

Scientific and Hydrogeological Opposition to the Carlisle Water Tower Project

**Prepared for inclusion in Ministerial, Legal, and Public Submissions – May 2025
Focus: WHPA-A Violation, Fractured Aquifer Risk, Public Exclusion, and Clean Water Act Breach**

Preface: Peer-Reviewed Science Flags Major Risk to WHPA-A and Aquifer Integrity

This scientific opposition brief is based primarily on the published research of Dr. Beth L. Parker and the Morwick G360 Groundwater Research Institute at the University of Guelph.

Their decades of work on fractured bedrock aquifers and WHPA-A zones—particularly in Guelph, Ontario—provides the foundation for all hydrogeological conclusions in this document.

Key studies informing this brief include:

- Marshall, R., Levison, J., Parker, B., & McBean, E. (2022). Septic System Impacts on Source Water. <https://www.mdpi.com/2071-1050/14/4/1959>
- Opazo, T., Aravena, R., & Parker, B. (2016). Nitrate Distribution in a Municipal Water Supply Bedrock Aquifer. <https://atrium.lib.uoguelph.ca/server/api/core/bitstreams/b9f3e9e0-8200-4768-a95d-87f03da89df4/content>
- Bairos, K., Quinn, P., Pehme, P., & Parker, B. L. (2023). High-Resolution Fracture Mapping. <https://doi.org/10.1016/j.jhydrol.2023.129362>

For more on Dr. Parker's team, visit: <https://g360group.org>

Section 1: Fractured Bedrock Contamination – Why Tower Park Is Scientifically Indefensible

Scientific Danger:

The fractured dolostone under Tower Park will allow pollutants to bypass filtration and rapidly reach nearby municipal wells. The site is designated WHPA-A with a vulnerability score of 10—indicating maximum risk. There is no clay cap or aquitard. Any spill of diesel, oil, or concrete leachate during construction would immediately enter the fracture system and travel downslope to drinking water infrastructure.

Expert Authority:

Dr. Beth L. Parker is one of Canada's foremost hydrogeologists and a global authority on fractured bedrock aquifers. She directs the *Morwick G360 Groundwater Research Institute* at the University of Guelph—just 20 km from Carlisle—and has led multi-decade studies on contaminant transport in the exact geological formations that underlie the proposed Tower Park site.

“The Carlisle water tower in Ontario is situated atop a fractured bedrock aquifer, specifically within the Amabel Dolostone formation. This geological formation is characterized by its fractured nature, allowing water to move rapidly through its fissures.”

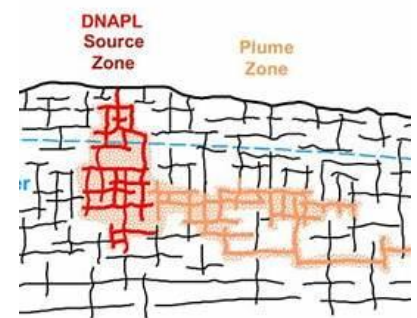
From Carlisle's last fight see: stopthequarry.ca

Expert Source Quote:

“In fractured bedrock aquifers, groundwater flow and contaminant transport are controlled by interconnected fractures. These systems are particularly vulnerable because contaminants can rapidly travel great distances with limited natural attenuation.”

— Parker, B.L., Chapman, S.W., Cherry, J.A. (2008). *Journal of Contaminant Hydrology*, 102(1–2), 86–104.

<https://doi.org/10.1016/j.jconhyd.2008.05.008>



Conclusion:

It is not scientifically defensible to build industrial-scale infrastructure on fractured WHPA-A terrain immediately upslope from vulnerable wellheads. The site is **permanently unsuitable** for this purpose. Proceeding is a rejection of well-established hydrogeological science and public protection standards.

Section 2: Persistent Contamination Through Back Diffusion – A Hidden Long-Term Threat

Expert Authority:

Dr. Parker's research on **back diffusion** shows that even small chemical intrusions into fractured rock can persist for decades, leaching slowly into the aquifer long after the original spill is gone.

Expert Source Quote:

“Back diffusion from low-permeability zones causes contaminant persistence in fractured porous media. This slow release creates a long-term source, undermining remediation and threatening drinking water over decades.”

— Parker, B.L., Chapman, S.W., Guilbeault, M.A. (2004). *Ground Water*, 42(7), 107–118.

