

# Trans Mountain Pipeline: The truth about construction



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# EXECUTIVE SUMMARY

This report reviews the expected timeline for the construction of the Trans Mountain Pipeline and some of the most troubling hotspots for construction.

The public has a right to know what construction will look like and what the social and ecological impacts will be, so Stand.earth created this report to increase transparency and highlight the major potential impacts of the proposed construction.

Analysts reviewed thousands of documents and consulted with numerous experts and local residents tracking the project to provide this in-depth review of what can be expected if construction begins.

Many details of construction are publicly available, but are complex or buried in the National Energy Board (NEB) website.

## SEVEN CONSTRUCTION HOTSPOTS: AN OVERVIEW



*Trans Mountain plans to expand the Westridge Tanker Terminal, which will obstruct 30% of the width of Burrard Inlet. Photo: Stand.earth*

### Westridge Tanker Terminal

Plans indicate the intention to expand the Westridge Tanker Terminal in Burnaby so it can fill three Aframax-size tankers simultaneously.

This planned expansion would obstruct 30% of the width of the Burrard Inlet. Coupled with a sevenfold increase in oil tanker traffic, the risk of collision in the Burrard Inlet is significantly heightened.

This terminal is also the starting point for the tunnel drilled into Burnaby Mountain running to the Burnaby Tank Farm.

### Burnaby Tank Farm

The company plans to build 14 new oil storage tanks at the Burnaby Tank Farm in Burnaby, BC. Work has begun the process of clearing land and expanding the facility perimeter to make room for the new tanks.

The Burnaby Tank Farm is the terminus of the tunnel drilled into Burnaby Mountain running from the Westridge Tanker Terminal.

A fire at the Burnaby Tank Farm could result in a situation where thousands of people would need to be evacuated. However, evacuation plans are nonexistent to date. Students and faculty at Simon Fraser University could potentially be trapped if the fire or smoke renders the only two access roads to the campuses unusable, leaving over 30,000 people isolated and without an escape route.



Trans Mountain plans to use a drill to bore a tunnel under Burnaby Mountain to connect the Westridge Marine Terminal (upper left) to the Burnaby Tank Farm (south of Simon Fraser University). Photo: Google

## Burnaby Mountain Tunnel

The company plans to use one of the largest drills on the market to bore a tunnel through Burnaby Mountain — connecting the Westridge Tanker Terminal to the Burnaby Tank Farm. Both the new and existing pipelines will run through Burnaby Mountain. Geologists have not ruled out the possibility of active fault lines on the mountain and asked for further geological survey, which the company denied.



Trans Mountain plans to expand Sumas Tank Farm, the site of five spills since 1994. Photo: John Vissers

## Sumas Tank Farm

Located in Abbotsford, BC, the Sumas Tank Farm will be expanded to a total storage capacity of 890,000 barrels. The Auguston neighbourhood surrounding the tank farm is one of the fastest-growing areas in the city.

Since 1994, there have been five spills at the Sumas Tank Farm. The National Energy Board noted that in 2012, human error — from improper alarm settings and the failure of an operator to follow response procedures — led to a 210,000 litre spill, some of which entered a nearby creek.

## Coquihalla River crossing

The Coquihalla River follows the highway sharing its name down the west side of the Cascade Mountains and meets the Fraser River in the small town of Hope, BC. The Coquihalla River is well known as an excellent spot for fly fishing steelhead trout, and is also home to Coho salmon.

The company plans for the pipeline to cross the Coquihalla River at five different locations using a technique the industry calls “cut and cover.”

At four crossings, this involves dewatering a stretch of the river — by building a temporary dam upstream and then piping water around the section of river where work is being done — then excavating a trench across the riverbed, installing the pipeline, and covering the pipe. At one crossing, this involves excavating a trench and installing the pipeline directly into the stream.

The cut and cover technique is more financially attractive than less-invasive alternatives, but can be devastating for fish species and the communities and businesses that rely on them.



Trans Mountain plans for the pipeline to cross the Coquihalla River at five locations. Photo: Wikipedia

## Fraser River crossing

Between Edmonton and Burnaby, the pipeline crosses over 1,300 streams, rivers and other bodies of water — but none more significant than the Fraser River. The company plans for the pipeline to cross the Fraser River at the Fraser River Crossing, which runs between Surrey and Coquitlam just east of the Port Mann Bridge. The crossing will be constructed using a technique the industry calls “horizontal directional drilling.” Horizontal directional drilling uses a drilling rig to bore a tunnel under the river. Once the drill emerges on the other side of the river, it is attached to a preassembled length of pipeline which is pulled back through the bore hole.

In the case of a pipeline rupture in or surrounding the Fraser River, the entirety of the Lower Mainland would suffer the economic and health consequences that arrive with the contamination of such a critical waterway.



Trans Mountain plans for the pipeline to cross the Fraser River just east of the Port Mann Bridge (seen above). Photo: Jason Drury, Creative Commons



*Trans Mountain plans to establish man camps in at least five BC communities. Photo: Lars Plougmann, Flickr*

# SECTION 1: FUNDAMENTAL PROBLEMS WITH THE PIPELINE

## Man camps

Temporary work camps, or man camps, will be established in at least five BC communities during pipeline construction.

Historically, these man camps have been strongly correlated with dramatic increases in rates of sexual violence towards women in the communities surrounding the camps.

Evidence suggests that Indigenous women and girls are subjected to the worst of the negative impacts of resource extraction at every phase. These man camps would run through Secwepemc Territories in Interior B.C.

In response to the threat man camps pose to Indigenous women, the Indigenous-led Tiny House Warriors are building 10 tiny houses to be placed strategically along the route through the territories.

# VIOLATION OF INDIGENOUS RIGHTS



Indigenous drummers perform at a mass demonstration against the Trans Mountain Pipeline in March 2018. Photo: Rogue Collective

## A continued legacy of colonialism

The legacy of colonialism and residential schools resulted in the suppression of Indigenous culture and languages, disruption of Indigenous governments, decimation of Indigenous economies, and confined Indigenous communities to marginal and often unproductive land.

This legacy continues today in the form of systemic discrimination and prejudicial attitudes against Indigenous peoples, which has resulted in the marginalization of Indigenous communities where individuals are disproportionately affected by violence, poverty, and illness.



Squamish Nation spokesperson Khelsilem speaks at a press conference in August 2018. Photo: Stand.earth

“ What we experienced was a shallow attempt at consultation that resulted in a failure to address our concerns. The failure to meaningfully engage with rights holders means this government is either not serious about building this pipeline or not serious about respecting Indigenous rights.<sup>1</sup>

*Khelsilem, Squamish Nation spokesperson*

# Canada's commitment to the United Nations Declaration on the Rights of Indigenous Peoples (UNDRIP)

As a signatory to the United Nations Declaration on the Rights of Indigenous Peoples (UNDRIP), Canada is responsible to uphold the articles of this declaration with integrity. UNDRIP outlines rights including the right to self-determination, the right to practice and revitalize cultural traditions and customs, the right to be secure in the enjoyment of their own means of subsistence and development, and the right to the conservation and protection of the environment and the productive capacity of their lands and resources.

UNDRIP heavily emphasizes the necessity of free, prior, and informed consent given by Indigenous peoples in any transaction between the state and Indigenous peoples.<sup>2</sup>

There are 140 First Nation bands and Indigenous groups along the pipeline route. 43 First Nations have an agreement with the company regarding the pipeline expansion.<sup>3</sup> However, those agreements do not equate to community support, given the multiple testimonies by First Nations leaders saying they felt they had no choice but to sign an agreement. This is a clear sign that free, prior, and informed consent was not given.

Twelve First Nations and two Indigenous groups went to court and successfully quashed the original federal permits for this project. The court found that consultations had amounted to little more than note taking and failed to meet the standard set out by the Supreme Court of Canada. As a result of the court's ruling, the Government of Canada conducted another round of consultations. Unfortunately, those consultations did little to address these deficiencies in the eyes of many Indigenous participants.

There are also 83 First Nations bands or Indigenous groups who do not have agreements with the company.<sup>4</sup> The continuation of the project through the lands of these First Nations and Indigenous groups is a direct violation of the following articles outlined in UNDRIP:

## UNDRIP Article 32

1. Indigenous peoples have the right to determine and develop priorities and strategies for the development or use of their lands or territories and other resources.
2. States shall consult and cooperate in good faith with the indigenous peoples concerned through their own representative institutions in order to obtain their free and informed consent prior to the approval of any project affecting their lands or territories and other resources, particularly in connection with the development, utilization or exploitation of mineral, water or other resources.<sup>5</sup>



*The Trans Mountain Pipeline violates the United Nations Declaration on the Rights of Indigenous Peoples. Photo: Stand.earth*

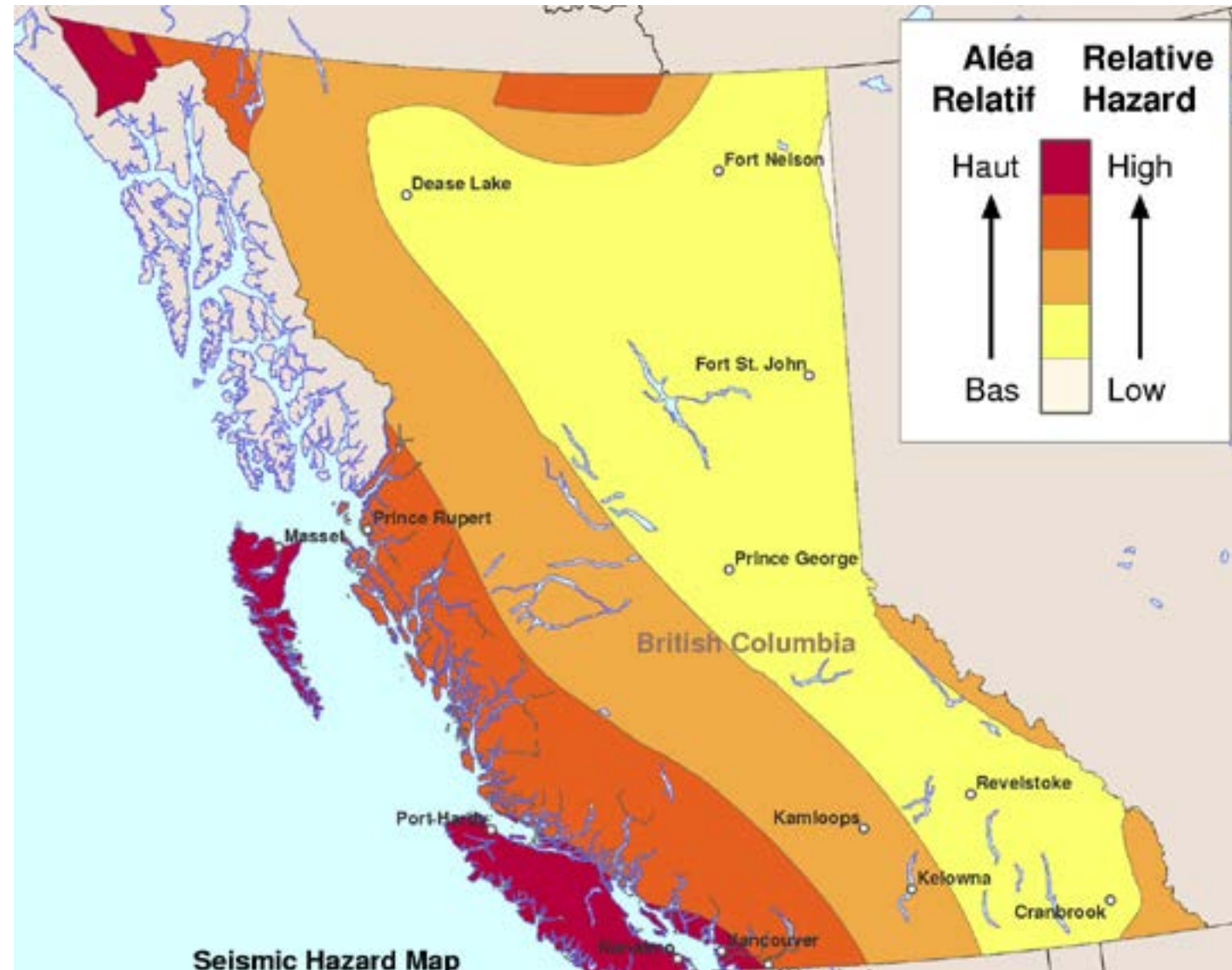
## Consultation was a 'one way street'

When Indigenous applicants challenged the approval of pipeline expansion project, each encountered a Crown consultation team that took notes to pass along to Cabinet, but would not engage in a two-way dialogue that had been previously required and promised. In phase three of the consultation — following the NEB recommendation for the Federal Governor in Council to approve the expansion project — no changes were made to NEB conditions. This demonstrates that concerns expressed by applicants were not meaningfully reviewed and implemented.<sup>6</sup> This flawed process is not only a clear violation of Indigenous rights, it is also an example of a democratic system whose mechanisms fail to uphold principles of fairness and impartiality.

