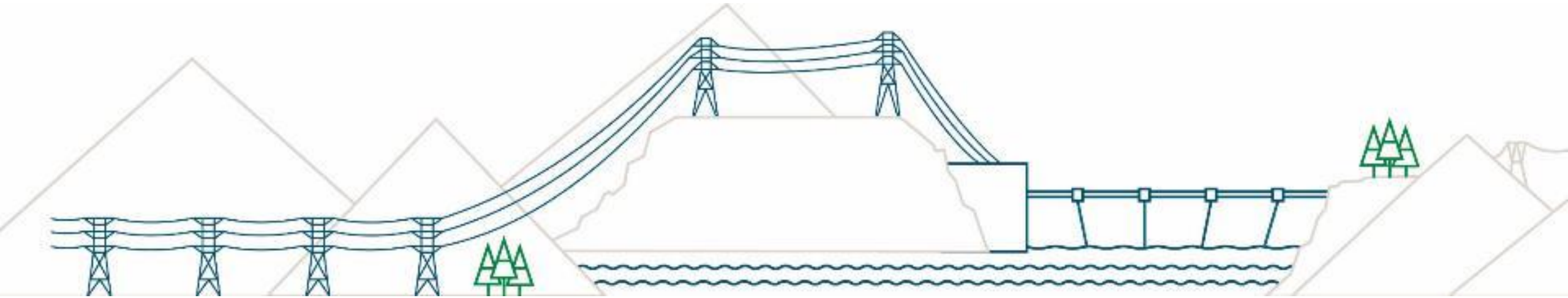
Contingency Haul: 85th Avenue Industrial Lands to Dam Site

EAC Amendment Request

April 19, 2021



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Reason for Request:

- ~3 million m^3 of this material must be transported to the dam site area for the approach channel and earthfill dam
- Transport of material to the dam site can only take place during warmer seasons
- Stoppages to the delivery of material to the dam site during this 7-month window could result in significant construction delays
- Moving material via trucks will offset potential construction impacts on these components of the Project.

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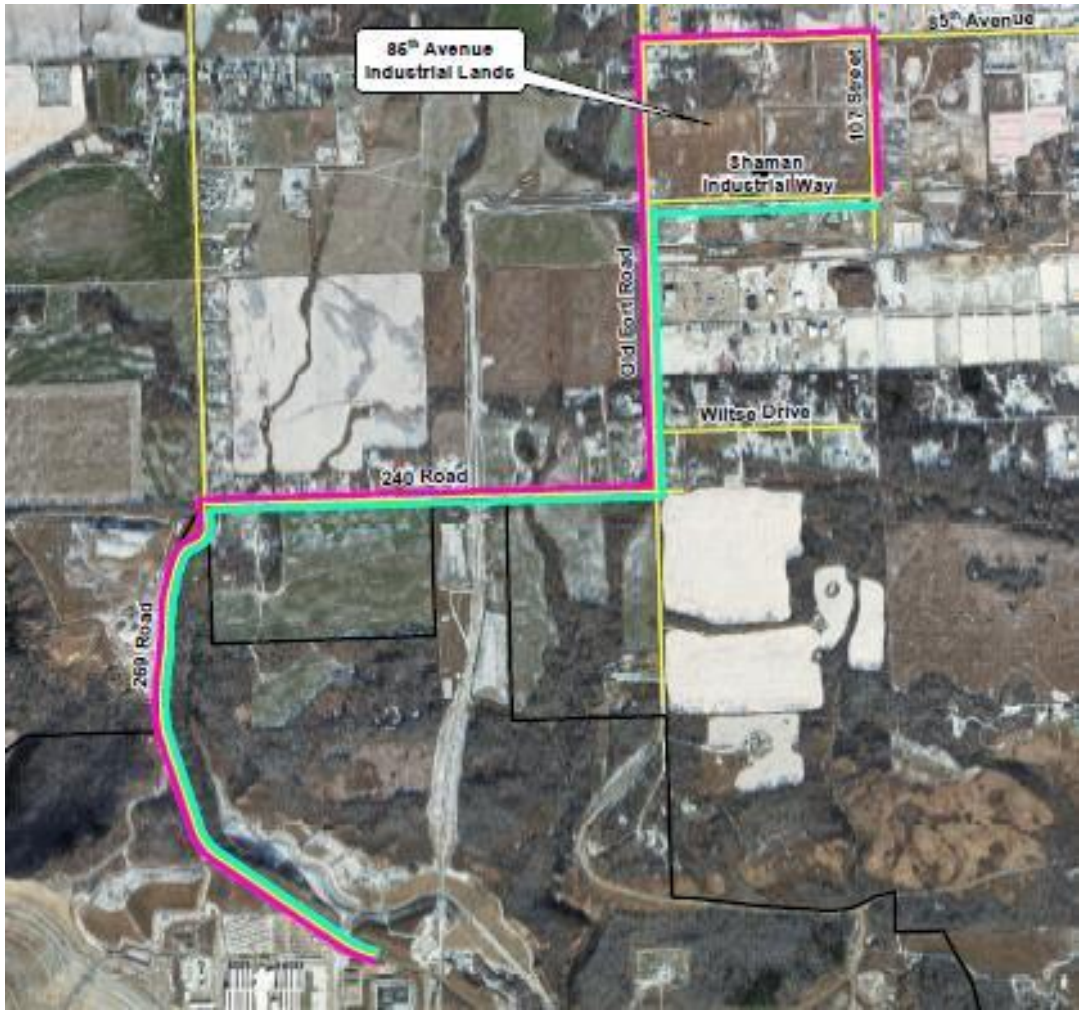
DRAFT EAC Amendment Request:

