

Stormwater & Backyards: Ajax Drainage Resilience Review

Two 100-year storms in one summer put Ajax under severe weather alerts — what an engineered turf base can, and cannot, do for Durham Region backyards

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Artificial Grass Ajax Research publishes data-driven local studies on residential landscaping, water use and outdoor surfaces in Ajax and the Greater Toronto Area. This report is provided free for information purposes.

ABSTRACT

This report reviews Ajax's exposure to the two 100-year storms of summer 2024 — July 16 and August 17 — alongside published descriptions of how water moves through an engineered artificial-turf system, and asks where a synthetic lawn honestly fits in a flood-resilient Ajax backyard. Every input is drawn from published sources: Environment and Climate Change Canada records, Insurance Bureau of Canada releases, Region of Durham water-rate schedules, the 2021 Census and published installer descriptions. Derived figures are labelled with their inputs where they appear.

The findings are deliberately two-sided. The exposure is real: a typical 500 sq ft Ajax yard received about **4.5 m³ of rain on July 16, 2024** and about 6.0 m³ on August 17, when Pearson recorded **128.3 mm — its rainiest day on record**. A well-built turf base gives that water a designed path instead of a compacted-soil lottery, and keeps the yard usable between storms. But turf is not a flood fix: basements are protected by grading, downspouts and plumbing, and Durham Region's volumetric water rate of **\$3.786/m³** does not change with the lawn surface.

KEY FINDINGS AT A GLANCE

128.3 mm

rain at Toronto Pearson on
Aug 17, 2024 — the
station's rainiest day on
record

≈6.0 m³

rain landing on a 500 sq ft
yard on Aug 17, 2024
(depth × area)

1,145 mm

Pearson's 2024 total
precipitation — wettest
year on record, 42% above
normal

\$3.786/m³

Durham's 2026 combined
water + sewer rate —
volumetric, not keyed to
lawn surface

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1 Ajax's flood story: a summer that reset the baseline

Ajax sits on the Lake Ontario shoreline in the Regional Municipality of Durham, home to **39,488 occupied private dwellings** in the 2021 Census [1]. The town's stormwater infrastructure faces the same intensifying rainfall pattern seen across the GTA. Summer 2024 delivered two benchmark events within five weeks.

On **July 16, 2024**, Toronto Pearson recorded **97.8 mm of rain** — more than the entire July normal of 74 mm in a single morning. Environment Canada placed Ajax, Pickering, Oshawa and Whitby under a severe thunderstorm alert [6][9]. The GTA-wide July 15–16 event caused over **\$940 million in insured damage** across Toronto and southern Ontario, with a roughly 100-year return period [8]. On **August 17, 2024**, Pearson set a new daily rainfall record of **128.3 mm**; July–August 2024 flooding contributed to 2024 becoming Pearson's wettest year on record at **1,145 mm** — nearly 42% above the 1991–2020 normal of 806.8 mm [5][7]. Durham Region municipalities including Ajax were under flood warnings from conservation authorities throughout the 2024 storm season [7].

Table 1 — The two storms that define Ajax's 2024 flood exposure. Sources: [5][6][7][8][9].

Event	Recorded rainfall	Recorded impacts
Jul 16, 2024	97.8 mm at Pearson (exceeding the 74 mm July normal in one morning)	Ajax, Pickering, Oshawa, Whitby under severe thunderstorm alert; GTA insured damage >\$940M
Aug 17, 2024	128.3 mm at Pearson (station daily record)	Pearson's wettest year on record (1,145 mm); Durham Region under flood warnings

LOCAL CONTEXT — FROM FLOOD TO DROUGHT IN ONE YEAR

The same region that flooded in summer 2024 imposed **mandatory outdoor watering bans** on north Durham communities in summer 2025 during drought conditions — a reminder that Durham's water system swings between extremes. Restrictions were lifted after water use dropped 10–15% [4][10][12].

2 How water moves through an engineered turf system

Hydrologically, an artificial lawn is a layered construction, not a carpet. Rain passes through the perforated backing of most landscape turf products, then through granular infill into an open-graded aggregate base. The base is the workhorse: its stone voids store and convey water while it infiltrates into the subgrade or moves laterally toward a drainage route [11].

What does an Ajax storm deliver to one yard? Figure 1 applies the recorded rainfall depths to a typical 500 sq ft (46.45 m²) backyard, computed as depth × area (1 mm over 1 m² = 1 L). The July 16 storm delivered about **4.5 m³**; the August 17 storm about **6.0 m³**. Across a normal year, roughly 37.5 m³ of precipitation lands on that same yard (806.8 mm × 46.45 m²).