“ It is telling that not a single NEB condition was changed or added following phase three of consultation — the consultation process that followed the NEB recommendation. That is indicative of the Crown not being prepared to engage if it was to accommodate with an open mind.

*Matthew Kirchner, Lawyer for Squamish Nation<sup>7</sup>*

# EARTHQUAKES AND PIPELINES



A massive earthquake is predicted to hit the West Coast within the next 50 years, but many scientists are also concerned about the threats posed by weaker earthquakes. Photo: Natural Resources Canada

In a submission to the NEB, the group Burnaby Residents Opposing Kinder Morgan Expansion (BROKE) describes a 73% probability of moderate to very strong ground shaking in BC's Lower Mainland within the next 50 years. Members of BROKE describe the pipeline expansion project — and an expanded Burnaby Tank Farm — as “time-bombs”, with enormous risk for the communities the pipeline passes through and no realistic benefits.<sup>8</sup>

Scientists are particularly concerned about the “Big One” — a massive earthquake predicted to hit the West Coast within the next 50 years. However, many scientists are even more concerned with the threats from weaker earthquakes occurring within 100 kilometres of Vancouver, BC, given the high plausibility of smaller quakes in the region.<sup>9</sup> In the case of a minor earthquake in the region, pipeline infrastructure is at risk of a breakage, which could lead to a spill and/or fire.



Several oil storage tanks at the Burnaby Tank Farm employ floating roofs, which in an earthquake region can be a more dangerous alternative to fixed roofs. Photo: Stand.earth

## Floating-roof tanks in an earthquake zone

Of the six tanks at the Sumas Tank Farm, four tanks operate using a floating roof. Seven out of 13 tanks at the Burnaby Tank Farm are equipped with floating roofs instead of fixed roofs. In the context of an earthquake region, floating roofs are the more dangerous alternative to fixed roofs. Tanks with floating roofs have proven to be highly vulnerable to earthquakes, such as in the 7.4 magnitude Izmit earthquake in 1999 that caused a fire at the largest oil refinery in the country of Turkey. In this fire, six tanks burned completely and the fire continued to burn uncontrolled for five days following the earthquake. The fire spread to jet fuel and gasoline tanks, causing heavy damage to most of the tanks in the storage facility. The refinery experienced major structural collapses and oil spills.

The earthquake rendered the roofs in need of either major repair and decontamination or complete replacement. Around 30 out of the Turkish facility's 45 floating roof tanks were heavily damaged and put out of commission. Five floating roofs caved in and sank completely when the seals were damaged. Fires were ignited at four of the floating roof tanks due to the sparks from metal-to-metal contact between the roof and tank wall.<sup>10</sup>

In the event of an earthquake within 100 kilometres of Vancouver, BC, similar problems may occur at the Burnaby Tank Farm. The disaster at Turkey's largest oil refinery was caused by the combination of an earthquake and a tank farm with floating roofs — a situation not far-fetched for the Trans Mountain Pipeline.





An earthquake in Turkey in 1999 caused damage to an oil refinery's floating roof tanks, which have a similar design to several oil storage tanks at the Burnaby Tank Farm. Photo: ResearchGate

## Failure to consider historical precedent

The existing infrastructure at Trans Mountain facilities, such as floating-roof tanks, must be upgraded and retrofitted to mitigate the potential harmful effects of major infrastructure malfunction or damage caused by external factors such as an earthquake. The company's negligence in disregarding historical precedent in cases of earthquake-induced tank farm fires is not only irresponsible as a corporate entity, but puts thousands of people at risk of acute toxic symptoms from exposure to fumes and/or toxic smoke. These major oversights could potentially result in a situation of human fatalities and widespread health repercussions.

## Earthquakes impede emergency response

The 1994 Northridge earthquake in the San Fernando Valley in southern California caused a rupture of a pipeline. The crude oil caught fire, resulting in severe burns for one man and charred cars and houses.<sup>11</sup> Over 700,000 litres of crude oil flowed into storm drains and into the Santa Clara River.

The Coast Guard commander, Cdr. Thomas Leveille, noted that the initial response efforts to this spill were impeded by other earthquake-related problems such as closed roads and broken communications infrastructure.<sup>12</sup> This spill and the delayed response process illustrates the added dangers of building and expanding crude oil infrastructure in an earthquake region.

# OIL SPILLS AND HEALTH

## What would an oil spill mean for our health?

The local health effects of the Trans Mountain Pipeline are also deeply concerning. Diluted bitumen (dilbit), the product this pipeline would transport to tidewater, has very different properties than conventional oil. Bitumen is a heavy and viscous oil that is mixed with sand, clay and water. Rather than liquid like conventional oil, bitumen has a sludgy consistency similar to sand mixed with molasses. As a result, it needs to be heated and diluted with powerful chemical solvents to be transportable. This mixture of bitumen and up to 30% diluents is called dilbit. The exact components of the diluents are a trade secret that companies are not required to reveal.

Dilbit contains two carcinogens: benzene and 1,3-butadiene. Both have no known safe threshold of exposure. The primary health concern from this project, childhood leukemia, can arise from benzene exposure — due to both the routine operations at Westridge Tanker Terminal and/or from an oil spill.

Other exposure-related health impacts include increased risk of cardiovascular and respiratory illness, reproductive disorders or defects (e.g., neural tube defects), cancers, and death.

All of Greater Vancouver's 2.3 million people are at potential risk from these effects, but there are certain populations that are more vulnerable to health decline in the event of an exposure incident — namely children, women of childbearing age, and the elderly.

Additionally, this project comes with a significant risk of accidents. How such events impact individual and community health is of critical importance.

Communities along the pipeline and tanker routes face a triple-threat: first, they are victim to the routine toxic emissions that come with oil and gas operations; second, there is an increased risk of a major oil spill or fire that could devastate local health and the environment; and lastly, climate change will continue to worsen and deteriorate public health for current and future generations.

In 2012, the Canadian Medical Association passed a resolution to support "a comprehensive federal environmental review process, including health impact studies, for all industrial projects".<sup>13</sup> The Canadian government cannot fulfill their responsibility to safeguard the public — their health, their security, and their future — without knowing the breadth and depth of the health risks this project would produce.



# **SECTION 2:**

# **A HISTORY OF DELAYS**

# CONSTRUCTION HAS NEVER BEEN ON SCHEDULE

Since the inception of this project, construction activities have not once been on schedule, and have instead been repeatedly delayed due to an array of issues ranging from permit acquisition to legal challenges to a growing protest movement.<sup>14</sup>

- February 21, 2012** Kinder Morgan says it wants to expand the Trans Mountain Pipeline after receiving support from oil shippers and will begin public consultations.
- December 16, 2013** An application is made to the National Energy Board (NEB) to expand the Trans Mountain Pipeline. Construction is proposed to begin in 2015<sup>15</sup>, with the aim of having oil flow through the expansion by December 2019.
- November 2014** More than 100 people are arrested after they camp out in a conservation area on Burnaby Mountain, east of Vancouver, BC, to block crews from conducting drilling and survey work related to the pipeline expansion. Most of the charges are later dropped.
- August 2015** The NEB postpones public hearings after striking from the record economic evidence prepared by a Kinder Morgan consultant who was to begin working for the energy regulator (NEB).
- May 29, 2016** The NEB recommends approval of the pipeline, subject to 157 conditions, concluding that the project is “in the public interest.”
- May 29, 2017** After a provincial election where the BC Liberal Party lost its majority in the legislature, the BC NDP and Greens agree to form a coalition. The two parties agree to “immediately employ every tool available” to stop the project.
- October 26, 2017** Kinder Morgan Canada asks the NEB to allow work to begin despite a failure by the company to obtain municipal permits from the City of Burnaby.
- December 7, 2017** NEB allows Kinder Morgan Canada to bypass Burnaby bylaws.
- January 17, 2018** Kinder Morgan Canada warns the expansion project could be a year behind schedule.

- March 23, 2018** Green Party Leader Elizabeth May and NDP MP Kennedy Stewart are arrested at a protest against the pipeline expansion. The Federal Court of Appeal dismisses a BC government bid challenging a NEB ruling that allows Kinder Morgan Canada to bypass local bylaws.<sup>16</sup>
- April 8, 2018** Steve Kean, CEO of Kinder Morgan’s Houston, Texas-based parent company, announces the company is suspending all non-essential spending on the construction of the Trans Mountain expansion project until May 31.
- May 29, 2018** Federal Finance Minister Bill Morneau announced the Canadian federal government will purchase the existing Trans Mountain Pipeline for \$4.5 billion, and is prepared to use taxpayer money to complete the project.
- August 7, 2018** Kinder Morgan reveals in documents filed with US securities regulators that construction costs are \$1.9 billion higher than previously expected, bringing the total cost \$9.3 billion. It also announces the construction timeline has been set back a full year to December 2021.
- August 30, 2018** The Federal Court of Appeals quashes federal permits for the project on the grounds that consultations with Indigenous peoples had not met the legal standard and that the NEB had failed to assess the impacts of increased oil tanker traffic. It would take almost 10 months to attempt to address these shortcomings and reissue the permits.
- July 19, 2019** The National Energy Board orders Trans Mountain to complete a new, detailed route hearing process along the entire pipeline, which effectively means there is no official, approved route for the pipeline until the hearings are complete.
- August 21, 2019** Trans Mountain CEO and President Ian Anderson says in statements to media that the project will not go until operation until mid-2022, which is a 6-month delay from the previous timeline released by the federal government.
- September 3, 2019** Trans Mountain releases its latest monthly construction schedule update that confirms route hearings will delay construction, saying “This decision has introduced uncertainty into the construction schedule.”

## Why is construction still delayed?

1

### **There is still no approved route for the pipeline.**

Despite the fact that the federal government reapproved the project in June 2019, there is still not an official, approved route for the pipeline. Route approval took a step backward in July 2019 when the NEB revoked all previous route approvals and required Trans Mountain to file new detailed route documents and serve and publish new notices for the entire project.

