Municipal Class Environmental Assessment for the Additional Water Supply, Water Storage, and Pumping Facilities for the Community of Sunderland

August 23, 2021

Project Update Meeting for Township of Brock Council

DURHAM REGION

Service Excellence for our Communities

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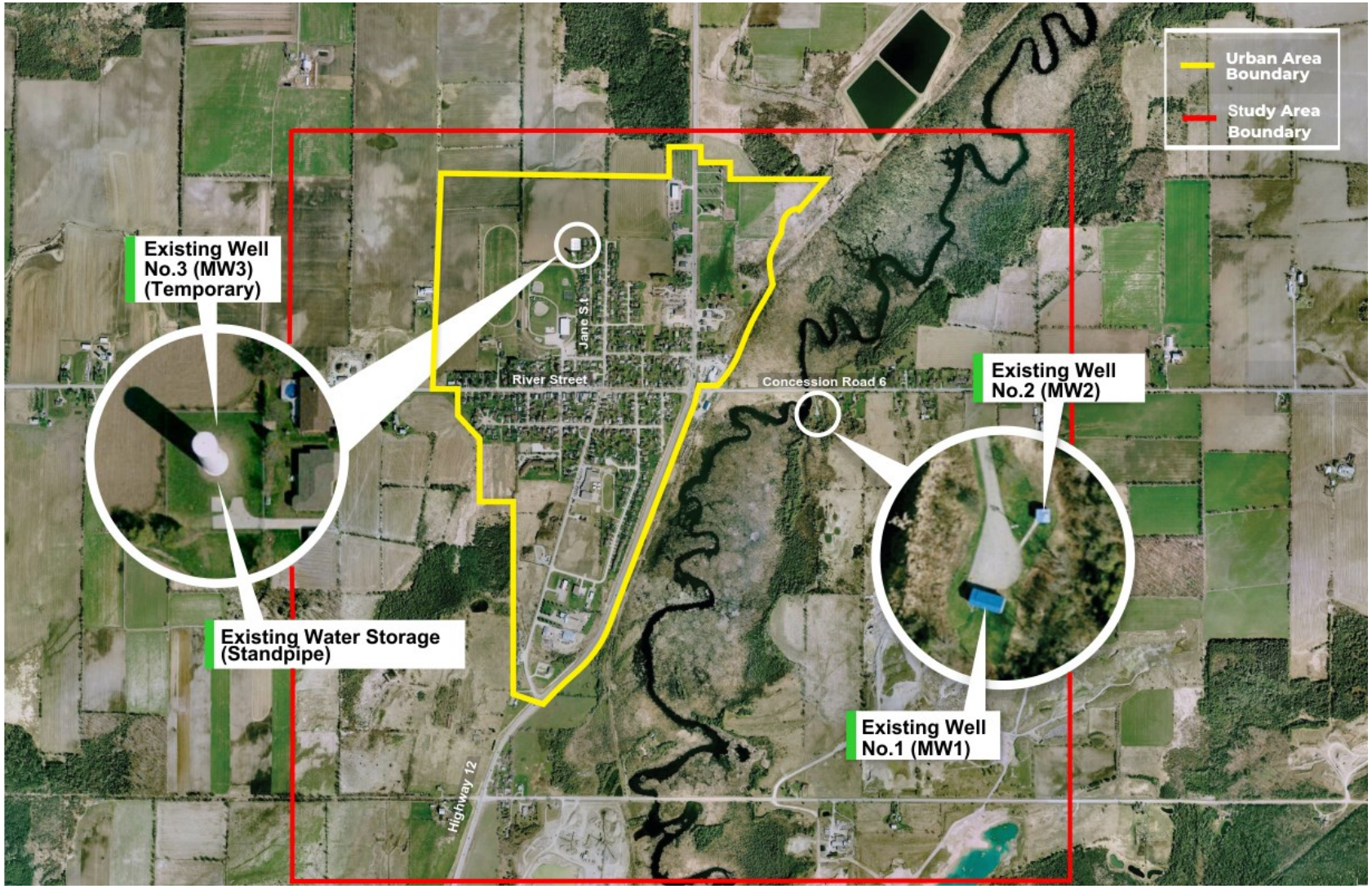
AGENDA

- Introductions
- Project Background
- Project Status
  - Summary of groundwater exploration study
  - Evaluated list of Alternative Solutions for Water Supply and Water Storage
  - Evaluation Criteria
  - Preferred Alternatives for Water Supply and Securing Land for Potential Future Water Source
  - Preferred Alternatives for Water Storage
- Schedule
- Questions

SUNDERLAND STUDY AREA



EXISTING SUNDERLAND MUNICIPAL WATER SYSTEM

The current Municipal Water System servicing the Sunderland Urban Area is comprised of:

Water Supply

Municipal Well No. 1 (MW1)

- Constructed in 1957
- Classified as Groundwater Under Direct Influence of Surface Water (GUDI) with in-situ filtration
- Permit to Take Water (PTTW) rating is as high as 17.05 L/s, however due to current operational limitations, MW1 can only be operated at 8.2 L/s

Municipal Well No. 2 (MW2)

