Lakefront Utility Services Inc.

Cobourg Drinking Water System

Master Plan

Presented by
Dan Campbell, Senior Project Manager
June 2021

CIMA+

Introductions & Purpose

Project Team Members at this Meeting

Lakefront Utility Services Inc.

Dereck Paul
President & CEO

Larry Spyrka
Manager Water Capital Projects

Shawn Bolender
Manager Water Operations

Adam Giddings
Director of Regulation & Finance

CIMA+

Dan Campbell
Senior Project Manager

Claire Wallis-South, EIT
Engineer in Training

The purpose of this meeting is to:

- Provide a snapshot of the existing Cobourg Drinking Water System
- Share an overview of the technical analysis that informs the master plan recommendations
- Provide an outline of the master plan recommendations

Presentation Outline

- Master Plan Purpose & Process
- Existing Cobourg Drinking Water System
- Water Demand
- Master Plan Recommendations
  - Water Treatment
  - Pumping and Storage
  - Water Distribution
- Wrap-up
  - Questions and Answers

Clarifier at Cobourg WTP

Master Plan Purpose

1. Provide an overview snapshot of the existing system
2. Forecast water demand associated with projected residential population growth and non-residential growth within the Cobourg urban/municipal boundary
3. Identify system expansion projects that will be necessary to service growth and evaluate potential options
4. Identify non-growth capital projects required to sustain the existing system over the next 10 years

Cobourg Zone 2 Elevated Tank on Strathy Road

Watermain Installation on Mathew Street

Master Plan Process

https://youtu.be/79EKPBjoTVQ

TM-1	Demand Projections, Design Criteria & Preliminary Capacity Evaluations
TM-2	Treated Water Storage Requirements
TM-3	Treated Water Pumping Requirements
TM-4	Water Treatment Plant Capacity & Preliminary Condition Assessment
TM-5	Distribution System Pressures & Upgrade Requirements

Technical Analysis Completed in 2020

Cobourg Drinking Water System Master Plan — **Draft**

Early 2021

Community and Stakeholder Consultation

Presentation to Cobourg Council

Recorded Presentation (1hr)

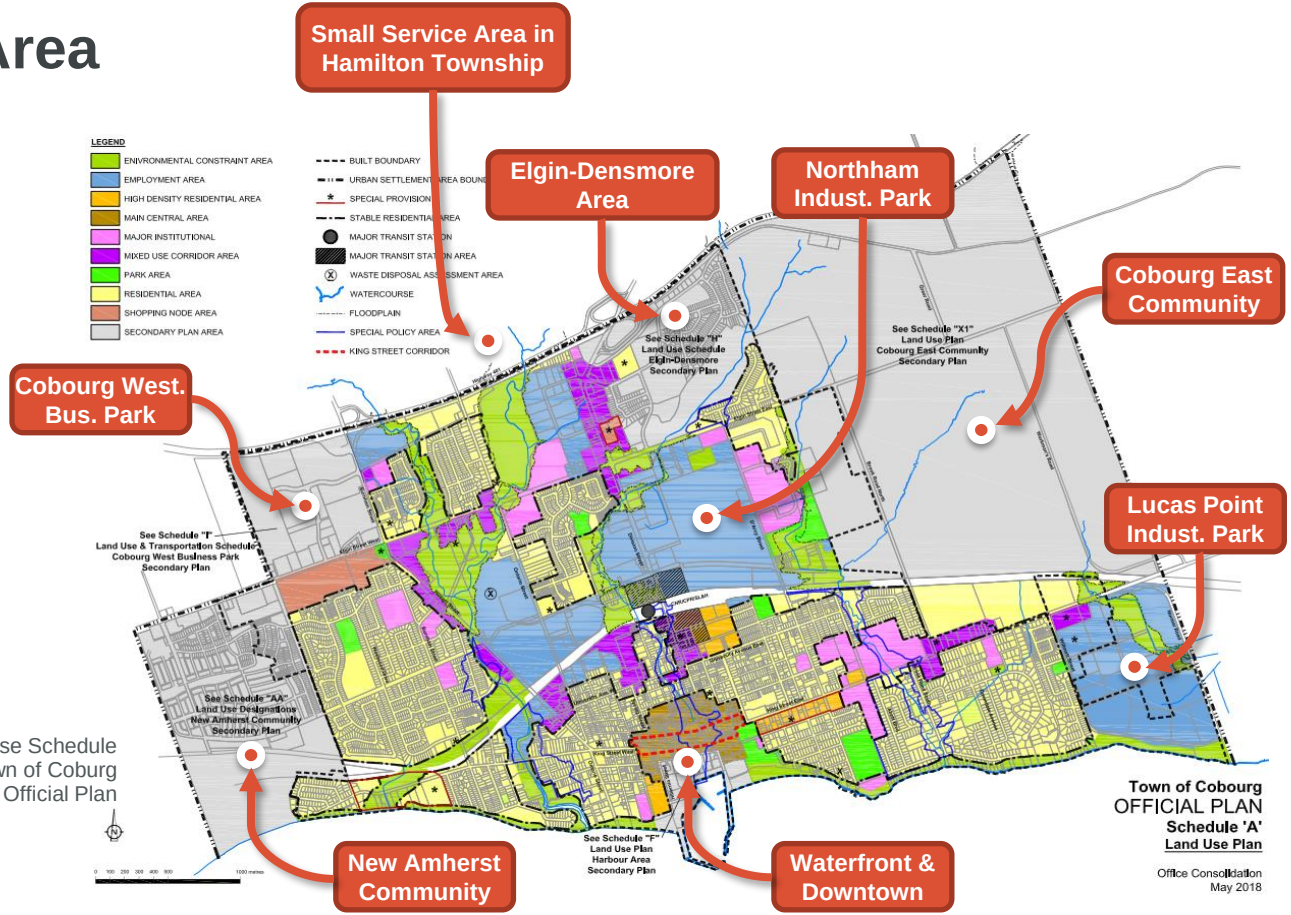
2021

Cobourg Drinking Water System Master Plan — **Final**

MCEA Municipal Class Environmental Assessment for Schedule B Projects

Future (Beyond 2021)