- Shared with Indigenous groups, local governments, MOTI, EAO and local residents in January 2021
- Haul Route: from 85th Avenue/Shaman Industrial Way to the Dam Site via Old Fort Road, 240th Road, and 269th Road to Gate A
- Indicated BC Hydro would be hauling approximately 10 days per season (April to October) for maintenance, and for longer periods when the conveyor was not operational due to mechanical breakdowns



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Draft EAC Amendment Request:

- PRRD, City of Fort St. John and local resident feedback on draft EAC Amendment Request:
  - Questions about alternatives (stockpiling material on site, constructing another conveyor, constructing road beside till haul conveyor)
  - Concerns about noise, air quality, traffic impacts, and safety

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Revised EAC Amendment Request - Alternatives to Hauling:

- ***Sourcing material from another till location:***
  - 85th Avenue Industrial Lands is the best source of glacial till
  - 85th Avenue is also close enough to the dam site to transport material via conveyor

- ***Constructing an Additional Till Conveyor:***
  - Would require the widening of the current right-of-way
  - Impacts on wooded areas, agricultural land reserve, private property owners adjacent to the right-of-way.

- ***Hauling on Service Maintenance Road:***
  - Would require both upgrading of the road base to accommodate haul truck loads, and widening of the right-of-way to accommodate two-way traffic.
  - Impacts on wooded areas, the agricultural land reserve and private properties.
  - Hauling on non-paved road may cause dust levels adverse to human health

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Revised EAC Amendment Request Reflects Revised Haul Route

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Revised EAC Amendment Request Reflects Revised Contingency Hauling Proposal

No hauling required during periods of regular or planned maintenance.

"Haul trucks may be required to transport material from 85th Avenue Industrial Lands to the dam site area via public roads **when the conveyor is not operational due to events beyond BC Hydro's control.** Hauling may commence when the conveyor is expected to be not operational for more than three days."