When the original project approval was nullified by the court, 31 route hearings had been put on hold. With new detailed route filings and notices, the door is open for affected parties who had not been heard in the previous round of detailed route hearings to file new statements of opposition and possibly spark new route hearings in segments of the route that had been previously approved.

2

### **Points of contention on the route have not been resolved.**

The Coldwater First Nation and the City of Chilliwack in British Columbia both have serious and well-founded objections to the pipeline route running through the source of their drinking water. Since July 2019, new statements of opposition have been filed in every major segment of the project, including in cases where property changed hands during the time the NEB was conducting its reconsideration process. The Mountain Cree Traditional Band has filed an official statement of opposition, which means that even in Alberta the project faces delays.

The route of the pipeline is by no means assured, as detailed route hearings will likely be considered in locations such as the Fraser River crossing, Burnaby Mountain Tunnel, and areas where schools, homes and municipal water supplies are at risk. If the NEB rules in favour of any of these communities, it would quite literally send the company back to the drawing board in search of a new route.

3

### **Provincial permits are still missing.**

In addition to the outstanding NEB conditions, the project needs 1,187 permits from the Province of BC. As of June 2019, the province was still reviewing 658 of these permits and a further 243 have not even been applied for yet.<sup>17</sup>

4

### **The pipeline is headed back to court.**

Within hours of the federal government's announcement of the reapproval of the pipeline, opponents lined up to take the government to court over the decision.<sup>18</sup> In September 2019, 6 First Nations were granted the right to appeal the federal government's reapproval of the pipeline. These include many litigants, like the Tsleil-Waututh and Squamish First Nations,<sup>19</sup> who were successful in quashing earlier permits.

# SECTION 3:

# PLANNED CONSTRUCTION & HOTSPOTS

# SEGMENTS 1, 2:

# ALBERTA



**Segment 2: Approximately 290 km of pipeline between the outskirts of Edmonton and Jasper National Park**

- Preparation, survey, and clearing
- Pipeline construction
- Clearing and fencing at Gainford, Edson and Hinton pump stations

Work to begin October 2019  
Contractor: Midwest Pipelines Inc.

*This information is current as of Trans Mountain's September 2019 monthly construction update to the National Energy Board*

**Segment 1: Approximately 49 km of pipeline in the greater Edmonton area**

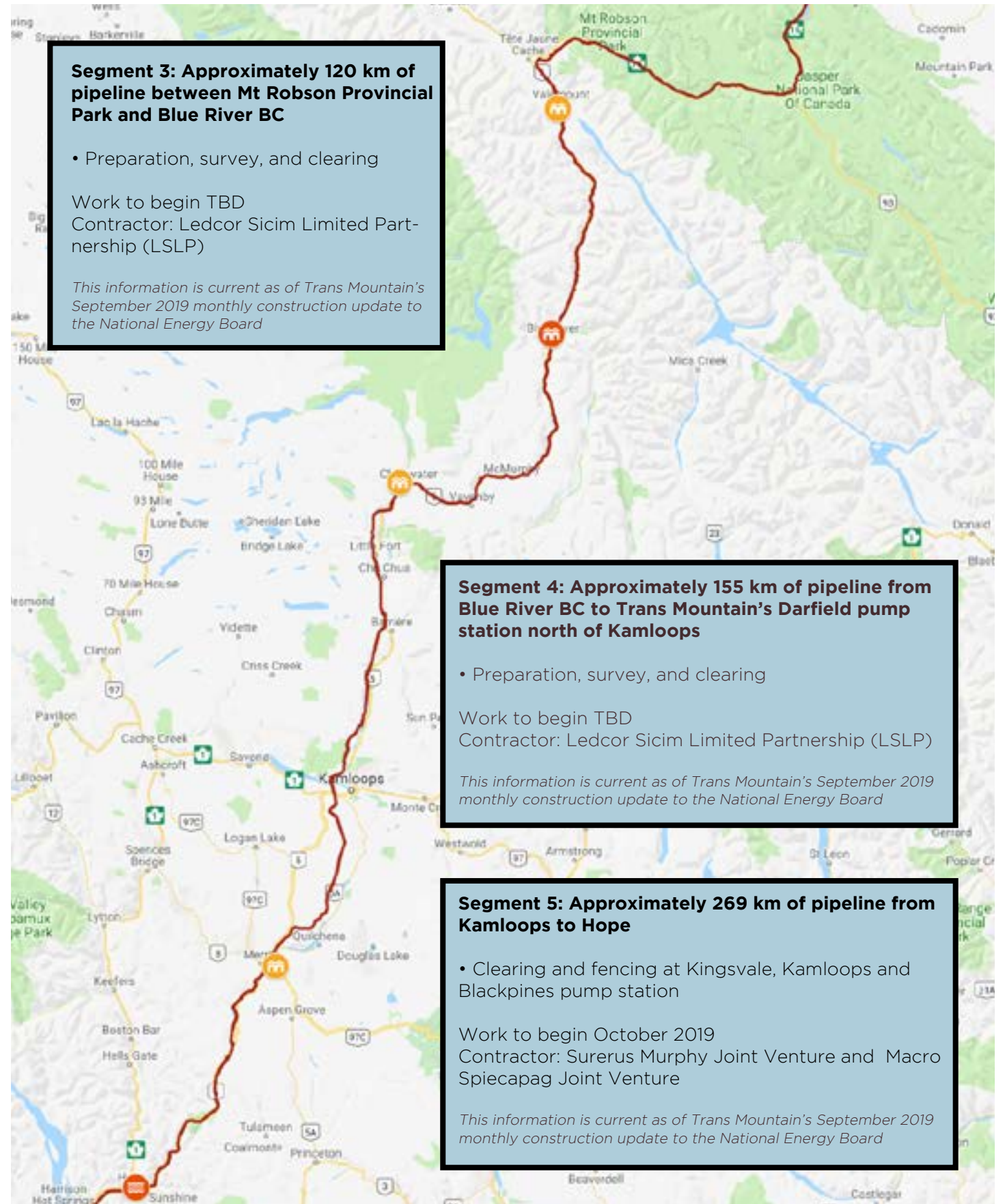
- Preparation, survey, and clearing
- Pipeline construction
- Horizontal directional drilling under waterways and roads
- Earthwork and foundation preparation at the Edmonton Tank Farm

Work to begin October 2019  
Contractor: SA Energy Group

*This information is current as of Trans Mountain's September 2019 monthly construction update to the National Energy Board*

# SEGMENTS 3, 4, 5:

## BC INTERIOR



# HOT SPOT: MAN CAMPS

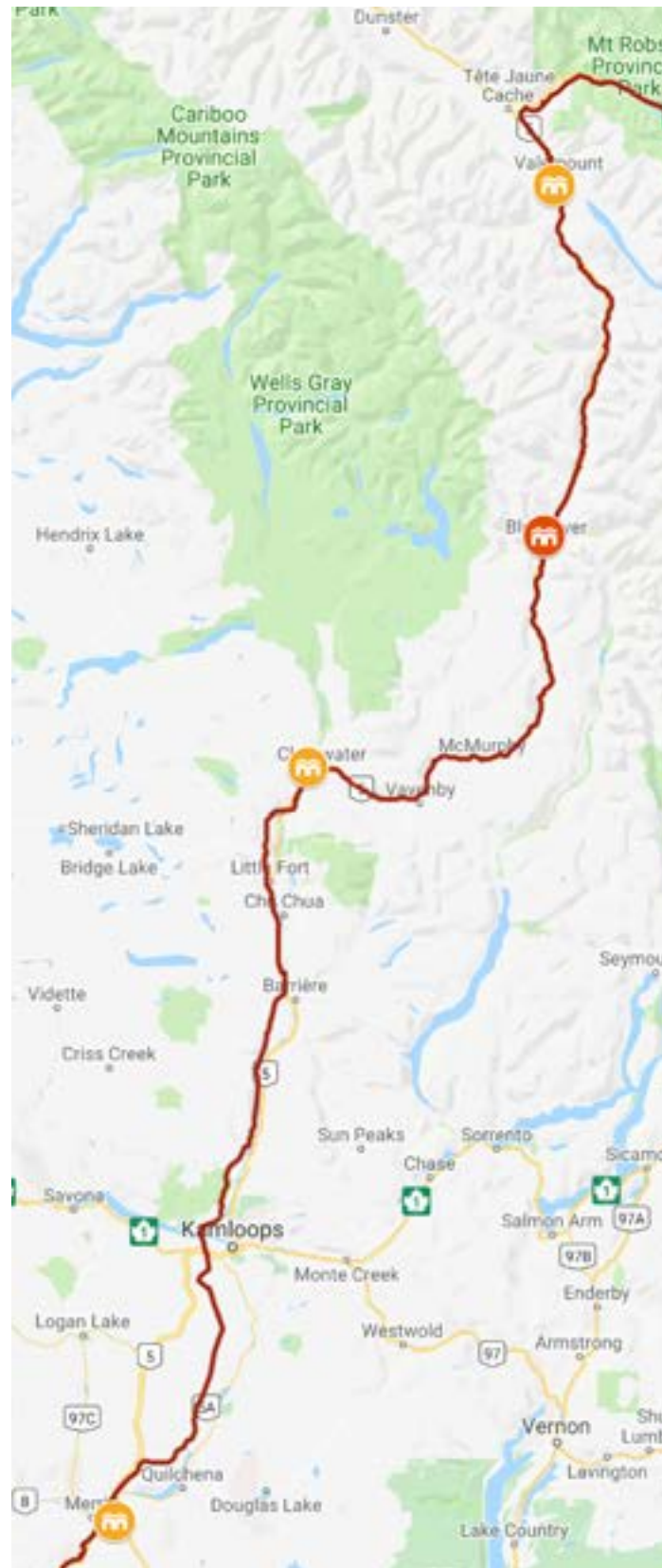
## What are man camps?

Man camps are temporary housing facilities for predominantly male workers, constructed for workers for resource development projects in the oil, pipeline, mining, hydroelectric, and forestry industries. These camps are typically located far from cities and close to rural Indigenous communities, bringing an influx of mostly non-Indigenous workers to profit from the resource economy. The layout of these camps vary from RVs and trailers to lodges and barracks-style portables, as well as undocumented, unregulated camps on land rented out by locals.<sup>20</sup>

## Impacts on Indigenous women

The influx of temporary workers for resource development projects have historically seen rates of sexual violence towards women increase dramatically in the communities surrounding the camps. Canada's history of colonialism and its systematic oppression of Indigenous peoples must be understood and considered when observing the power dynamics between non-local temporary workers and Indigenous women in rural communities.

The addition of temporary and permanent industrial camps near remote communities brings about a new set of risks. Evidence suggests that Indigenous women and girls are subjected to the worst of the negative impacts of resource extraction at every phase. Impacts include increased domestic violence, sexual assault, substance abuse, and an increased rate of sexually transmitted infections (STIs) and HIV/AIDS due to rape, prostitution, and sex trafficking. These impacts are identified specifically as a result of the presence of industrial camps and transient work forces.<sup>21</sup>



The presence and impacts of man camps clearly help widen the gap between gender-based differences in who benefits from industrial projects, as Indigenous women are least likely to participate in the benefits associated with projects such as the Trans Mountain expansion project.