Study Area

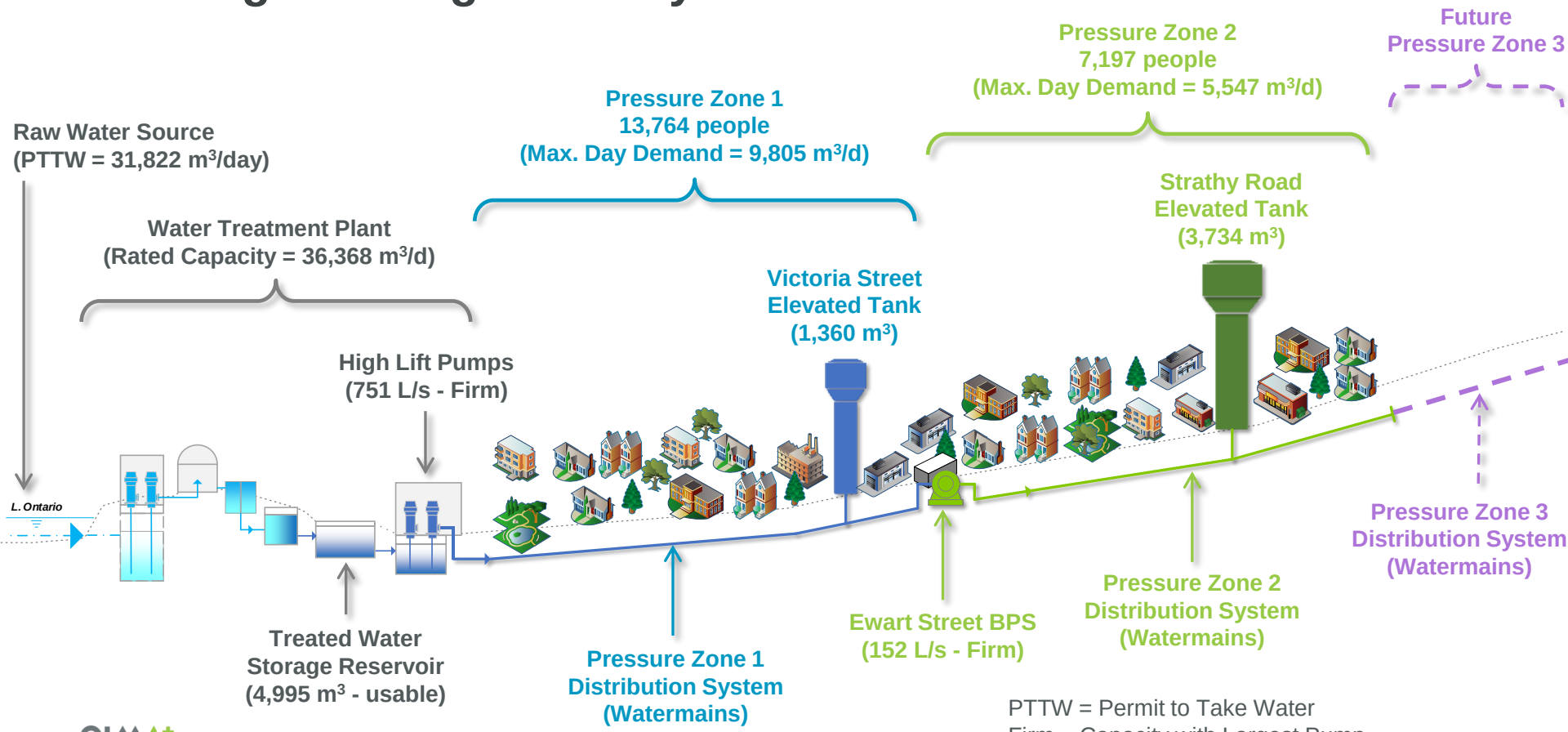


Annotated Land Use Schedule from the Town of Coburg Official Plan

1

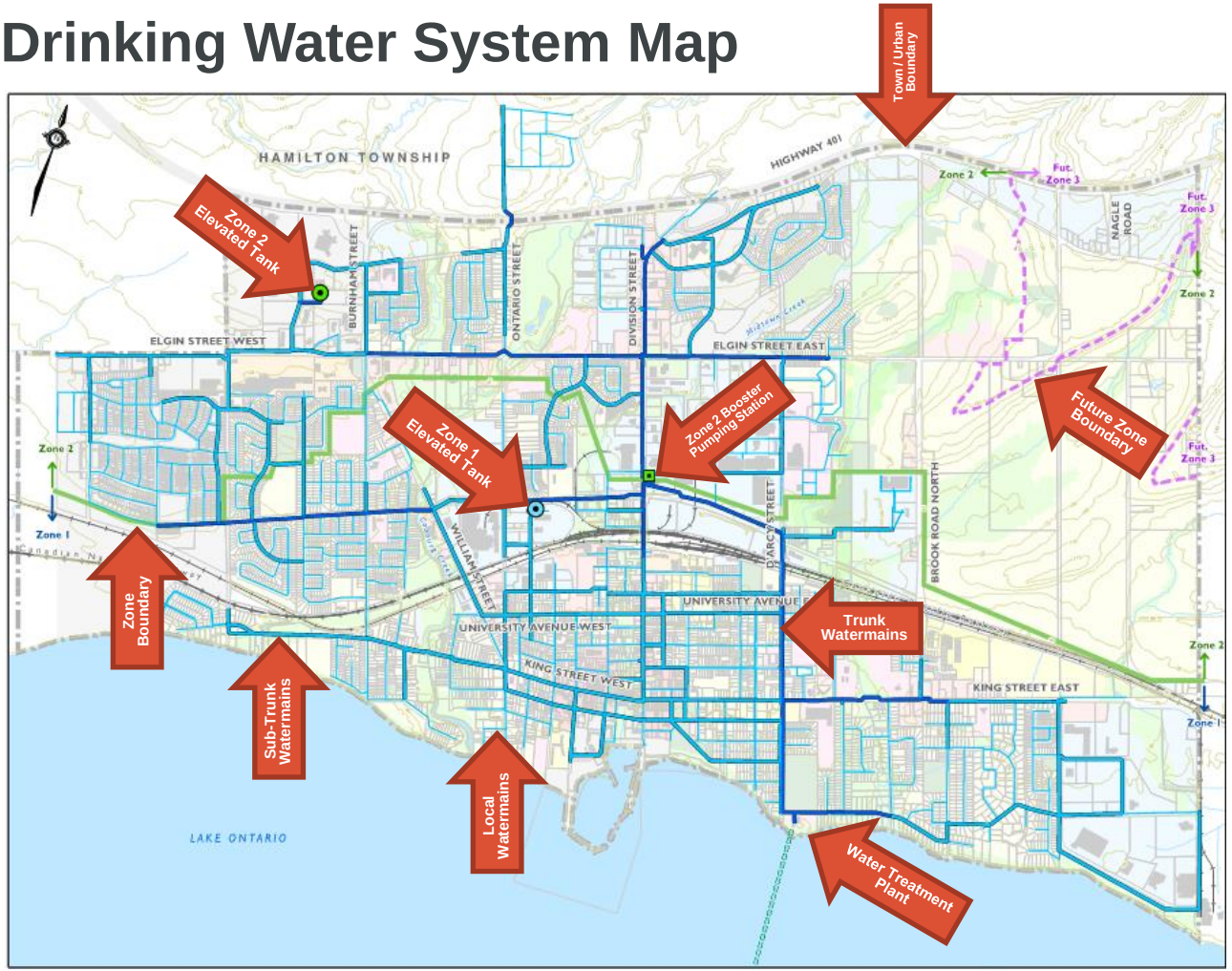
Existing System

Existing Drinking Water System Schematic



PTTW = Permit to Take Water
Firm = Capacity with Largest Pump Out of Service

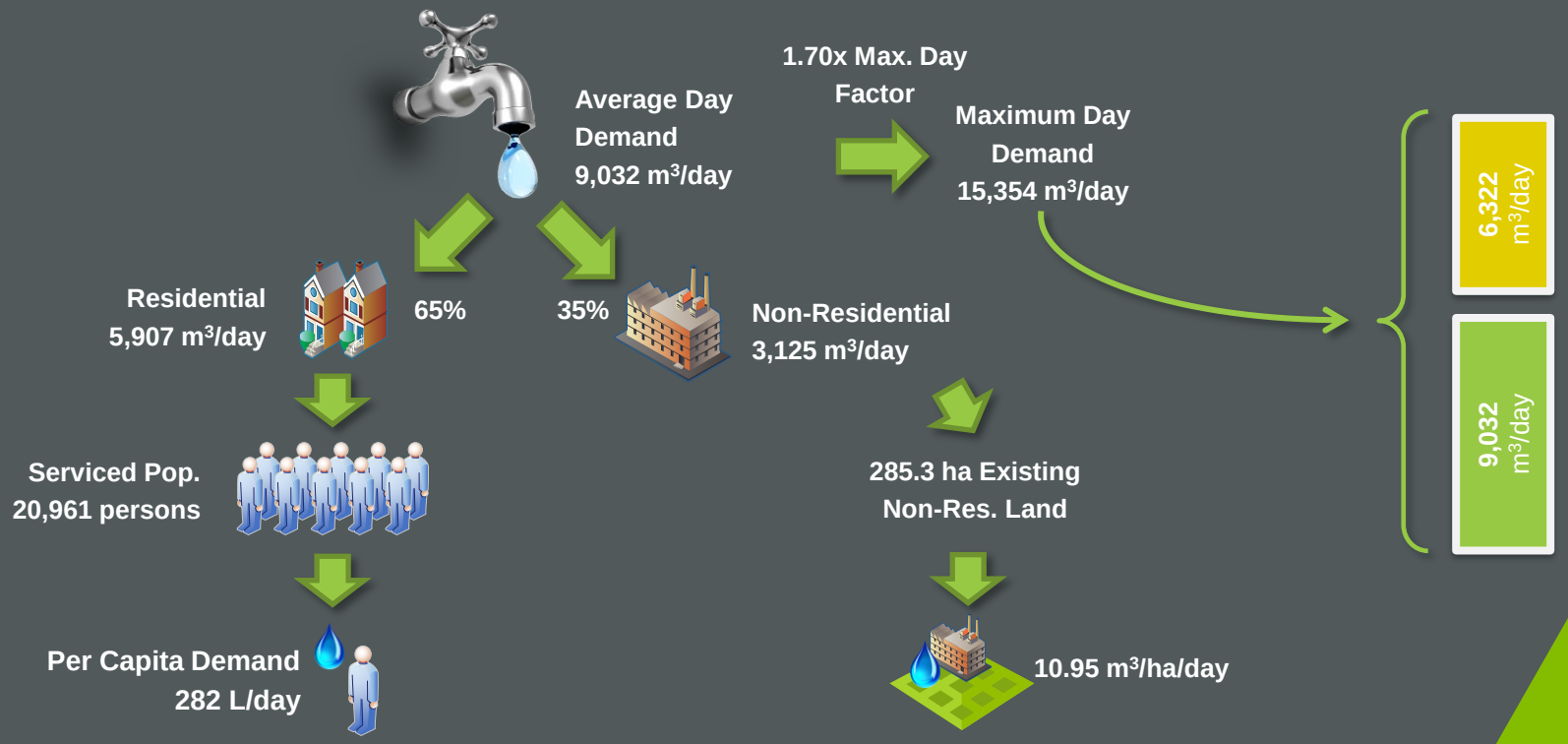
Existing Drinking Water System Map



2

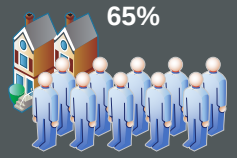
Water Demand

Current Serviced Population and Water Demand



Population and Water Demand Growth

Residential
5,907 m³/day



20,961 persons

±18,084 persons

±39,045 persons

282 L/day

68%

Residential
11,011 m³/day

Non-Residential
3,125 m³/day

285.3 ha
Developed
Non-Res. Land

190.5 ha
Undeveloped
Non-Res. Land

475.8 ha
Developed
Non-Res. Land

10.95
m³/ha/day

32%

Non-Residential
5,211 m³/day

9,032 m³/day = Total Average Demand

15,354 m³/day = Total Maximum Day Demand

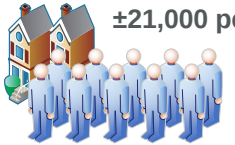
79% Growth

Total Average Day Demand = 16,222 m³/day

Total Maximum Day Demand = 27,577 m³/day

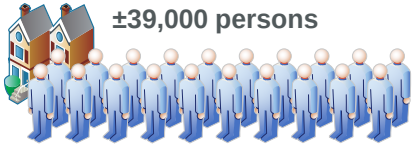
Population and Demand Summary

Today (2021)



±21,000 persons

Build-out (2050 or beyond)



±39,000 persons

9,000 m^3/day → 16,200 m^3/day

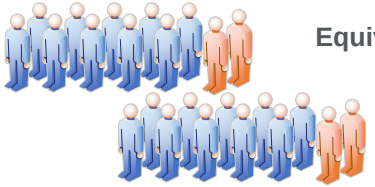
79% Increase in Daily Water Demand

Max Day Demand: 15,300 m^3/day → 27,500 m^3/day

285.3 ha Developed Non-Res. Land

475.8 ha Developed Non-Res. Land

Equivalent Serviced Pop. 32,050 persons



Equivalent Serviced Pop. 58,350 persons

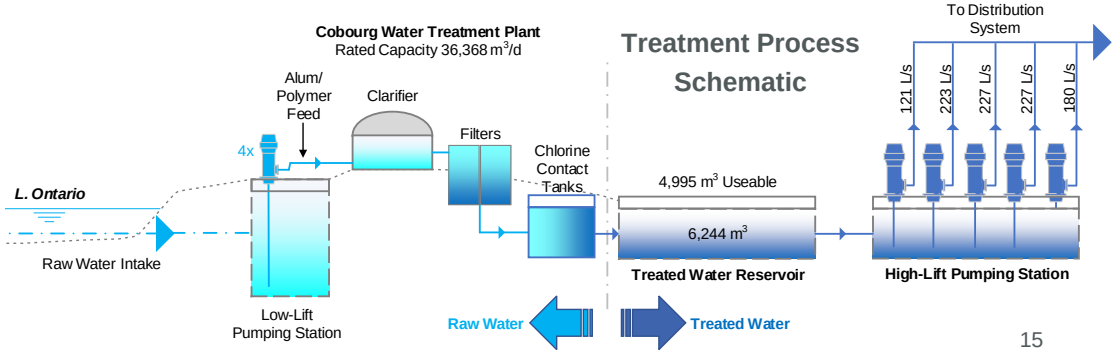
3

Water Treatment

Current & Future Needs

Water Treatment Plant

- WTP constructed in 1978 and upgraded in:
  - 1987 (pump house)
  - 2002 (chorine contact)
- As capacity utilization increases certain processes are “taxed” more heavily and greater up-time is required
- Ongoing investments are required to maintain condition and capacity of the WTP

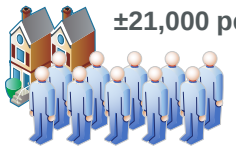


Water Treatment Plant Capacity

Net Delivery Capacity of ±32,700 m³/day

(90% of rated capacity = 36,368 m³/day)

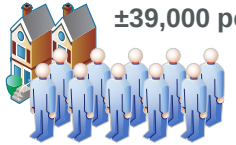
