

**Impacts of Unauthorized Construction-Derived
Contaminated Soil Disposal in Quebec: A Case Study of
Rang Dumas in the Chateauguay River Watershed**

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Section 1: Abstract

The contaminated site located on Rang Dumas in the Chateauguay River watershed is one of the few properties contaminated by construction waste that has been extensively documented for the public, despite having not received a compliance order from Quebec's Ministry of Environment and Fight Against Climate Change, of Fauna and Parks (MELCCFP). Significant groundwater resources are located below the site, which serve as drinking water for 1,324 Ormstown residents. At the end of spring 2022, Ormstown employees noticed what was at the time unauthorized backfilling activities on the property, which raised concerns about the potential risks it posed to the local community's water supply and therefore health and livelihood. While the local groundwater currently remains uncontaminated, soil and hydrogeological analyses have confirmed soil contamination on the property, highlighting the necessity for restoration to prevent future groundwater contamination. Such backfilling operations, carried out in proximity to high recharge rate areas of the aquifer, pose a threat to the sustainable replenishment of the groundwater. The contaminants identified in the soil could also pose significant health risks to the local community, including increased carcinogenicity and the potential for birth defects, if they were to infiltrate the groundwater. While the party held liable for the high costs associated with the property's decontamination remains uncertain, the court has determined that the installation of monitoring wells around the backfill is necessary at this stage of the procedure. The contaminated property on Rang Dumas is not an isolated incident and highlights the inadequate monitoring and enforcement that has plagued the province when it comes to regulating the disposal of construction-derived contaminated soil. Quebec's traceability system, an innovative regulatory change, holds promise in addressing the widespread issue, provided it is effectively implemented. The problem of unauthorized construction-derived contaminated soil disposal, exemplified by the Rang Dumas case study, is a significant concern that should not be taken lightly when ensuring the long-term sustainability of rural livelihoods in Quebec. The subject matter of this paper involves a rapidly changing and evolving situation. As such, the findings and conclusions presented are based on the information available up to July 17th 2023.



Figure 1 – June 2nd 2018 Satellite Imagery of the Rang Dumas Property (Google Earth Pro 7.3.6.9345, 2022)



Figure 2 – July 6th 2023 Satellite Imagery of the Rang Dumas Property (UP42, 2023)

Section 2: Introduction

Throughout the past decade, the rural regions surrounding the Greater Montreal area have struggled mightily with the problem of illegal construction waste and contaminated soil dumping. In the past thirteen years, Quebec's Ministry of Environment and Fight Against Climate Change, of Fauna and Parks (MELCCFP) issued thirteen compliance orders to thirteen different offenders, each of whom have been observed to repeatedly violate Quebec's *Environment Quality Act* through illegal disposal of construction waste or construction-derived contaminated soil. Ten of the thirteen compliance orders mentioned above have been issued in the past five years alone (DePani, 2023). A compliance order is currently the most powerful tool at the disposal of the ministry to put a halt to illegal activity. Once the offender receives the compliance order, they are obligated by law to comply with the demands stated in the legal document issued by the province. Failure to comply leads, in theory, to significant monetary sanctions (MELCCFP, 2023). All compliance orders are publicly available on the MELCCFP's website¹.

The Haut St-Laurent is a regional county municipality (MRC) containing true jewels of nature such as Covey Hill, as well as vast areas of agricultural land that provide a livelihood for a large segment of the population (Nature Conservancy Canada, 2023 ; MRC du Haut St-Laurent, 2023). The MRC is however one of Quebec's territories that is particularly hard hit by illegal dumping: two properties, in Hinchinbrooke and Franklin, have already received a compliance order from the MELCCFP, in 2018 and 2021 respectively, for accepting unauthorized construction-derived contaminated soil (DePani, 2023). There are however solid indications that many other landowners in the MRC, although having not received a compliance order from the MELCCFP, are accepting waste material on their properties. Quebec's *Environment Quality Act* states that waste material must be disposed of in an authorized facility (Gouvernement du Québec, 2023). However, In the past four years, media outlets including LaPresse, *Radio-Canada* and *The Gleaner*, have documented construction-derived contaminated soil dump sites on agricultural land all over this MRC, from Saint-Rémi to Saint-Chrysostome; these properties, which are only authorized to use their land for agricultural purposes, don't appear on Quebec's registry of ordinances (Larouche, 2018 ; Denis, Taschereau, 2019 ;

¹ <https://www.registres.environnement.gouv.qc.ca/ordonnances/index.htm>

Dressel, 2020; Gouvernement du Québec, 2023). The provincially documented violations that are publicly available are therefore an underestimation of the true scale of the issue.

Due to the lack of publicly available information, it is difficult to provide valuable insight on the magnitude of potential harms brought by dump sites that have not received a compliance order from the MELCCFP. However, an ongoing court case involving the municipalities of Franklin and Ormstown has provided extensive, publicly available data on a particular property that has been documented as receiving construction-derived contaminated soil as backfill since November 2021. Located on Rang Dumas, the property is close to a high recharge rate area of the Chateauguay River aquifer and offers a good example of the threats that can be caused by unauthorized dump sites that are not receiving a proper level of attention from Quebec's ministry's highest level of attention (Croteau et al., 2010).

Based in the most part off publicly available legal files obtained at the Salaberry-de-Valleyfield Courthouse (consulted June 29th 2023), this paper is written with the intention of providing valuable, accessible, complimentary information on an important issue that poses a threat to the livelihood of local communities in the Chateauguay River watershed. Better comprehension of the circumstances in which unauthorized dumping took place on the Rang Dumas property provides an opportunity to understand more about the aquifer contamination threats caused by construction-derived contaminated soil dumping. It is also an example of the legal battles that can arise from such issues. Finally, this paper seeks to analyze and expose the underlying causes of this situation, which seem to boil down to inadequate monitoring and enforcement. This paper provides a tool that hopefully will bring community members together to demand better management of the common resources on which the entire region depends.

