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PAY DIRT

A GROWING PART OF STANTEC'S $5 BILLION-PLUS IN REVENUE COMES FROM THE RACE TO GET AHEAD OF CLIMATE CHANGE—AND ITS ENVIRONMENTAL ASSESSMENTS HAVE LED ITS TEAM OF ARCHAEOLOGISTS AND OTHER SPECIALISTS TO SOME WILD DISCOVERIES

BY SIMON LEWSEN

PHOTOGRAPHS BY RYAN WALKER

In Port Credit, a neighbourhood in Mississauga, this 75-acre parcel of lakeside property once housed a petrochemical plant. Stantec dug exploratory wells to find soil contaminated with hydrocarbons, which was then carted off to a Niagara-area landfill to be used as topsoil

IN THE EARLY 2000s, Hayley Bond, an archaeologist from British Columbia, was in Vancouver Island surveying a plot of land that had been slated for a residential development. The developer had hired Stantec—the international design and engineering firm, where Bond is a principal—to investigate the property. Her job was to find out what treasures might be buried beneath the topsoil.

The initial study was exploratory. Bond and a four-person team demarcated a series of square-metre patches evenly distributed across the site. These were like windows into archaeological history. With flat-headed shovels, the team dug out each square to a depth of roughly 80 centimetres to see what they could find.

Not much, it turns out. Just bits of debitage: stone filings, the likely byproduct of tool making. Clearly, pre-contact people had been at the site, but there was little evidence of sustained human activity—and therefore little reason to delay the project further. Soon, workers swarmed in with backhoes and excavators. Bond's job wasn't finished, though. "We always have an archaeologist on site during construction," she says, "because we never know what might turn up."

Between rounds of digging, Bond inspected the walls of the ever-deepening hole. At roughly a metre, she saw something surprising—a dark layer of earth, tightly compacted and greasy, perhaps from the oils in human skin. It was evidence of a "living floor," a patch of ground on which people had once resided. With this discovery, the entire project halted. The development site was now an archaeological site; it would remain that way until the team could figure out what else it contained.

They excavated the property by hand, whereupon they found additional patches of dark earth, rounded and tapered—the likely residue of stakes that had been driven into the ground, perhaps to support tents, longhouses or salmon-drying racks. Nearby, they found what Bond calls a "migrating hearth," a fire pit that had been disassembled and then reassembled on higher ground, suggesting people had returned to the site at different moments in time. They also unearthed a circle of cobbles beneath a layer of compacted sediment, perhaps a system for steaming roots. Such discoveries—evidence of plant gathering, rather than hunting—are rare, since plants decay faster than animal bones. Carbon analysis dated the artifacts to roughly 3,000 years ago, a period that doesn't often appear on the archaeological record.

It was a small but significant breakthrough. But why had it happened at all? And why, moreover, had the developer paid for the excavation? Aren't builders in the business of building?

The answer is that, today, we define that business more expansively than we used to. One doubts that Richmond Shreve and William F. Lamb, the men who built the Empire State Building in a mere 13 months, found time in their schedules to search for Lenape cultural artifacts beneath their plot in midtown Manhattan. One also doubts that they studied the possible effects of the tower on bats or migratory birds. Today, though, we expect big-ticket developers to think these things through; their permits depend on it. That's hardly the only environmental pressure builders now face. There's also the pressure to fortify brittle infrastructure, to clean up contaminated sites and to build resiliently for a world of floods, fires and rising sea levels.

For a construction company, these challenges are a headache. But for a firm like Stantec—which specializes in engineering, architecture, urban planning, project management and land surveying—they're a business opportunity. Stantec's environmental services group currently handles 20% of its overall work, and sustainability-related projects will help the company achieve its goal of growing by 50% in the next three years. "We've come a long way," says Stantec CEO Gord Johnston of the wildly successful 31,000-person company he runs. "But we're just getting started."

