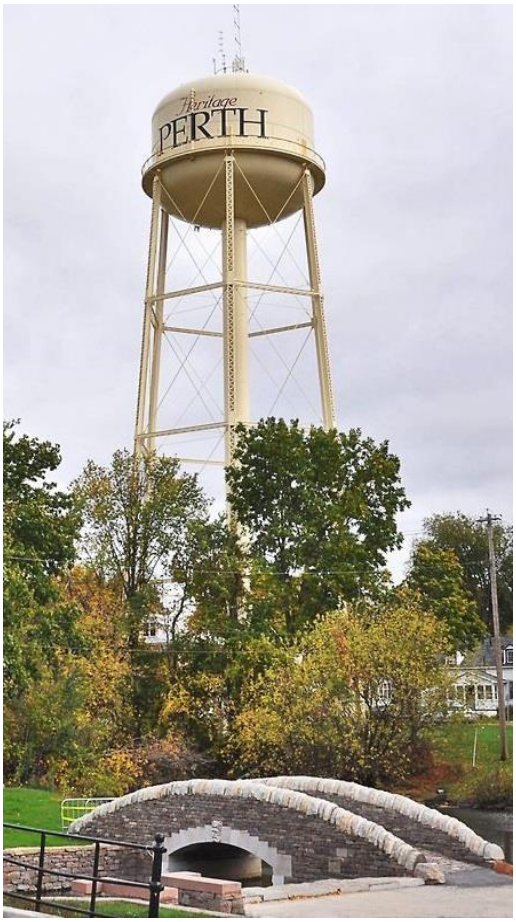
SEMI-ELLIPSOIDAL LANDMARK

Perth's Water Tower

For several weeks in October 1939 throngs of spectators gathered on Harvey Street in Perth craning their necks and squinting up against the bright autumn sky. They came to gawk as high riggers "*agile as cats walked on narrow beams, slid down cables and climbed … with a nonchalance which drew gasps from the sidewalk watchers".*[1] With an apparent death-defying disregard for gravity, the steel workers quickly raised a frame of six steel pillars 150 feet (46 meters) above the banks of the Tay River and assembled a massive 208,000-gallon (945,587-liter) *"semi-ellipsoidal"* water tank on top.



(Photo courtesy of Metroland)

More than 85 years later, that water tower continues to ensure a constant steady supply of water to the taps of Perth's households, businesses, and industries.

By the early years of the 1930s it had become abundantly clear that the unreliability and high operational costs of Perth's antiquated municipal water system demanded action. In 1933 the town's Public Utilities Commission (PUC)[2] brought in consulting engineers Gore & Storrie Ltd. of Toronto[3]. Several of their proposals for improvements to the water plant were immediately implemented. However, their recommendation that, to reduce operating costs and assist in maintaining the water supply in the case of pump failure or a broken main, an overhead tank be installed east of the canal, was deferred.

For decades, water had been pumped into the distribution system directly from the pumping station on the Tay River, north of the golf course, making constant operation of the pumps necessary. In 1933 the system relied upon one electric duplex turbine pump of 1,200 gallons per minute (gpm) capacity; one gasoline engine duplex turbine pump of 1,400 gpm; and one electric domestic pump of 900 gpm capacity.

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[1] *Perth Courier*, October 13, 1939.

[2] The Perth Public Utilities Commission (PUC) was a non-profit corporation governed by a board of five members, elected to their posts by the ratepayers of Perth as part of each municipal election cycle. The PUC provided both electricity and water services. It purchased electrical power in bulk from the Ontario Hydro Commission and resold it, over a PUC owned distribution system, it to individual households, businesses, and industries within the town. It owned and operated the town's water pumping and treatment system.

[3] Gore & Storrie, employee owned and operated, established in 1919, was Canada's largest environmental engineering firm, specializing in the water/wastewater and environmental markets. In 1995 it became CH2M Gore & Storrie, Ltd. (CG&S) and continues to operate in 2024.

This system was problematic because maintaining steady pressure in the system was almost impossible. Opening a kitchen tap might produce a gush or a dribble as pressure varied constantly according to fluctuating demand. More important, whenever there was a power failure, or maintenance and repair of the pumps was necessary, service to consumers was cut off entirely. These interruptions were not only inconvenient for residents, business and industries but were also dangerous. In the event of a fire, the fire department pumper was unable to draw water from the hydrants.