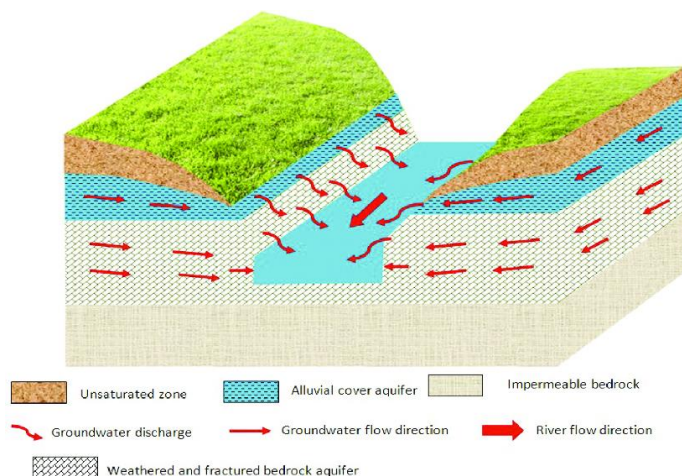
<https://doi.org/10.1111/j.1745-6584.2004.tb02614.x>

Scientific Danger:

Back diffusion means that once concrete leachate or diesel enters this aquifer, **it will not flush out**. The chemical remains trapped in micro-fractures and releases slowly into drinking water for decades. No mitigation is possible after the fact.

Conclusion:

This site presents not just a construction-phase risk, but a **multi-generational contamination threat**. Any intrusion now will become a permanent feature of Carlisle's drinking water system.



Section 3: Dewatering and Excavation in Shallow Bedrock – Disruption of Natural Aquifer Integrity

Expert Authority:

Dr. Martin Preene's work on construction dewatering highlights how excavation in fractured bedrock changes groundwater gradients and induces contamination from unintended sources.

Expert Source Quote:

“Dewatering systems required for construction in shallow fractured rock aquifers often result in wider drawdown cones than expected, inducing flow from contaminated or vulnerable zones.”

— Preene, M. & Brassington, R. (2009). CIRIA Report C750.

https://www.preene.com/uploads/preene/files/Preene_and_Brassington_Groundwater_Impacts.pdf

Scientific Danger:

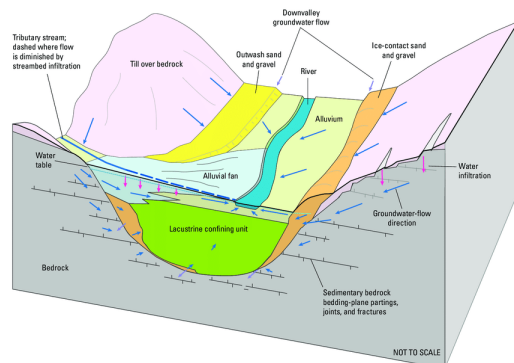
Excavation for the tower foundation will create an artificial pull on the aquifer. This can **redirect surface runoff, septic influence, or road contaminants into deep groundwater**. Once the aquifer is disturbed, it cannot be “re-sealed.”

Carlisle Context:

The **entire construction and staging area falls within 100 metres of municipal wellheads**. The site slopes downslope toward them. Any aquifer disruption here is a direct threat to drinking water.

Conclusion:

No large-scale excavation should occur in this terrain. **There is no safe way to dewater or pour foundations in fractured WHPA-A rock**—doing so introduces irreversible risk.



Section 4: Diesel, Concrete, and Construction Chemicals – Direct Threats to Drinking Water in WHPA-A

Expert Authority:

Ontario's Clean Water Act and Dr. Parker's reports for the MECP identify diesel, hydraulic oil, concrete additives, and leachate as **significant drinking water threats** in WHPA-A.

Expert Source Quote:

"Leachate from surface spills or construction waste is not filtered in fractured rock... Even trace diesel or solvents can persist and travel rapidly in the groundwater."

— Parker, B.L., et al. (2008). *Fractured Rock Contamination: Scientific Understanding and Environmental Risk*.

<https://g360group.org/publications>

Regulatory Source Quote:

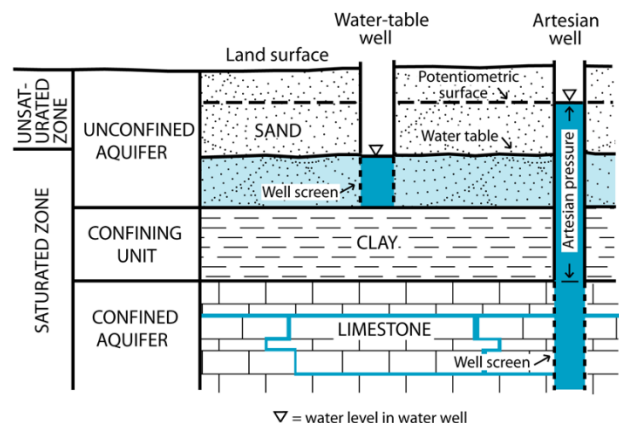
"Concrete leachate is highly alkaline and contains soluble chromium, sulfates, and metals... It poses a toxic risk to aquatic life and human health."