At many man camps, the culture has been reported to be hyper-masculine, sexist, and apathetic towards self care, and has been found to exacerbate isolation, mental illness, drug and alcohol abuse, violence, and misogyny. Workers at these camps undergo stressful, strenuous, and potentially dangerous working conditions without the help of family, friends, and other social supports. These conditions, paired with a heightened disposable income, often translate to the marginalization of women, children, and two-spirit people in cases of sexual assault, and increased economic disparities due to higher wages earned in the resource sector driving up food and housing prices, which thereby serves as a barrier to women and two-spirit people in economically precarious situations.<sup>22</sup>

Each man camp would bring an average of 500+ temporary workers to the following communities:

- Valemount, BC (population around 1,000)
- Blue River, BC (population around 260)
- Clearwater, BC (population around 2,000)
- Merritt, BC (population around 7,000)
- Fraser Valley / Cheam First Nation (west of Hope), BC (population around 230 in Cheam First Nation)

Excerpt from the National Observer article “Pipeline ‘man camps’ loom over BC’s Highway of Tears” published in September 2017<sup>23</sup>

Mia is a First Nations woman in Alberta. A former sex trade worker, she said camp workers and sex go hand-in-hand. She worked in Fort McMurray for 10 years during the oilsands boom and was on call “23 hours a day.”

Mia’s name has been changed to protect her identity.

“I think the guys are maybe lonely,” she told National Observer. “They’re away from home, they have a lot of money — disposable income if you will.” ...

Mia described many dangerous encounters, including one with a client she said threatened to hang her in his apartment in Fort McMurray — a memory that haunts her. Employers know full well what’s going on, she added. But they don’t get involved.

“In that industry, nothing would surprise me. I can see people that may be running the camps turning a blind eye to this kind of thing.”

Mia said local women and girls in Alberta are recruited to the sex industry to service camp workers on a regular basis by pimps and escort agencies, and that locals in communities like Nak’azdli wouldn’t be passed by.

“We already know of cases where our young people have been recruited right off the reserve through the Internet. But if (a camp’s) in their own backyards, I would be very concerned,” she explained. “It’s scary. I hope that the communities are looking at ways of preventing and also educating on exploitation.”



Red dresses are used to symbolize how sexual violence towards women increases dramatically in the communities surrounding man camps. Photo: BC Government, Creative Commons

## National Inquiry into Missing and Murdered Indigenous Women and Girls (MMIWG)

Launched by the federal government in September 2016, the National Inquiry into Missing and Murdered Indigenous Women and Girls (MMIWG) consists of four commissioners whose mandate is to examine and report on the systemic causes of all forms of violence against Indigenous women and girls and Two-Spirit, Lesbian, Gay, Bisexual, Transgender, and Queer (2SLGBTQ) individuals in Canada by looking at patterns and underlying factors.<sup>24</sup>

Though the inquiry is not yet complete, community hearings, testimonies, and research have all enforced the desperate need for violence against Indigenous women to be addressed with utmost integrity.

Allowing man camps to exist near or within Indigenous communities is a direct contradiction of the federal government's motions to address the epidemic of MMIWG.



Kanahus Manuel of Tiny House Warriors stands where the tiny houses are being constructed in the path of the Trans Mountain Pipeline. Photo: Garth Lenz

## Ongoing legal challenge

The pipeline route, along with man camps, are proposed to pass through the territories of the Stk'emlupsemc te Secwepemc Nation (SSN), a traditional governance group including members from the Tk'emlúps te Secwepemc (Kamloops Indian Band) and Skeetchestn Indian Band. Certain members of the Tk'emlúps te Secwepemc band have joined with members of the Skeetchestn Indian Band to form SSN, representing the traditional governance of their territory.

In court, the SSN spoke of the failure of the Crown to adequately consult and address impacts from the project on SSN's Aboriginal rights and title. They specifically noted the failure of the government to engage with the Nation regarding Trans Mountain's proposed pipeline route, which passes through a sacred site at Pípsell, sensitive grasslands in protected areas, and previously undisturbed lands.<sup>25</sup>

## Tiny House Warriors

The proposed pipeline expansion project would install several temporary work camps through Secwepemc Territories in Interior BC, where Indigenous resistance to the pipeline is particularly strong.

In this region, the Tiny House Warriors are building 10 tiny houses to be placed strategically along the 518 kilometre pipeline route through Secwepemc Territories.

The Secwepemc have never ceded, surrendered, or given up their sovereign title and rights over the land, waters, and resources within Secwepemcul'ecw.<sup>26</sup>



## HOTSPOT: COQUIHALLA RIVER CROSSING

The Coquihalla River follows the highway sharing its name down the west side of the Cascade Mountains and meets the Fraser River in the small town of Hope, BC. The Coquihalla River is well known as an excellent spot for fly fishing steelhead trout, and is also home to Coho salmon.

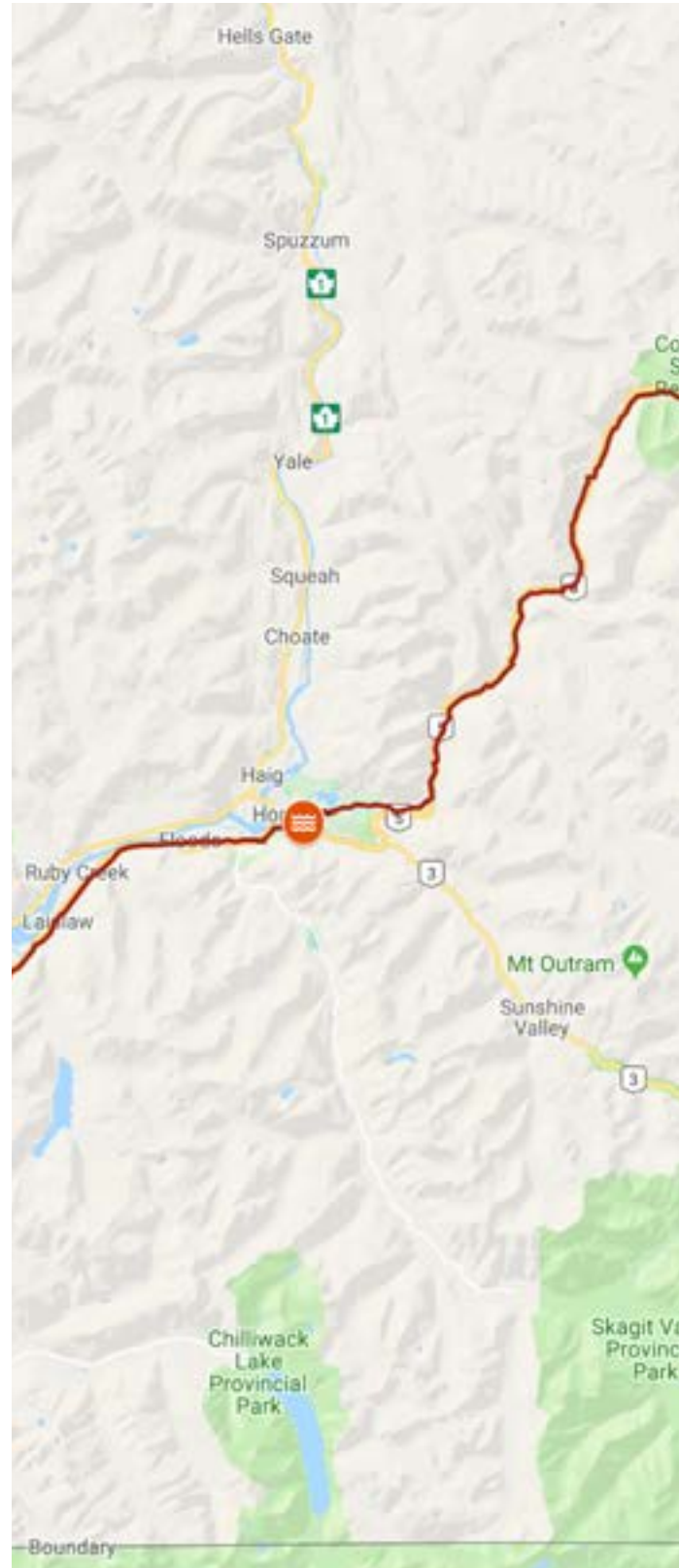
The company plans for the pipeline to cross the Coquihalla River at five different locations using a technique the industry calls “cut and cover.” This technique is more financially attractive for the company than less-invasive alternatives, but can be devastating for fish species and the communities and businesses that rely on them.

### Cut and cover techniques

Cut and cover is a technique where a trench is excavated and backfilled after pipe is laid. There are two techniques used to lay pipe using this method:

1. Wet open-cut crossings: Excavating the trench and laying pipe directly in streamflow. This technique typically causes short-term increased sedimentation downstream.
2. Isolation techniques: Diverting stream flow around the trench excavation and pipe installation zones. This technique usually significantly reduces sediment yield, however, it is best suited for relatively narrow rivers or streams with relatively low flow rates.<sup>27</sup> Additionally, it is significantly more time-consuming and costly, as the average duration of construction using isolation techniques was shown to be up to seven times that of open-cut crossings.<sup>28</sup>

The company plans to use isolation techniques for the first four crossings, and a wet open-cut for the final crossing.



## Consequences for salmon spawning

Sedimentation is one of the main concerns related to salmon survival. The mass movement of soil and other debris destroys spawning habitats, having a detrimental effect on a salmon’s life cycle. The survival of salmon eggs depends on well-oxygenated water flowing through streambed gravel — a necessary condition that is destroyed when sediment settles in the spawning beds and suffocates the eggs. If eggs manage to hatch despite these conditions, the newly spawned salmon need to navigate through the gravel to the open stream. If the gravel passages are blocked with fine sediment, the emerging fish are trapped.<sup>29</sup>

This is particularly concerning given that numerous salmon spawning beds exist on both the Coquihalla River and Fraser River, which the Coquihalla River feeds into. The population decline of this keystone species has the potential to have detrimental effects on both the terrestrial and marine food webs. Additionally, salmon species are highly valued from both economic and cultural perspectives, making their population decline directly relevant to the people, economies, and cultures that rely on these species.<sup>30</sup>

## Ecological concerns

- Wildlife resources of primary management concern in the Coquihalla River include: grizzly bear, spotted owl, mule deer, mountain goats, fish (e.g. wild summer run steelhead) and some species at risk that are considered “Identified Wildlife”. Many other species occur including forest birds, raptors, small mammals, amphibians, and furbearers.
- Important area for mule deer and mountain goats.
- Most of the Coquihalla River and its major tributaries support resident and/or anadromous salmonid populations.<sup>31</sup>