Stantec is celebrating its 70th birthday this year, and while it's tens of thousands of times larger than it was at inception, it's still small relative to what its leaders hope it will be. When its founder, Don Russell Stanley, an Ice Hockey World Champion, graduated from Harvard in 1953 with a doctorate in environmental engineering, he faced a choice: stay in Boston and play for the Bruins or return to Edmonton and put his expertise to use.

He chose to come home. In 1954, he founded D. R. Stanley Associates, a one-man shop, despite what the name implies. Over four months, he sent out 600 letters and drove 27,000 kilometres in search of work. He got early commissions from small-town municipalities seeking help with water and sewage systems. When the Peace River Suspension Bridge, a span on the Alaska Highway, collapsed in 1957, he designed the replacement, adding bridges to his professional portfolio.

That portfolio continued to grow. By the late '70s, the company had 400 employees, and it had

▲ Stantec's proprietary EchoPITCH tool uses data from bat acoustics, weather and wind turbine operations to help reduce bat mortalities without disrupting power

▶ For the 14-kilometre Brantford-Kirkwall natural gas pipeline—which stretches between the Township of North Dumfries and Hamilton, Ont.—Stantec provided full environmental studies, reports and permits to support construction

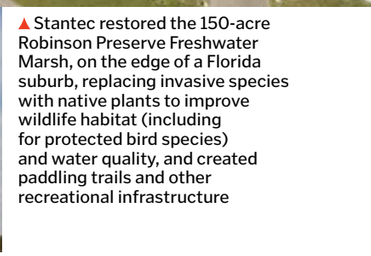
▲ Stantec performed geohazard and geotechnical assessments to help design and locate a 138-kV transmission line to bring power to the Brucejack Gold Mine in northwest British Columbia

OUT OF SITE

STANTEC AND ITS ROSTER OF SPECIALISTS, FROM PALEONTOLOGISTS TO BAT EXPERTS, PERFORM ALL MANNER OF ASSESSMENTS, STUDIES AND SURVEYS FOR PROJECTS AROUND THE WORLD

▲ Stantec provided site engineering and other services for the New Naples Botanical Gardens in Florida, which span 160 acres and contain seven distinct Florida habitats

▲ Stantec paleontologists helped excavate 17 turbine foundations for the Blackspring Ridge Wind Power Project in Alberta, turning up dinosaur bones, plant fossils and microfossil sites in shellbeds that contained small bones, teeth and scales from dinosaurs, turtles, crocodiles and fish. The fossils are now at the Royal Tyrrell Museum of Paleontology in Drumheller



▲ Stantec restored the 150-acre Robinson Preserve Freshwater Marsh, on the edge of a Florida suburb, replacing invasive species with native plants to improve wildlife habitat (including for protected bird species) and water quality, and created paddling trails and other recreational infrastructure

worked on ambitious development projects, including the transformation of Fort McMurray from sleepy frontier town to bustling petropolis. But the recession of the early '80s hit Alberta hard, perhaps because of Pierre Trudeau's decision to put price controls on the energy sector. Stanley Associates, as the company was then called, had to lay off half its staff. Whatever the cause, the lesson was clear: The firm needed to further diversify to ensure it never got rocked again.

Since adopting the name Stantec in 1998, the company has been on an acquisition spree, buying up over 120 entities in the 21st century alone, and it has participated in the grandest, priciest, gnarliest developments on the planet. It worked on the new lock system for the Panama Canal. And the $2-billion expansion of the Long Island Expressway. And the 13-kilometre Confederation Bridge connecting PEI to the mainland. And the post-Katrina network of pumping stations in New Orleans, which, during a hurricane, will remove enough storm water to fill an Olympic swimming pool in three seconds flat. And a skyscraper in Sydney, called Atlassian Central, that will be the world's tallest steel-and-timber building. Each initiative is a drop in a larger bucket. "Today, no project or client makes up more than 2% or 3% of revenue," says Johnston.

