	North End Trunk Sewer - Twinning	Sections of the North End Trunk Sewer do not meet LOS in 2015 and decreases to 2036 due to development	Twinning Trunk Sewer	Phased Twinning Trunk Sewer
by 2021	James St PS - Forcemain Upsize	The James St PS forcemain does not meet LOS in 2015	Upsizing Forcemain	Upsizing Forcemain
by 2021	Days Rd PS Capacity Increase	The Days Rd PS does not meet LOS by 2021 and decreases to 2036 due to development	Increase Capacity of PS	Increase Capacity of PS
by 2021	Princess St. Collector	Princess St Collector does not meet LOS in 2015 and decreases to 2036 due to development	Upsizing of Collector	Phased Upsizing of Collector
by 2026	Notch Hill Collector - Upsize	Notch Hill Collector does not meet LOS in 2015	Upsizing Collector	Upsizing Collector
by 2026	King St PS - Twin Forcemain	The King St PS forcemain does not meet LOS in 2015 due to combined sewer flows	Twinning Forcemain	Twinning Forcemain
by 2026	North West Collector (Lincoln Dr. to Pembrige Cres)	A section of the North West Collector does not meet the LOS in 2015 and decreases to 2036 due to development	Upsizing Collector	Upsizing Collector
by 2026	Cataraqui Bay WWTP - Design	Plant reaches 80% of capacity by 2026 due to development	Planning & Design incl. flow review (some of this work has already been completed)	Planning & Design incl. flow review (to be deferred if flows are not reached)
by 2026	Collingwood St. Collector - Upsize	A section of the Collector does not meet the LOS in 2015	Upsizing Collector Redirect Palace Rd PS	Upsizing Collector
by 2036	Rideau St. Collector - Upsize	A small section of Collector sewer is undersized once combined sewers are separated.	Upsizing Collector	Upsizing Collector
by 2036	Harbour Front Trunk Sewer - Twinning	A small section of trunk sewer is undersized once combined sewers are separated.	Upsizing Trunk Sewer	Upsizing Trunk Sewer
by 2036	Ravensview Trunk Sewer - Twinning	The Trunk sewer is undersized once combined sewers are separated.	Twinning the Trunk Sewer in various alignments	Twinning the Trunk Sewer on Hwy 2
by 2036	Cataraqui Bay WWTP - Capacity Upgrade	Capacity of the Plant is almost reached by 2036	Upgrade Plant Capacity	Upgrade Plant Capacity (to be deferred if flow are not reached)



RECOMMENDED WATER PROJECTS



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Capital Improvement Recommended Projects

Year	Project Title	Why was this considered	What was considered	Recommended
by 2021	Decommission Old Colony & Sydenham BS	Excess boosting capacity in zone by 2015 interconnected	Decommissioning the two booster stations	Decommissioning the two booster stations
by 2021	New Zone 3 Subzone	Storage Deficiency in zone by 2021 due to DND tower decommissioning and increase by 2036 due to development	Optimize tower levels without over pressurizing system New pressure zone north of Gore Rd including booster station New sub-zone to utilize all storage and not over pressurize system	New sub-zone to utilize all storage and not over pressurize system
by 2021	Balsam Grove - Rideau Trail Watermain Looping	Improve fire flows in area	New watermain addition	New watermain addition
by 2021	Holden - New Watermain	Improve fire flows in area	New watermain addition on Holden Upsizing Princess St watermain	New watermain addition on Holden
by 2021	O'Connor Tower - Decommissioning	Excess storage in zone by 2015	Decommissioning O'Connor tower including backflow valve Decommissioning Progress Ave reservoir including backflow valve	Decommissioning O'Connor tower including backflow valve
by 2021	Lower Dr. Watermain Looping	Improve fire flows in area	New watermain along Bath Rd New watermain addition on Lower Dr	New watermain addition on Lower Dr
by 2026	Norman Roger's Ave. - Watermain Upsizing	Improve fire flows in area	Watermain Upsizing	Watermain Upsizing
by 2026	Dalton Ave. - Watermain Replacement	Improve fire flows in area	Upsizing watermain on Dalton	Upsizing watermain on Dalton
by 2026	Creekford Rd - New Watermain	Improve fire flows in area	New watermain along Princess St New watermain along Creekford Rd	New watermain along Creekford Rd
by 2036	Gardiners Rd - Watermain Upsizing	Reduce headloss in pipes due to development	Upsizing watermain along Gardiners Rd	Upsizing watermain along Gardiners Rd
by 2036	Cataraqui Woods - Watermain Upsizing	Reduce headloss in pipes due to development	Upsizing watermain along Cataraqui Woods Dr	Upsizing watermain along Cataraqui Woods Dr
by 2036	Dalton Ave. - Watermain Twinning	Improve fire flows in area	Upsizing watermain on Dalton Twinning watermain on Dalton	Twinning watermain on Dalton



POLLUTION CONTROL PLAN UPDATE

PURPOSE / OVERALL GOAL

- The Pollution control Plan update is in support of demonstrating conformance with MOE Procedure F-5-5. This procedure provides guidelines for collection systems with existing combined sewers and outlines the best practices to be considered for pollution prevention and control.
- The purpose of the PCP update was to review available pertaining documentation, validate the recommendations made in the 2010 PCP update, and modify/recommend additional controls to work towards the goal of ‘virtual elimination’ of all Combined sewer overflows.