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Revised EAC Amendment Request Reflects Revised Contingency Hauling Proposal

Potential Causes of Conveyor System Downtime Triggering Need to Haul:

- Vandalism
- Extreme and prolonged inclement weather
- Equipment repair delay/disruption
- Expertise disruption
- Localized fires
- Vehicle, equipment, or human accident
- “Force Majeure” or “Act of God” events

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Revised EAC Amendment Request Includes Communications Plan

Purpose: To ensure the public is aware of why truck hauling is being proposed as a contingency when the conveyor is not operational due to events beyond BC Hydro's control

Audience: Nearby residents, Road users, local government, provincial MLA and federal MP, media

Methods of Communication:

- First haul: Door-to-door notification
- Twitter
- Email and/or text notification list
- Website update
- Electronic dynamic messaging signs on the roadway
- Public advisory
- Standing item in biweekly construction bulletin

BC Hydro contact for questions/concerns: sitec@bchydro.com or 1-877-217-0777.

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Assessment Of Effects/Valued Components

- Assessment of effects of proposed hauling based on maximum potential hauling schedule:

- Hauling activities would occur from 7.00 AM to 7.00 PM daily
  - except during the period of the school bus pick-up and drop-off schedule

- Assessment assumes that we will need to haul 7,600 m^3 of till per day.
  - 25 trucks
  - 122 trucks trips per hour along the route (61 trucks loaded/ 61 trucks unloaded
  - approximately one truck passing a given location along the route every 30 seconds

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Assessment of Effects/Valued Components

- 22 Valued Components in the EIS Reviewed for interactions with the proposed hauling activity
- 9 Valued Components Assessed as having Interactions
- Assessment determined that the proposed hauling will not change the outcome of the findings of the EIS with respect to the Valued Components
- Feedback on draft amendment focused on the following Valued Components:
    - Transportation (Traffic Analysis)
    - Human Health
        - Air Quality
        - Noise

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Transportation (Traffic Analysis)

Methodology

- Establish existing traffic volumes and performance of the roadway/intersections.
- Include anticipated growth patterns for this background traffic years of operation.
- Add the volume of contingency haul traffic.
- Model any changes to performance of the roadway/intersections.
- Identify any changes to the Level of Service for the route intersections.

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Transportation (Traffic Analysis)

Control Delay (seconds/vehicle)	Operational Level of Service
0 to 10	A
>10 to 15	B
>15 to 25	C
>25 to 35	D
>35 to 50	E
>50	F

Old Fort Road Segment	Operational Performance	
	Background (without haul)	Background (with haul)
Shaman intersection	A	B
Shaman to 240 Road	A	A
240 Road intersection	B	B
240 Road to Gate B	A	A
Gate B intersection	A	B

Old Fort Road Segment	Peak Hour Traffic Volume (two-way)	
	Background (without haul)	Background (with haul)
Shaman intersection	270	390
Shaman to 240 Road	270	390
240 Road intersection	270	390
240 Road to Gate B	50	170
Gate B intersection	60	180

- Level of Service (LoS) A represents the highest operational performance, effectively unimpeded traffic movement
- LoS C represents acceptable conditions

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Transportation (Traffic Analysis)

Findings:

- Shaman Intersection – westbound left turn at LoS B; all other movements remain at LoS A
- 240 Road intersection – eastbound movements at LoS B; all other movements remain at LoS A
- Gate B intersection – northbound left turn at LoS B; all other movements remain at LoS A

Old Fort Road Segment	Operational Performance	
	Background (without haul)	Background (with haul)
Shaman intersection	A	B
Shaman to 240 Road	A	A
240 Road intersection	B	B
240 Road to Gate B	A	A
Gate B intersection	A	B

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Transportation (Traffic Analysis)

Findings:

- Analysis confirmed that the background traffic for current and future traffic volumes are performing very well.
- The addition of truck traffic demonstrates only slight increases in the expected delay for all vehicles using the proposed haul route (3 seconds or less at intersections).
- Greatest impact in terms of delay would be for the internal BC Hydro segments.
- Proposed haul route is viewed to be safe now; do not expect any changes to the road safety

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Transportation (Traffic Analysis)

Mitigation:

- The contractor will be required to develop a traffic management plan in accordance with BC MoTI Traffic Management Manual for Work on Roadways – which would include:
  - Minor signage, variable message signs, speed reader boards.
  - Scheduling – school bus operating hours, local events.
  - Monitoring – dust/debris/surface base repairs
- Roadway maintenance – would be identified and completed as required in conjunction with MoTI.