And what a lot of revenue there is. In 2018, the company brought in $3.4 billion; by 2023, that number had jumped to $5.1 billion. Over the same period, Stantec's share price more than tripled, from $30 to $106, outpacing Google and Meta. Its growth over the past five years is about 50% organic and 50% acquisition based. The current strategic plan, released earlier this year, aims to bring annual revenues to $7.5 billion by the end of 2026.

Part of that growth will be fuelled by acquisitions. But climate change, and the race to get ahead of it, is also a critical driver. The work of forestalling disaster is basically an engineering job—or rather, a series of engineering jobs, all interlinked. We need solar farms, offshore wind farms and geothermal wells. We need to bolster our supply of critical metals, from the copper that goes into electrical wiring to the lithium that sustains EV batteries. And we need to double the size of our grid, not only to serve the EV market but also to power the data centres of the AI sector. "At Stantec," says Johnston, "we do all of that."

In addition to creating the infrastructure of the future, he adds, engineers are being asked to retrofit the built environment of the past. Stantec gets plenty of work in nature-based design: rewilding marine ecosystems with kelp and sea grasses to stave off coastal erosion, or renaturalizing concrete water channels with absorptive banks and expansive fish habitats. Afif El-Dana, a regional growth leader at the company and a geotechnical engineer—an engineer, that is, who deals with soil and rock mechanics—is overseeing a project to save an imperilled town in northern Quebec. In the past, he says, people who live in the upper half of the country anchored their buildings in permafrost, expecting, quite reasonably, that this substrate would remain frozen (as the prefix "perma" implies). But today, the frost is receding, causing the ground to shift and the buildings above it to sink and warp.

In the Quebec town (which, for confidentiality reasons, El-Dana can't name), a Stantec team is inspecting each house for thaw-related damage. "They are no longer stable," says El-Dana. "You see cracks in the walls and foundations. You have issues opening doors." After this initial survey, the team will explore further, perhaps by injecting thermostats into subterranean wells across the town, enabling them to gauge how far the permafrost has diminished.

If the damage is limited, the cheapest option might be to jack up the most vulnerable homes and fortify them with deeper piles; if it's extensive, the town may have to relocate to higher ground. Either way, its residents are facing a knotty logistical challenge that previous generations of builders could never have imagined. But knotty logistical challenges are Stantec's speciality. "I'm not saying climate change is a good thing," says El-Dana. "But it is a thing. We're living it. That's why this is such an exciting time to be a geotechnical engineer."

Developers are focusing on issues of climate and ecology not merely because it's the right thing to do but rather because they're forced to do it. Over the past five decades, governments have taken a more aggressive role in the construction industry, compelling investors to think about ecological impacts that didn't bother them before.

In 1980, for instance, the U.S. government passed the Comprehensive Environmental Response, Compensation and Liability Act. It designated Superfund sites—contaminated properties that would be cleaned up by the Environmental Protection Agency—and created an aggressive program of cost recovery. When assessing a cleanup site, the government figures out which parties might be held responsible for the mess. If some have gone bankrupt, others are told to pick up the tab. The message is clear: When you buy a property, you assume its liabilities. Owners can be forced to remediate damage they neither caused nor knew about.

The same is often true in Canada, where investors do extensive due diligence—including full assessments for contamination—before making any major land purchase. They do similar due diligence before building, too. The Canadian Environmental Assessment Act, passed in 1992 (and since replaced under different names), compels developers of big infrastructure works to submit a report to the government outlining potential ecological impacts and a plan to mitigate them. Sub-federal

laws—for instance, the B.C. Heritage Conservation Act, which protects archaeological sites and shipwrecks—force smaller developers to do similar investigations (albeit with varying degrees of thoroughness), even if the projects aren't big enough to warrant federal involvement.

And so land owners must ask questions they didn't ask before: What ecological damage has already happened on my property? What might happen if I develop it further? What can I do to reduce liabilities? And how can I clean things up today so that I don't have a bigger mess on my hands tomorrow? Answering those questions is Stantec's business.