— MECP, 2011.

fractured rock system **without natural filtration**, reaching nearby wells in hours or days. No containment measures are shown in the City's documentation.

Conclusion:

Use of these substances within WHPA-A is listed as a **significant threat under Ontario law**. The City has proceeded without a Section 59 Risk Management Plan. **The legal and environmental breach is total.**



Section 5: Absence of Field Data and Modeling – A Case of Scientific Misconduct by Omission

Expert Authority:

Dr. Parker's G360 Institute stresses that **desktop studies cannot determine aquifer safety** in fractured rock. Boreholes, tracer testing, and modeling are mandatory.

Expert Source Quote:

“Desktop data alone cannot reveal the key pathways and controls on contaminant transport in fractured rock... Only detailed site-specific investigations can determine whether a site is hydrogeologically safe.”

— Parker, B.L. (2017). *High-Resolution Characterization of Fractured Rock Sites*.

<https://g360group.org/publications>

(Note: The city only did a Desktop study!)

Scientific Danger:

The City's own report admits it conducted **no boreholes, no water level monitoring, no fracture mapping, and no contaminant modeling**. Every conclusion drawn is speculative.

Context:

Despite having had time and funding, and despite the approval by Council on **February 13, 2025**, the City has **never done the basic field science** required for a project of this scale and risk.

Conclusion:

This isn't just a missing study. It is a willful omission. **No responsible hydrologist would permit construction under these conditions.** The site is unfit. The risks are unknown because they were never measured. However, what we do know about the area, from the “Stop the Quarry !” research is that: *“ the Carlisle water tower in Ontario is situated atop a fractured bedrock aquifer, specifically within the Amabel Dolostone formation”, which means it is high risk for contamination.*

And yet Hamilton's city council (including the Mayor) voted unanimously to approve the project, with out the consultation of the Carlisle community.

Section 6: Scientific Consensus, Legal Violations, and Total Public Exclusion

Scientific Consensus:

The risk factors identified across Ontario's groundwater science community are unanimous: fractured bedrock, shallow water tables, and WHPA-A zones are **off-limits for high-risk construction**. **The Carlisle site fits all three.**

Regulatory Source Quote:

"Significant drinking water threats must be proactively managed or prohibited within WHPA-A zones... A Section 59 Risk Management Plan is required."

— *Ontario Ministry of the Environment, 2017*

<https://www.ontario.ca/document/technical-rules-assessment-and-mitigation-drinking-water-threats>

Legal and Procedural Breach:

On February 13, 2025, Hamilton City Council approved the water tower without notifying residents, disclosing the vote, or holding a single town hall. This violated:

- **Ontario Building Code Act** provisions for community notice
- **Zoning By-law 05-200** prohibitions on tower construction in P1 parkland
- **Environmental Assessment Act** obligations to consult on high-risk projects

Public Impact:

No engagement, no outreach, no science. The City has knowingly pursued a project that violates Ontario law, environmental science, and the community's trust.

Final Conclusion:

The Tower Park project is not just flawed—it is **illegitimate**. Scientifically, legally, and morally, this project must be stopped.

Disqualify this site. Shut the project down.

Do not wait for disaster to prove the experts right!

More about Dr. Beth L. Parker

Dr. Beth L. Parker is a globally recognized hydrogeologist, and the founder and Director of the Morwick - G360 Groundwater Research Institute, at the University of Guelph, located just 20 km from Carlisle. Her pioneering research focuses on contaminant transport in fractured bedrock aquifers—the exact geological setting of the Tower Park site. Dr. Parker has authored over 180 peer-reviewed publications and served as principal investigator on multi-million-dollar research projects related to groundwater protec...



The G360 Institute, under Dr. Parker's leadership, has become one of Canada's foremost authorities on groundwater vulnerability and contaminant migration, working in collaboration with municipalities, provincial ministries, and environmental engineers across Ontario. Their field-based methods, high-resolution modeling, and long-term monitoring programs have directly influenced drinking water safety standards in the province. For more, visit: <https://g360group.org>