Section 3: Context Behind the Backfilling Operations on the Rang Dumas Property

In 1983, two wells, having been dug approximately 60 meters deep to reach the aquifer, were set up on a property located at 1250 Rang Dumas in the municipality of Franklin. Both wells were to be connected to the municipality of Ormstown's water system, following an agreement between Ormstown and the property owner at the time. To assure the maintenance of the two town wells, which were destined to serve a large fraction of the Ormstown population in the coming years, both parties signed a series of

permanent easements. These would allow the municipality to, among other things, freely access the property, in the event that reparations or installation of new equipment needed to be undertaken on the water system, to maintain its proper functioning (DHC Avocats, 2023). It is noteworthy to state that a permanent easement is attached to the property; successive landowners who purchase the property will have to accommodate the obligations stated in the easement, even if they weren't the ones who negotiated the clauses in the document (St-Pierre, 2019).

According to the sworn statement, the current property owners, Jeannine Clément and Louis Drapeau, decided to undertake backfilling operations on their property in order to level what was a very uneven ground. This was a necessary step to accommodate the bee farm they said they wanted to build. Jeannine Clément and Louis Drapeau therefore hired, in November 2021, Crêtes Excavation Inc, a firm specialized in excavation and ground levelling, to backfill the property with new soil (Drapeau, 2023).

On May 25th 2022, two municipal employees from Ormstown, Luc Pilon and Stéphane Leclerc, entered the property in order to access the water system infrastructure. It was at this moment that they observed unauthorized backfilling activities. Both employees claimed to have witnessed, upon further inspection, various construction waste materials visible in the soil, such as geotextile fabric, bricks, glass, plastic and metal; they also stated that the backfill was black and emitted a foul odour. Pictures were taken by Luc Pilon on site and he promptly reported the unauthorized activity to the municipality of Franklin, as the property falls within their jurisdiction (DHC Avocats, 2023). On the same day, an inspector from the municipality of Franklin visited the property, informing Louis Drapeau that backfilling of soils required a permit and must therefore be ceased; however, no comment was made on the presence of construction waste in the soil. Backfilling was momentarily ceased as the property owners decided to apply for a permit (Drapeau, 2023).

Shortly after, the municipality of Franklin received a permit application from Louis Drapeau and Jeannine Clément, along with a report from an agronomist hired by Crêtes Excavation Inc, which claimed that the soil contained no contaminants. From Franklin's perspective, everything seemingly conformed to its rules. They therefore issued a backfilling permit to the property owners: backfilling of clean soil was authorized on the property from June 1st 2022 to June 1st 2023 (Municipalité de Franklin, 2022). The municipality of Ormstown, in the meantime, had decided to hire an independent firm, SolmaTech, to conduct soil analysis on the property. As their inspector had observed construction waste in the backfill dangerously close to their water system infrastructure, Ormstown interpreted this action as a normal application of their legal

right as stated in the easements. The work to be undertaken by SolmaTech was to assure the provision of clean drinking water to the municipality's citizens (DHS Avocats, 2023).

On June 12th 2022, the municipality of Ormstown sent a notice to the property owners, letting them know that an inspector from SolmaTech was going to inspect the soil on their property in the coming days. It was made clear in the report that a lack of collaboration on behalf of the property owners was not to be tolerated; if the property owners were to cooperate with the municipality of Ormstown, it would be considered as an attenuating factor in the event of legal recourse. Such legal recourse could take the form of damage claims or expropriation, depending on the gravity of the contamination. It was also mentioned that a complaint on behalf of the municipality has been filed to the *Commission for the Protection of Agricultural Territory of Quebec* (Gagnon, 2022). The property owners claimed to be shocked and outraged by the notice. After obtaining authorization from their municipality to proceed with the backfilling operations, Mr. Drapeau and Mrs. Clément had not foreseen the possibility of facing damage claims or even expropriation for engaging in what they believed to be a lawful activity. Following this notification, the municipality of Franklin sent out a request to the municipality of Ormstown, asking them to not send the SolmaTech inspector to Mr. Drapeau and Mrs. Clément's property (Drapeau, 2023).

On June 13th 2022, Luc Pilon and Stéphane Leclerc, along with an employee from SolmaTech, showed up on the Rang Dumas property in order to proceed with the soil analysis. Shortly after the beginning of the soil sampling, Louis Drapeau came out of his house and demanded all three employees leave his property. Luc Pilon, Stéphane Leclerc and the employee from SolmaTech tried to explain that the soil analysis was necessary in order to assure the integrity of Ormstown's water system. They later claimed that Louis Drapeau was agitated, and, to avoid any escalation, all three employees decided to leave the property before the soil sampling could be completed (DHS Avocats, 2023). Following the unsuccessful soil sampling, Ormstown alerted the MELCCFP of the events that took place that day, describing the situation as a threat to their citizens' health (DHS Avocats, 2023). Two inspectors from the MELCCFP arrived on site on June 14th 2022, undertaking their own soil sample analysis (Drapeau, 2023). On top of the ministry's soil sampling, the municipalities of Ormstown and Franklin then both agreed on conducting further analysis: they therefore hired another independent firm, Labo Montérégie, to inspect the property on June 16th 2022 (Municipalité de Franklin, 2022). On April 25 2023, the property owners stated that they had ceased all backfilling activities since August 25 2022, following a court-issued protective order that required the cessation of any work that could potentially harm the groundwater (DHS Avocats, 2023 ;

Drapeau, 2023). Although the protective order came to an end on February 24th 2023, the MELCCFP has prohibited any further backfilling on the property as of March 22nd 2023 (Drapeau, 2023 ; Dionne, 2023).

