

APPENDIX 4

EVALUATION OF LONG LIST OF ALTERNATIVES TECH MEMO



TECHNICAL MEMORANDUM

To: Justin Wilson, City of Hamilton **RVA:** 215933
From: Andrew McGregor, RVA
Date: February 2, 2024
Subject: Evaluation of Long List of Alternatives

1.0 Introduction

R.V. Anderson Associates Limited has been retained by the City of Hamilton (the City) to provide engineering services for the Carlisle Water Storage Facility Municipal Class Environmental Assessment (EA) and Conceptual design (the project).

Based on the Problem and Opportunity Statement developed through the EA, additional water storage infrastructure is required within the Community of Carlisle to address the community's water storage capacity needs now, and in the future.

This Class EA will identify and evaluate the various types of water storage facilities and the potential sites for the required water storage infrastructure. The type of water storage facility has not been determined at this stage. This will be completed following the evaluation of the long list of alternatives.

2.0 Long List of Alternatives

As part of the EA process, a long list of alternatives to address the Problem and Opportunity Statement was created. The long list of alternatives identified eight (8) potential locations for a new water storage facility.

- Area 1: Tower Park (40, 42, 48 Woodend Drive)
- Area 2: William Street (1535 Centre Road)
- Area 3: Baseball Diamonds (1496 Centre Road)
- Area 4: Tennis Court (1496 Centre Road)

- Area 5: 302 Carlisle Road
- Area 6: Centre Road
- Area 7: Palomino Park (8 Oldenburg Road)
- Area 8: Carlisle Memorial Park

An aerial view of the locations is shown in Figure 2-1 below.