## First Nation does not have an agreement

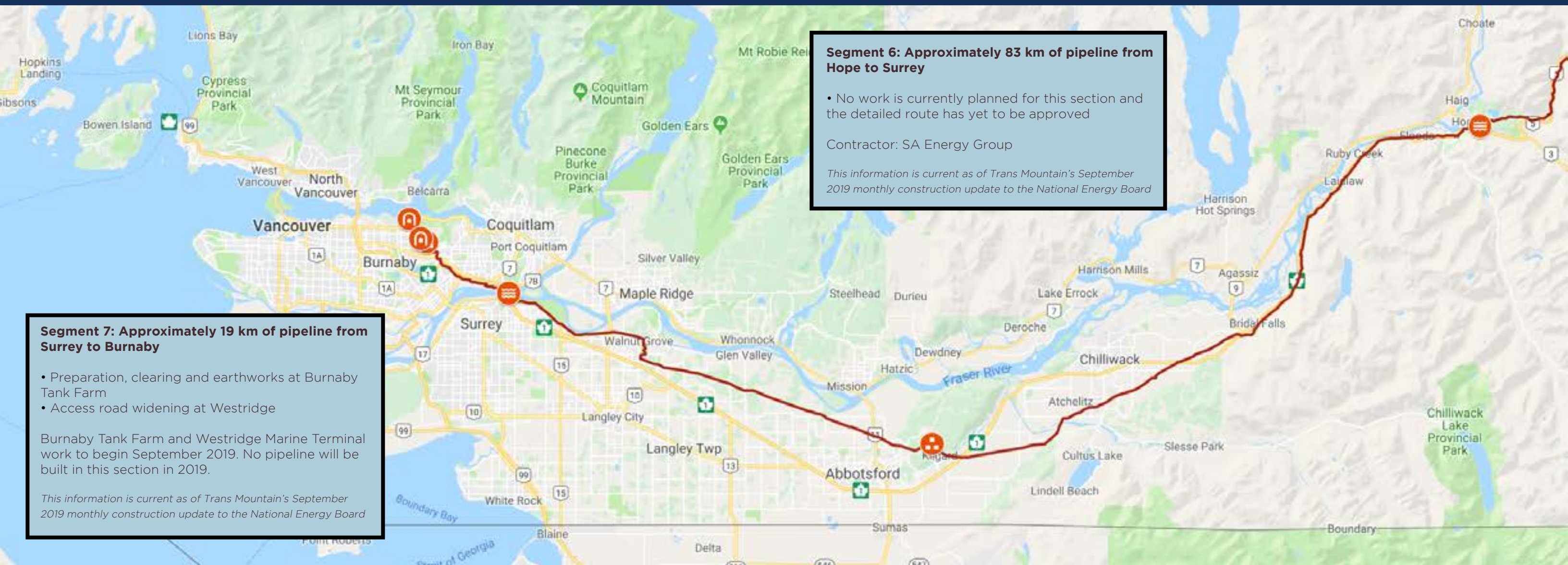
The proposed pipeline expansion runs through Nlaka’pamux Nation, a Nation that has been adamant in their opposition to the pipeline. In a January 2017 press release, the Nlaka’pamux Nation Tribal Council (NNTC) stated they “were never consulted when the original Trans Mountain Pipeline was built in 1953” and that “Kinder Morgan has never properly dealt with the ruptures and oil spills that have taken place on [their] territory.” They assert that the federal government and company are attempting to force the NNTC to make a decision promptly in order to adhere to their construction timeline. The NNTC explicitly states that due to the historical and current actions of the federal government and Kinder Morgan, they “will not tolerate the Trans Mountain expansion, anywhere on [their] traditional territory” and add that they want the original Trans Mountain Pipeline to be removed from their lands.<sup>32</sup>



Grizzly bears are a species of concern in the Coquihalla River. Photo: Victor Zapanta, Creative Commons

# SEGMENTS 6, 7:

## BC LOWER MAINLAND



**Segment 6: Approximately 83 km of pipeline from Hope to Surrey**

- No work is currently planned for this section and the detailed route has yet to be approved

Contractor: SA Energy Group

*This information is current as of Trans Mountain's September 2019 monthly construction update to the National Energy Board*

**Segment 7: Approximately 19 km of pipeline from Surrey to Burnaby**

- Preparation, clearing and earthworks at Burnaby Tank Farm
- Access road widening at Westridge

Burnaby Tank Farm and Westridge Marine Terminal work to begin September 2019. No pipeline will be built in this section in 2019.

*This information is current as of Trans Mountain's September 2019 monthly construction update to the National Energy Board*

## HOTSPOT: SUMAS TANK FARM



### Growing suburban neighbourhood

Northeast of Abbotsford, BC, lies the rapidly growing suburb of Auguston. According to the City of Abbotsford, this area will continue to be transformed in the next few decades as more families move to the city and more single-family homes are built.

The company has plans to expand its nearby Sumas Mountain Tank Farm to hold 890,000 barrels of oil, from a previous capacity of 715,000 barrels. Expanding the Sumas Tank Farm while surrounding residential neighbourhoods are on a steep upward trajectory increases the risk of health hazards and displacement to the thousands of residents in the area. Spill history at the Sumas Tank Farm is not favourable for the company. Since 1994, there have been 5 spills at the Sumas Terminal occurring in 1994, 1997, 2002, 2005, and 2012.<sup>33</sup>

### 2005 oil spill and delayed response

A report filed with the National Energy Board revealed that pipeline operators ignored warning alarms for 3.5 hours before responding to a gasket failure on July 15, 2005. As a result, approximately 210,000 litres of crude oil was released into the surrounding area, entering Kilgard Creek.<sup>34</sup> Kilgard Creek contributes significant food and nutrient values to downstream fish-bearing habitats. The effects of this oil spill include the temporary loss of breeding and rearing habitat for birds and amphibians, as well as a decrease in aquatic productivity for downstream fish populations.<sup>35</sup> As for the residents in the area, this incident forced a number of residents to temporarily leave their homes while cleanup was underway. Many residents expressed concerns over potential health impacts of the toxic fumes.



There have been 5 oil spills at the Sumas Terminal since 1994. Photo: Google

### 2012 oil spill and delayed response

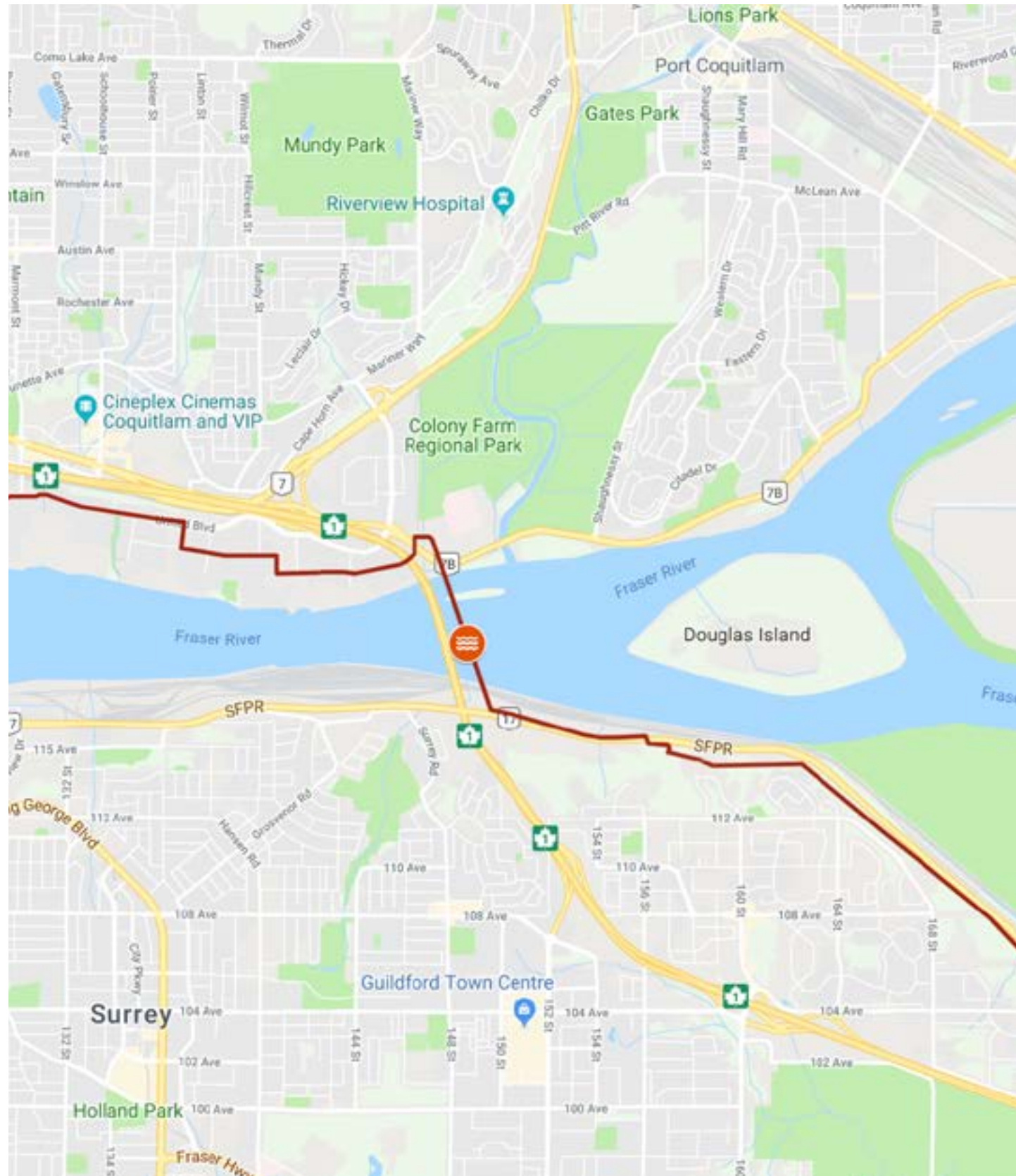
Similar to the delayed response to the oil spill in 2005, operators failed to act swiftly when another oil spill occurred in Abbotsford in 2012. Just before midnight on January 23, alarms at Kinder Morgan's control center signaled something was wrong on Sumas Mountain. At 4:30 a.m., local residents awoke from their sleep by the overwhelming odor of petrochemicals. By the time pipeline staff arrived at the site six hours after the incident began, over 90,000 litres of oil had been spilled.<sup>36</sup> Though the crude oil did not escape from a containment area, residents of the Auguston neighbourhood said they experienced nausea and headaches from the fumes.<sup>37</sup> According to the NEB, there were improper alarm settings in a recently-installed data acquisition system and the control centre operator failed to follow procedures.<sup>38</sup>

### Tribal Council does not have an agreement

The Sumas Tank Farm exists on the traditional territories of the Sto:lo Nation. Six of Sto:lo Nation's 11 member bands formed the Sto:lo Collective and applied as intervenors in the National Energy Board hearing process in 2014. In their final argument submitted to the NEB in 2016, they conclude "that the process is fatally flawed" due to the NEB not fulfilling its responsibility to address the rights, title, and interests of members of the Sto:lo Collective.

It was also requested that Trans Mountain should file a report on consultation activities with the members of the Sto:lo Collective; a report that must be approved by the Collective. The report must include a comprehensive summary of consultation activities undertaken, a summary of the assessments of the potential effects of the proposed pipeline expansion on identified interests of the Sto:lo Collective, and descriptions on measures to reduce, eliminate, or offset potential hazards to the Collective's interests.<sup>39</sup>

# HOTSPOT: FRASER RIVER CROSSING



Between Edmonton and Burnaby, the pipeline crosses over 1,300 streams, rivers, and other bodies of water — but none more significant than the Fraser River. The company plans for the pipeline to cross the Fraser River at the Fraser River Crossing, which runs between Surrey and Coquitlam just east of the Port Mann Bridge. The crossing will be constructed using a technique the industry calls “horizontal directional drilling.”

Horizontal directional drilling uses a drilling rig to bore a tunnel under the river. Once the drill emerges on the other side, it is attached to a preassembled length of pipeline which is pulled back through the bore hole. This process is less invasive than the cut and cover technique, and causes less disturbance to the watercourse bed and banks.<sup>40</sup>

## Main water supply tunnel

As of February 2017, Metro Vancouver’s \$240-million Port Mann Water Supply Tunnel has been in operation, delivering drinking water to residents south of the Fraser River. This water supply tunnel is one of the key links between Metro Vancouver’s watersheds and communities south of the Fraser River.<sup>41</sup>

## Economic importance of Lower Fraser River

The Lower Fraser River is crucial to the economies of the Fraser Valley and Metro Vancouver, serving as an economic waterway for port activity, a recreational destination, a productive commercial and sport fishing area, an agricultural delta, and a marine transportation corridor. It plays a key role in supporting the 2.8 million people residing in the Lower Mainland.