CHRIS CUSHING, a Stantec principal in environmental remediation, has been working to remediate a 75-acre lakeside property in the Port Credit neighbourhood of Mississauga. The lot would be prime real estate, had it not been contaminated with hydrocarbons thanks to a petrochemical refinery that once stood there. To assess the extent of the leakage, Cushing's team dug exploratory wells across the property, from which they extracted soil samples that could be tested in a lab. Contaminated dirt was carted off, truck after truck after truck, to a Niagara-area landfill, where it will be used as topsoil. An entire stratum of polluted ground was effectively removed, much as you'd peel off the outer layer of a rotting onion.

But contamination isn't always so easy to access. Chris Mathies, an environmental engineer and Stantec vice-president, recently surveyed a gas station where decades-old petrol tanks had corroded, leaking hydrocarbons into the ground. By analyzing soil samples, Mathies and his team established that the gas had seeped below the foundations of an apartment block. None of this was the current owner's fault (the spill had happened before his time), but it was nevertheless his problem.

To solve it, the station owner leased out a nearby parking lot, where the team dug a trench adjacent to the apartment building. From there, they inserted slotted pipes—called horizontal wells—that ran beneath the foundations, enabling engineers to pump a concoction of nitrogen, phosphorus and potassium into the ground, stimulating microbial growth. The microbes ate the hydrocarbons, cleaning up the mess.

Such bespoke solutions are now commonplace, Mathies says. Sometimes, Stantec engineers will heat contaminated soil above boiling point, transforming gasoline into vapour, which can be vacuumed up. Or they'll install a massive underground cathode at one end of a site and a massive anode at the other, a system for pulling salt molecules apart. "When I started in this industry more than two decades ago," says Mathies, "I thought the runway for decontamination work would dry up quickly. But there are so many contaminated sites that we won't be running out of projects any time soon." The easy cleanup jobs, he adds, are mostly done: "What's left are the complicated ones, the hard technical challenges that inspire engineers like me to get up in the morning."

Assessing sites for wildlife is equally tricky. To be sure, there are many ways for developers to mitigate harm to endangered species. Construction can be scheduled for winter, when birds and bats aren't nesting. Roadways can be bisected with wildlife corridors, like overpasses for deer and elk, or tunnels for turtles and snakes. Turbines can be made to automatically switch off at low wind speeds, when migratory bats are likely to pass through. And if a developer must destroy a wetland, it can compensate by building a larger one nearby.

But you can't protect endangered species if you don't know which ones are present. Andrew Taylor, a senior ecologist at Stantec, says he or his colleagues have searched for caribou via aerial reconnaissance, often in winter, when tree cover is limited. They have extracted animal DNA from samples of water or air. They have employed AI-based algorithms to pick out endangered bird calls from field recordings. And they have installed motion-sensor cameras to record animal activity that humans would surely miss. In a culvert beneath an Oshawa, Ont., railway, Taylor and his team got footage of owls, deer, mink and, to his surprise, otters. "That's something we would have had a difficult time finding in person," he says.

Jennifer Randall, a terrestrial ecologist at Stantec, uses ultrasonic devices to record bat echolocation calls. The noises, she says, are too high-pitched for the human ear, but they look distinctive on a spectrogram. The northern myotis, a small bat with long ears, has a call like a near-vertical line, whereas the little brown myotis, a bat with glossy fur and a snub nose, produces a series of thin slants. Randall often searches in what should be unlikely places. "We have found at-risk migratory bats on sites in Labrador," she says. "We didn't know these particular species travelled so far north." Had it not been for industrial development in the region, this fact would still be unknown today.

WHICH BRINGS US to the awkward reality of Stantec's assessment work: It is ecologically minded, but the ultimate goal is to get things built. To be sure, construction can be done with greater or lesser degrees of environmental sensitivity. One hopes that builders will choose the former. But the incentives of development can't be perfectly aligned with the imperatives of conservation. When designing a roadway, you can search for trees in which owls are nesting. You can even establish a perimeter around each owl tree and declare, as Stantec has done, that no trunks within that radius will be felled. But the brute reality remains: When you're building a road, you're serving the needs of humans, not owls, who'd be better off if you left their forest habitat alone.