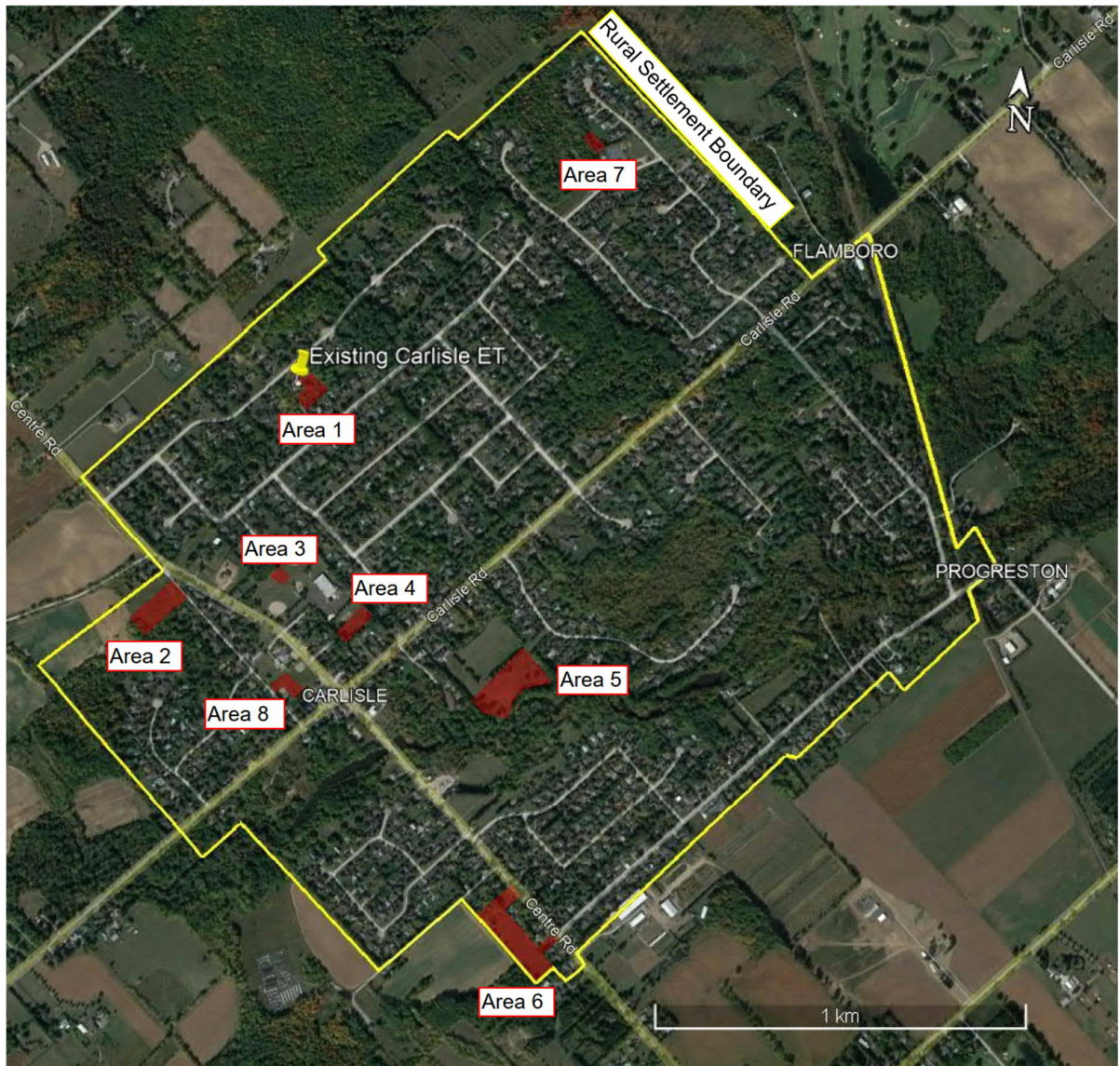


Figure 2-1 - Long List of Alternatives

2.1 Long List of Alternatives Evaluation

The long list of alternatives was evaluated based on three main criteria.

- Is the alternative feasible and reasonable?
 - Can a water storage facility be constructed?
 - Is there enough space? Is there access to the property? Can a water storage facility, access road, and construction laydown area be provided?
 - Is the elevation reasonable compared to other alternatives? Will there be significant additional effort to reach the required pressures and overcome the elevation change?
 - Is there an existing watermain approaching the property? Is a watermain extension required? Does the size of the existing watermain need to be upgraded?
 - Is the area appropriate for a water storage facility? Are there any local hazards? Are there any utility interferences?
 - Will there be any impact to existing infrastructure? Will there be any shutdowns/interruptions? Will there be an impact to the local environment?
 - Is it a long-term solution? Or is it a temporary/short term solution?
 - Is the cost reasonable compared to the other alternatives?
- Does the alternative address the identified problem/need?
 - Does the alternative meet the Problem and Opportunity Statement?
 - Does the alternative meet long term growth? Allows for growth to buildout, or will significant upgrades be required to reach the projected growth demands?
 - Will the alternative be resilient to future changes in climate? Will the projected changes in weather have an affect on the alternative? More rain, more heat, etc.
 - Will the projected changes, including construction, have an impact on the aquifer? Impact water demand, contamination, etc.

- Will the projected changes to local, provincial, or federal regulations have an impact on the alternative? Cleaner water, enhanced testing, additional testing procedures, etc.
- Does the alternative meet applicable planning policies?
 - Does the alternative follow the Rural Hamilton Official Plan? Is the infrastructure located in Rural Settlement Boundary? Is the development located in a hazardous area (flood, erosion, etc.)?
 - Does the alternative follow the Water and Wastewater Master Servicing Plan/Carlisle Water Supply Master Plan? Provide water storage for the projected population/water demand to buildout.
 - Does the alternative follow the Recreation Master Plan? Allow for additional baseball diamonds and tennis courts and does not affect current baseball diamonds or tennis courts.

Table 2.1 below presents a summary of the screening of the long list of alternatives against the evaluation criteria. The expanded table is provided as **Attachment 1**.