Section 4: Expert Reports

Three publicly available expert reports, from Labo Montérégie, SolmaTech and Envir'eau Puits, allow community members to leave the politics of the current issue aside to gain valuable insight on the current threat posed by the backfilled soil on the Rang Dumas dump site. The reports labeled the concentration of contaminants with respect to four different levels, consistent with the proposed methodology in *Quebec's Intervention Guide: Soil Protection and Remediation of Contaminated Sites*: criterion A, criterion B, criterion C and criterion > C. While it is possible for soils contaminated at levels below criterion C to be reused in other applications or purposes without posing a threat to human health, it is explicitly stated in *Quebec's Intervention Guide: Soil Protection and Remediation of Contaminated Sites* that such valorization of contaminated soil can not be done on agricultural land (Daigneault, 2019 ; Beaulieu, 2021). It is therefore prohibited to import soils that are more contaminated than the baseline soils in an area zoned agricultural, such as the property located on 1250 Rang Dumas. It is also noteworthy to state that all soils contaminated beyond criterion C can not be reused in any context and must be either decontaminated or disposed of in a registered landfill (Beaulieu, 2021).

The presence of groundwater also creates new contamination dynamics as groundwater can become contaminated simply by flowing through contaminated soil. In many instances, this amplifies the need to adopt a precautionary principle. For some contaminants, such as benzo[a]pyrene (a polycyclic aromatic hydrocarbon), a groundwater concentration of less than one tenth of a microgram per liter (< 0.0001 mg/L) is sufficient to make the water unsafe to drink (Beaulieu, 2021). As human exposure to polycyclic aromatic hydrocarbons occurs through inhalation, dermal absorption or ingestion of the contaminant, contaminated drinking water leads to a much bigger health risk than contaminated soil, as the latter is relatively isolated from human contact (Okechukwu et al., 2021). Benzo[a]pyrene was present in concentrations of 7 mg/kg (criterion B) in some of SolmaTech's soil samples taken on Rang Dumas (Croteau, 2023).

Undertaken by numerous different experts, each study brings distinct findings on key aspects of the issue, all the while establishing similar recommendations regarding the procedures to be followed going forward.

Labo Montréalégie: June 2022

On June 16th 2022, Following an agreement between Ormstown and Franklin to proceed with an independent study, Labo Montréalégie collected twenty-five soil samples on the Rang Dumas property, with the purpose of analyzing the quality of the backfilled material. The concentrations of the following contaminants were evaluated in each sample: petroleum hydrocarbons (PHCs), polycyclic aromatic hydrocarbons (PAHs), volatile organic compounds (VOCs) and diverse metals. As there was no evidence that the baseline soil concentration on site was above criterion A for any of the listed contaminants, the firm judged that the contaminant concentration threshold for the site was criterion A of Quebec’s *Intervention Guide: Soil Protection and Remediation of Contaminated Sites*. Any soil sample containing a contaminant in concentration equal to or above criterion A would therefore be considered contaminated. Soil samples were taken at varying depths, ranging from 0 m to 2.2 m (Sarrazin, Robineau, 2022). The findings of the report, made available to the municipality of Franklin on August 15th 2022, are summarized in Table 1 below.

Contaminant	Units	< A	A-B	B-C	> C
PAHs	Number of soil samples	17	8	0	0
PHCs	Number of soil samples	21	4	0	0
Metals	Number of soil samples	22	3	0	0
VOCs	Number of soil samples	25	0	0	0

Table 1 – Labo Montréalégie’s Soil Sample Contaminant Concentrations Across Pollutant on the Rang Dumas Property (Sarrazin, Robineau, 2022)

Soil samples from this first analysis were found to contain, among others, benzo[a]pyrene in concentrations as high as 0.72 mg/kg, petroleum hydrocarbons C₁₀-C₅₀ in concentrations as high as 520 mg/kg and arsenic in concentrations as high as 6.1 mg/kg. Depth of backfilled material was observed to vary between 1 m and 3 m. Various construction waste materials, such as wood residues, diverse metals, plastic, concrete, asphalt and bricks, were observed to be present in the backfill. Across the different samples of analyzed backfill, waste material was observed to be present in proportions inferior or equal to 8%. (Sarrazin, Robineau, 2022).

In the concluding remarks of the report, Labo Montérégie stated that soils must be removed in specific areas of the site. Indeed, every area of the site that yielded contaminated soil samples needed to be restored as to contain no contaminant in concentrations exceeding criterion A (Sarrazin, Robineau, 2022).

SolmaTech: August 2022

On August 29th 2022, SolmaTech collected thirty-nine soil samples on the Rang Dumas property with the purpose of analyzing the quality of the backfilled material. Ormstown decided to hire SolmaTech following the discovery of the unauthorized backfilling activity that happened on May 25th 2022 (DHS Avocats, 2023). This was the firm’s second attempt at collecting soil samples on site, following a first unsuccessful attempt on June 13th 2022. Soil samples from SolmaTech were taken two months after Labo Montérégie's. The concentrations of the following contaminants were evaluated in each sample: PHCs, PAHs, VOCs and diverse metals. As there was no evidence that the baseline soil concentration on site was above criterion A for any of the listed contaminants, SolmaTech judged that the contaminant concentration threshold for the site was criterion A of Quebec’s *Intervention Guide: Soil Protection and Remediation of Contaminated Sites*. Soil samples were taken at varying depths, ranging from 0 m to 2.5 m (Croteau, 2023). The findings of the report, made available to the municipality of Ormstown on February 24th 2023, are summarized in Table 2 below. The comparison of contaminated sample rates between the Labo Montérégie study conducted in spring and the SolmaTech study conducted near the end of summer, after an additional two months of on-site backfilling activities, is presented in Table 3. SolmaTech also proceeded to estimate the volume and weight of contaminated soils on site; these estimations are summarized in Table 4.