- Constructed in 1972
- Classified as GUDI with in-situ filtration
- Water quality of MW2 declined over the years, exceeding aesthetic objectives and operational guidelines for manganese, iron and hardness.
- PTTW rating as high as 17.05 L/s, however due to current operational and water quality issues, MW2 has been taken offline

Municipal Well No. 3 (MW3)

- Constructed in 2020
- Developed to temporarily supplement MW1 due to MW2 being taken offline, in order to provide security of the Sunderland water supply system
- PTTW rating as high as 10 L/s, & will be operated until a permanent solution for water supply is determined

EXISTING SUNDERLAND MUNICIPAL WATER SYSTEM CONT'D

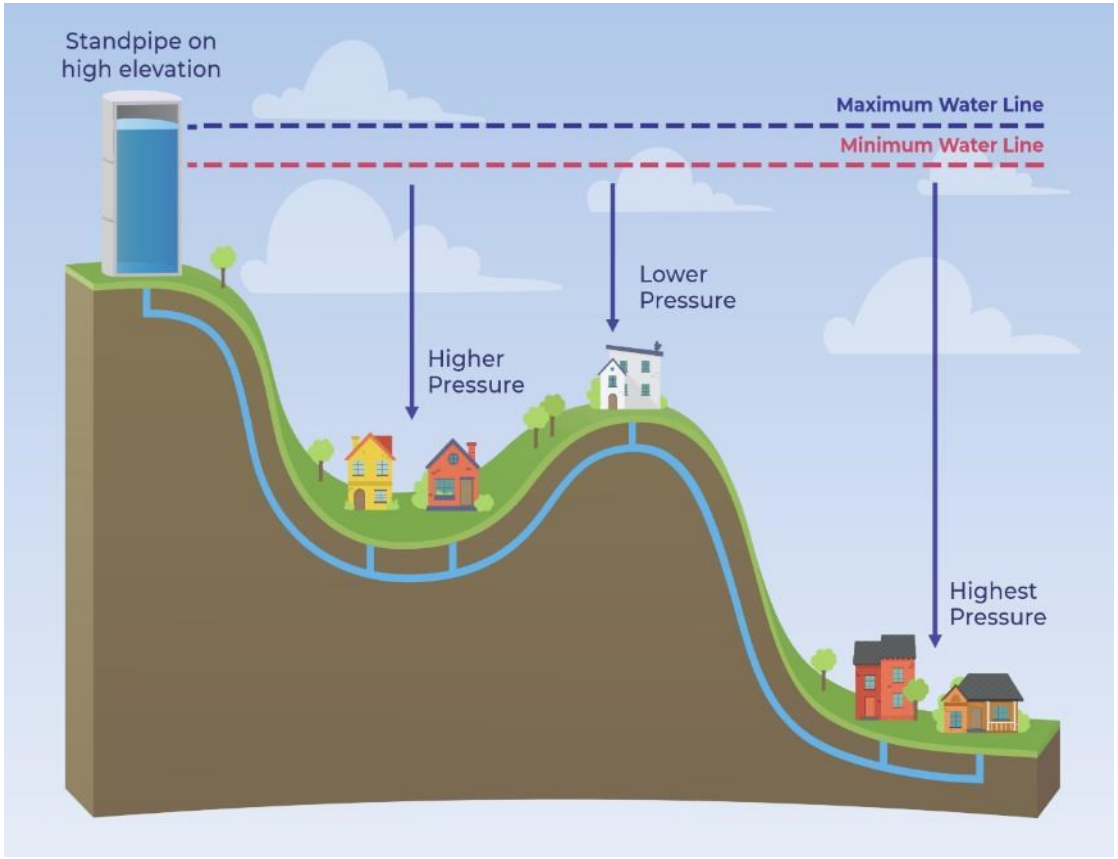
Water Storage

Standpipe – Jane Street

- Constructed in 1979
- Total Storage Volume of 1.77 Million Liters (ML)
- **Total Usable[1] Storage Volume of 0.93 ML**
- Existing Usable Storage Volume is <u>not</u> sufficient to meet Ministry Design Guidelines

Distribution System

- Approximately 9km of watermains
- Serviced by one Pressure Zone



[1] Usable storage is the volume of water stored in the standpipe which can be utilized without causing the distribution system pressures to drop below minimum requirements or cause damage to the water supply system.

TIMELINE OF THE CHANGES TO THE SUNDERLAND WATER SUPPLY SYSTEM

Summer 2017

MW2 Offline

- MW2 Taken Offline
- MW1 only well remaining operational to provide water supply to Sunderland

Note: MW – Municipal Well

Summer 2017- Mid 2018

Groundwater Exploration Program

- Region undertook an emergency well exploration program to urgently find a backup groundwater source
- New source was identified at the same property as the Existing Jane Street Standpipe
- Declaration Order Issued by Ministry to permit installation of the emergency well. This order requires the Class EA Process to Address Long-Term Water Supply Needs

2018 - 2020

Design and Construction of MW3

- Development of an emergency municipal groundwater well (MW3) on the existing Jane Street Standpipe property and associated treatment system