Table 2.1 - Evaluation of Long List of Alternatives

Alternative	Is it feasible and reasonable?	Does it address the identified problem/need?	Does it meet applicable planning policies?	Carry to Short List
Area 1: Tower Park	Yes	Yes	Yes	Yes
Area 2: William Street	Yes	Yes	Yes	Yes
Area 3: Baseball Diamonds	No	Yes	No	No
Area 4: Tennis Court	No	Yes	No	No
Area 5: South of Carlisle Road	No	Yes	Yes	No
Area 6: Centre Road	No	Yes	Yes	No
Area 7: Oldenburg Road	No	Yes	Yes	No
Area 8: Carlisle Memorial Park	No	Yes	Yes	No

1.1.1. Area 1: Tower Park

Tower Park is the current location of the existing Elevated Tank and meets all short list evaluation criteria. The location is technically feasible, it addresses the identified problem, and it meets applicable policies (e.g. Water and Wastewater Master Plan, Recreation Master Plan, Rural Hamilton Official Plan). The Hydraulic Modeling investigation confirmed the fire flows and pressure under future condition are acceptable.

Tower Park is administered by the City's Parks/Cemeteries, Facilities and Recreation Department. As such, City owned parkland would be required for a new storage facility and a fee would be required to compensate the Parks/Cemeteries, Facilities and Recreation Department for the land. This alternative is recommended to be carried forward to the short list.



1.1.2. Area 2: William Street

The William Street location meets all evaluation criteria. Area 2 address is 1535 Centre Road, but there is property access to William Street. 1535 Centre Road is a large parcel of land that extends along Centre Road and William Street. To avoid confusion with Area 6, Area 2 is named William Street.

The William Street location is feasible, it addresses the identified problem, and it meets the applicable policies. The Hydraulic Modeling investigation confirmed the fire flows and pressure under future condition are acceptable.

This location is not City owned, therefore the City would need to obtain a portion of the property for a new water storage facility. The north-west portion of the property contains two large diameter Enbridge gas pipes. Enbridge confirmed that any work within their easement will need to be evaluated by Enbridge to determine if there will be any adverse effects to Enbridge facilities. Along with permission from Enbridge, adequate clearance of these pipes must be maintained. The north-east portion of the property is away from the pipelines, and could be used for a water storage facility.

The existing watermain would have to be extended approximately 115 m from Centre Road or 275 m from Elderberry Lane to the proposed property. This work, along with obtaining the land, would increase the costs compared to a City-owned property and will require a Permit to enter prior to undertaking necessary follow up studies. This alternative is recommended to be carried forward to the short list for further evaluation.



1.1.3. Area 3: Baseball Diamonds

The Baseball Diamonds location does not meet all evaluation criteria. The location addresses the identified problem, but it is not as feasible in comparison to the sites recommended to be shortlisted, and it does not meet the applicable policies (e.g. Recreational Master Plan). There could be a significant social impact as a baseball diamond may be temporarily out of service during construction. The impact on the baseball diamond

could negatively effect the goal of the City’s Recreation Master Plan to increase the number of baseball diamonds in the City of Hamilton. This alternative is not recommended to be carried forward to the short list.



1.1.4. Area 4: Tennis Court

The existing Tennis Court location, southeast of the Carlisle Arena, does not meet all evaluation criteria. The location addresses the identified problem but does not meet all applicable policies and it is not feasible in comparison to the shortlisted alternatives. The tennis court is the only public tennis court in Carlisle and is heavily used. Installation of a water storage facility would require the relocation, if not the removal of the tennis court. This would cause negative social impacts to the community and go against the City’s Recreational Master Plan goal to increase the quantity of tennis courts in the City of Hamilton.

The Carlisle Community Centre septic tile bed also discharges in this grass area. The septic bed would be required to meet provincial regulations, but it is typically a good idea to avoid treated water and wastewater, if possible. This alternative is not recommended to be carried forward to the short list.



