

BIKE TUNNEL QUÉBEC

150 km underground cycling network
Québec City region — The Boring Company technology

Complete financial analysis

Cost evaluation, justification of assumptions, regional comparisons

Document prepared in May 2026

1. Executive summary

The Bike Tunnel Québec project proposes the construction of a 150 km underground cycling network in the Québec City metropolitan region, using the Prufrock boring technology developed by The Boring Company. The network would cover the boroughs of Sainte-Foy, Sillery, Cap-Rouge, the Upper Town, Old Québec, Limoilou, Beauport and Charlesbourg, with a Québec–Lévis link provided in the short term by shuttle-trucks and shuttle-boats.

This analysis establishes the total cost of the project at about C\$8.7 billion, based on The Boring Company's full-rate production price (US\$10M per mile) increased by a coefficient of 40% for boring in Québec rock (Ordovician limestone and shale).

KEY FIGURE: C\$8.7 billion for 150 km, i.e. C\$58M per kilometre. For comparison, the government's third road link costs C\$940M per kilometre, about 16 times more per kilometre.

2. Base assumptions and conversion factors

Any financial analysis of this project must rest on rigorous conversions, because The Boring Company publishes its costs in US dollars per mile, whereas our project is measured in kilometres and financed in Canadian dollars.

2.1 Conversion factors used

Conversion	Value	Source / Date
1 mile in kilometres	1.609 km	International standard
150 km in miles	93.2 miles	Calculation: $150 \div 1.609$
1 USD in CAD	C\$1.38	Rate, May 2026
Hard-rock premium	+40%	Tunnelling-industry standard

3. Justification of the US\$10M/mile rate

The choice of rate is the most decisive factor in the analysis. The Boring Company has published several figures over the years, which must be clearly distinguished.

3.1 Actual evolution of The Boring Company's rates

Period	Rate USD/mile	Soil type	Status
2018 (Hawthorne)	≈ US\$50M	Soft soil	Prototype, demonstration tunnel
2021 (Vegas LVCC)	≈ US\$30M	Soft soil	Completed commercial project
2024–2025 (Vegas)	≈ US\$27M	Soft soil	Current billed rate (actual)

Period	Rate USD/mile	Soil type	Status
2027–2030 (target)	US\$8–10M	Soft soil	Official TBC target with Prufrock-5/6/7
Long term	US\$4–6M	Soft soil	Boring Revolution / McKinsey projection

3.2 Justification for choosing US\$10M/mile

For this project, which would be built between 2028 and 2038, we adopt the rate of US\$10M/mile rather than the floor target of US\$8M or the current rate of US\$27M, for the following reasons:

1. The trajectory is demonstrated: the rate fell from US\$50M to US\$27M/mile in 6 years, a 46% decrease. Continuing this trend toward US\$10M is plausible.
2. Prufrock-5 was delivered in November 2025, and Prufrock-6 and 7 are in production at the Bastrop, Texas plant at a rate of about one machine per month.
3. This pace represents a capacity of 600 miles of tunnel per year, compared with fewer than 20 miles of metro built in the United States over the last 20 years.
4. The move from Prufrock-2 to Prufrock-3 targets a 7-fold speed gain (from 1 mile/week to 7 miles/day), which justifies the announced cost reductions.
5. US\$10M includes a 25% safety margin relative to the US\$8M floor target, which is prudent for a project outside the United States.

DECISION: We use US\$10M/mile as the base rate. This figure is conservative relative to The Boring Company's public targets while remaining aligned with their cost-reduction trajectory.

4. Justification of the rock-boring multiplier

The Boring Company has so far bored essentially in soft soil (alluvium, sand, clay) in Las Vegas, Los Angeles, Austin and Bastrop. However, the Québec City region sits on a subsoil made of Ordovician-age sedimentary rock, geologically identical to that of Montréal and similar to that of Nashville.

4.1 Geology of the Québec–Lévis subsoil

The subsoil of the Québec City metropolitan region is dominated by the Lévis Formation (1,000 feet, about 305 metres, of exposed thickness). This formation consists mainly of grey, green and red argillaceous shales, interbedded with thin beds of limestone and limestone conglomerates.

For reference, during the construction of the Rosemont Reservoir tunnel in Montréal (4.0 km, completed in 2015), the measured compressive strength of the limestone ranged between 50 and 300 MPa, with intrusions reaching 100 to 430 MPa. More than 80 dykes and sills were mapped along the 4 km route.

4.2 Precedent: the special order for Nashville

In November 2025, The Boring Company unveiled its first hard-rock machine, specially developed for the Music City Loop project in Nashville (hard Mississippian limestone). Steve Davis, president of TBC, stated:

Nashville is a hard place to dig. If we were optimizing for the easiest places, it wouldn't be here. The rock is extremely hard, much harder than it should be. It's a relatively simple engineering problem to solve, but it's different.

This machine has a gripping force of 4 million pounds and a maximum thrust of 1.5 million pounds, versus markedly more modest specifications for soft-soil machines. It is equipped with a dust-collection system with 15 high-capacity self-cleaning filters.