In 1933, in the depths of the great depression, the cost of constructing a water tower was judged unsupportable, but the Commission acknowledged the need and began setting aside funds for future construction. Six years later there was sufficient money in the Commission's piggy bank to proceed.

In May 1939 Town Council agreed to sell Lot-1 on the north side of Harvey Street to the PUC *"for the erection of an overhead tank"*[4], with the proviso that the Commission maintain the property (under the tower) as a public park. The choice of location, beside the river, ensured that in case of over-flow the water would do no damage but would spill into the river.

On July 24th, the PUC awarded Horton Steel Works Limited, of Toronto[5], a $20,750 contract for the fabrication and erection of an elevated steel water tank, 150 feet (45.72 meters) high, with capacity of 208,000 imperial gallons (945,587 litres). By September, work was underway.

> *Employees of the PUC have started work on the foundations for the huge steel water tank being erected on Harvey Street by the Commission. They are at present preparing six concrete piers which will act as foundations for the steel supports of the tank.*
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> *The piers which will support the tank tower are all concrete, 10 feet square. Two will go eight feet below the surface of the ground and four seven feet. The huge central pipe which will also help support the tank will be six feet in diameter. For this a foundation 15 feet square and nine feet, six inches deep is being constructed.*[6]
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> *The tank will be semi-ellipsoidal in shape, and will be painted aluminum, with 'Perth' lettered on two sides. When finished it will be the most dominant feature of the landscape for several miles.*[7]

Perth's new water tower represented leading edge technology of the day. In place of the cone roof then common, Perth's tank is symmetrical with an elliptical roof. Furthermore, the roof was designed so that the bottom portion of it acts as part of the tank capacity, permitting the shell to be lowered slightly, thus eliminating much of the waste space found under the former type of

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[4] *Perth Courier*, May 12, 1939.

[5] Horton Steel Works Ltd., established 1913, was the Canadian subsidiary of the Chicago Bridge & Iron Company. It became Horton CBI Ltd. In 1973 and is still in business in 2024.

[6] *Perth Courier*, September 8, 1939.

[7] *Perth Courier*, October 13, 1939.

roof. The tank is welded throughout and instead of a projecting cornice at the roof line, the roof curves smoothly down into the shell. A special conical vent at the peak of the roof added to the modern lines.

The tank on Harvey Street was the first in Canada to be fitted with equipment to prevent interior corrosion. An electrode at its center maintains an electric potential between itself and the tank shell and bottom. Known as cathodic protection, the principle was well known in 1939, but its application was comparatively new.[8] Horton Steel Works Ltd. guaranteed the system to prevent rust, corrosion, and pitting.

The installation of a 'Bristol Chronoflow' type telemeter ensured that the full capacity of the tank could be utilized without risk of overflow. The associated 'graphic indicator' installed at the pump-house a mile away kept the operator always informed of the height of water in the tank.

After the new tank went into service, pressure in the water system was found to vary only from 60 to 65 pounds per square inch (PSI) and pumps were required only intermittently, and then at a constant rate. It was no longer necessary to run pumps during the town's electric peak load period and by eliminating such pumping an annual cost saving of over $2,000 was realized. In 1940 PUC Chairman T. Arthur Rogers (1895-1957)[9] told Town Council that, at an interest rate of 3 ½ per cent, the savings were enough to retire the cost of the tank in 15 years.

Should it become necessary to greatly increase the pressure in the system for fire fighting purposes this could be done by closing a valve at the base of the tank riser, operated by a relay-type solenoid pilot valve also controlled from the pump-house. The solenoid operated on direct 220-volt AC or 115-volt DC battery power. *"Officials of the local PUC maintain that it will be possible to supply all the water necessary for a fire pumper and that it would be impossible for such a machine to pump the town mains dry"*.[10]

On September 8, 1939, as work got underway on the town's new water tower, five days after Britain declared war on Nazi Germany, the *Perth Courier* observed that, *"The fact the contract was signed then* [in July] *proved fortunate in view of the present situation and the advances in steel prices which will result"*.[11] Time would further prove that the town had indeed secured a bargain when it paid only $20,750 in 1939. A landmark for over 80 years, the tank's original cost has been recovered many times over and compares well with the $298,941.50 cost of a maintenance overhaul in 2023.

- ***Ron W. Shaw (2024)***

[8] The system had been used in about 300 tanks in the United States.

[9] Lawyer T. Arthur Rogers was also Mayor of Perth 1927-1929.

[10] *Perth Courier*, November 3, 1939.

[11] *Perth Courier*, September 8, 1939.