Present - 2021

Class EA Process

- Notice of Commencement - Issued February 2019
- Public Information Centre No.1 Held– June 2019
- Groundwater exploration program to secure long term source of water is completed - February 2019 to Winter 2020
- Supporting investigations completed (e.g. Archeological, cultural, geotechnical, hydrogeological, natural environmental, etc.) - Feb 2019 to Fall 2020

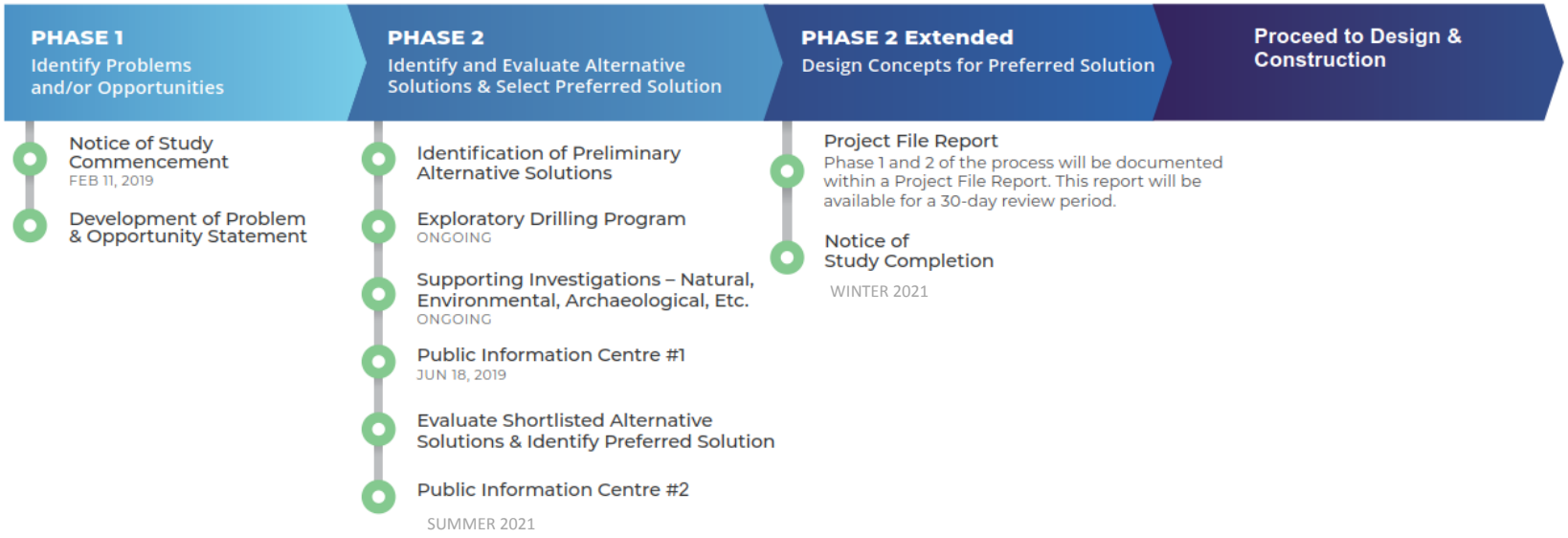
CLASS EA OBJECTIVES

The objectives of the Schedule “B” MCEA study are to:

- Plan for a permanent source of water supply
- Plan for additional water supply capacity
- Plan for additional water storage capacity
- Plan for additional pumping facilities
- Address aesthetic quality (taste, odour and colour)

The additional capacity is required to:

- Provide a secure and sustainable water supply system for the growing community of Sunderland, in accordance with land uses currently approved under the Durham Regional Official Plan (2017)



Long Upgrades Required for the Sunderland Water Supply System

	Current System	Ultimate Build-Out
Population	• Current Serviced Population (2018) of **1,573 persons**	• Population may grow as high as **4,372 persons** based on land uses currently approved under the Durham Regional Official Plan (2017)
Water Supply	• Current[1] Firm Capacity[2] Required (Max. Day Water Demand): 8 L/s • MW1 can provide: 8 L/s • MW3 (temporary) can provide: 10 L/s	• Estimated Firm Capacity[2] Required (Max. Day Water Demand): 31 L/s
Water Storage	• Current Usable Storage: 0.93 ML • Current Water Storage Required: 1.0ML • Deficit[3] Storage Volume of 0.07ML	• Additional Future Storage Required: 1.0 ML • Estimated Total Storage Required: 2.0 ML

[1] Based on historical water demand data from 2007 to 2018

[2] Firm Capacity refers to the total capacity of all the wells available to service the water demand if the largest well is out of service. The existing well system of Sunderland MW1 can provide water at 8 L/s, as well as MW3 at 10 L/s if it is determined to be a permanent well long-term as part of the Class EA process. For example, at present the firm capacity is the total capacity less the largest well capacity or (8L/s + 10L/s) - 10L/s = 8 L/s. Based on this, the available firm capacity of the system is provided by the remaining well MW1 at 8 L/s.

[3] Current minor storage deficit is being compensated by additional pumping and supply from the well system, as required by the system.