Today (2020)



±21,000 persons

285.3 ha Developed Non-Res. Land

Build-out (2050 or Beyond)



±39,000 persons

475.8 ha Developed Non-Res. Land

15,300 m³/day → 27,500 m³/day

WTP Capacity Expansion Not Anticipated

±47% of Net Delivery Capacity

±84% of Net Delivery Capacity

WTP: Repairs, Improvements and Upgrades

While there is no need for capacity expansion at the WTP, investments will be required to ensure that the existing WTP can continue to operate reliably up to its full rated capacity.

$2.0 M	Short Term (0 – 4 years)
$13.3 M	Long Term (5-10 years)
$2.0 M	Long Term Reserve Items (10+ Years)

Including Rehabilitation or Replacement of Existing Clarifier

Clarifier Replacement

- The entire WTP is dependent on a single clarifier that is 42-years old and cannot be taken offline without shutting down the entire WTP.
- Flexibility for rehabilitation or replacement will decline as water demand increases.

Six Options

C1	C2	C3	C4	C5	C6
Temp. switch to direct filtration	Temp. switch to direct filtration	Permanently switch to direct filtration	Add a second similar clarifier	New clarification system in new location on the WTP site	Temp. switch to direct filtration
Add temp. enhanced chlorination	Add temp. UV disinfection	Add permanent UV disinfection to compensate for loss of clarifier	Rehabilitate existing clarifier in the near-future	Decommission & remove existing clarifier	Add temp. enhan-ced chlorination
Rehabilitate existing clarifier	Rehabilitate existing clarifier	Decommission & remove existing clarifier	Run both clarifiers with flow splitting		Decommission existing clarifier
Return to current operation	Return to current operation				New clarification system in existing clarifier building

Preferred Option C5

- Reduces risks associated with investing in existing clarifier building
- No investment in major temporary operating measures
- Provides significant future flexibility with respect to:
  - Choice of clarifier technology
  - Clarifier operation (multiple trains)
  - Addition of a third filter train to allow for filter maintenance