Contaminant	Units	< A	A-B	B-C	> C
PAHs	Number of contaminated soil samples	10	18	11	0
PHCs	Number of contaminated soil samples	19	18	2	0
Metals	Number of contaminated soil samples	18	15	2	4
VOCs	Number of contaminated soil samples	37	1	0	0

Table 2 – SolmaTech’s Soil Sample Contaminant Concentrations Across Pollutant on the Rang Dumas Property (Croteau, 2023)

Contaminant	Units	June 16 th 2022	August 29 th 2022	Relative Change
PAHs	Percentage (%) of contaminated soil samples	16	51	319
PHCs	Percentage (%) of contaminated soil samples	32	74	231
Metals	Percentage (%) of contaminated soil samples	12	54	450
VOCs	Percentage (%) of contaminated soil samples	0	3	NA
No Contamination	Percentage (%) of soil samples	56	18	-68

Table 3 – Comparison Across Time of Soil Samples Exceeding Criterion A on the Rang Dumas Dump Site (Sarrazin, Robineau, 2022 ; Croteau, 2023)

Level of Contamination	Volume (m ³)	Quantity (metric tons)
A - B	6990	13 980
B - C	1313	2626
> C	422	844
Total:	8725	9147

Table 4 – Estimated Volume and Quantity of Contaminated Soils on the Rang Dumas Dump Site (Croteau, 2023)

Soil samples were found to contain, among others, benzo[a]pyrene in concentrations as high as 7 mg/kg, petroleum hydrocarbons C₁₀-C₅₀ in concentrations as high as 1 000 mg/kg and arsenic in concentrations as high as 9.5 mg/kg (Croteau, 2023). Comparatively, these concentrations exhibited an increase from the levels reported in the study conducted by Labo Montérégie.

In the concluding remarks of the report, SolmaTech recommended the removal of all contaminated soils from the property. Given the proximity of Ormstown’s water system infrastructure to the contaminated soils, it was also recommended that three monitoring wells be built on site to ensure the monitoring of groundwater quality (Croteau, 2023).

Envir'eau Puits: July 2022 – January 2023

Following the discovery of unauthorized backfilling activities near their water system infrastructure in May 2022, Ormstown mandated Envir'eau Puits, a firm specialized in groundwater research, to assess the potential risks posed by the contaminated soils to the municipality's groundwater. Envir'eau Puits has already been hired by the municipality in past years to undertake water testing on both town wells as well as other projects necessitating hydrogeological expertise (McCormack, 2023).

According to a previous study undertaken by Envir'eau Puits in March 2022, groundwater essentially flows southeast to northwest under the Rang Dumas dump site. Therefore, one town well, Dumas 6, located 425 m northwest of the contaminated backfill, was deemed more susceptible to contamination compared to the other town well, Dumas 8, which is situated 350 m southeast of the affected area. Past studies undertaken by Envir'eau Puits have also revealed the relative contamination potential of the groundwater around the town wells and the areas where the backfilling has taken place (McCormack, 2023). Quebec's *Regulation on Water Extraction and Protection* defines three levels of groundwater vulnerability: "low", "medium" and "high" (Gouvernement du Québec, 2023). While most of the backfilling activity has taken place in areas of "low" groundwater vulnerability, some of the contaminated soil remains in areas of "medium" vulnerability, where the geological layers are of greater permeability. These would allow the potential for relatively more contaminated precipitation water to seep to the aquifer below. A large portion of the Rang Dumas property has been identified to have a "medium" groundwater vulnerability (McCormack, 2023).

Previous analysis of groundwater samples from the two town wells dating back to 2007, 2010 and 2015 revealed, for the most part, no abnormal concentration of contaminants (McCormack, 2023). Only manganese was present in unusually high concentrations at Dumas 6, at times slightly exceeding the 0.12 mg/L recommendation of Health Canada (McCormack, 2023 ; Santé Canada, 2023). This historically high manganese concentration can be traced back to a mineralogical composition naturally richer in manganese than the groundwater's surrounding rock in the Dumas 6 area. Despite the high manganese concentration, the well water has historically been deemed of decent quality. Groundwater tests conducted from July 2022 to January 2023 revealed only manganese to be present in concentrations slightly higher than those recommended by Health Canada or the World Health Organization. These are however naturally high and can not be traced back to the surface contaminants present in the backfilled soil (McCormack, 2023).

The final report was provided to the municipality of Ormstown in February 2023. Although the groundwater was found to be free of contaminants and had low relative contamination potential in most backfilled areas, the presence of contaminants in the soil above the groundwater was still considered a contamination threat. It was therefore recommended to undertake the installation of three monitoring wells. Two of them would be installed between the location of the contaminated backfill and the Dumas 6 town well, while the other one would be installed between the location of the contaminated backfill and the Dumas 8 town well. Such operations would have to be undertaken as soon as possible to detect any seepage that might contaminate the well water. Furthermore, water samples from Dumas 6 would need to be collected and analyzed every month; water samples from Dumas 8 would however only have to undergo such procedure once every two months. It was also strongly recommended that the contaminated backfill be removed from the property.

MELCCFP : September 2022

On March 22nd 2023, the MELCCFP issued a notice to the property owners of the Rang Dumas dump site: an on-site verification having been undertaken by an inspector on September 1st 2022 concluded that contaminated soils have indeed been illegally disposed on the property. Even if the municipality of Franklin issued a permit to the property owners, allowing them to undertake backfilling operations, imported soils were not authorized to exceed criterion A for any contaminant concentration. Soil samples collected by the ministry unveiled concentrations of POHs falling within the range of criterion A to criterion B, concentrations of PAHs falling within the range of criterion B to criterion C, and lead concentrations surpassing criterion C. Corrective action was therefore demanded without further delay; new backfilling activity was also prohibited as long as the contaminated soil remained illegally on site (Dionne, 2023).

Section 5: Livelihood Risks Brought by Unregulated Backfilling

Diminished Recharge Rates

Backfilling contaminated materials above a groundwater reservoir, as was being done on the Rang Dumas property, could lead to various negative externalities for citizens who depend on regional well water for their livelihood. One such effect is a decreased recharge rate of the aquifer, leading to a lowered water

table. In the Chateauguay River watershed, the geographic zone in which the Haut St-Laurent MRC is located, 91% of the groundwater is replenished through areal recharge, meaning that water seeps from the permeable land surface all the way down to the aquifer (Lavigne et al., 2013). The land surface area of the watershed has varying recharge rates across regions, depending on variables such as ground permeability, surface accumulation of snow and plant transpiration. Therefore, some regions of the MRC will have a more important role to play on the replenishment of the groundwater resources (Croteau et al. 2010). Over the studied area of the watershed, which encompasses approximately 2 500 km² of land, the regions with the highest recharge rates were found to be Covey Hill, Le Rocher and Huntington Hills, with recharge rates being as high as 404 mm per year (Vescosvi et al., 2009; Croteau et al., 2010). Notably, a dump site on Route 201 in the municipality of Franklin, which received a compliance order from the MELCCFP on June 2nd 2021, is located directly on Le Rocher (DePani, 2023).