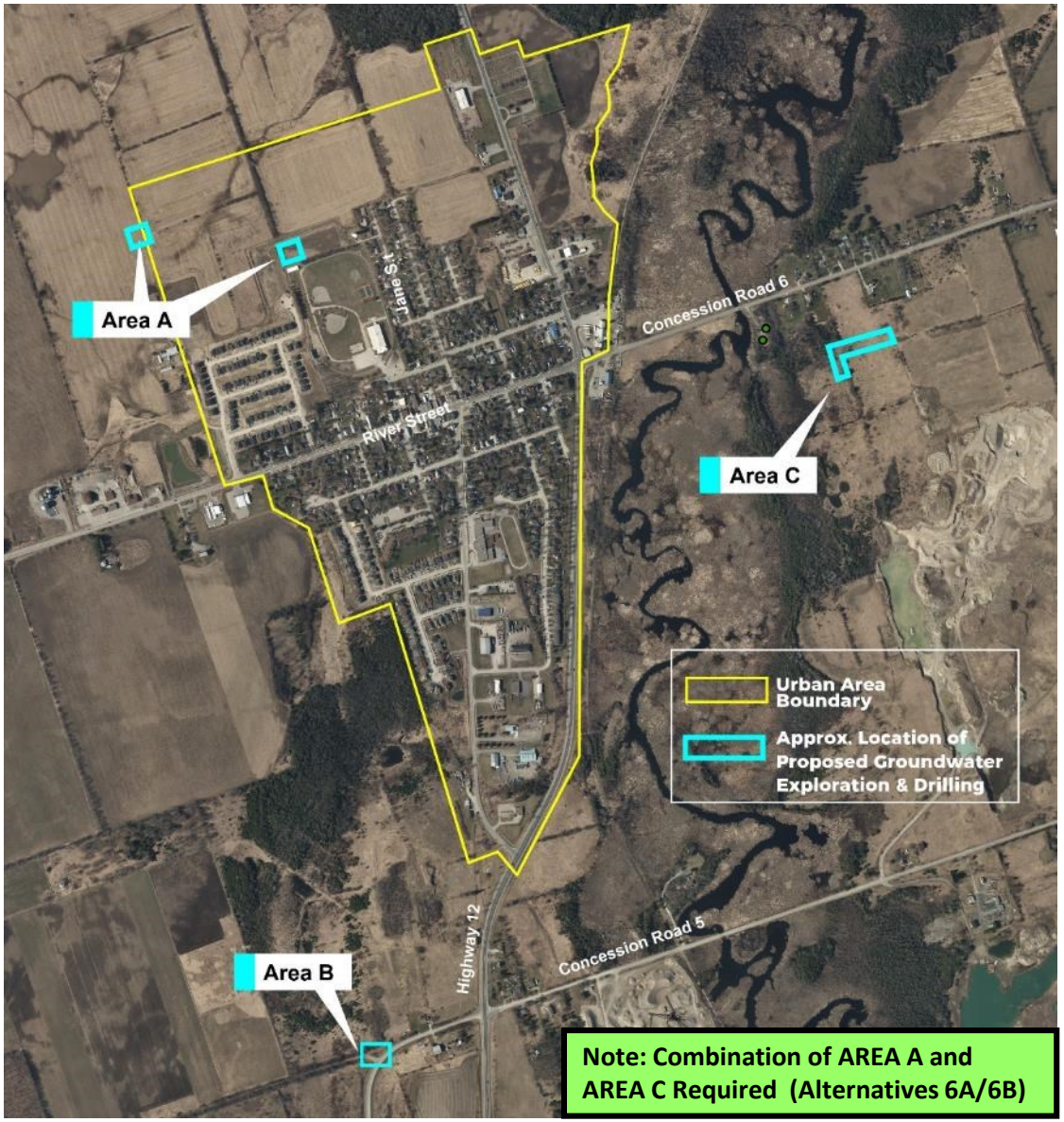
PRELIMINARY LIST OF WATER SUPPLY ALTERNATIVES

	Preliminary Assessment of Water Supply Alternatives
1. Do nothing 2. Limit community growth 3. Implement water conservation measures	Alternatives 1, 2, and 3 do not meet the Problem & Opportunity Statement, thus will not be considered further.
4. Optimize and restore the capacity of MW1 5. Restore MW2 to original capacity through added treatment 6. Development of a new groundwater source to supplement and/or replace the existing well(s) A. New local municipal groundwater well(s) (i.e., in Sunderland or the immediate surrounding area) B. Transition MW3 from an emergency/temporary well to a permanent part of the water supply system C. New municipal groundwater well(s) developed in a nearby community and conveyed to Sunderland	Alternatives 4, 5, 6A, and 6B are feasible solutions, and will be reviewed and evaluated in detail to identify a preferred solution. Source Water Protection will be addressed as part of the evaluation of shortlisted alternatives.
7. Conveyance from another existing municipal groundwater-based system (e.g., Cannington) 8. Conveyance from an existing municipal surface water-based system (e.g., Beaverton) 9. Development of a new surface water supply (e.g., Beaver River)	Alternatives 6C, 7, 8 and 9 may be feasible solutions, however, have significant financial costs. These alternatives will only be considered further if all of the alternatives identified above are determined to not be viable solutions during the detailed evaluation.