1.1.5. Area 5: South of Carlisle Road

The South of Carlisle Road location does not meet all evaluation criteria. The location addresses the identified problem, and it meets the applicable policies, but it is not feasible. The property is not City owned and partially land locked. An additional property on Parkshore Place would have to be purchased to provide access to the property.

Part of the property is also located adjacent to multiple hazards. Conservation Halton identifies flood plain hazard, meander belt hazard, wetland hazard, and stable top of bank hazard associated with the property being adjacent to a river/stream. This alternative is not recommended to be carried forward to the short list.



1.1.6. Area 6: Centre Road

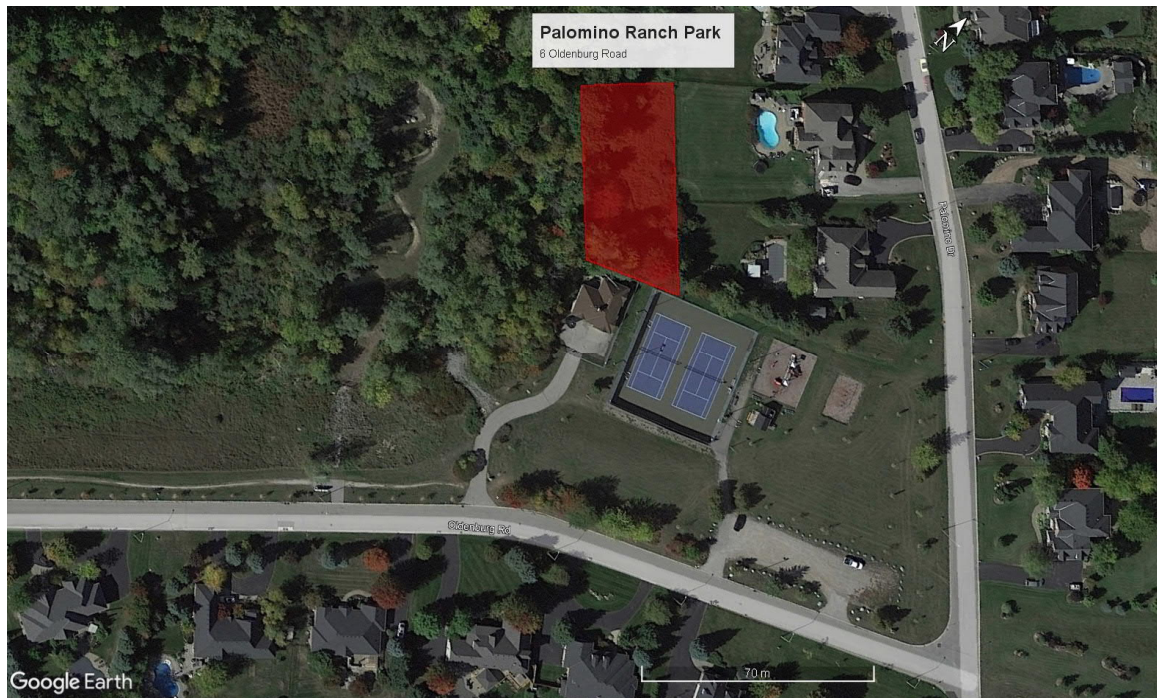
The Centre Road location does not meet all evaluation criteria. The location addresses the identified problem, and it meets the applicable policies, but it is not as feasible in comparison to the sites recommended to be shortlisted. The property is not City owned and would require an approximate 100 m watermain extension along Centre Road. Centre Road also contains overhead hydro-one lines that would have to be avoided throughout construction. The elevation of the property is lower than the William Street property, potentially requiring a larger structure or equipment to meet the hydraulic grade line. This alternative is not recommended to be carried forward to the short list.



1.1.7. Area 7: Oldenburg Road

The Oldenburg Road location does not meet all evaluation criteria. The location addresses the identified problem, and it meets the applicable policies, but it is not feasible in comparison to the shortlisted options. Even though the Hydraulic Modeling investigation confirmed the fire flows and pressure under future condition are acceptable and this location would create improved flows in the low flow areas around Steeplehill Court, there are impacts to the environment.