The Rang Dumas dump site is located only 3.5 km away from Le Rocher. While the quantity of groundwater being recharged on the Rang Dumas property has not been extensively studied, its proximity to a high recharge rate area should be a reason for precaution. Backfilled soils are much more impermeable than most sediments observed above the groundwater in the Chateauguay River watershed; only 7% of the aquifer's total water recharge is seeping from sedimentary layers less permeable than backfilled soils. The remaining water trickles through sedimentary layers that are considered much more permeable than backfill. These permeable layers range from being 100 times more permeable (till) to 500,000 times more permeable (sand and gravel) than backfill (Croteau et al. 2010). Adding a thick layer of backfilled soil over a large area of permeable land, as was done on the Route 201 dump site situated on Le Rocher, can have consequences on the groundwater's recharge rate. In the Covey Hill area, it was evaluated that decreasing the groundwater recharge rate by only a few millimeters per year can result in a local groundwater level reduction of more than ten meters. As most of the pumping wells of the region only reach the upper portion of the aquifer, a permanent reduction of the water table caused by diminished recharge rates could force groundwater consumers to re-drill their wells to reach deeper groundwater levels (Lavigne et al. 2013). If the backfilled soil on the Rang Dumas property is layered over a highly permeable sedimentary layer, it could therefore contribute to the reduction of the regional aquifer's water table.

Drinking Water Contamination Risks

Although backfilled material has the potential to slow recharge rates, if it is contaminated, water flowing through it can nonetheless reach and potentially contaminate the downgradient aquifers. Therefore,

because the backfilled material on the Rang Dumas property is contaminated, it poses a supplementary threat to the health of the territory's groundwater resources. According to reports from SolmaTech and Envir'eau Puits, if the contaminated soils are not removed, the contaminants in the backfill could potentially reach the local groundwater, which currently serves as a water source for 1 324 Ormstown residents. (Croteau, 2023 ; McCormack, 2023 ; DHS Avocats, 2023). Table 5 below summarizes the list of specific soil contaminants that were present in concentrations exceeding criterion B, their highest observed concentration (mg/kg) in the backfill as of August 29th 2022, the contaminant threshold concentration allowed in drinking water (mg/L) as well as the health hazards the contaminant pose to humans and ecosystems upon exposure. Since the provincial and federal government do not provide threshold concentrations for drinking water for most of the substances listed below, threshold concentrations for certain substances were sourced from data available at the state level in the United States. The human and ecosystem health risks are those documented in the Globally Harmonized System of Classification and Labelling of Chemicals; if a contaminant was not classified in the database, Material Safety Data Sheets provided by a private firm, such as Analytical Products Group, were consulted for reference. Due to the large variety of possible petroleum hydrocarbon compounds present in the C₁₀-C₅₀ family, the analysis was limited to three particular compounds: toluene, ethylbenzene and xylenes.

Contaminant	Category	Maximum Observed Soil Concentration (mg/kg)	Drinking Water Threshold Concentration (mg/L)	Potential Human and Ecosystem Health Risks
Benz[a]anthracene	PAHs	8.5	0.0002	-May cause cancer -Acute hazard to aquatic life -Long term hazard to aquatic life
Benzo[a]pyrene	PAHs	7.0	0.00004	-May cause an allergic skin reaction -May cause genetic defects -May damage fertility -May damage an unborn child -Acute hazard to aquatic life -Long term hazard to aquatic life
Benzo[b]fluoranthene	PAHs	5.2	0.0002	-May cause cancer -Acute hazard to aquatic life -Long term hazard to aquatic life
Benzo[j]fluoranthene	PAHs	3.0	NA	-May cause cancer -Acute hazard to aquatic life -Long term hazard to aquatic life
Benzo[k]fluoranthene	PAHs	2.9	0.0005	-May cause cancer -Acute hazard to aquatic life -Long term hazard to aquatic life
Benzo[c]phenanthrene	PAHs	1.3	NA	-Harmful if swallowed -Harmful in contact with skin -Causes serious eye irritation -May cause respiratory irritation -Suspected of causing genetic defects -Suspected of causing cancer
Benzo[ghi]perylene	PAHs	3.4	0.210	-Acute hazard to aquatic life -Long term hazard to aquatic life -May cause long lasting harmful effects to aquatic life
Chrysene	PAHs	8.1	0.0048	-Suspected of causing genetic defects -May cause cancer -Acute hazard to aquatic life -Long term hazard to aquatic life
Fluoranthene	PAHs	19	0.280	-Harmful if swallowed -Acute hazard to aquatic life -Long term hazard to aquatic life
Indeno[1,2,3-cd]pyrene	PAHs	3.8	0.0002	-Suspected of causing cancer -Acute hazard to aquatic life -Long term hazard to aquatic life
Phenanthrene	PAHs	16	0.210	-Harmful if swallowed -Causes skin irritation -Causes serious eye irritation -May cause respiratory irritation -Long term hazard to aquatic life
Pyrene	PAHs	16	0.210	-Acute hazard to aquatic life -Long term hazard to aquatic life
Petroleum Hydrocarbons C ₁₀ -C ₅₀	POHs	1000	0.7 – 10 (depending on compound)	-Acute irritation of nose and throat -Long term kidney damage, liver damage
Molybdenum	Metals	700	0.100	-Suspected of damaging fertility or the unborn child
Nickel	Metals	160	0.100	-May cause an allergic skin reaction -Suspected of causing cancer
Zinc	Metals	650	5.000	-Acute hazard to aquatic life -Long term hazard to aquatic life

Table 5 – Contaminants present on the Rang Dumas property in concentrations exceeding criterion B and their potential human and ecosystem health risks (Croteau, 2023 ; PubChem, 2023 ; Analytical Products Group inc., 2008 ; Florida Department of Health Environmental Health, 2016 ; Pennsylvania Department of Health, 2022 ; Health Canada, 2023)

As can be seen in the previous table, only a very small fraction of the pollutant found in one kilogram of contaminated backfill is sufficient to dangerously contaminate one liter of water. Upon exposure to the contaminants, individuals could suffer from irritation, genetic defects and elevated cancer risks.