GROUNDWATER EXPLORATION

Ground Water Exploration Program Findings:

- **Area A** - produced good quantity of water however quality of water required additional treatment (high nitrates).
- **Area C** - produced good quality of water however limited quantity of water.
- **Area B –** was not explored as Area A and Area C results were favourable. Area B is also technically complex and would have higher financial costs.



GROUNDWATER EXPLORATION

Test wells drilled at Area A and Area C to find permanent municipal water wells:

- Area A (TW19-3, TW19-1)
- Area C (TW19-4)

Note: Combination of **AREA A** and **AREA C** required (Alternatives 6A/ 6B). Target Firm Capacity of 32 L/s.

EVALUATION CRITERIA FOR ASSESSING SHORTLISTED ALTERNATIVES

Each of the shortlisted alternatives has been evaluated based on the following criteria:

Criteria	Example Considerations
Social & Cultural	• Consistency with Local & Provincial • Policies/Planning • Property Impacts • Potential to Affect Residents • Drinking Water Quality & Protection to Public Health • Potential to Affect Archeological Resources • Potential to Affect Heritage Features • Potential to Affect First Nations Rights and/or Interest
Economic	• Life cycle costs (capital cost, operation & maintenance cost) • Sustainability and affordability

Criteria	Example Considerations
Technical	• Construction Feasibility • Implementation Staging • Potential to Impact Existing Utilities • Ease of Integration with Existing Infrastructure • Site Access Requirements • Odour/Noise Impact • Operations • Treatment Requirements • Water System Approvals & Requirements • Water Quality Monitoring • Aquifer Redundancy
Environmental	• Potential to Affect Fish/Fish Habitat • Potential to Affect Wetlands and/or Surface Water • Potential to Affect Species at Risk (SAR) and/or Significant Wildlife Habitat • Potential to Impact Designated Natural Areas • Potential Effects on Existing Private/Local Wells • Climate Change Impacts Wastewater Disposal

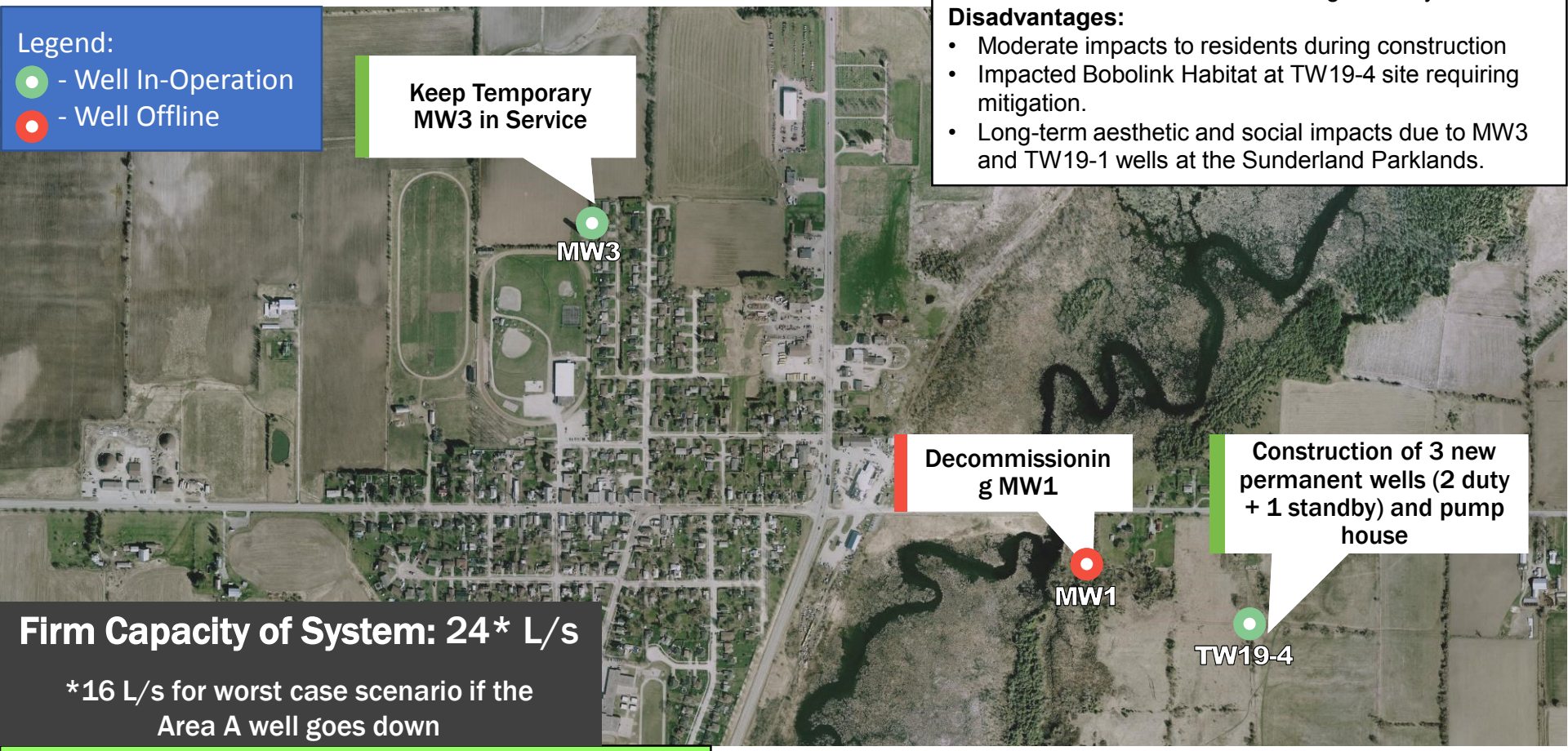
				
1	2	3	4	5
Poor Alignment with Criteria	Not Well Aligned with Criteria	Somewhat Aligned with Criteria	Well Aligned with Criteria	Very Well Aligned with Criteria

