

February 2023

Land Hazards

Our region, like all regions throughout Canada, is home to many natural hazards. In the Quesnel area hazards include land movement and landslides (geotechnical hazards) as well as flooding, wildfires and severe weather.

In 2020 and 2021 we saw an increase in land movement in various areas across the community. This newsletter will provide you information on slow-moving land movement, potential causes and risks, and the responsibilities of the homeowner and City.

Additionally, find information on the City's recently updated floodplain bylaw; provincial data on the four main natural hazards in the area; and information on how prepare for an emergency.

Land movement

The Quesnel area is found in a river valley, which puts several areas in the city at risk of land movement. These are typically slow-moving landslides, which creep progressively over a period of months or years. Slow-moving slides cause damage, but it often occurs over longer periods of time, rather than minutes. Slow-moving slides typically do not move all at once – one area may shift, while another area may have no activity at all. The movement can be complex and different areas can move at different rates. Certain zones of the slide may activate and continue to move, while others can be stable for decades.

Impacting land movement

Land movement is impacted by the amount of water in the ground over varying soils, as well as the water flows of our rivers.

We also know that climate change plays a factor. Changes to rain and snowfall patterns, spring melt, winter temperatures and wildfires all impact river and stream flows, and groundwater.

Human interactions can also affect land movement. Removing trees and vegetation, over-watering lawns, poor stormwater drainage, as well as excavation or grading of soils can expose property to risks of erosion and allow the accumulation of groundwater, both of which increase the risk of land movement.

Safety and risks

In most instances, slow-moving slides do not pose life-safety risks. These slides often occur over months or years, rather than minutes. However, this does not mean there is “no risk” at all. Slow-moving slides can cause extensive property and building damage over time, and as such, the risk of these events is typically financial resulting from damage to property.

The City's hillside hazard map identifies areas where land stability may be questionable. If you own property on or near one of the identified areas, it is important that you educate yourself on the risks and avoid increasing the problem. In these areas development proposals may require a geotechnical assessment.

In our area, there is also a risk of fast-moving slides associated with stream banks and steep slopes. Building in close proximity to these areas should be avoided. A geotechnical engineer is required for any development in these areas.

Any specific questions regarding risk to your property should be directed to a qualified professional with geotechnical expertise, who can assess the immediate or long-term risks and determine whether anything can be done to stabilize the area and manage further movement.

Hillside hazard map: quesnel.ca/geo-hazard





Land movement mitigation

The control and mitigation of slow-moving slides is a complex area of study. The characteristics of a particular slide will determine whether any projects can halt or slow down the slide activity. Often, there are very little options, if anything, that can stabilize the area and prevent further movement.

Building in Quesnel

City staff will be able to assist in identifying areas that are susceptible to land movement and or flooding based on mapping of these hazards.

In cases where there are natural or man-made hazards, a geotechnical engineer will be required to ensure the lots are safe and suitable for the intended use. It is important to note that not all hazard areas are mapped and may be identified by the Building Inspector through a site inspection at time of permit application. City staff do not provide site inspections or building inspections for the purposes of property purchases and purchasers are recommended to seek qualified advice.

The West Quesnel Land Stability area has an allowance to place mobile homes on sites that are not showing signs of differential movement. The Building Inspection department will review serviced sites in this area to determine if they are suitable for mobile home placement.

For more information contact the Building Department at 250-992-2111 or buildinginspection@quesnel.ca

West Quesnel Land Stability (WQLS)

Areas of West Quesnel sit on a large, ancient, slow-moving landslide. Since 2018, a full system of pumps and drains have been removing water from the ground in this area. The groundwater and movement were reducing. However, in recent years of significant rain and snowfall, the ground movement has significantly increased again.

The City and Provincial and Federal Governments have invested over \$17 million since the program began in 2000. Due to the large costs and unpredictable effectiveness of adding pumping equipment, the current plan is to maintain the existing infrastructure rather than expand the drainage capacity. The City will continue to monitor land movement in the WQLS area.