If the groundwater below the Rang Dumas property were to be contaminated, the 1 324 Ormstown citizens depending on the well water from Dumas 6 and Dumas 8 may not be the only ones to suffer from the incident. Given the direction of the groundwater flow below the Rang Dumas property, private wells located northwest of the contaminated soils are also at risk of suffering the adverse effects of leaching contaminants. As affirmed by Natural Resources Canada (2017), there have been numerous documented instances where nearby bodies of water became contaminated due to the migration of groundwater within its hydrological cycle. Such dynamics are not yet fully understood, making the precautionary principle the recommended approach when it comes to groundwater contamination (Natural Resources Canada, 2023). The contamination of the Mercier esker, which occurred over fifty years ago, 35 kilometers northeast of the Rang Dumas property, demonstrates that localized groundwater contamination can have long-lasting effects on a significant area of the groundwater system. More than two kilometers southeast of the Mercier site, contaminants were still identified in well water in 2017, despite the upstream installation of a costly water pumping system designed to redirect contaminated groundwater to a water treatment plant (MELCCFP, 2020 ; Health Canada, 2023 ; MELCCFP, 2023).

Section 6: Legalities Regarding Decontamination Responsibilities

While the expert reports available at the Salaberry-de-Valleyfield Courthouse unanimously called for the removal of contaminated soils from the property, stakeholders are currently concerned with how these operations should be undertaken and who will be responsible for paying for the costly restoration. As the plaintiff in the court case, the municipality of Ormstown sought restitution from both the property owners and the municipality of Franklin (the primary defendants) to cover the expenses associated with the removal of contaminated backfill and the installation of three monitoring wells, as was advised in the reports by SolmaTech and Envir'eau Puits. These operations would cost the defenders \$977 416. An additional \$125,000 was being sought from the defendants by the municipality of Ormstown to fully reimburse the expenses incurred during the court proceedings and the procurement of expert reports.

From the municipality of Ormstown's point of view, the sequence of events that led to the potential contamination of the well water of Dumas 6 and Dumas 8 was solely attributable to the defendants' actions or negligence (DHS Avocats, 2023). According to article 66 of Quebec's *Environment Quality Act* and article 13.0.2 of Quebec's *Regulation on the protection and rehabilitation of lands*, it is the responsibility of property owners to take corrective action after having stored or backfilled contaminated soils containing construction waste on their land (Gouvernement du Québec, 2023). The backfilling operations also should never have taken place, had the municipality of Franklin properly applied its own laws. Not only is the backfilling of contaminated soils prohibited in agricultural areas, the municipality of Franklin only authorizes dirt, clay, silt and sand as backfill material (Paquet, 2022 ; Municipalité de Franklin, 2020). The municipality, either by negligence or deliberate ignorance, issued the permit to the owners of 1250 Rang Dumas when construction waste was clearly present in the backfill, as proven by the pictures taken on site by Luc Pilon on May 25th 2022. Furthermore, the municipality of Franklin failed to revoke the property owners' permit after the reception of Labo Montérégie's report on August 15th 2022, which clearly stated that the backfill was contaminated (DHS Avocats, 2023).

The argument from the property owners' point of view is that the monetary compensation demanded on behalf of the municipality of Ormstown has been inappropriately inflated. The municipality of Ormstown did not collaborate to find cost effective solutions to the issue. The property owners claim that the hiring of SolmaTech, among others, was unnecessary, as Labo Montérégie had already been hired to undertake soil analysis.

The proprietors, Louis Drapeau and Jeannine Clément, now wish to collaborate with the MELCCFP as well as with Strata Environnement et Géotechnique Inc the firm providing assistance throughout the remediation work demanded by the ministry. Their goal is to find an optimal solution that considers their needs as property owners. Even if the removal of backfill and the installation of monitoring wells is once again judged necessary by Strata Environnement et Géotechnique inc, the property owners still refuse to cover the costs for such operations, as they claim to not have known that the soil they were backfilling was contaminated. They proceeded with their backfilling project during the spring and summer of 2022, firmly believing that they were engaging in a lawful activity.

For this reason, the property owners judge that any possible restitution should come at the expense of Franklin; this would possibly put a burden of over one million dollars on the municipality's taxpayers. Crêtes Excavation Inc has also been brought into the court case as third party defendant, since they conducted the backfilling operations. They may be proven to be partially liable if they are judged to be

responsible for the quality of the backfill they brought onto the property, which was contaminated with construction waste (Rancourt Legault Joncas, 2023 ; DHS Avocats, 2023). It is noteworthy to state that Crêtes Excavation Inc has already faced monetary sanctions, due to infractions revolving around the unauthorized manipulation of construction waste. On October 7th 2014, the MELCCFP issued a \$1 000 fine to the firm for storing illegally over 6 000 m³ (the volume of 2 ½ Olympic swimming pools) of construction waste on their property (Paquin, 2014 ; Sicard Lajeunesse, 2014).

Section 7: Inadequate Monitoring and Enforcement

Recurring Issues Arising Across Unauthorized Construction-Derived Contaminated Soil Disposal Sites

Preventing contamination of soils and groundwater resources is considerably easier than remedying the issue once contamination has occurred. It took only one summer to contaminate close to 10 000 metric tons of soil. As of now, Ormstown's estimated cost of environmental restoration for the site, which is aimed at preventing contamination of the local groundwater, is approaching one million dollars. As the municipalities of Franklin and Ormstown, the property owners and Crêtes Excavation Inc, as of June 29th 2023, remain tied up in court in the hopes of avoiding the financial burden of cleaning up the site, the contaminants present in the backfill will continue to seep deeper into the sedimentary layers, increasing the probability of groundwater contamination. In the event of groundwater contamination, remediation costs will increase significantly, further increasing the financial burden on whoever is judged liable of the soil contamination on the Rang Dumas property (Natural Resource Canada, 2017).