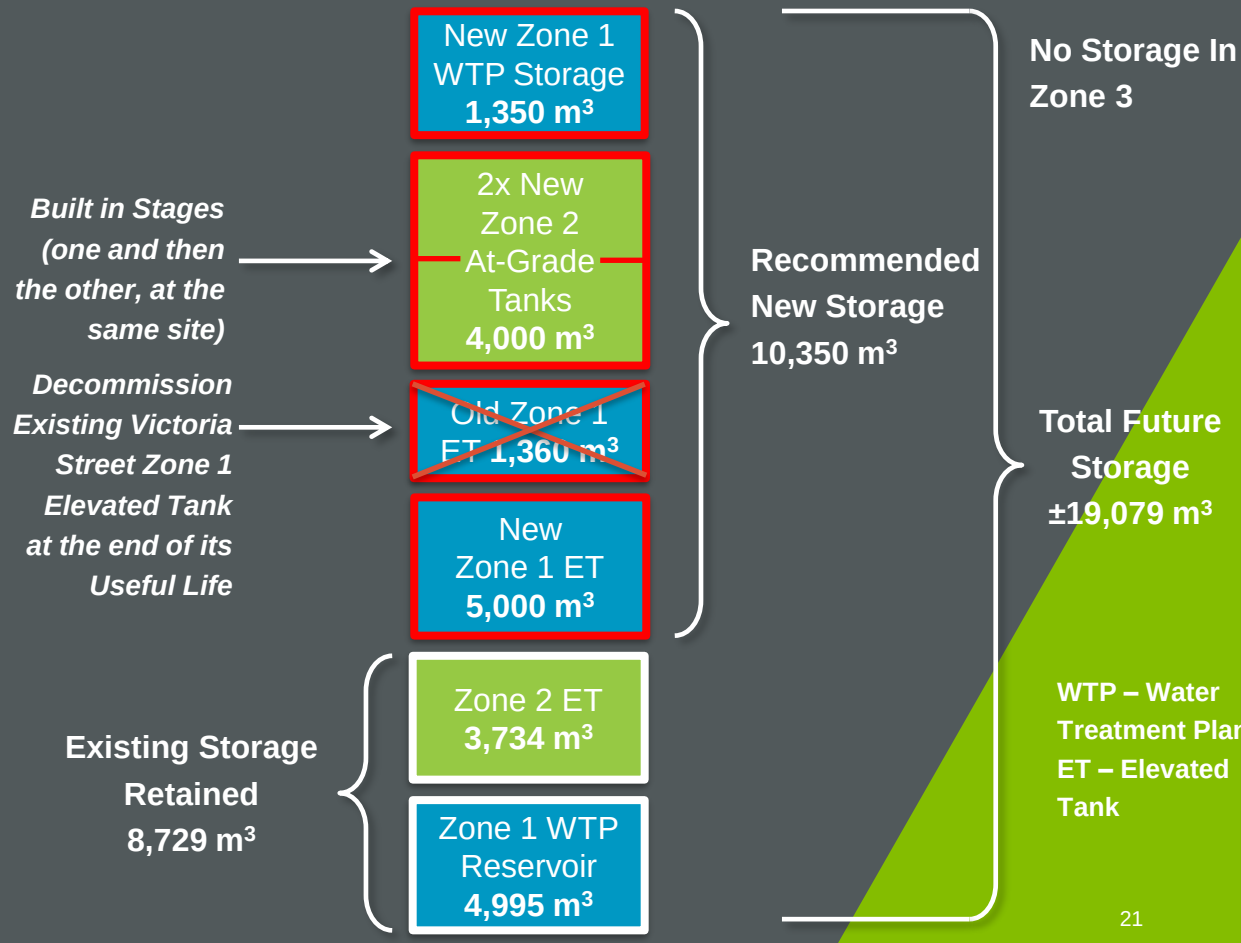
4

Pumping and Storage

Current & Future Needs

Recommended Treated Water Storage Strategy

- 10,089m^3 of storage currently provided in three facilities
- Relative to current design standards, there is a storage short-fall of ±2,500m^3
- Inclusive of this short-fall, development to build-out will require ±8,900m^3 of storage to provide a total of at least ±19,079m^3



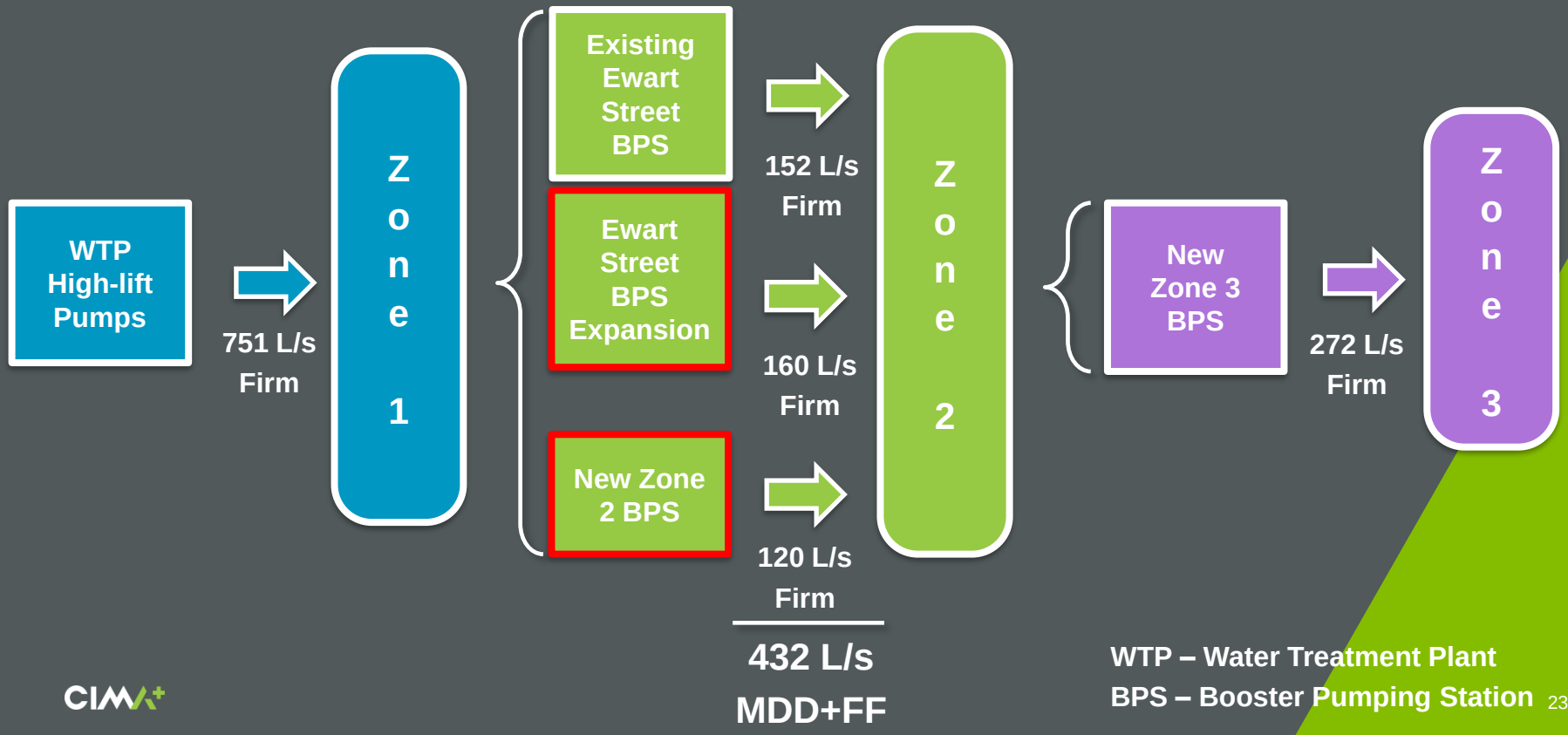
Pumping Requirements

- Water Treatment Plant high-lift pumps at 751 L/s have sufficient capacity to meet all current and future pumping requirements for Zone 1
- Ewart Street Booster Pumping Station has limited reserve capacity to support continued growth in Zone 2
  - Can support approximately 2,225 additional people in Zone 2
- Most growth will occur in Zone 2 (or Zone 3) and as such, short-term and long-term expansion of Zone 2 pumping capacity is required
- Zone 3 will require its own dedicated pumping station