OBJECTIVE

MOECC F-5-5 CRITERIA (BASED ON AVG. WEATHER YEAR)

- Treat 90% Wet Weather Volume (for an Average Year) above the Dry Weather Flow.
- Combined Total Duration of CSO Events at Any One CSO Location Shall Not Exceed 48hrs.
- Controlling Overflow to Not More than 2 Events Per Season
- An Additional Overflow Event May be Permitted Provided that the PWQO for E.coli Based on a Geometric Mean at Beaches are Not Exceeded for 95% of the Season.



WETTER THAN AVERAGE YEAR

- Continue to Reduce Overflow Volumes and “Virtually Eliminate” Combined Sewer Overflows under a wetter than average year of rainfall
- “Virtually Eliminate”=Containment of all Combined Sewer Flows under a Wet Year Conditions, with Overflows Occurring only Under Less Frequent Storm Events

To meet the objectives, 5 alternatives were reviewed that included:

- Alternative 1. Do nothing: Status quo or to stop any further upgrades in the central system.
- Alternative 2. Source Control: Eliminate all combined sewers in the central system
- Alternative 3. Conveyance Control: Upsize/Upgrade the sewers and pumping station within the central system
- Alternative 4. End of Pipe Control: Increase/add storage facilities within the central system to contain the flows
- Alternative 5. Conveyance & End of Pipe Control: A combination of alternative 3 and 4

POLLUTION CONTROL PLAN UPDATE



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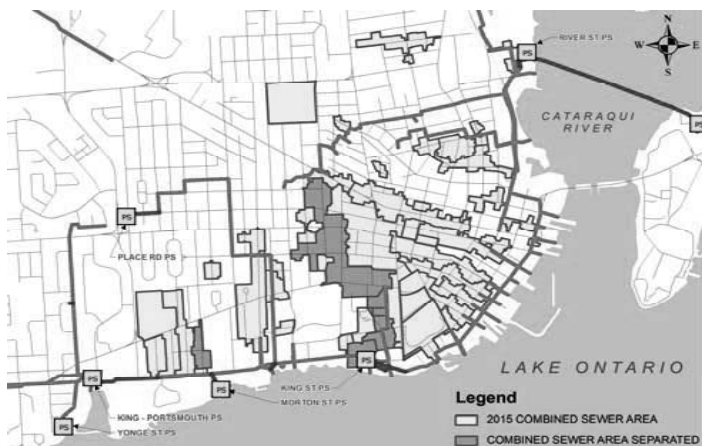
CSO Evaluation Matrix:

Alternatives	Natural Environmental Considerations	Social and Cultural Environmental Considerations	Technical Suitability Considerations	Economical Considerations	Overall Rating
Alternative 1: Do Nothing	Least Preferred	Most Preferred	Least Preferred	Less Preferred	Least Preferred
Alternative 2: Source Control	Less Preferred	Least Preferred	Less Preferred	Less Preferred	Most Preferred
Alternative 3: Conveyance Control	Less Preferred	Least Preferred	Least Preferred	Least Preferred	Least Preferred
Alternative 4: End-of-pipe Control	Less Preferred	Less Preferred	Least Preferred	Less Preferred	Less Preferred
Alternative 5: Conveyance & End-of-pipe Control	Less Preferred	Least Preferred	Least Preferred	Least Preferred	Less Preferred



POLLUTION CONTROL PLAN UPDATE

Recommended Alternative: Source Control



2015



2021



2026



2036

The Maps Illustrate the Projected Reduction in Combine Sewer Areas between the Different Time Steps.

These maps have been developed by Utilities Kingston and WSP staff in an effort to estimate the pace and location of future sewer separation work for the purposes of master planning for the Wastewater Utility. This estimation is based on an approach consistent with that used during the development of last 8 years of capital reconstruction plans. This takes into consideration such things as infrastructure age, priority separation areas and risk assessment based on the condition of all features within the right-of-way, including road and other utilities. This is subject to change.

POLLUTION CONTROL PLAN UPDATE



Source Control Results

Note: Historic Data is from actually metering of overflows. 2015 – Buildout are from modelling outputs. Modelling results are based on the “projected sewer separation”

CRITERIA	Historic (2014)	2015	2021	2026	2036	Buildout
MOE F-5-5 CRITERIA						
Combined sewer area Remaining (ha)	198	174	117	90	54	0
Wet Weather Volume Treated	90.0%	96.1%	99.4%	99.4%	99.3%	99.9%
Total by-pass volume	300,000	76,000	8,200	7,825	3,550	275
Meets Duration Requirements	X	X	X	X	✓	✓
Number of locations in exceedance	7	3	1	1	0	0
Meets Frequency Requirements	X	X	X	X	X	✓
Number of locations in exceedance	19	5	4	3	2	0
WETTER THAN AVERAGE YEAR						
Wet Weather Volume Treated	N/A	93.2%	97.7%	97.8%	98.7%	99.9%
Virtual Elimination	X	X	X	X	X	X



It should be noted that it is suspected that backflow from the storm sewer is occurring that would artificially increase the historic overflow volumes that was not able to be reproduced in the projected numbers (2015 – Full Buildout)



NEXT STEPS

- Finalize Alternative Servicing Strategies for Infrastructure that has been Identified below the LOS
- Finalize Evaluation of Alternative servicing strategies and Recommend Servicing Solutions based on Public input
- Update the Pollution Prevention Control Plans
- Finalize Master Plan Document & Make Available to the Public for Review



**THANK YOU FOR ATTENDING THIS PUBLIC INFORMATION CENTRE
PLEASE COMPLETE A COMMENT SHEET BEFORE YOU LEAVE**

If you have any additional comments or questions, please contact one or all of the following:

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