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Air Quality

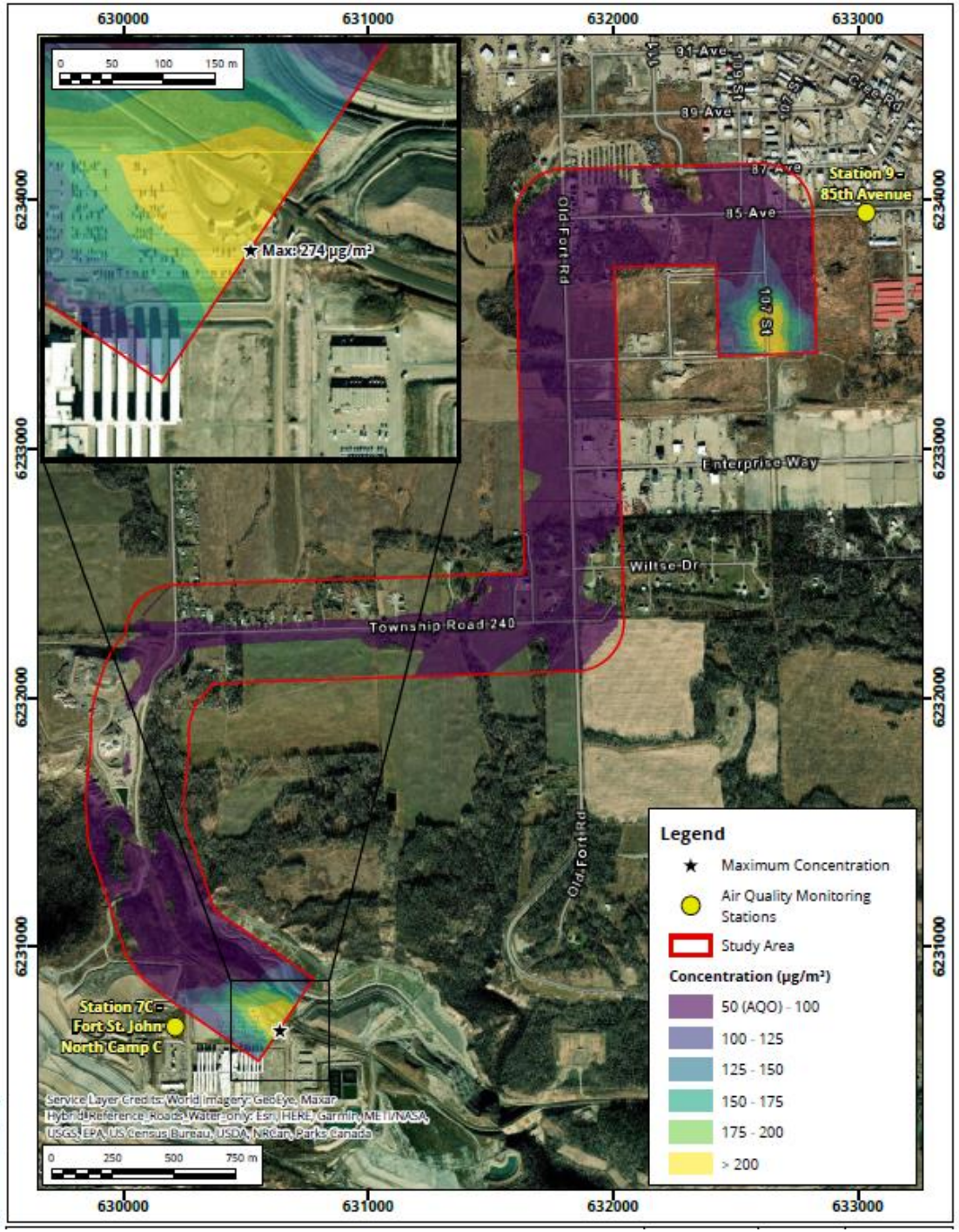
All paved roads have a fine layer of silt that varies by local activity, and the number and weight of the vehicles.