High-lift Pumps at Cobourg WTP

Piping at Ewart Street Booster Pumping Station

Treated Water Pumping Strategy

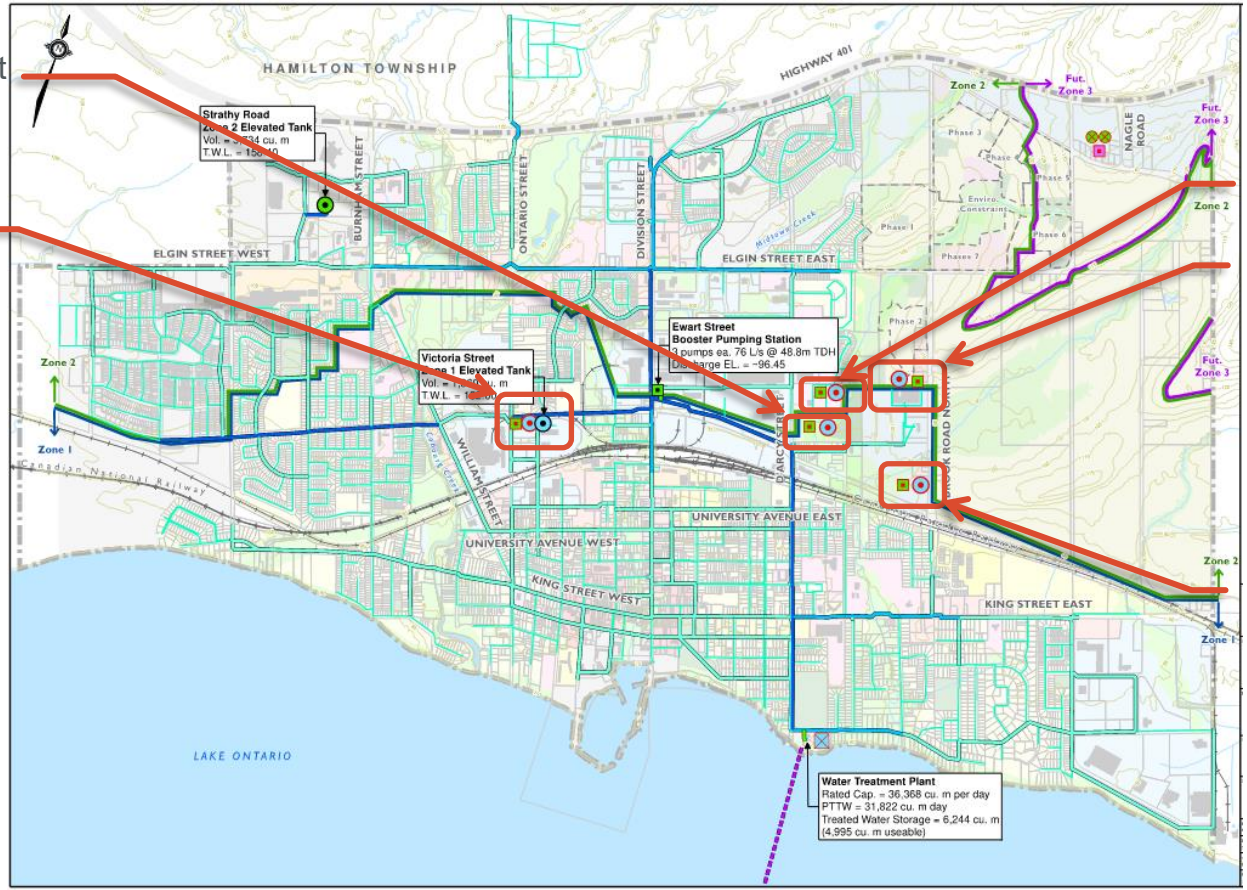


WTP – Water Treatment Plant
BPS – Booster Pumping Station

Zone 1 Storage & Zone 2 Pumping Location Options

Option 2: D'Arcy Street Legion Field Soccer Pitch

Option 1: Existing Victoria Street ET Site



Option 5: Cobourg Community Centre

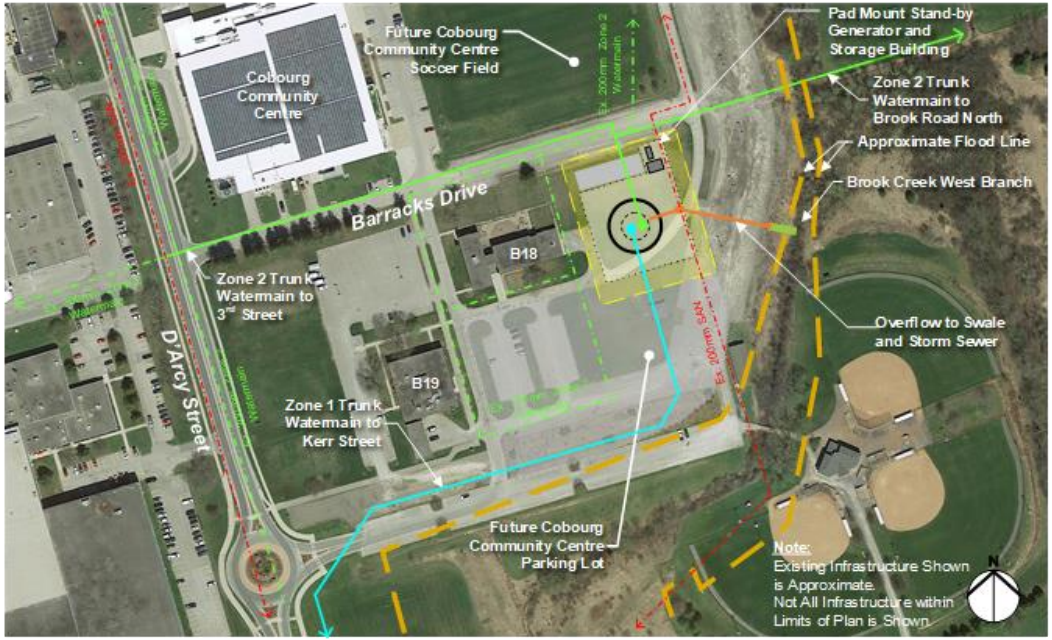
Option 4: LUSI Electrical Sub-Station Property and Phase 2 Villages of Central Park Site

Option 3: Brook Road North / Kerr Street

Evaluation of Location Options

Criteria	Option 1A		Option 1B		Option 2		Option 3		Option 4		Option 5	
Site Availability	◔	*1*	○	0	◕	3	◔	1	◑	2	●	4
Compatibility	●	*4*	●	4	◕	3	◑	2	◑	2	◕	3
Environmental Factors	●	*4*	●	4	◔	1	◑	2	◕	3	●	4
Technical Factors	◔	*1*	○	0	◑	2	◑	2	◕	3	◑	2
External Servicing	◔	*1*	◔	1	●	4	◕	3	◑	2	◕	3
Economic Factors	○	*0*	○	0	◕	3	◕	3	◑	2	◕	3
Score	**11**		**9**		**16**		**13**		**14**		**19**	
Overall Rank	**5th**		**6th**		**2nd**		**4th**		**3rd**		**1st**	
Legend	Least Preferred		→								Most Preferred	
	○ *0 pts*		◔ *1 pt*		◑ *2 pts*		◕ *3 pts*		● *4 pts*			

Preferred Location Option



Option 5: Cobourg Community Centre Site Plan

Advantages of the Site

- Land is owned by the Town of Cobourg
- Similar institutional type developments exist adjacent the site
- Existing Zone 1 ET can continue to operate during construction
- Well positioned in terms of proximity to Zone 2 trunk watermains
- Not impacted by mapped Brook Creek floodplain

Disadvantages of the Site

- Town of Cobourg will have to reassess part of the Cobourg Community Centre Master Plan
- Additional Zone 1 watermain length is required to accommodate the site

Pumping & Storage Project Costs (1-10 years)