PREFERRED ALTERNATIVE & STAGING FOR WATER SUPPLY

PREFERRED SCENARIO - PHASE 1

Advantages:
- Aquifer and site redundancy
- Lowest Lifecycle Cost Estimate
- Low construction complexity
- Both sites are close to the existing water system

Disadvantages:
- Moderate impacts to residents during construction
- Impacted Bobolink Habitat at TW19-4 site requiring mitigation.
- Long-term aesthetic and social impacts due to MW3 and TW19-1 wells at the Sunderland Parklands.

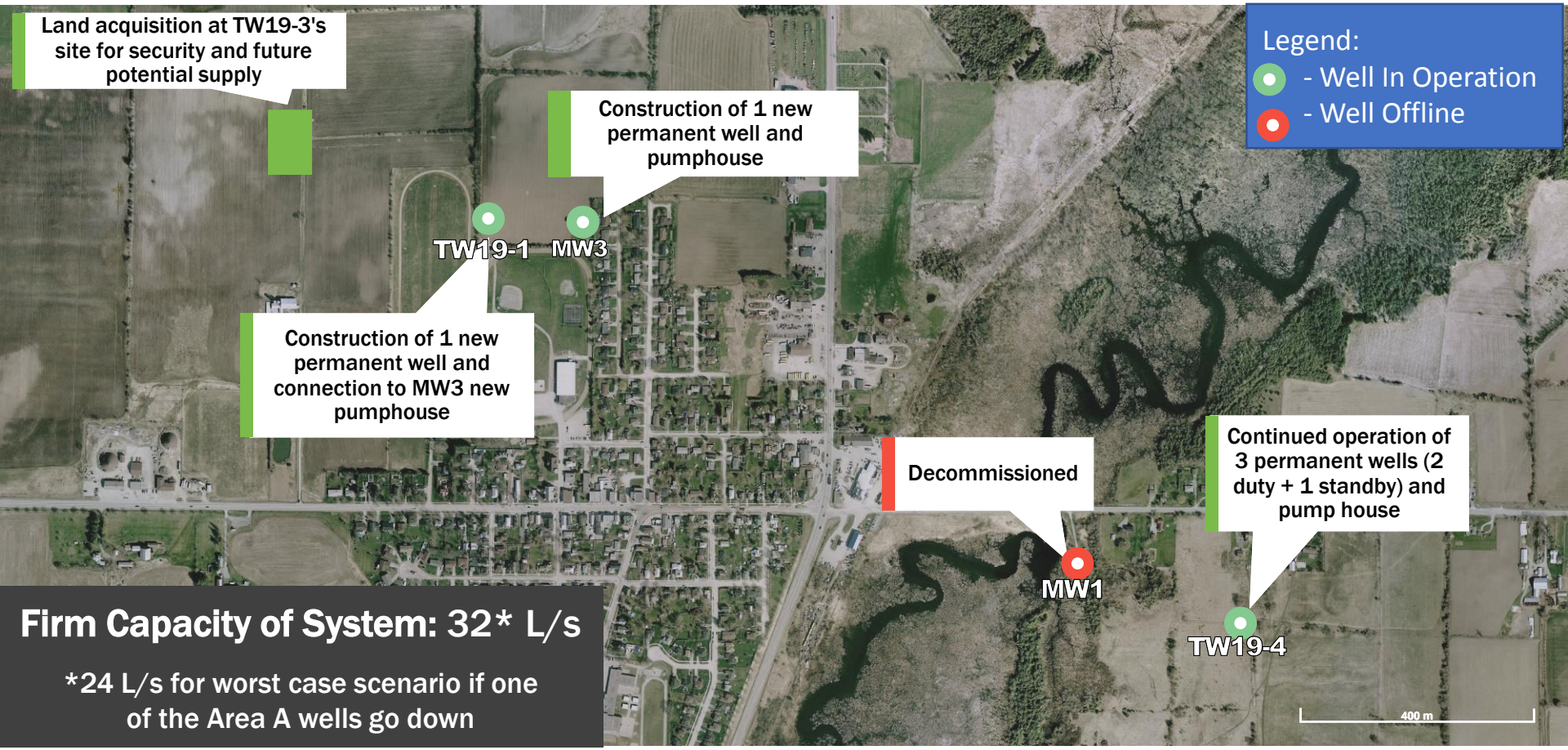


Firm Capacity of System: 24* L/s

*16 L/s for worst case scenario if the Area A well goes down

Note: There are various phasing options for the preferred option, however it is preferred to have aquifer redundancy in the beginning with TW19-4 wells in operation first. As such, this was the preferred phasing for this option.