The case of unauthorized dumping on the Rang Dumas property is consistent with the idea that environmental issues caused by illegal dumping and backfilling of construction waste and construction-derived contaminated soil in Quebec is rendered possible by inadequate monitoring and enforcement. An article analyzing the compliance orders issued by the MELCCFP concerning cases where construction waste and construction-derived contaminated soil were illegally stored or backfilled over the past 13 years shows how easily such waste can move from a construction or demolition site to an unauthorized location in sparsely populated areas. Once the offender is recognized to have violated environmental regulations, legal recourse has been demonstrated to be slow. The governing body often took a long time to implement

severe disciplinary actions, and even when they did, the offenders sometimes failed to comply adequately with these measures (DePani, 2023).

A comparable pattern has been observed on Rang Dumas. Contaminated soils of unknown origin made their way to a property situated on agricultural land, despite an existing regulation restricting the backfilling of any soil contaminated beyond criterion A in the area. The inspection conducted by a municipal inspector from Franklin failed to properly recognize the threat, which led to the issuance of a permit to the property owners. The agronomist hired by Crêtes Excavation Inc also seems to have inadequately characterized the integrity of the backfill. The agronomist's findings, asserting the absence of contaminants in the imported soil, contradicts the conclusions reached by the MELCCFP, as well as Labo Montérégie and SolmaTech's reports.

Although a court judgment requiring that the installation of the monitoring wells should be undertaken at this stage of the legal procedure was passed in court on May 8th 2023, it is yet to be determined who will be held liable to pay for such operations. While the site does require decontamination, it was considered in court that implementing Ormstown's proposed plan, which involved removing the contaminated soil at the cost of the property owners, would cause more harm to the property owners than benefits to the plaintiff. The judge has thus ordered more time to allow the defendants to work with the MELCCFP and get a second opinion on the approach to be taken for the remediation project (Pless, 2023). There is no timetable for the remediation project in whatever form it will take. After more than a year, very clear, specific sections of Quebec's *Environment Quality Act* and *Regulation on the protection and rehabilitation of lands* have still not been properly enforced.² Time will tell if the MELCCFP's patient approach towards working with offenders will result in sufficiently prompt action to protect its citizens' water sources.

Traces Québec: a Potential Silver Lining

Ormstown initially attempted to manage the situation at a local level, but the monitoring and enforcement of environmental law concerning the intra-provincial transport, storage and disposal of construction-derived contaminated soil and construction waste remains under the provincial government's jurisdiction.³ Making monitoring more efficient, in order to stop illegal dumping of construction waste and

² Such sections include article 66 of Quebec's *Environment Quality Act* and article 13.0.2 of Quebec's *Regulation on the protection and rehabilitation of lands*.

³ Such laws are defined in Quebec's *Environment Quality Act* and Quebec's *Regulation on the protection and rehabilitation of lands*.

construction-derived contaminated soil before it happens, and increasing the stringency and consistency of enforcement so that offenders don't view illegal dumping of construction waste and construction-derived contaminated soil as a profitable venture, must therefore start with prompt and clear provincial action. Acknowledging the ongoing environmental consequences brought by the illegal disposal of contaminated soils in Quebec, Benoit Charette, Quebec's Minister of the Environment, Climate Change, Wildlife and Parks, is claiming such action, with the introduction of what he has referred to as one of the most effective traceability laws in Canada (Charette, 2019). Construction waste is frequently commingled with excavated soils at construction and demolition sites, thereby engendering a soil mixture that is contaminated. This new regulation aims to ensure thorough monitoring and enforcement of such contaminated soils, as well as other types of contaminated soils arising from various sectors, including mining operations.

According to Quebec's new *Regulation regarding the traceability of excavated contaminated soils (RCTSCE)*, all targeted economic agents, such as contaminated soil exporters, transporters and receptors, needed to be registered before January 1st 2023 in Quebec's digital traceability system, Traces Québec (MELCCFP, 2023 ; Attestra, 2023). The province is however granting users an adaptation period for an indefinite amount of time, where they will not be obliged to adhere to the regulation after registration (Attestra, 2023).

The *RCTSCE* essentially aims to track the movement of contaminated soils over their entire life cycle, from their generation to their disposal. Any soil that is considered contaminated will be targeted by the regulation. However, to be considered as contaminated soil, waste material must consist of less than half of the soil's mix; if the mixture of soil contains waste material in proportions greater to 50%, the contaminated substance will not be targeted by the *RCTSCE* as it will no longer be considered "soil", but just "waste." (MELCCFP, 2023).

Project managers, who could be part of a firm or simply a property owner, must declare if their excavation project is expected to generate more or less than 200 tons of contaminated soils; the level of monitoring imposed on the project will essentially be determined by this 200-ton limit. If the project is expected to generate less than 200 tons of contaminated soils, the owner of the property receiving the soils and the employee in charge of completing the monitoring sheet must be signed into Traces Québec. The soil receptor must be signed into the system at least 72 hours before receiving the contaminated soil. The monitoring sheet also needs to be filled out electronically before the contaminated soil is transferred to the receptor site. The monitoring sheet will contain information such as the location of the original site,

the name and address of the person or company transporting the soils, the contaminant concentrations in the soil and the quantity of soils being transported (MELCCFP, 2023).

If the excavation project is expected to generate more than 200 tons of contaminated soils, the exporter of contaminated soils and the firm or person responsible of the transportation of soils must also be signed into Traces Québec. For such projects, truck drivers must turn on a GPS tracker on their mobile device for the entirety of their trip; data generated by the GPS tracker will be made available to the MELCCFP. The monitoring sheet must also be filled out, analogously to projects generating less than 200 tons of contaminated soils (MELCCFP, 2023). The ministry has the authority to impose fines on non-compliers, ranging from \$2 500 to \$6 000 000, depending on the identity of the offender and severity of the violation (MELCCFP, 2021).