$7.3 million

New 5,000 m^3 Zone 1 Elevated Tank

- 75% water rates
- 25% development charges

$1.6 million

Decommission Existing Zone 1 Elevated Tank

- To Occur at end of Existing Tank's Useful Life

Storage Projects
Mainly Funded from Water Rates

$1.6 million

New 120 L/s Zone 2 BPS

- 100% development charges
- Co-located with new Zone 1 elevated tank

$2.0 million

New Zone 3 BPS (Phase 1)

- Built in phases to 272.5 L/s
- 1st Phase 100 L/s
- 100% development charges

Pumping Projects
Funded from Development Charges

Costs Including Contingencies

Pumping & Storage Project Costs (10+ years)

$4.9 million

4,000 m^3 of New Zone 2 Floating Storage

- 100% development charges
- Two at Grade Tanks in Phases

$3.1 million

Additional Zone 1 Storage

- 100% development charges
- Min. Capacity of 1,200 m^3 - could be larger for fut. growth

Storage Projects
Funded from Development Charges

$1.8 million

Expand Zone 3 BPS (Phase 2)

- Build in phases to 272.5 L/s
- 100% development charges

$1.6 million

Expand Ewart BPS by 160 L/s

- 100% development charges
- Total pumping capacity of 312 L/s at Ewart Street BPS