PREFERRED SCENARIO – PHASE 2

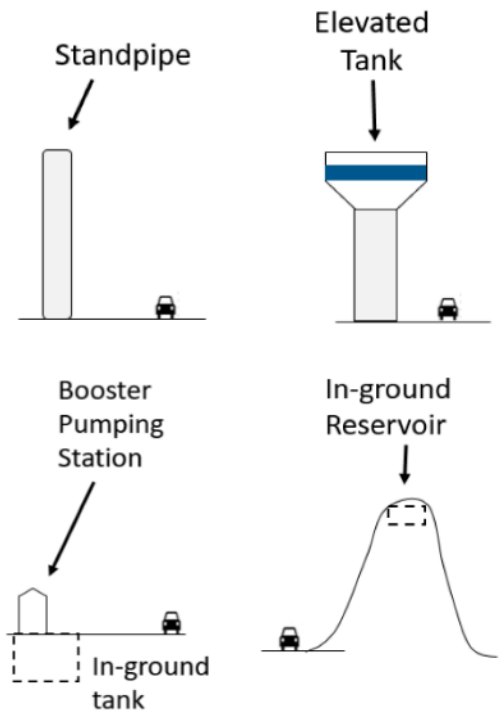


Preferred Scenario provide sufficient capacity for the Full Buildout of Existing Sunderland Urban Boundary ± **4,372** people.

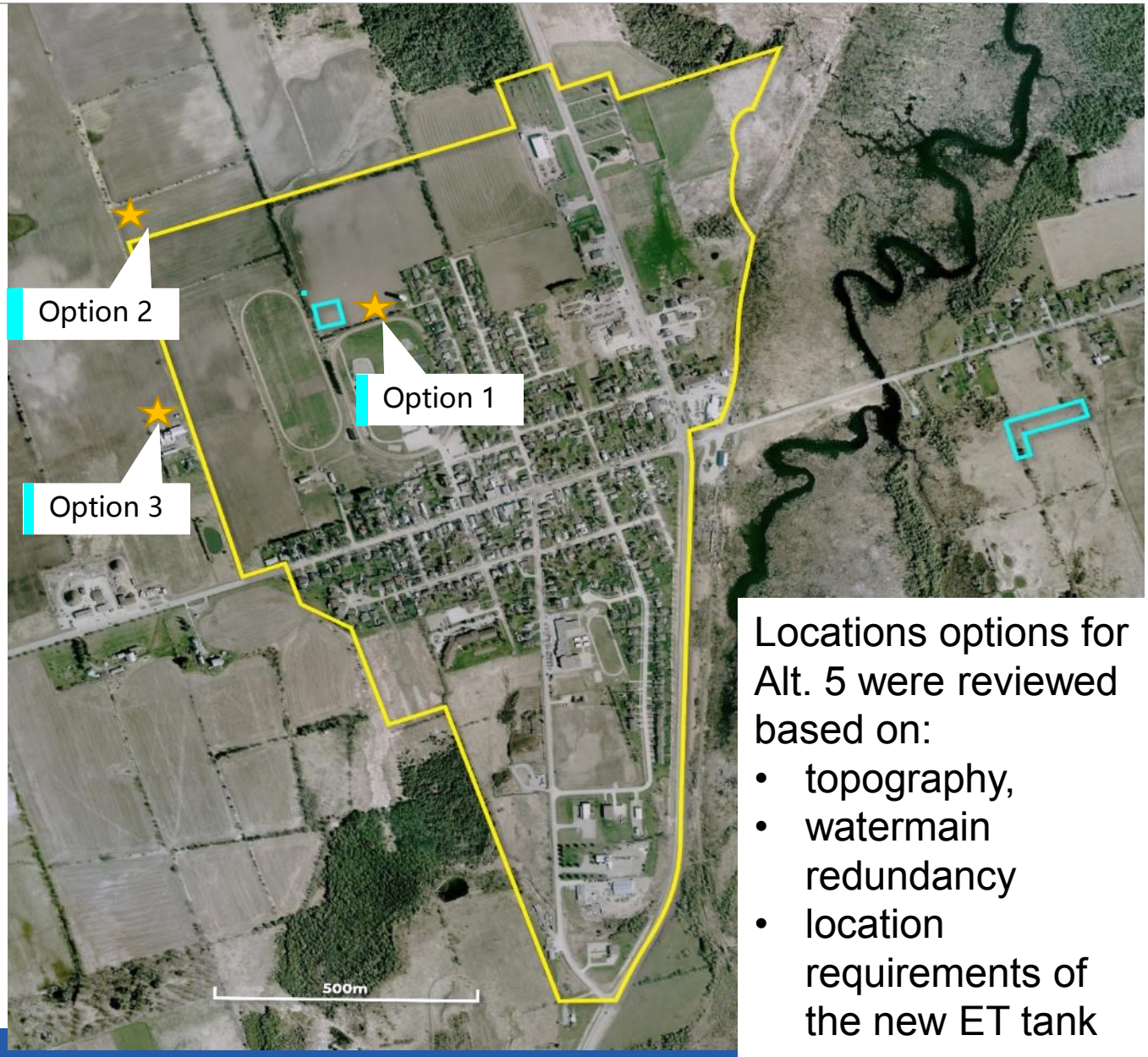
PRELIMINARY LIST OF WATER STORAGE ALTERNATIVES