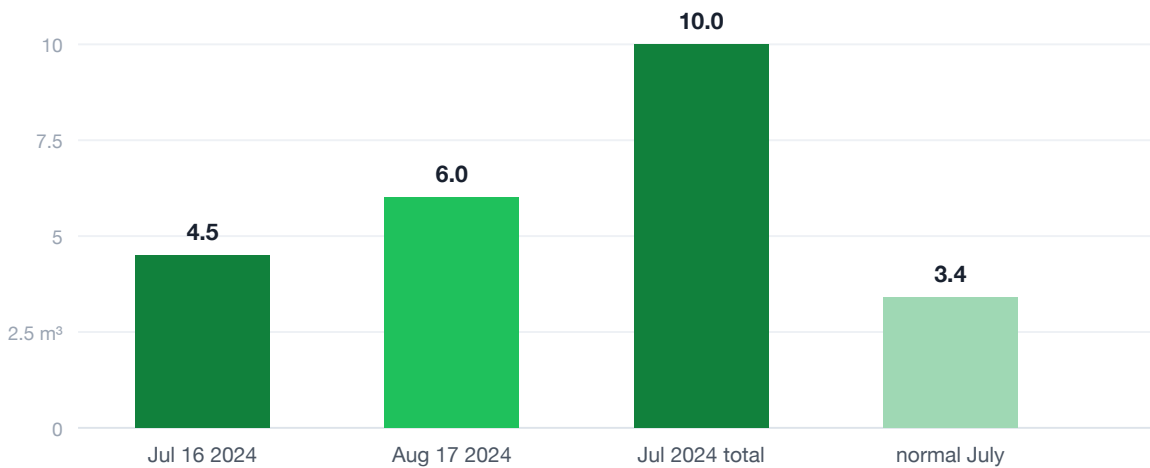


Figure 1 — Rain delivered to a typical 500 sq ft (46.45 m²) Ajax backyard per event, computed as recorded depth × area (1 mm over 1 m² = 1 L; uniform depth assumed). The July 2024 monthly total was nearly three times the July normal. *Rainfall records: [5][6][7]; derivation in §M.*

Table 2 — Layers of an engineered residential turf system and what each does with stormwater. *Sources: published installer base-prep descriptions [11]; §M.*

Layer	Typical build	Drainage function
Turf carpet & backing	perforated in most landscape products	admits rainfall across the whole surface
Infill	granular, product-dependent	holds the pile open so water reaches the backing
Engineered base	compacted open-graded aggregate; deeper on clay [11]	temporary storage and conveyance — the workhorse
Subgrade	native Durham soil	final infiltration step; rate depends on soil type

3 Turf vs natural lawn on infiltration: a balanced reading

Does swapping the lawn change how a lot takes water? The evidence cuts both ways. **In turf's favour:** many Ajax lawns sit on thin topsoil over subsoil compacted during construction — the town's housing stock is relatively young, with 26.9% built 2001–2010 and 14.2% after 2011 [1]. A compacted, thatched lawn can shed an intense burst nearly as fast as it lands. Replacing that profile with an open-graded engineered base substitutes a designed drainage path for an accidental one [11] — which is why well-built turf yards are typically puddle-free and back in use soon after a storm.

Against overclaiming: a healthy, deeply rooted natural lawn is itself a competent infiltration medium — living soil stores water, roots open channels, and evapotranspiration returns moisture to the air between storms. Artificial turf removes that living layer. The honest summary: in a cloudburst, an engineered base can outperform a tired, compacted lawn; over a season, a thriving lawn's living soil does work that no aggregate can. **Neither surface prevents basement flooding** — that job belongs to the measures in Section 4.

Durham Region bills water volumetrically at a combined **\$3.786/m³ in 2026** — \$1.431/m³ for water plus \$2.355/m³ in volumetric sewer surcharge, plus a fixed metered-service charge of \$24.04/month and an annual sewer service charge of \$111 [2][3]. Because the rate keys to metered consumption, converting to artificial turf does not reduce any line on the water bill. Homeowners who eliminate outdoor irrigation save on the water they would have used, but the lawn surface itself is financially neutral on the utility bill.

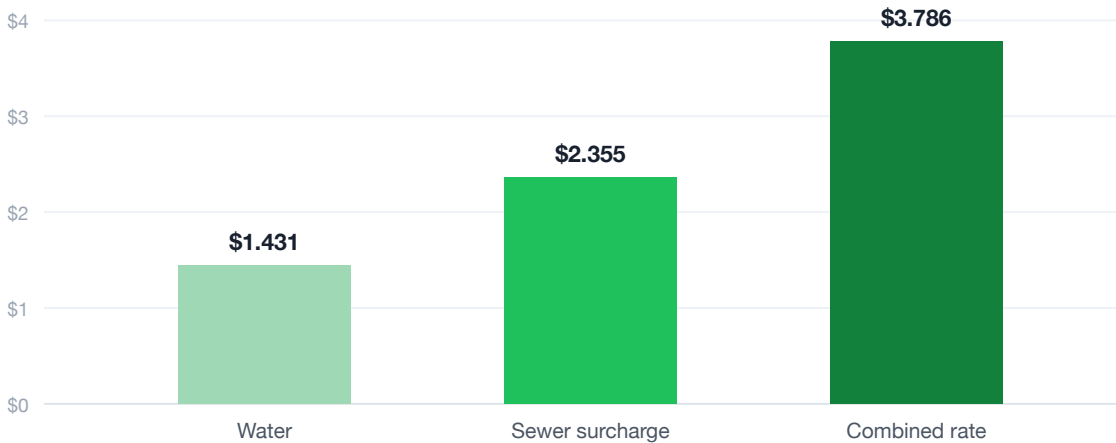


Figure 2 — Durham Region's 2026 residential water cost structure: the combined \$3.786/m³ rate is billed volumetrically on metered consumption. Lawn-surface choice does not change any rate component. Source: *Region of Durham 2026 Fees and Charges* [2].