Track-out of gravel and silt by truck tires from unpaved roads to paved roads at both ends of the haul route were identified as being the most likely contributors to airborne dust emissions.

Prediction of the effect from truck air emissions relied upon estimation models from the US EPA including:

- Roadway particulate emissions were estimated using factors for sand and gravel processing (70 g/m^2);
- Tailpipe emissions were calculated for haul trucks both travelling and idling using MOVES model; and
- To predict effects of all haul route trucks on public property, AERMOD dispersion model was used with 3 years of hourly meteorological readings from FSJ airport and background ambient air quality readings from Site C monitoring network. This approach is consistent with BC MOE dispersion model guideline.

Haul route emissions would increase existing 85th Ave emissions by approximately 33% to 270% (annually) and Dam Construction Year 6 (2020-2021) emissions ranging from approximately 1% to 5%.



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Air Quality

Maximum predicted 24-hour PM_{10} concentrations with ambient background and mitigation

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Mitigation Measures

- **Air Quality:**
  - Cover truck loads where feasible, check truck tires for rocks and dislodge as required
  - Keep first 200 m of paved road clean at both ends of haul route by continuous water flushing of road surface using water trucks with spray bars
  - For the first 200 m of paved roads at both ends of haul route, continuously wet sweep road surface to dislodge tracked out soil and gravel using wet sweepers
  - Apply dust suppressant to gravel roads at borrow pit

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Noise

Noise from haul trucks is expected to be most audible at residences during pass-by events.

The dominant noise sources from haul trucks include:

- Truck engine (primarily the engine exhaust);
- Tire noise; and
- Braking.

Community noise impacts due to the haul route were assessed as follows:

- Detailed modelling was completed using Datakustik's Cadna/A sound level prediction software (ISO Standard 9613)
- Modelled Results were evaluated using Health Canada's Guideline *Evaluating Human Health Impacts in Environmental Assessment: Noise*
- According to Health Canada, the two primary indicators for potential health effects due to noise are **complaints** and **annoyance.**

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Noise

Modelling results indicated that predicted noise impacts at homes may invoke sporadic complaints from the public but are below the threshold for unacceptable annoyance as defined by Health Canada.

Primary factors in limiting health effects included:

- Daytime only hauling (limiting sleep disturbance);
- Haul trucks assumed to be in good working order with appropriate mufflers.

Good operating practices will further minimize community disturbance due to noise. For example:

- Implement construction communications plan, notifying potentially affected residents
- Implement and verify effective traffic management strategies are in place (controlled braking, no use of engine retarder brakes and avoid lineups close to residences

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Human Health

- Human health risk assessment of original haul route
- Followed conventional approach (Health Canada, BC MOH)
- Based on findings of the air quality and noise assessments
- Focus on homes along the haul route

- **Conclusion**: With implementation of the planned mitigation measures, use of the (original or revised) haul route was not expected to have an adverse effect on health.