4.3 Industry standards for the rock surcharge

Soil type	Surcharge	Examples / Justification
Soft soil (alluvium, clay)	Reference	Vegas, Austin, LA — published TBC rate
Soft rock (sandstone, marl)	+15 to 25%	Moderate cutter wear
Medium rock (limestone, shale)	+30 to 50%	Québec, Montréal, Nashville — reduced boring speed
Hard rock (granite, gneiss)	+60 to 100%	Canadian Shield, Manhattan — frequent cutter replacement

DECISION: We adopt a multiplier of +40% for boring in Québec rock, i.e. the median of the range applicable to limestone and shale. This coefficient is consistent with international tunnelling-industry standards.

5. Detailed tunnel-cost calculation

The calculation of the cost of the 150 km of tunnels is done in four steps, starting from TBC's base rate and successively applying the conversions and the rock multiplier.

5.1 Calculation steps

Step	Description	Calculation	Result
1	TBC base rate (soft soil, production target)	Public data	US\$10.0M/mile
2	Application of the Québec-rock multiplier	10.0×1.40	US\$14.0M/mile
3	Conversion to Canadian dollars	14.0×1.38	C\$19.3M/mile
4	Conversion to cost per kilometre	$19.3 \div 1.609$	C\$12.0M/km
5	Multiplication by total network length	$12.0 \times 150 \text{ km}$	C\$1.80B

RESULT: The strict cost of the 150 km of tunnels in Québec rock comes to C\$1.80 billion, i.e. C\$12.0M per kilometre.

6. Complete detailed budget

The cost of the tunnels is only part of the project. Here is the complete budget including all items needed to bring the network into service.

6.1 Budget summary table

Budget item	Amount	Justification
MAIN INFRASTRUCTURE		
Tunnels (150 km in Québec rock)	C\$1,800M	US\$10M/mile × 1.40 (rock) × 1.38 (CAD) × 93.2 mi
Major stations (75 × \$10M)	C\$750M	Escalators, elevators, info, bike loan
Minor stations (75 × \$6M)	C\$450M	Simple access, turnstiles, technical rooms
TECHNICAL SYSTEMS		
Ventilation and air filtration	C\$600M	Air-quality sensors every 200 m
LED lighting + nature projection (gobos)	C\$180M	Phosphorescent emergency paint included
Acoustics (textured concrete + panels)	C\$450M	Rock wool, perforated metal, raised patterns
Safety (1,500 cameras + 1,500 SOS posts)	C\$550M	24/7 control centre, AI, patrols, drones
Fire suppression + emergency exits	C\$350M	Smoke locks every 500–1,000 m, niches every 100 m
Generators + backup power	C\$120M	Hydro-Québec backup + UPS
Bike path + drainage + recharge + electrical	C\$450M	Asphalt, marking, pumping, charging stations
Telecommunications (5G, WiFi, fibre, radios)	C\$100M	Total network coverage, mobile app
FLEET AND LINKS		
50,000 e-bikes (× \$3,000)	C\$150M	Self-service rental fleet
25,000 regular bikes (× \$1,000)	C\$25M	For families, occasional users
1,000 quadricycles (× \$1,500)	C\$2M	People with reduced mobility, families
Québec–Lévis link (30 trucks + 4 boats + terminals)	C\$85M	Short-term solution before under-river tunnel
STUDIES, ENGINEERING AND MANAGEMENT		
Land acquisition (150 stations)	C\$250M	Surface entrances, Québec property values
Engineering and detailed design (10%)	C\$550M	Plans, specifications, 3D modelling
Project management (5%)	C\$280M	Prime contractor, quality control

Budget item	Amount	Justification
BAPE + geotechnics + permits + consultations	C\$120M	Environmental studies, Wendake, seismic
SUBTOTAL	C\$7,260M	Before contingency
Contingency (20% — megaproject minimum)	C\$1,450M	Technical risks, inflation, unforeseen items
TOTAL PROJECT	C\$8,710M	i.e. ≈ C\$8.7 billion

7. Comparison with other regional megaprojects

The best way to assess whether the C\$8.7B budget is reasonable is to compare it with the other transport megaprojects already announced or completed in the Québec City region and in Québec.

7.1 Comparative table

Project	Length	Total cost	Cost / km	Status
Bike Tunnel Québec	150 km	C\$8.7B	C\$58M/km	Proposed
Montréal REM	67 km	C\$17.0B	C\$254M/km	Partially in service
Québec tramway	19 km	C\$5.8B	C\$305M/km	In planning
Québec–Lévis third road link	8.3 km	C\$7.8B (median)	C\$940M/km	Estimates C\$5.3B to C\$9.3B

7.2 Comparative analysis

The cost per kilometre of Bike Tunnel Québec is radically lower than that of the other transport megaprojects:

- 16 times cheaper per kilometre than the third road link (8.3 km for C\$7.8B)
- 5 times cheaper per kilometre than the Québec tramway
- 4 times cheaper per kilometre than the Montréal REM

This gap is explained by three main factors: a much smaller tunnel diameter (3.6 m versus 12 to 15 m for the third road link), radically simpler stations (no platforms, no railcars), and the absence of complex rolling stock (no trains, no rails).