While the new regulation has the potential for bringing a necessary paradigm shift into how monitoring and enforcement is done in Quebec, several prerequisites must be fulfilled for the regulation to operate effectively. Although the list of the contaminated soil receptor sites is intended to be made publicly available on the ministry's website, the traceability system is overall fairly opaque to the general public. The GPS tracking of contaminated soils, the date and time that soils are being transported, as well as the quantity of contaminated waste being transported to different receptor sites, are only available to the MELCCFP and those who hold are involved in the excavation project (MELCCFP, 2023). Considering that many of the compliance orders issued to offenders for issues revolving around illegal disposal of construction waste and construction-derived contaminated soil involved the assistance of whistleblowers from the general public or municipal bodies, this could be seen as a neglected opportunity to make the monitoring as efficient as possible (DePani, 2023).

Minister Benoit Charette however claims that such a digital system will simplify the monitoring effort for compliant firms, freeing up the MELCCFP's personnel to focus on non-compliers (Charette, 2019). A strong capability to detect deviant activities and do appropriate follow-ups on remediation projects, once offenders have been identified is key to improve Quebec's efforts in ceasing illegal dumping of construction-derived contaminated soil and construction waste. While the *RCTSCE* may on paper be a step in the right direction to strengthen the current monitoring and enforcement, it remains to be seen if the regulation will translate into any important decrease in deviant activity, or into faster remediation after a site has been found to be illegally contaminated.

There are also other potential loopholes in the law that may allow offenders to minimize the stringency of the imposed regulation, or even avoid any monitoring from Quebec's new system. After the project is created in Traces Québec, the level of stringency applied to the monitoring cannot be changed. Therefore, an ill-intentioned project manager could voluntarily underestimate the expected quantity of contaminated soils generated throughout the excavation project, avoiding the highest level of monitoring by setting it below 200 tons. If the project ends up generating more than 200 tons of contaminated soils, the stringency of the monitoring is not subject to any retroactive change. There is also the possibility of assigning different contracts or hiring different entrepreneurs to complete different phases of a large-scale excavation project. The subdivision of a large project into multiple smaller projects would provide a potential avenue for project managers to circumvent the 200-ton limit imposed on the entire project. By breaking down the project into an adequate number of smaller phases or contracts, project managers can avoid surpassing the threshold applied on each phase of the project rather than the project as a whole. This strategy could be employed by ill-intentioned project managers with the aim of reducing the level of monitoring they would be subjected to. Finally, the *RCTSCÉ* does not consider a mixture of construction waste and soil as "contaminated soil" if the mixture is composed of waste material by more than 50%. Therefore, by increasing the concentration of waste material in the mixture slated for disposal, construction waste could be exported from a construction or demolition site without necessitating any compliance with Quebec's new traceability system (MELCCFP, 2023).

Section 8: Concluding Remarks

The preventable missteps committed by the property owners, the municipality of Franklin and Crêtes Excavation Inc during the summer of 2022 which resulted in soil contamination on Rang Dumas underscores that the problem of contaminated soil in Quebec is not due to a lack of proper written regulation, but rather a lack of proper implementation. The significant costs associated with the necessary site decontamination, along with the legal fees accrued in resolving the conflict stemming from this unfortunate situation, may motivate local stakeholders to embrace a precautionary approach when it comes to backfilling activities. This is especially relevant considering that illegal construction-derived contaminated soil disposal sites have often employed soil backfilling as a camouflage for their operations (DePani, 2023). The environmental and livelihood consequences, which could be as severe as drinking

water contamination for a large fraction of an area's population, should motivate policy makers to establish a robust regulatory framework that effectively discourages economic actors from deviating from legal compliance.

During an interview with *The Gleaner*, Ormstown mayor Christine McAleer described a situation where the provincial regulatory body's support seemed lacking; local municipalities and community stakeholders were forced to deal with the issue using their limited resources (Dressel, 2022). However, as long as the regulation of illegal dumping of construction waste and construction-derived contaminated soil remains under provincial jurisdiction, such responsibility does in fact belong to the MELCCFP; innovative changes that modernize the methods of monitoring, such as the adoption of the *RCTSCE*, do at least provide reasons for hope. Community members from the Chateauguay Valley watershed, threatened by the soil and groundwater contamination caused by illegal disposal of construction waste and construction-derived contaminated soil, should remain wary of the new law's limitations, and hold the MELCCFP accountable for potential shortfalls that may persist in the future.

The Rang Dumas property is one of the few publicly documented sites contaminated by construction waste that hasn't received a compliance order and therefore serves as a perfect example of where generated construction waste is being funnelled. Indeed, many properties that have illegally stored or backfilled construction-derived contaminated soil have not received a compliance order and are therefore not publicly documented on the MELCCFP's website. An article from Vincent Larouche, investigative journalist at *La Presse*, highlights that 4 711 fake weighing vouchers for trucks transporting soils have been seized by Quebec's provincial police during operation Naphtalène, which aimed to take down a Quebec-based criminal organization managing the transportation of contaminated soils. The organization used counterfeit weighing vouchers to create the illusion that soils were being disposed of in an authorized location, when in reality they vanished from the legal system's radar (Larouche, 2018). Operation Naphtalène was ultimately terminated in June 2018, due to "unreasonable trial delays" (Réseau Environnement, 2019).

The ongoing court case involving the Rang Dumas property, operation Naphtalène, along with numerous locally documented incidents, clearly demonstrate that the problem of illegal construction waste and construction-derived contaminated soil disposal runs deeper than what is documented in the publicly available information published by the MELCCFP. Whether or not all these infractions can be traced back to organized criminal activity, the environmental impacts and financial burdens are similar for affected community members and stakeholders. Unauthorized disposal of construction waste and construction-

derived contaminated soil should not be taken lightly, as the true scale of the issue (still unknown but obviously very large) can have a significant adverse cumulative impact on future generations' capacity to enjoy nature's precious endowment of clean drinking water.

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