Pumping Projects
Funded from Development Charges

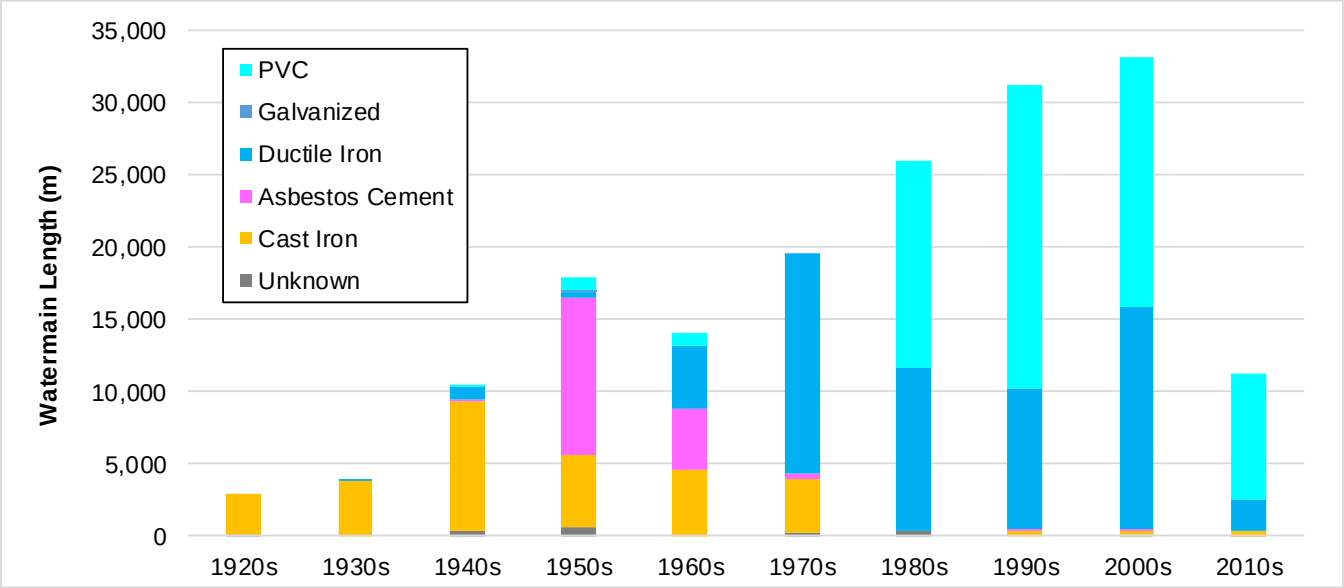
Costs Including Contingencies

5

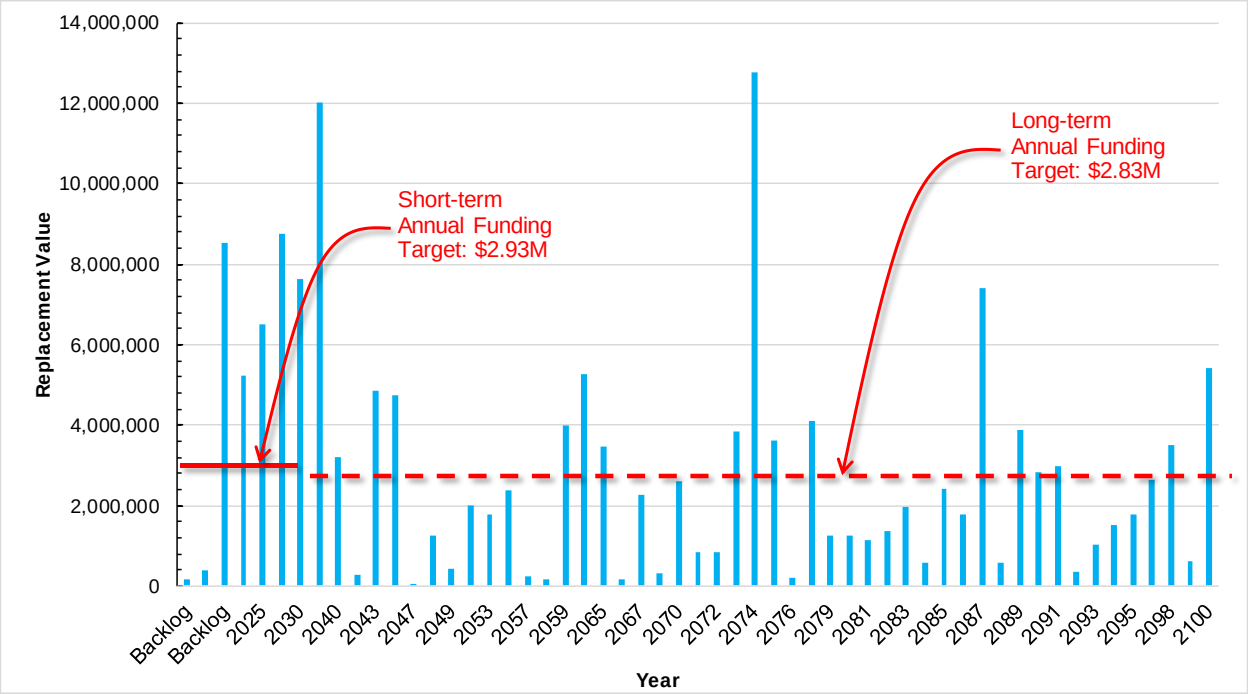
Distribution System

Current & Future Needs

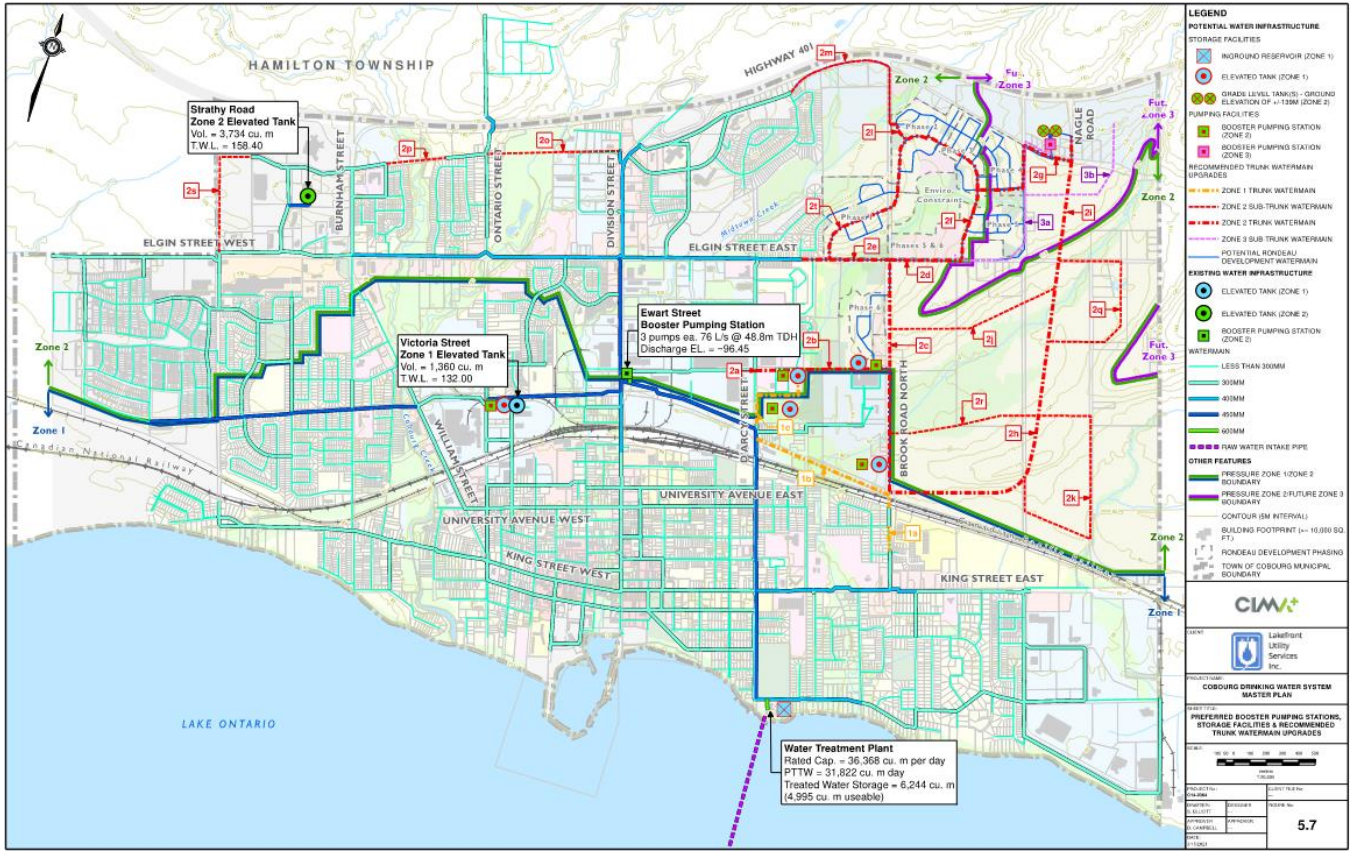
Watermain Age and Materials



Annual Replacement Forecast



Distribution System Expansion (trunk & sub-trunk watermains)

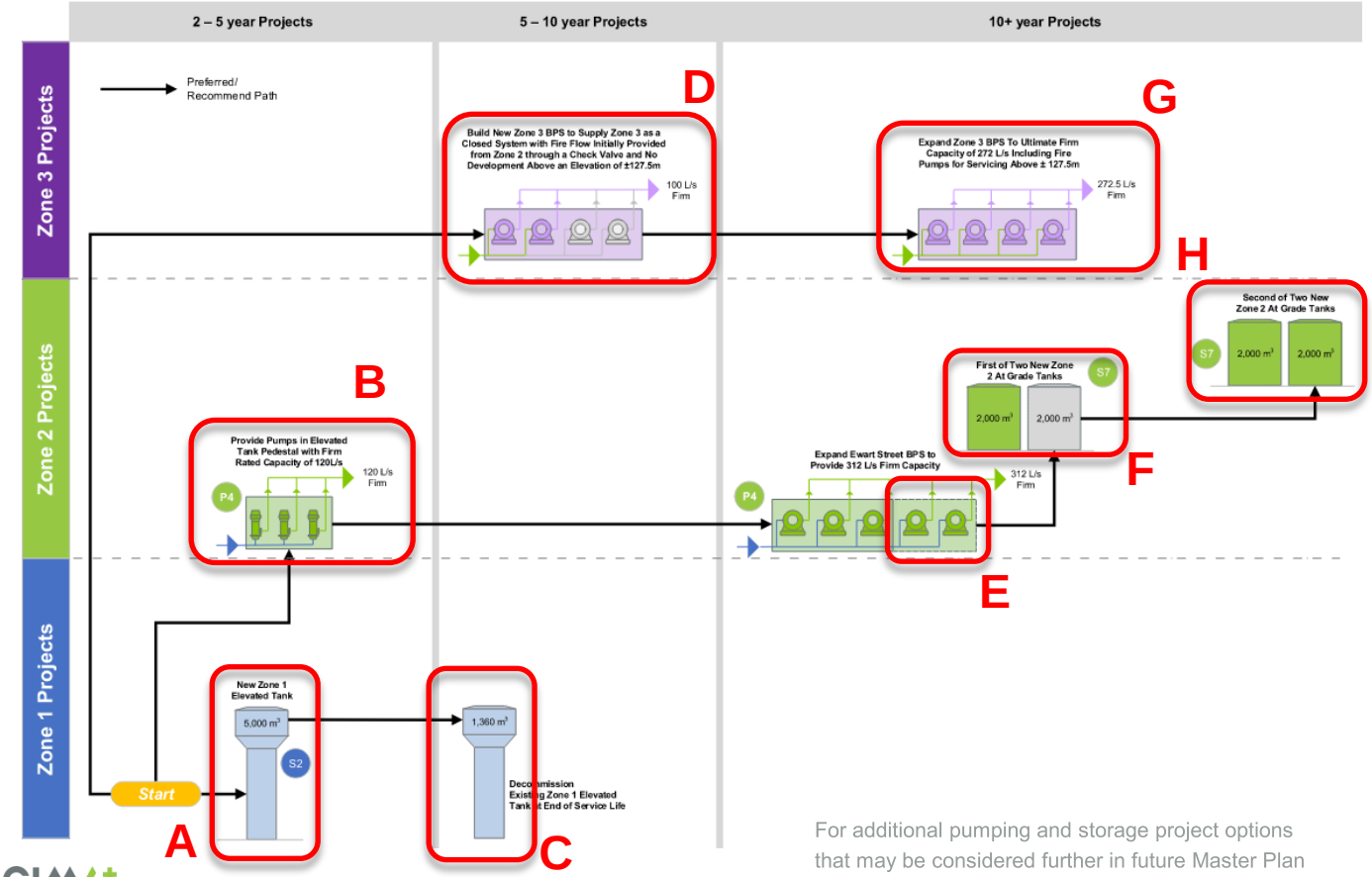


- Primarily growth driven in Zone 2
  - Most of these watermains will be 100% development funded
- Some Zone 1 upgrades to supply new pumping and storage facilities
  - Partially rate funded