KEY ARGUMENT FOR COMMUNICATION: for the price of a single 8 km road tunnel under the river, you can build 150 km of underground cycling network covering the whole metropolitan region. That's 18 times more mileage for roughly the same price.

8. Economic analysis per user

8.1 Investment cost per user

The network serves two categories of users: 100,000 intensive users (daily trips) and 100,000 lower-intensity users (occasional trips, tourists, weekends), for a total of 200,000 regular users. The investment cost per user is established as follows:

Calculation	Result
Total cost ÷ users (C\$8.7B ÷ 200,000)	C\$43,500 per user
Amortization over 50 years at 3% interest	≈ C\$1,690 per user per year

The amortization calculation uses the constant annual payment formula: $A = P \times (r(1+r)^n) / ((1+r)^n - 1)$, where $P = C\$8.7B$, $r = 3\%$ and $n = 50$ years. With $(1.03)^{50} \approx 4.384$, this gives an annual payment of about C\$338M, divided by 200,000 users, i.e. C\$1,690 per user per year.

The 50-year amortization period is justified by the real lifespan of underground infrastructure: reinforced-concrete tunnels installed at depth, sheltered from the freeze-thaw cycle and the weather, have a technical lifespan of 75 to 100 years. A 50-year amortization therefore remains conservative.

8.2 Comparison with other modes of transport

Mode of transport	Annual cost	Notes
Bike Tunnel Québec	≈ C\$1,690	Full amortization over 50 years, 200,000 users
RTC (public transit)	≈ C\$4,700	Public subsidy per user
Car (all costs included)	C\$8,000 to 12,000	Purchase, fuel, insurance, maintenance, parking, plus public costs (road maintenance, police, snow removal)
Surface bike (city)	C\$10 to 100	But limited 6 months/yr and dangerous trips

9. Risks and phasing strategy

9.1 Main risks to manage

- **Technological risk:** The Boring Company has not yet bored commercially at large scale in hard rock. Nashville will be the first test (start 2026). Our project would be the 2nd or 3rd of this kind in the world.
- **Exchange-rate risk:** a depreciation of the Canadian dollar would directly increase the bill (each 5% drop = about +C\$350M on the total cost).
- **Regulatory risk:** BAPE process, Indigenous consultations (Huron-Wendat Nation), municipal permits. Expected delay of 3 to 5 years before the first works.

- **Geotechnical risk:** possible presence of faults (Logan's Line), water pockets, rock harder than expected. A program of 50 to 70 preliminary borings is necessary.
- **Inflation risk:** over a 10- to 12-year construction project, inflation can add 15 to 25% to the final cost.

9.2 Recommended phasing

To limit risks and demonstrate the viability of the concept, we recommend a deployment in three phases:

Phase	Main route	Length	Cost	Timeline
Phase 1	Sainte-Foy ↔ Université Laval ↔ Old Québec (proof of concept)	15 km	C\$1.2B	2028–2032
Phase 2	Northern extension (Limoilou, Charlesbourg, Beauport)	60 km	C\$3.5B	2032–2036
Phase 3	Lévis + western extensions (Cap-Rouge) + links	75 km	C\$4.0B	2036–2040

This phasing makes it possible to:

- Test the technology on a limited section before committing to the whole
- Spread investments over 12 years rather than asking for C\$8.7B at once
- Let TBC mobilize several Prufrock machines in parallel
- Build public support as the first sections enter service

10. Conclusion

The complete analysis demonstrates that the Bike Tunnel Québec project is financially realistic at a cost of C\$8.7 billion for 150 km of network, i.e. C\$58 million per kilometre. This cost represents a fraction of that of the other transport megaprojects currently under study or construction in Québec.

The assumptions used are conservative:

- The US\$10M/mile rate includes a 25% margin relative to The Boring Company's floor target
- The +40% rock multiplier is in the median of international tunnelling-industry standards
- The 20% contingency covers the typical unforeseen items of an underground megaproject
- All items overlooked in early estimates (land, engineering, project management, environmental studies) are included

The project presents a rare combination of advantages: a cost per kilometre 4 to 16 times lower than other megaprojects, infrastructure usable 365 days a year, energy independence thanks to Hydro-Québec, major public-health benefits and a positioning of Québec City as the first city in the world to have such a network.

FINAL RECOMMENDATION: Present the project publicly at a cost of C\$8.5 to 9 billion for 150 km, using as the main hammer argument the comparison with the third road link (8.3 km for C\$7.8B median). Move forward in parallel on two fronts: submission to The Boring Company's "Tunnel Vision Challenge" before February 23, 2026, and the launch of a preliminary feasibility study for Phase 1.

Document prepared for the Bike Tunnel Québec project — May 2026