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Human Health

- Air contaminants:
  - Particulate matter (different size fractions: $PM_{2.5}$, PM_{10}, TSP and DPM)
  - NO_2
  - SO_2
- Short-term and long-term risks
- Air concentrations (predicted + background) were compared to health-based exposure limits

Notes: NO_2 = nitrogen dioxide, SO_2 = sulphur dioxide, TSP = total suspended particulate (up to 100 microns), PM_{10} = particulate < 10 microns, $PM_{2.5}$ = particulate < 2.5 microns, DPM = diesel particulate matter

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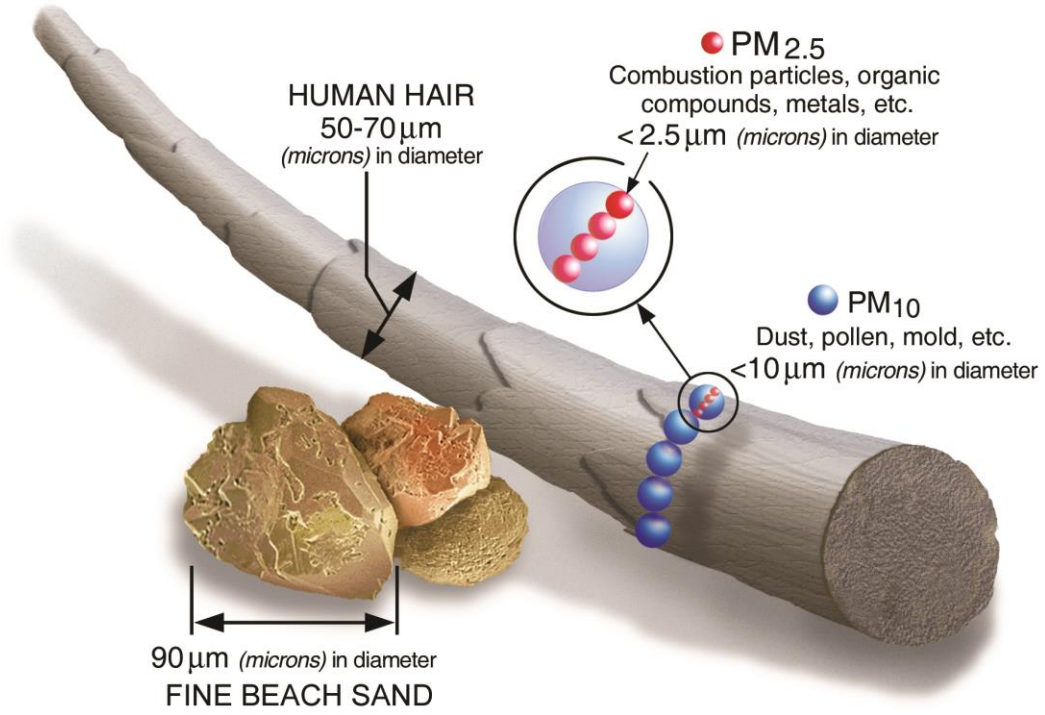
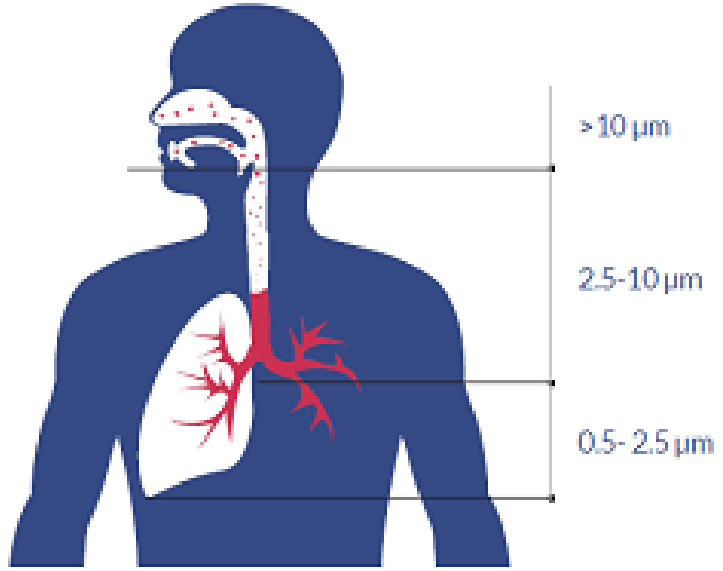
Human Health

PM: Why focus on smaller fractions?