Further complicating matters is the idiosyncratic way that Canadians do environmental assessments. The work is completed by consultants, but it's commissioned and paid for by the developer (what industry people call "the proponent"), who isn't exactly a neutral party. Of course, a consultant can't lie in an impact assessment (that's fraud), and a proponent can't tell a consultant to lie (that's coercion). But there's plenty of room for subjective decision-making. "Over the years, assessments have gotten bigger and bigger in scope," says Anna Johnston, a lawyer with the non-profit West Coast Environmental Law. "Proponents sometimes want that level of detail, because they can bury information that's harmful to their cause in tens of thousands of words."

Rodney Northey is an environmental litigator and partner at the law firm Gowling WLG. He says that when assessing significant environmental or cultural impacts, proponents are free to define the word "significant" as they see fit. "The government is saying far too little about what 'significant' means," he says, "and leaving proponents with too much say in the matter."

Northey is currently litigating a case against the Milton Logistics Hub, a CN truck-and-railway facility to be built in the Golden Horseshoe region of southern Ontario. A Stantec report from 2015 concluded that the development would not have significant environmental effects. But critics of the project, including the Halton municipalities, contend it will bring an influx of trucks to the area, further damaging air quality. A federal panel ultimately found several significant effects, some related to air quality. The government nevertheless approved the build in 2021, but in March of this year, a court set aside the approval. (That decision is now under appeal.)

When asked about such disagreements, Gord Johnston argues that an adversarial dynamic can be evidence of a system working well. An assessment report isn't supposed to be incontestable: It's conducted by humans, after all. If regulators, courts or interested third parties have doubts, Johnston states, they can call for further clarity or investigate themselves. (Of course, few public-interest groups or Indigenous nations are as well-resourced as big developers, but some government offices do have agents they can dispatch into the field.) Disagreement, Johnston adds, is constructive—a byway on the path to better decision-making. "It's a pretty fulsome process," he says of the environmental-assessment regime. "The proponents are trying to push a bit, which is their role. But the regulator is saying no, no, no. So there is a healthy tension at play."

When asked about another tension in Stantec's business model—its willingness, despite its green rhetoric, to work on projects environmentalists hate, like mines and pipelines—Johnston is similarly unfazed. The goal, he suggests, is to mitigate harm. "We're looking to make sure that when these projects are developed, they're done in the most environmentally sustainable way." He adds that even the greenest infrastructure can have adverse effects: "We know that, to manage climate change, we need more electrical transmission capacity. But to put up a transmission line, you have to clear the corridor it runs through."

Ultimately, the greenest development is the one that never happens, but nobody, not even the most fervent environmentalist, wants a moratorium on infrastructure of any kind. Assessments, mitigation strategies, remediation initiatives—these are all attempts to reduce the tension between development and damage or, to put it more bluntly, between construction and destruction. But these tendencies can't be uncoupled entirely. Stantec, therefore, is in the business of generating imperfect, contestable solutions, which may be the only kind possible.

Sometimes, when Hayley Bond, the archeologist, makes a discovery on a property, the developer responds with a plan for mitigation or avoidance. Highways can be routed above heritage sites; pipelines can be routed below or around them. But at other times, such fixes aren't in the offing. "Finding and destroying sites is not the goal of archeology," says Bond. But she doesn't always have a choice.

At the Vancouver Island property where she found the migrating hearth, there was no way to both build out the development and leave the site unaltered. Instead, Bond's team submitted its discoveries—lists of findings, drawings, sediment samples and radiocarbon data—to the archaeology branch of the Ministry of Forests. "All of that information is now available to researchers," Bond says. The site, to use the technical language, was "preserved through record," which is to say it was materially destroyed. Because of the developer, it no longer exists. Without the developer, we wouldn't have known it existed in the first place.

◀ This will be prime lakefront real estate in Port Credit, once Stantec has finished removing the contaminated soil