In the case of a pipeline rupture in or surrounding the Fraser River, the entirety of the Lower Mainland would suffer the economic and health consequences that arrive with the contamination of such a critical waterway.

## First Nation does not have an agreement

Not only has Kwantlen First Nation given no consent for this pipeline expansion to be constructed on their territory; leaders of the Nation have been continuously vocal in opposition to the expansion project. In 2014, Chief Marilyn Gabriel criticized the consultation process in an open letter with 10 other First Nations chiefs, stating that the review process “will fail to fully consider or assess potential adverse impacts on Aboriginal title, rights, including treaty rights or interests.”<sup>42</sup> In 2015, members of Kwantlen First Nation held a protest and press conference condemning Kinder Morgan for borehole drilling on their traditional territory with absolutely no communication.<sup>43</sup> Stand With Kwantlen is a group of Kwantlen people, Indigenous people and settlers working together to track pipeline operations in Kwantlen’s territory. In November 2017, the Langley Times reported that members were planning to build a healing lodge in the pipeline’s path.<sup>44</sup>

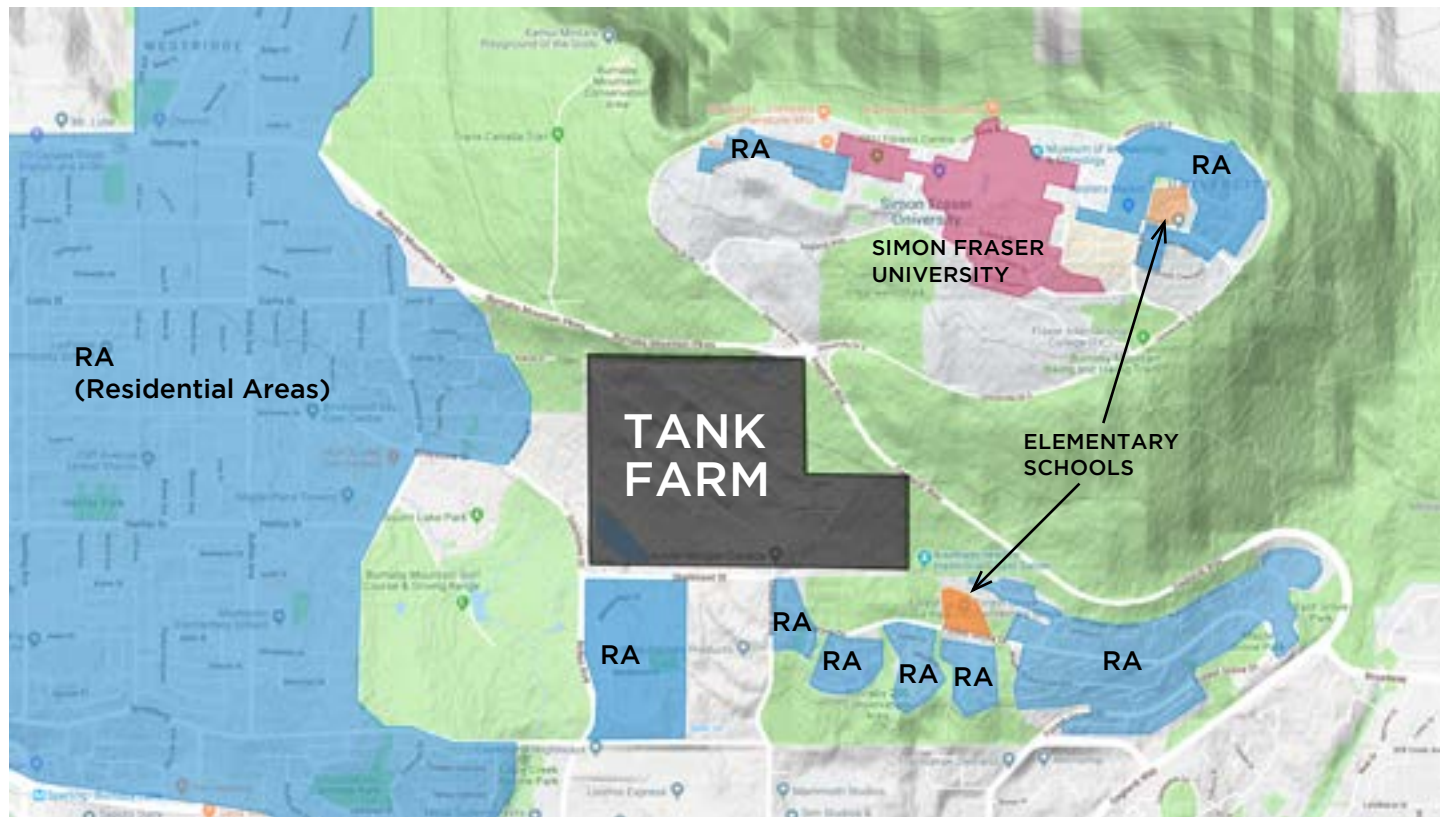
Excerpt from Richmond Chamber of Commerce report<sup>45</sup>

“The valley and delta of the Fraser River support agricultural production that totaled \$1.6 billion in 2011, representing a majority of the agricultural output of British Columbia. There is significant potential for increased agricultural output in the area, depending upon the effects of climate change and the availability of water for irrigation. However, there are threats to agriculture from flooding and salt water intrusion that could seriously affect the agricultural capability of the region.”

## HOTSPOT: BURNABY TANK FARM

The area surrounding the Burnaby Tank Farm is home to more than 45,000 residents, a number of playgrounds and public recreation areas, an elementary school, and two early childhood centres — as well as Simon Fraser University and its community of students, faculty, and staff, thousands of whom commute from other regions of the city on a daily basis.<sup>46</sup>

The Burnaby Tank Farm is the terminus of the tunnel drilled into Burnaby Mountain running from the Westridge Tanker Terminal, and is the end point of the Trans Mountain Pipeline. The tank farm houses 13 oil storage tanks, with a current shell capacity of approximately 168.5 million barrels of oil.<sup>47</sup> Planned expansion activities at the tank farm involve the densification of storage tanks from 13 to 26, by demolishing one storage tank and constructing 14 new tanks.<sup>48</sup> Work has begun on the process of clearing land and expanding the facility perimeter to make room for the new tanks.



The Burnaby Tank Farm (grey) is surrounded by a conservation area, residential areas (blue) elementary schools (orange), and Simon Fraser University (pink). Illustration: Stand.earth

## City of Burnaby still dissatisfied with tank diameter reductions

In response to concerns expressed by the City of Burnaby, Trans Mountain now plans to reduce the diameter of five of the 14 new tanks and the overall capacity of the facilities by 50,880 m<sup>3</sup> (320,000 bbls). The company also plans to increase the amount of space between the tanks and to reconfigure the secondary containment system at the tank farm in order to reduce the risk of fire.

This altered plan was approved by the NEB on June 22, 2018. That same day, the NEB also released reports announcing that Trans Mountain had fulfilled Conditions #22 (Updated Terminal Risk Assessment) and #24 (Secondary Containment).<sup>49</sup>

The City of Burnaby, however, was not appeased in the slightest despite Trans Mountain's altered plans and the NEB's approval of these two conditions. The City responded with a submission to the NEB outlining the failure to consult with the city on these conditions, taking issue with the lack of an independent technical review, which would have been more objective and thorough, and the lack of key site-specific information and data, which undermined the conclusions on risk, effect, and consequences.

The City of Burnaby's concerns include the following:

- Flawed and faulty modeling on behalf of the company regarding boil-over and vapour cloud explosion
- Important secondary event risks not addressed, including the evacuation of fire suppression personnel
- Drastically underestimated ignition probability
- Flawed and inadequate risk assessment of knock-on effects
- Flawed secondary containment design and overflow drainage configuration
- Unacceptable tertiary containment overflow risk
- Inadequate seismic risk assessment
- Unduly narrow risk assessment methodology
- Missing risk reduction methodologies<sup>50</sup>

The City's concerns can be read in full detail in its submission to the NEB.<sup>51</sup>



The Burnaby Tank Farm (background) is just 300 metres away from Forest Grove Elementary School (foreground). University Highlands Elementary and Sperling Elementary are also close by. Photo: Stand.earth

## Burnaby Mountain Conservation Area

Much of Burnaby Mountain is city-owned land designated as a conservation area, with schools, playgrounds, a golf course, and Simon Fraser University scattered throughout. The tank farm is located in the southwestern pocket of the Burnaby Mountain Conservation Area, and a fire at the tank farm with certain wind conditions could easily result in an uncontrolled forest fire. Additionally, an oil spill at or near the tank farm would leave the residential neighbourhoods below the tank farm susceptible to the flow of oil, posing serious health risks to families.

### May 2009 Oil Spill at the Burnaby Tank Farm

A major oil spill at the Burnaby Tank Farm in May of 2009 leaked nearly 200,000 litres of crude oil, some of which entered the groundwater suppression system. According to Trans Mountain's website, "The spill affected soil and groundwater in the vicinity of the tank bay, as well as sediment, water and wildlife in the tertiary retention area."<sup>52</sup> Residents in the surrounding neighbourhood reported a strong odour of oil fumes.

## Outdated infrastructure

Trans Mountain has not announced plans to upgrade or retrofit existing infrastructure at the Burnaby Tank Farm, which was designed and built in the early 1950s. Retired Structural Engineer Gordon Dunnet has expressed concerns about the structural integrity of the tanks, such as the seven out of 13 tanks at the Burnaby Tank Farm equipped with floating roofs instead of fixed roofs.

These floating-roof tanks have historically caused major oil spills and tank farm fires during earthquakes. The floating-roof tanks at the Burnaby Tank Farm were designed in the early 1950s, before earthquake design requirements were established in 1980. Dunnet also expresses concerns about the grade of steel used in the construction of the 1953 tanks — specifically about the carbon content of the steel and issues that may arise in welded joints in the case of an earthquake.<sup>53</sup>

## Fire concerns in community

The oil traveling through the pipeline is composed of unrefined bitumen and diluent. This diluent is typically comprised of volatile solvents such as naphtha or natural gas condensate that allows the thick bitumen to be pumped through pipelines. These light hydrocarbons are toxic and highly flammable.

A 2015 report by Deputy Fire Chief Chris Bowcock of the City of Burnaby Fire Department details the major risks faced by the community surrounding the Burnaby Tank farm.<sup>54</sup>

## Tank fire boilover

A boilover is an extremely hazardous semi-enclosed fire that can occur when water is used to extinguish a fire. The difference in density of the oil and water results in the water sinking to the bottom of the tank, having little in effect extinguishing the surface flames. As the water evaporates into steam, the volume of the container rapidly expands more than 1,700 times in volume. As a result, the surface fire is expelled upward and out of the tank, discharging heated and molten crude oil over the area 10 times the tank's diameter.

A boilover event occurring from a tank fire at the Burnaby Tank Farm would result in what firefighters call a "large area life hazard," an area where loss of life is a probable outcome in the case of a fire or emergency. There is also the potential to cause additional storage tank fires, due to the mass discharge of molten crude oil over areas encompassing the following:

- The entire Burnaby Tank Farm,
- Shellmont Tank Farm,
- Forest Grove Community,
- Meadowood Community,
- Sperling-Duthie Community, and
- Gagliardi Way and Burnaby Mountain Parkway, which are the only two access roads to the Burnaby SFU campus, UniverCity, a residential neighbourhood of 5,000 residents, University Highlands Elementary School, and the SFU Childcare Society.<sup>55</sup>

“ There is not a plan; there’s not a plan specific to that scenario. We would have to do what we call ‘shelter in place’ and keep people on the mountain.