To avoid the existing large diameter Enbridge gas mains, and the existing playground and green space, the proposed location would be located behind the existing pump house. The location is adjacent to a hazardous area, and removal of the forested area would be required for construction. The forested area could create a significant environmental impact depending on the plant and animal species that use the forested area as a habitat. This alternative is not recommended to be carried forward to the short list.



1.1.8. Area 8: Carlisle Memorial Park

The Carlisle Memorial Park location does not meet all evaluation criteria. The location addresses the identified problem, and it meets the applicable policies, but it is not as feasible in comparison to the sites recommended to be shortlisted. Temporarily or permanently removing the park would cause negative social impact in the community, and without relocating the park, there is not sufficient space for a new water storage facility.



3.0 Short List of Alternatives

Based on the evaluation of the long list of alternatives, and the Carlisle Water Storage Facility and Distribution System – Hydraulic Modeling analysis, the following two locations are recommended to be carried forward for further assessment:

- Area 1: Tower Park (40, 42, 48 Woodend Drive)
- Area 2: William Street (1535 Centre Road)

The short list of alternatives will be further evaluated, including consideration of different types of water storage facilities (above ground, below ground, etc.). Investigational services will also be conducted on these areas to help evaluate these alternatives in detail. A preferred alternative will be recommended following evaluation of the short list of alternatives.

Alternative Site #	Site Name	Address	Is it feasible and reasonable?				Does it address the identified problem / need?			Does it meet applicable planning policies?	Proceed to Short List	Comments
			Is the alternative technically feasible and reasonable?	Can the alternative be constructed for a reasonable cost?	Are the ecological, social, or other impacts anticipated to be reasonable relative to other alternatives?	Does the alternative provide a long-term solution?	Does the alternative address the considerations listed in the Problem and Opportunity Statement?	Does the alternative support planned growth to buildout	Can the alternative offer resiliency to potential future changes to regulatory, climatic, and raw water quality conditions?	Does the alternative meet local, regional, and provincial planning policies?		
Area 1	Tower Park	40, 42, 46 Woodland Drive	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Close proximity to the existing storage facility and existing infrastructure. Open space available for new storage facility. No local hazards identified. Adequate pressure and fire flows.
Area 2	William Street	1535 Centre Road	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Natural Gas pipeline is located on the property. Coordination with Enbridge is required to maintain minimum clearances. The property would have to be purchased. A watermain extension is required. No local hazards. Adequate pressure and fire flows.
Area 3	Baseball Diamonds	1496 Centre Road	Yes	Yes	No	Yes	Yes	Yes	Yes	No	No	Open space between two baseball diamonds. Potential impacts to the baseball diamonds during construction. Large diameter watermain on the property. This would not meet the Recreation Master Service Plan and would have negative social impacts.
Area 4	Tennis Court	1496 Centre Road	No	Yes	No	Yes	Yes	Yes	Yes	No	No	Flat open area by the tennis courts. Negative social impact due to removal or relocation of the tennis court. Connection to the existing watermain would require excavation through the asphalt parking area. The Community Centre septic tile bed is located in this area. The removal of the tennis court would not meet the Recreation Master Service Plan.
Area 5	South of Carlisle Road	302 Carlisle Road	No	No	Yes	Yes	Yes	Yes	Yes	Yes	No	Large open property, but part of the land is located in a hazardous area; adjacent to the body of water. The property is not City owned and would have to be purchased. The property is partially land locked. An additional property may have to be purchased to access the storage facility. Follows the Official Plan if the structure is built outside the hazardous areas.
Area 6	Centre Road	Centre Road (No Address)	No	No	Yes	Yes	Yes	Yes	Yes	Yes	No	Property is not City owned and would have to be purchased. A watermain extension would be required. The elevation is lower in this area compared to other alternatives. Hydro power lines are located above ground along the roads edge.
Area 7	Oldenburg Road	6 Oldenburg Road	Yes	Yes	No	Yes	Yes	Yes	Yes	No	No	Close proximity to one of the existing pumping stations. Adequate pressure and fire flows. Potential to use/share the driveway. Increased environmental impact compared to other alternatives, potential for significant impacts due to removal of forested area adjacent to the storm water pond. Infrastructure would be located adjacent to multiple hazards. Limited space is available.
Area 8	Carlisle Memorial Park	1487 Centre Road	Yes	Yes	No	Yes	Yes	Yes	Yes	Yes	No	Partial open space available. Space is limited. Impact to the playground and potential impact to the Baseball diamond. Playground may have to be relocated on the same property. There is also no watermain on William Street, so a long watermain service from Centre Road would be required.