	Preliminary Assessment of Water Storage Alternatives
1. Do Nothing 2. Limit Community Growth 3. Implement Water Conservation Measures	Alternatives 1, 2, and 3 do not meet the Problem & Opportunity Statement, thus will not be considered further.
4. Construct a New Water Storage Facility at a New Location to Supplement the Existing Standpipe 5. Construct a New Water Storage Facility and Decommission the Existing Standpipe A. New Storage Facility Constructed at the Existing Standpipe Location B. New Storage Facility Constructed at a New Location	Alternatives 4, 5A and 5B are feasible solutions, and will be reviewed and evaluated in detail to identify a preferred solution.
6. Keep Existing Standpipe and Supplement Storage Needs with Additional Pumping	Alternatives 6 is not a technically feasible solution as it does not address provision of the required storage volume to meet the Ministry's guidelines.

STORAGE OPTIONS FOR ALTERNATIVE 5



- Target = 2,008 m^3 of Storage Volume for Ultimate Build-Out

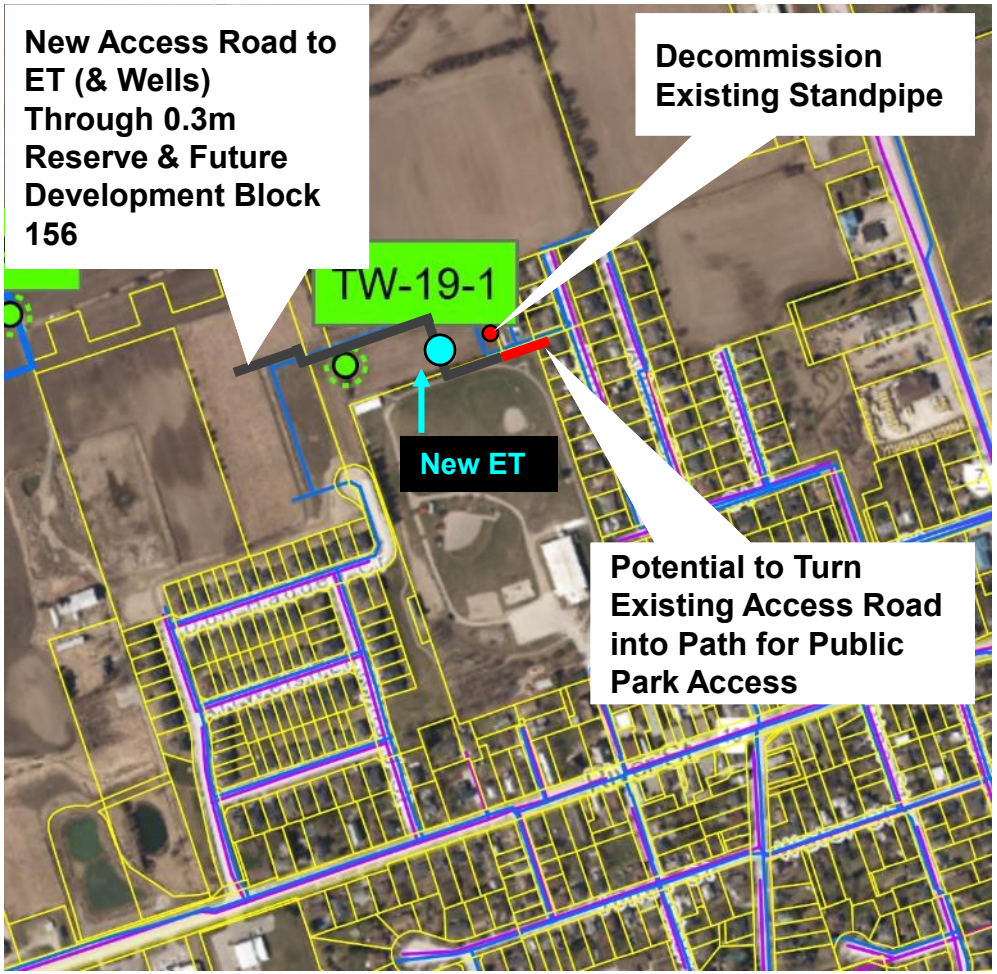


Locations options for Alt. 5 were reviewed based on:

- topography,
- watermain redundancy
- location requirements of the new ET tank

PREFERRED ALTERNATIVE & STAGING FOR WATER STORAGE

- Location Options for Alternative 5 evaluated similar to Water Supply
- Option 1 – Park Land was identified to be the preferred alternative:
  - New ET tank
  - Decommission existing Standpipe
  - Connection of ET at nearby stormwater management pond



CLASS EA SCHEDULE

Project Phases	Anticipated Date
Virtual Public Information Center #2	September 2021
Submission Date for Comments Following Virtual Public Information Centre	October 2021
Publication of Notice of Study Completion and Phase 1 & 2 ESR Report for 30-day Public Review	December 2021
MCEA Completion	January 2022

QUESTIONS?