Source: US EPA



Source: WHO

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Human Health

Conservative assumptions:

- Assumed haul route would be required continuously from April 1 to October 31 from 2021 to 2023
- Analysis assumes 61 truck trips per hour per direction (total of 122 trips per hour)
- Addition of conservative background estimates
- Assumed residents would be continuously present at their home

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Human Health

Air Quality Results:

- At residential locations:
  - Short- and long-term air concentrations of NO_2, $PM_{2.5}$ and SO_2 are expected to meet health-based exposure limits
  - Long-term air concentrations of DPM are expected to meet the health-based exposure limit
  - Short-term air concentrations of PM_{10} and TSP are expected to exceed health-based exposure limits
- When assessing different sizes (fractions) of particulate matter, $PM_{2.5}$ is the clearest indicator of potential health risks
- Most (90%) of the PM emissions are associated with road dust

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Human Health – Noise Results:

- All residential locations are expected to meet Health Canada's annoyance criterion for the proposed haul route.
- While predicted noise levels may result in sporadic complaints from residents along the haul route, BC Hydro plans to reduce the likelihood of complaints by communicating directly with potentially affected residents.

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Human Health -- Original Conclusions:

1. Changes in air quality are not expected to have an adverse effect on health.
2. Overall, noise associated with the haul route is not expected to have an adverse effect on health.

Conclusion: Effective implementation of BC Hydro's planned mitigation measures and a committed communication program with the nearby residents should ensure that use of the haul route will not result in adverse health effects.

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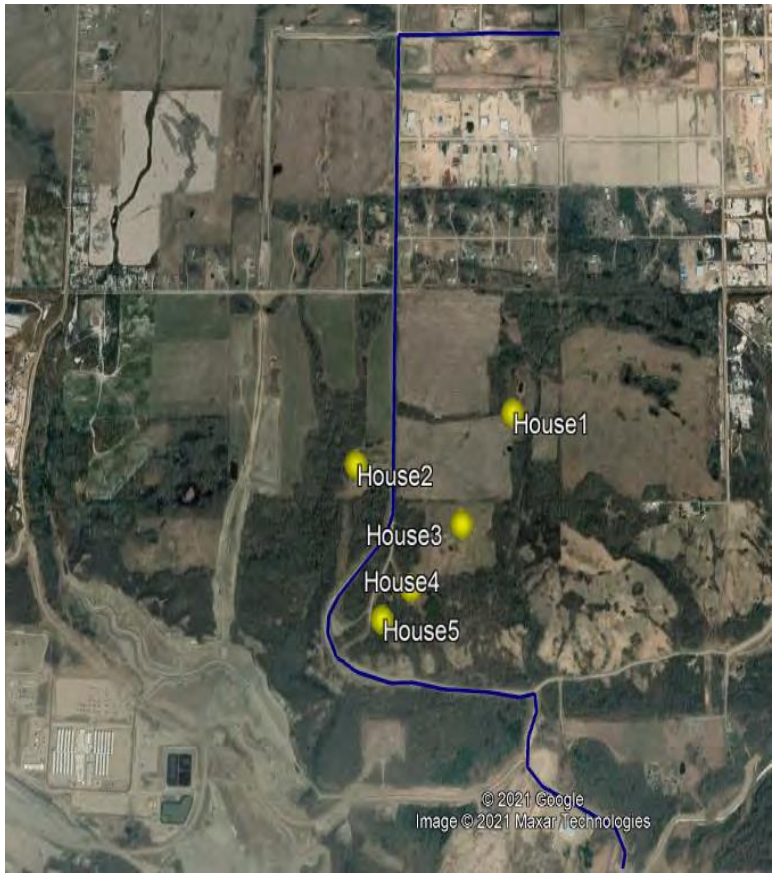
Human Health -- Conclusions

Alternate route: Conclusions Remain Valid



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Questions?

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