6

Wrap-up

Preferred Pumping and Storage Projects Implementation Sequence

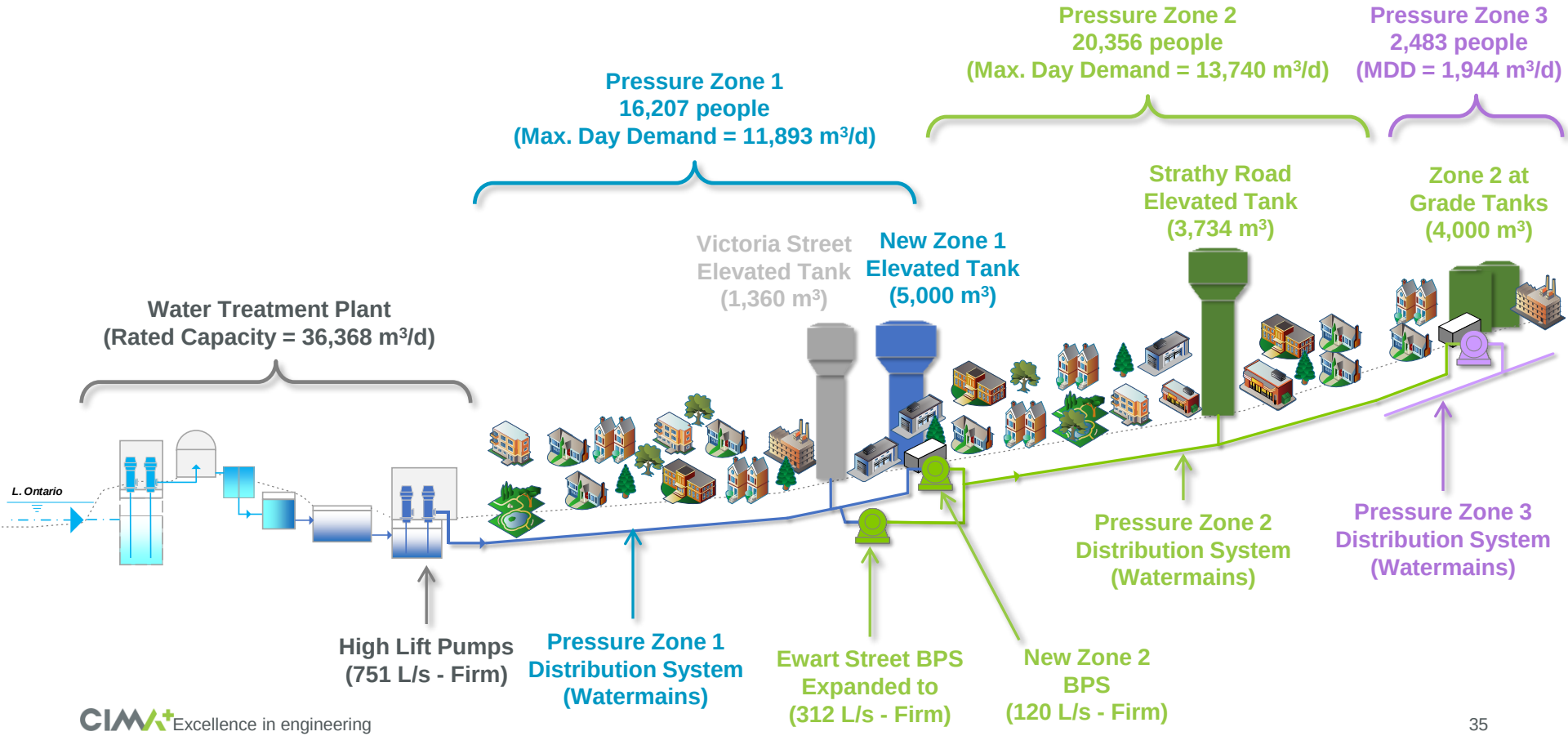


Preferred Path Projects

- **A** New 5,000 m³ Zone 1 Elevated Tank
- **B** New 120 Zone 2 Booster Pumping Station
- **C** Decommission Existing Zone 1 Elevated Tank at End of Its Useful Life
- **D** 1st Phase of Zone 3 Pumping Station
- **E** Expand Ewart Street Booster Pumping Station
- **F** 1st of Two at Grade Tanks to Expand Zone 2 Storage
- **G** Expand Zone 3 Pumping Station
- **H** 2nd of Two at Grade Tanks to Expand Zone 2 Storage

For additional pumping and storage project options that may be considered further in future Master Plan processes, see Executive Summary Figure 3.6.

Future Drinking Water System at Build-out



Master Plan Related Costs Next 10 years

Values Are Rounded
Includes Forecast of Routine Infrastructure Maintenance and Replacement

Project Category	Gross Capital	Rate %	Funded by Rates	Growth %	Funded by Development Charges
Watermain Renewal Projects (10-year program)	29,300,000	100%	29,300,000	0%	0
Watermain Expansion Projects	17,100,000	16%	2,800,000	84%	14,300,000
Pumping & Storage Projects	22,900,000	28%	6,412,000	72%	16,488,000
Water Treatment Projects	15,300,000	56%	8,568,000	44%	6,732,000
Total	**84,600,000**	**56%**	**47,886,000**	**44%**	**37,214,000**

Master Plan Related Costs 10+ years

Values Are Rounded

Does Not Include Routine Infrastructure Maintenance and Replacement

Project Category	Gross Capital	Rate %	Funded by Rates	Growth %	Funded by Development Charges
Watermain Expansion Projects	7,000,000	0%	-	100%	7,000,000
Pumping & Storage Projects	11,440,000	0%	-	100%	11,440,000
Water Treatment Projects	2,015,000	100%	2,015,000	0%	-
Total	**20,455,000**	**10%**	**2,015,000**	**90%**	**18,440,000**

What We've Heard

- Most responses agree with the preferred location for the new Zone 1 elevated tank/Zone 2 booster pumping station near the CCC.
- Those that indicate they disagree with the preferred location for the new Zone 1 elevated tank/Zone 2 booster pumping station near the CCC (i.e. Option 5) have a preference for Option 4 with facilities to be located on future development lands further east (i.e. Option 4 within Phase 2 of the Rondeau/Tribute development).
  - While technically possible, this option (Option 4) is not preferred for the reasons previously outlined in the location evaluation.
  - This option (Option 4) would also likely be at the expense of land within the development that would be dedicated to the Town for recreational uses.

Survey Responses Received Through Engage Cobourg after Public Information Presentation

Response	Preferred Site for New ET / BPS Near CCC	Overall Master Plan Recommendations
Strongly Agree	2	1
Agree	6	6
Disagree	-	-
Strongly Disagree	1	1
Don't Know	2	2
Total Responses	**11**	**11**

What We've Heard

- Impacts (increases) to water rates, wise use of financial resources and accessing alternative funding sources
  - Allowances for the majority of the projects identified as required within the next 10-years were incorporated in the most recent water rate study, which was presented to Council in January of 2021.
  - Most of the projects required beyond the 10-year time horizon are development driven and will be funded largely through development charges.
- Actual growth may not justify the recommendations presented in the master plan
  - The master plan provides a "road map" to requirements at full build-out so that decisions that are made as development progresses can be aligned with long-term needs. Beyond the projects that are identified as necessary today, the timing of other recommended projects would be dictated by development occurring and would not occur until justified by water demands.
- Pumped storage (inground reservoirs) instead of floating storage (water towers)
  - Some floating storage is beneficial to avoid the need for continuous pump operation and provide for maintenance of pressure without pump operation.
  - Reservoir options are possible, but generally have more operational complexity. Either they require more pumping facilities (pump-in, pump-out) or they must be placed remote from the area they serve at a higher elevation.

What We've Heard

- Climate change impacts on water use & lake levels
  - Water demand forecast does not consider a further trend of additional water conservation in Cobourg as per capita demands have declined in the past and this may be offset by climate change related increases.
  - Actuated gates have been installed to protect the low lift pumping facilities on the shoreline from the effects of high lake levels.
  - The depth of the intake is adequate to not be impacted by low lake levels.
- Aesthetic design of new buildings & facilities and opportunities for additional public uses
  - This can be addressed through detailed design of the facilities. Additional public uses on the sites will have to be balanced with considerations for safety of the public and necessary security of the infrastructure and water supply.
- Backflow prevention and exposure to potential sources of contamination
  - LUSI and its partners monitor the security of the water supply and plan for its protection through the source water protection process
  - A County-wide backflow prevention by-law has been created and is being applied to certain new development projects. The next steps include education sessions for the public and stakeholders to outline timelines for backflow prevention implementation and how backflow prevention requirements will be enforced.
  - New facilities will be designed to mitigate against potential sources of contamination local to the sites.

Next Steps

Schedule B Projects

- New Zone 2 BPS
- New Zone 3 BPS
- New Zone 1 ET at Preferred Site
- New Zone 2 At-Grade Tanks
- New Zone 3 BPS
- Linear Watermain Projects not within an Existing Road Allowance

Presentation Summary

Significant pop. and demand growth (+79%) to build-out

An existing storage deficit and increased demand require new storage facilities in Zone 1 and ultimately Zone 2

Existing pumping capacity can support some growth (2,220 ppl) before new and expanded pumping facilities are required

WTP has sufficient capacity to support growth to build-out, but requires investment to sustain that capacity

Renewal and expansion of the existing distribution system represents a significant cost funded through rates and development

Questions…

Thank You!