*Terry Waterhouse, SFU’s chief safety officer*

## Tank fire burnout

The contingency option to extinguish a tank fire in scenarios of adverse environmental conditions, lack of firefighting resources, or when the facility design does not allow for safe firefighting operations is to let the tank fire burn completely to the ground.

In a situation of a tank fire burnout, it is estimated that over 30,000 people would be exposed to toxic smoke and heat discharge.<sup>56</sup>

A fire at the Burnaby Tank Farm could result in a situation where thousands of people would need to be evacuated. Evacuation plans for the surrounding community are nonexistent to date – yet another liability for Trans Mountain.

The evacuation of Simon Fraser University could be impossible in the case of an uncontrolled forest fire, given that the only two access roads intersect just above the storage facility. In a worst-case scenario, over 30,000 people would be trapped on SFU’s Burnaby Mountain campus.



In January 2019, a fire burned down a private building (seen at left) just steps away from the Burnaby Tank Farm. Photo: Stand.earth

## Toxic smoke in Metro Vancouver

If a fire were to occur, impacts could include injuries resulting from smoke inhalation and reduced air quality that may impact community members with pre-existing respiratory conditions such as asthma.

In the case of a fire at the Burnaby Tank Farm, Trans Mountain expects toxic smoke to be discharged in the community for 1-2 days. According to Burnaby Deputy Fire Chief Chris Bowcock’s report, it is expected the 1-2 day burn time would generate a sufficient toxic smoke plume that would significantly affect the entire Metro Vancouver area, with specifically high concentrations in Burnaby, Port Moody, Coquitlam, and New Westminister.<sup>57</sup> This would put over 2 million people at risk of respiratory health hazards, especially people with pre-existing respiratory conditions.

The loss of containment of crude oil products also presents the potential for the release of highly toxic hydrogen sulfide and sulphur dioxide. The following levels of concentrations of hydrogen sulfide and related symptoms are cited in the 2015 Trans Mountain Tactical Risk Analysis report.

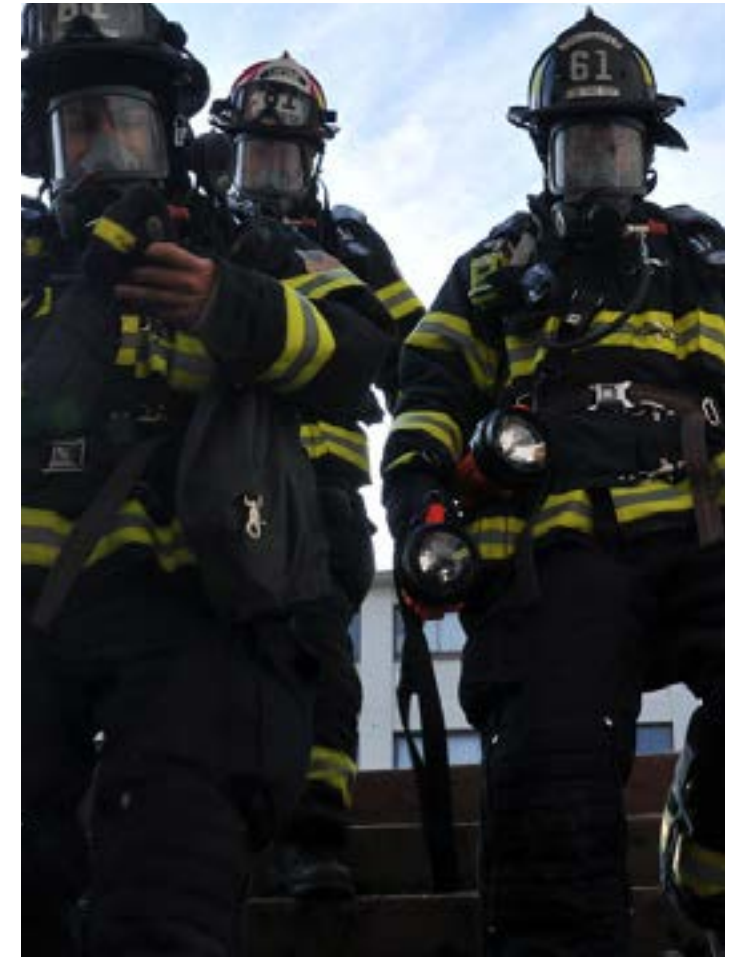
“ These factors pose significant risks to lives and property arising from the densifications of petroleum products on a sub-standard, ill-configured and undersized property located in proximity to urban residential and other populations.

*Burnaby Deputy Fire Chief Chris Bowcock<sup>58</sup>*

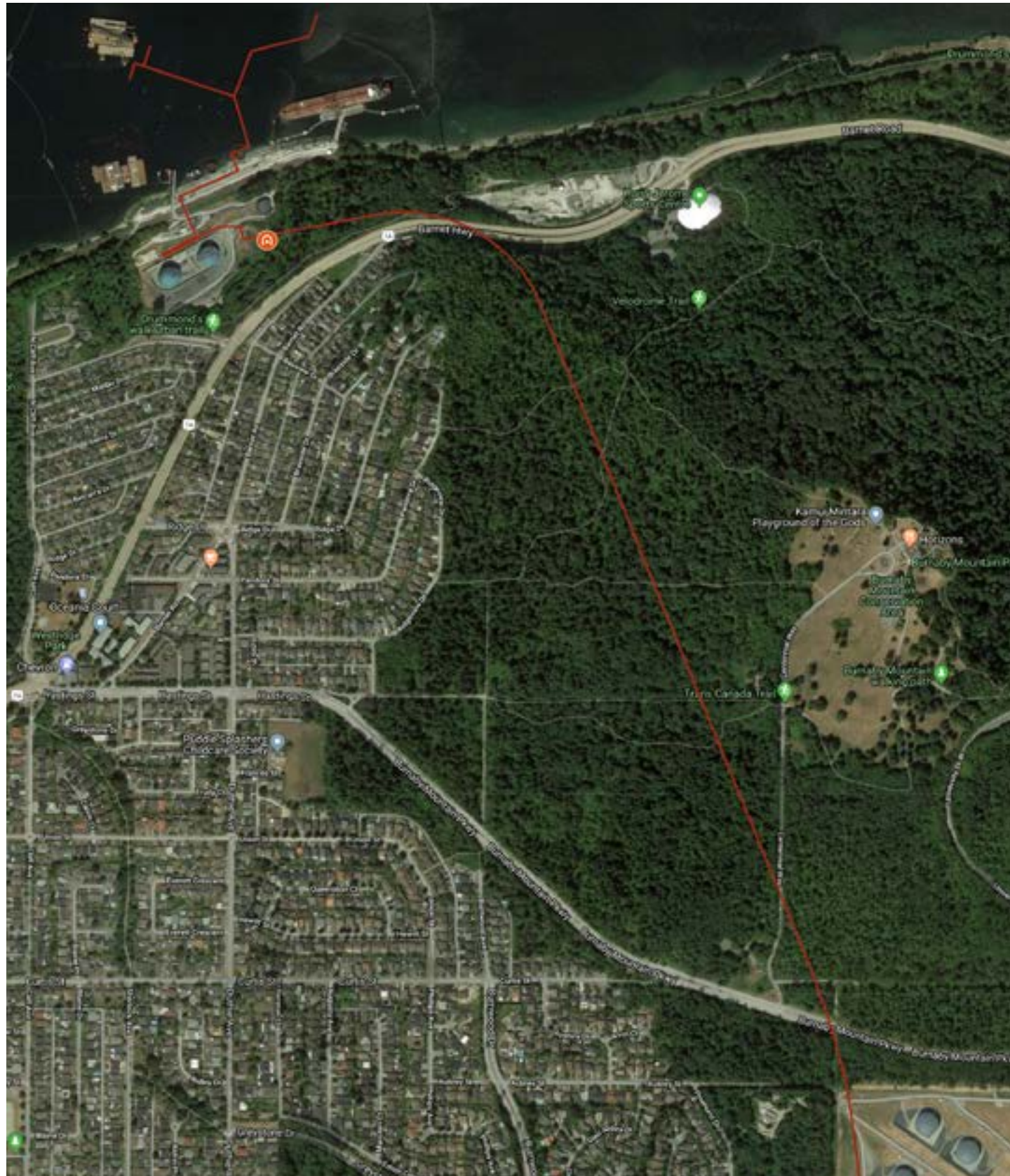
## Emergency response limitations

Within the existing emergency management programs at the Burnaby Tank Farm, the company lacks immediate emergency communication plans, protocols, and procedures to notify the community at the first identification of a hazard.

In the case of a major tank farm fire, the Burnaby Fire Department would be unequipped to address the fire, as the facility would require a full hazardous materials (hazmat) team. The closest hazmat team is located in Kamloops, BC, which would leave the fire unattended for at least 4-6 hours.



A major fire at the Burnaby Tank Farm would require a hazmat team to respond. The closest one is 4-6 hours away. Photo: Creative Commons



Part of the Trans Mountain Pipeline expansion includes a tunnel that would be dug under Burnaby Mountain between Westridge Marine Terminal (upper left) and the Burnaby Tank Farm (lower right). Photo: Google

## HOTSPOT: BURNABY MOUNTAIN TUNNEL

### Drilling through Burnaby Mountain

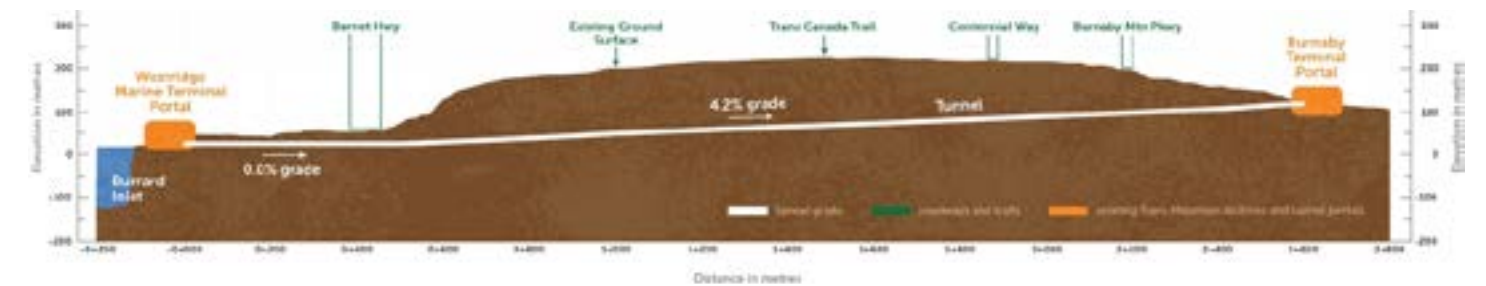
The company has purchased a tunnel boring machine to drill a 2.6-kilometre tunnel through Burnaby Mountain to connect the Westridge Tanker Terminal on the northern side of the mountain and the Burnaby Tank Farm on the southern side. This pipeline would be inserted through Burnaby Mountain using one of the largest drills on the market.<sup>59</sup>

Both the new and existing pipelines will run through Burnaby Mountain.

### Possibility of active fault lines

A 2013 report produced by BGC Engineering Inc. investigated whether or not there are active fault lines on Burnaby Mountain, by reviewing historical geological surveys of the area.