LOCAL CONTEXT — BY-LAW #85-2003

Regional Water Supply By-law #85-2003 mandates odd-even lawn watering across Durham Region every May through September: odd-numbered addresses water on odd days, even on even days. The Region can escalate to full bans during drought, as it did for north Durham in summer 2025 [4][10].

4 What actually protects basements

Basements flood when water arrives at the foundation faster than the weeping tile can carry it, or when municipal sewers surcharge. The defences are unglamorous, and none of them is a lawn surface. Table 3 sets out the standard stack and where a turf project honestly fits.

Table 3 — The basement-protection stack, and where artificial turf fits. *Framing: \$M; event context [6][8].*

Measure	What it does	Where turf fits
Lot grading	positive slope carries surface water away from the foundation	a turf base must preserve the same falls — not flatten them
Downspout management	extensions move roof water away from the house	turf edges and seams should never block discharge routes
Backwater valve & sump	block sewer surcharge; remove foundation seepage	unrelated to surface choice; essential in flood-prone areas
Window wells & sealing	keep below-grade openings drained and tight	unaffected by lawn surface
Permeable, puddle-free yard	limits ponding; keeps the yard usable between storms	turf's real role — liveability, not flood proofing

Where turf genuinely helps is liveability: a yard that drains through its base instead of ponding on compacted soil returns to use quickly after events like those of 2024, and the mud-and-rutting cycle disappears. But no homeowner should buy turf as flood protection.

5 Design notes for Ajax lots

Ajax's housing stock frames the design problem. The 2021 Census counted 40,275 private dwellings, **64.7% single-detached**, with an average household size of 3.2 and median household income of \$119,000. Typical detached lots run around 50 × 114 ft [1].

- **Expect compacted subsoil.** With 41.1% of Ajax homes built after 2001, many lawns sit on construction-compacted ground — budget for a proper engineered base, not a thin screed [11].
- **Keep an overflow route.** In a storm exceeding the base's storage, water needs a defined surface path to the street or swale that respects property lines.
- **Scale changes little.** Even a compact 300 sq ft (27.9 m²) yard took on roughly **3.6 m³ on August 17** (128.3 mm × 27.9 m²) — small yards face the same intensities as large ones.
- **Sequence the work.** Grading, downspouts and plumbing come first, then the surface.

M Methodology & data sources

This is a desk-research report. Published figures were collected in August 2026 from the sources listed under References: Environment and Climate Change Canada's 1991–2020 Canadian Climate Normals for Toronto Pearson International Airport (Climate ID 6158731, approximately 50 km west of Ajax), ECCC and Weather Network reporting on the July 16 and August 17, 2024 extreme rainfall events, Insurance Bureau of Canada damage releases, Canadian Press coverage of the 2024 precipitation record, Region of Durham 2026 water-rate schedules and water-efficiency reporting, the Township of Scugog's summary of Regional Water Supply By-law #85-2003, Statistics Canada 2021 Census data published by the Town of Ajax, and published installer descriptions of turf construction serving Durham Region.

Derived figures and stated assumptions. Yard water volumes are computed as recorded rainfall depth multiplied by yard area — 46.45 m² for a 500 sq ft yard, 27.9 m² for a 300 sq ft yard — using 1 mm over 1 m² = 1 litre and assuming uniform depth across the lot. That is an idealization: real lots have roofs, trees, slopes and flow paths, so figures such as "6.0 m³ on August 17" describe the rain that fell on the yard's footprint, not the water any surface actually held. The 2024 annual precipitation figure of 1,145 mm is a point measurement at Pearson; gauges closer to Ajax may have recorded different totals. Durham Region's combined rate of \$3.786/m³ reflects the first-block residential rate effective January 1, 2026, under By-laws 75-2023 and 76-2023; additional fixed charges (\$24.04/month metered service, \$111/year sewer service) apply regardless of lawn surface [2][3].

Limitations

This report is not a site assessment, an engineering study or drainage-design advice for any specific property. Rainfall records are point measurements at Toronto Pearson, approximately 50 km west of Ajax; lakeshore moderation and local convective cells mean Ajax's actual rainfall may have differed during the 2024 events. Infiltration on any specific lot depends on soil, compaction and maintenance history. Dollar figures are nominal event-wide totals, not per-property losses, and insured-damage figures exclude uninsured losses. The 1991–2020 climate normals predate both 2024 storms; the 2024 record year may represent a new baseline or an outlier — this report does not distinguish between the two.

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