Key Map Reference	Location	Elevation - Low (m)	Elevation - High (m)	Footprint (m)	Connection to Existing System	Environmental Impacts	Property Owner	Access to Property	Potential Storage Facility	Other Impacts/Concerns
Area 1	Existing ET	273	277	65 x 65	Accessible	Tree Removal would be required. Previous geotechnical investigation identified no presence of groundwater within the 8 m deep borehole. Borehole was terminated in dense to very dense fine sand with traces of silt. Bedrock was not located.	City Owned	Available from Acredale Drive or Woodend Drive	Can accommodate above ground or below ground facility.	Located in a community park and in between residential homes. Potential disturbance to park during construction.
Area 2	William Street	267	276	80 x 130	350 m WTM extension required from Elderberry Lane	Adjacent to Wetland Hazard Lands. Located within Conservation Halton Regulation Limit.	Not Owned	Available from William Street	Can accommodate above ground or below ground facility.	No vehicle access from Centre Road. Potential for guardrails to be modified to allow vehicle access. Communication tower at the back of the property.
Area 3	Baseball Diamonds	272	273	35 x 35	Accessible	Landscaping	City Owned	Available from Arena Parking Lot	Can accommodate above ground or below ground facility.	Located in a community park, adjacent to Baseball diamond and playground. Potential disturbance to park during construction.
Area 4	Tennis Court	265	268	95 x 40	Accessible	Tree Removal	City Owned	Available from Arena Parking Lot or from George Street.	Can accommodate above ground or below ground facility.	Potential disturbance to tennis court during construction. Extension of George Street would allow direct access to the property.
Area 5	South of Carlisle Road	256	263	200 x 70	Accessible	Partially located in Floodplain Hazard, Meander Belt Hazard, and Stable Top of Bank Hazard.	Not Owned	Available from Parkshore Place	Can accommodate above ground or below ground facility.	Potentially landlocked property. Would require purchase of additional property or an easement agreement. Part of property is located adjacent to the water body.
Area 6	Centre Road	260	266	235 x 60	175 m WTM extension required	Tree Removal	Not Owned	Available from Centre Road	Can accommodate above ground or below ground facility.	Potentially landlocked property. Would require purchase of additional property or an easement agreement.
Area 7	Oldenburg Road	270	271	40 x 20	Accessible	Landscaping and potential tree removal. Adjacent to Wetland Hazard Lands. Located within Conservation Halton Regulation Limit.	City Owned	Access from Oldenburg Road or Palomino Drive	Can accommodate above ground or below ground facility.	Located in a park. Would have minimal impact on the park during construction. Potential to use existing driveway entrance and green space as construction laydown area.
Area 8	Carlisle Memorial Park	259	261	60 x 25	Accessible	Tree Removal. Previously geotechnical investigation did not identify any groundwater. The borehole terminated in sandy clay 2.5 m below grade. Bedrock was not located.	City Owned	Access from William Street or Centre Street	Can accommodate above ground or below ground facility.	Located in a community park and in between residential homes. Potential disturbance to park during construction.