The report found that active fault lines were neither apparent nor non-existent, and it suggested more geological surveys would need to be conducted — a recommendation that the company denied.<sup>60</sup>



A cross-sectional diagram of the Burnaby Mountain Tunnel. Photo: Trans Mountain<sup>61</sup>



Demonstrators protested the Trans Mountain Pipeline in November 2014, when the company began test drilling in Burnaby Mountain. Photo: Mark Klotz





Led by Salish canoes, kayaktivists challenge the gates of the Westridge Marine Terminal in July 2018. Photo: Stand.earth

## HOTSPOT: WESTRIDGE TANKER TERMINAL



Climbers prevent oil tankers from passing under the Second Narrows Bridge in July 2018. Photo: Greenpeace

### Blocking marine traffic and recreation

The proposed Westridge Tanker Terminal expansion would require the realignment of the vessel traffic corridor in front of the terminal so it can fill three Aframax-size tankers simultaneously. This planned expansion would obstruct 30% of the width of the Burrard Inlet.<sup>62</sup>

Oil tanker traffic would increase sevenfold — from one per week to one per day. This narrow corridor — along with the hundreds of other watercrafts in Burrard Inlet — significantly heightens the risk of a collision, and, in turn, an oil spill.

The Westridge Tanker Terminal is located in a recreational area of the Burrard inlet, surrounded by three parks. Local residents are concerned that the increase in oil tanker traffic and tugboats would render this area of the Burrard Inlet unsafe for recreational watercraft users. Residents have also reported the closure of local trails near the terminal, and express concern that more trails will be closed with the expansion of the facility.

### Risk of oil tanker collision with Second Narrows Bridge

Both the Second Narrows and Lions Gate Bridges are essential infrastructure to Metro Vancouver's economic well-being, "connecting people, goods and services to the North Shore with around 182,000 trips a day."<sup>63</sup>

The sevenfold increase in oil tankers passing through the Burrard Inlet brings a risk of collision and spills five times greater than the acceptable level of risk for earthquake damage to buildings and infrastructure, and 20 times greater than the level of risk accepted for ship collisions with new bridge designs.<sup>64</sup>

The Concerned Professional Engineers (CPE) state that in the case of a rudder failure, the speed and momentum of a tanker would lead to a collision with the Canadian National Railway bridge, bringing the superstructure of the railway bridge into another collision with the Second Narrows bridge. The group cites a situation in Japan that had a devastating collision of this nature in 1979.<sup>65</sup>

The CPE believes the NEB and the federal government must do a thorough risk assessment of the increased tanker traffic and calculate the probability of bridge collision for a major infrastructure project such as the Trans Mountain Pipeline. The CPE's 2017 request for a risk analysis has gone unanswered.



There is a 79-87% likelihood of a spill at Westridge Tanker Terminal or Burrard Inlet over 50 years. Photo: Google

## Impacts of an oil spill in Burrard Inlet

### Is a spill inevitable in Burrard Inlet?

Drs. Thomas Gunton and Sean Broadbent, leading experts in risk assessment at Simon Fraser University, evaluated the likelihood of oil spills from the pipeline expansion project. Their major conclusions included the following:<sup>66</sup>

There is a 79-87% likelihood of a spill at the Westridge Tanker Terminal or in Burrard Inlet over 50 years.

Smaller spills are very likely (~160 cubic metres, or 1,000 barrels), but larger spills (~1600 cubic metres, or 10,000 barrels) also have a 37% likelihood over 50 years.

A reasonable worst-case spill of 16,000 cubic metres (100,000 barrels) somewhere along the marine shipping route has a 29% likelihood over 50 years.

In other words, this expansion gambles the health of the Burrard Inlet and the communities that depend on it for an almost-guaranteed spill over the next 50 years (79-87% chance) and puts the West Coast at a 29% chance of experiencing a devastating spill in the next 50 years.

### What would an oil spill look like?

The City of Vancouver, the City of Burnaby, and Tsleil-Waututh Nation commissioned Genwest Systems Inc. to model worst-case oil spill scenarios in the Burrard Inlet. Using GNOME, a 2-D oil spill model, they illustrated the dispersion of 16,000,000 litres of oil — roughly a fifth of the volume of an oil tanker — over the course of 72 hours. Both oil spill scenarios at the First Narrows Bridge and Second Narrows Bridge show approximately 90% of oil would be stranded on beaches along Vancouver, West Vancouver, North Vancouver, and Burnaby.

The small portion of oil that does not wash up on shore can cover tens of square kilometres on the water, and would very likely sink due to the heavy nature of diluents in the oil, rendering a full cleanup impossible.

### What would an oil spill mean for the environment and ecosystems?

Marine birds near a spill would likely be exposed to oil in quantities that would lead to probable death, according to Dr. Jeffrey Short, a retired research chemist at NOAA. A major spill at the Westridge Tanker Terminal or in the Burrard Inlet could result in one of the most serious bird mortality events caused by oil spills, due to the “exceptional abundance and diversity of birds in the Burrard Inlet and the Fraser Delta.” The death of birds on a large scale may have ripple effects, changing the composition and densities of other species and disrupting food webs.

Plankton serve as the foundation of the marine food chain, organisms upon which all marine life depends. Zooplankton play a key role in marine food web dynamics, and are particularly susceptible to crude oil pollution. Carried by currents, zooplankton cannot avoid crude oil patches. Crude oil components such as polycyclic aromatic hydrocarbons (PAHs) can be highly toxic to zooplankton and may bioaccumulate through food webs, poisoning feeders, fish, and humans that consume the entities that eat plankton.

Areas of fish spawning are particularly vulnerable to oil spills.<sup>67</sup> The Capilano River Hatchery sees salmon spawning in the Capilano River that leads directly into the Burrard Inlet — where a major oil spill is probable over the next fifty years. The risk of an oil spill in the Burrard Inlet puts local marine ecosystems at risk, which, in turn threatens the health of those who consume from the sea and the cultures that depend on the health of the sea.



An oil spill in Burrard Inlet would likely harm Tsleil-Waututh nation's subsistence economy, cultural work, and contemporary economy. Photo: Stand.earth

### Effects on the Tsleil-Waututh community

The Tsleil-Waututh Nation's Assessment of the Trans Mountain Pipeline and Tanker Expansion Proposal shows that an oil spill in the Burrard Inlet will likely harm their subsistence economy, cultural work, and contemporary economy.<sup>68</sup> An oil spill in the Burrard Inlet has the potential to contaminate places of cultural significance to the Tsleil-Waututh community, preventing community members from accessing the knowledge and wisdom of ancestors and the wealth of the natural environment of their territory. A spill would keep community members away from places essential to cultural work for fear of health and safety. The assessment also concludes that the Nation's modern economy depends on the health and visual quality of the Burrard Inlet. Tsleil-Waututh business initiatives, including cultural tourism and real estate development, would likely be harmed by an oil spill.

To learn more about the threats posed by increased tanker traffic in the Burrard Inlet to the cultural and economic well-being of the Tsleil-Waututh community, read the assessment.



A large oil spill could have a negative impact of \$1.2 billion on British Columbia's economy. Photo: Creative Commons

## Economic effects on British Columbians

A report produced by Conversations for Responsible Economic Development found that a large spill could have a negative impact of \$1.2 billion on British Columbia's economy. More than four out of five British Columbians now work in service-based industries such as manufacturing, construction, tourism, real estate, healthcare, and social assistance — sectors that produce the majority of BC's GDP.

According to CRED's report, "Only a small percentage comes from oil, gas, and supporting services."

Over 250,000 jobs depend on the health of the Burrard Inlet. Many industries would experience a massive setback in the case of an oil spill in the Burrard Inlet. Industries that would suffer from a spill include tourism, agrifood, seafood, real estate, and film and television.<sup>69</sup>



In 2007, the Trans Mountain pipeline ruptured, spilling 224,000 litres of crude oil bitumen. Photo: Shawn Soucy

## Major spills in the Westridge area

Since 1982, there have been four oil spills at the Westridge Tanker Terminal.<sup>70</sup> The July 24, 2007 spill occurred as a result of a third-party contractor accidentally rupturing the pipe with a backhoe. Approximately 224,000 litres of bitumen was released, coating the surrounding residential neighbourhood with oil. Roughly 89,600 litres of oil flowed into the Burrard Inlet via the city's storm drain system as well as nearby Kask Creek.

An estimated 225 people were evacuated from the affected residential area and around 100 evacuees spent that night in the homes of friends and relatives or in hotels or motels. Residents of the most-oiled homes stayed in longer-term alternate accommodations.<sup>71</sup>

Mary Hatch, a resident within the Red Zone (100m of the rupture), estimates it took about 30 months to get the physical property back to its original state.<sup>72</sup>

“ It was one of the hardest days of my entire career... The odour of the oil was quite powerful, and it was very difficult for people to even get close to the scene.

Former Burnaby City Manager Lambert Chu

- 1 [Canada Approves TMX Despite Failing to Achieve Consent: Declaration of Climate Emergency Rings Hollow](#)
- 2 [United Nations Declaration on the Rights of Indigenous Peoples](#)
- 3 [Here's our database tracking how Indigenous communities are affected by Trans Mountain](#)
- 4 [Here's our database tracking how Indigenous communities are affected by Trans Mountain, the Discourse](#)
- 5 [United Nations Declaration on the Rights of Indigenous People](#)
- 6 [Saw you in court: The Kinder Morgan Federal Court of Appeal hearing, West Coast Environmental Law](#)
- 7 [Saw you in court: The Kinder Morgan Federal Court of Appeal hearing, West Coast Environmental Law](#)
- 8 [Pipelines and Earthquakes: A ticking time bomb for lower mainland residents, Sierra Club BC](#)
- 9 [How smaller, off-coast quakes could badly shake BC, The Tyee](#)
- 10 [Refinery Damage and Emergency Response in the 1999 Izmit, Turkey Earthquake, Han-Padron Associates LLP](#)
- 11 [Oil Pipelines: Carrying crude below the valleys, LA Times](#)
- 12 [Earthquakes versus pipelines, The Tyee](#)
- 13 [RESOLUTIONS ADOPTED \(confirmed\) 149th Annual Meeting of the Canadian Medical Association General Council 2016](#)
- 14 [Timeline: Key dates in the history of the Trans Mountain pipeline](#)
- 15 <https://apps.neb-one.gc.ca/REGDOCS/File/Download/2385048>
- 16 [B.C. MPs Elizabeth May, Kennedy Stewart arrested at Kinder Morgan facility](#)
- 17 [Construction permits and local routing now Trans Mountain pipeline priority Vancouver Sun](#)
- 18 [Canada Approves TMX Despite Failing to Achieve Consent: Declaration of Climate Emergency Rings Hollow](#)
- 19 [Environmental groups file new challenge to Trans Mountain pipeline expansion approval - CBC](#)
- 20 [What Are Man Camps? - Secwepemcul'ecw Assembly](#)
- 21 [Indigenous Communities and Industrial Camps, The Firelight Group with Lake Babine Nation and Nak'azdli Whut'en, Feb 2017](#)
- 22 [What Are Man Camps? - Secwepemcul'ecw Assembly](#)
- 23 [Pipeline 'man camps' loom over B.C.'s Highway of Tears, National Observer](#)
- 24 [National Inquiry into Missing and Murdered Indigenous Women and Girls - website](#)
- 25 [Saw you in court: the Kinder Morgan Federal Court of Appeal hearing, West Coast Environmental Law](#)
- 26 [Tiny House Warriors](#)
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