Learn more at quesnel.ca/wqls

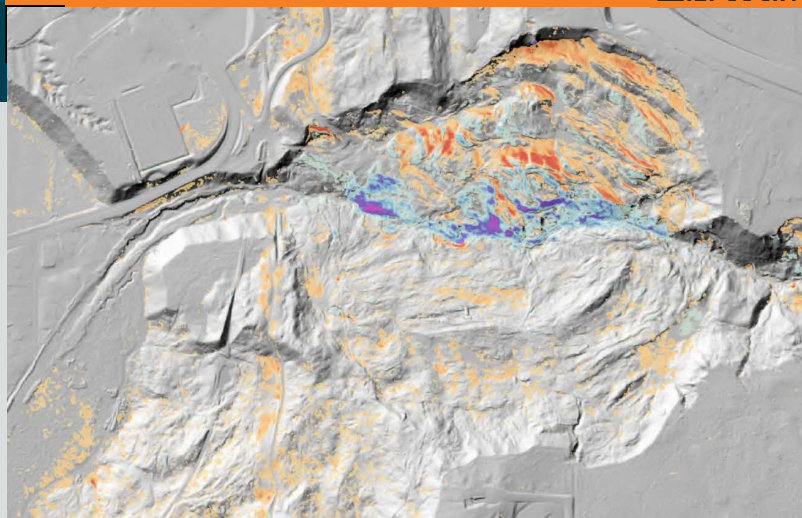


LiDAR Slope Stability Study

To better understand the land movement that occurred in 2020 and 2021 and find out if other areas of land had also moved, the City and Cariboo Regional District hired geotechnical services to do a comparative analysis of LiDAR images.

The analysis found that between 2019 and 2021, multiple areas in and around Quesnel saw land movement. The imagery and analysis can be used by Geotechnical Professionals who will help developers find suitable locations for developments.

Full study: quesnel.ca/geo-hazard



Portion of the 2019 and 2021 LiDAR Datasets for the slopes around the Quesnel Hill Slide Complex and the Dragon Hill Road Slide.

Property owner responsibilities

Property owners that are in areas susceptible to land movement have responsibilities to try to minimize their impact on land movement. Here are steps you can take to reduce groundwater and reduce ground movement.

Excavating, digging or re-grading

If you plan to remove or deposit soils, dig into slopes or re-grade areas you may need a permit, contact the City. Disruption of soils can instigate ground movement.

Limit Tree Cutting

Tree removal can trigger localized land movement as well as lead to an increase in groundwater contributing to overall instability. Tree Removal Permits are required in several areas in Quesnel including the WQLS area.

Minimize lawn watering

Water your lawn once or twice a week. Most lawns need 1 to 1.5 inches of water per week, either from rain or watering.

Utility Breaks

Repairing water and sewer lines breaks on private property are the responsibility of the property owner. When a leak or break is detected, call the City for a water shut-off.

Water Diversion

Divert the rainwater and snowmelt to storm drains through gutters and direct water away from homes into the storm drainage system or towards the street as much as reasonably possible.

In the WQLS area, downspouts should be directed to the storm drainage system rather than to permeable surfaces where it will contribute to increasing groundwater.

Mow higher than normal

Longer leaf surfaces promote deeper rooting and shade the root zone. Return mulched clippings to the lawn to provide moisture and shading to the roots.

Xeriscape your garden/lawns

Xeriscape lawns are composed of plants native to an area and of those, are drought tolerant and can thrive when given little water. These landscapes require little maintenance, water, or fertilizer. Because of this trait, xeriscapes act as a great land stabilizer due to little water being used on them. Ideas include micro clover lawn; sunflowers; and chives.

City responsibilities

The City uses land movement data to guide changes to planning and development policies, and regulations. The data helps form our approach to managing future development, including:

- subdivision approvals;
- rezoning approvals;
- building permit approvals;
- tree cutting; and
- development permit applications;
- soil removal.

The City will continue:

- educating community members about the realities of living in areas where there may be land movement and the steps they can take to avoid increasing it,
- working to develop policies involving future development in these areas, and
- raising awareness among all levels of government.

Floodplain management

The City experiences inconveniences dealing with the annual high-water river level events that cause some flooding of low-lying areas and a disruption to at least one road - the Johnston Bridge Loop). Less frequent but higher flow events have impacted private properties and public infrastructure. Every year the City must also monitor and decide what actions to take based on expected river levels.

Being at the confluence of three major waterways, the Fraser River, Quesnel River, and Baker Creek, Quesnel is known for its wealth of waterfront property. Although these waterways create a unique and appealing cityscape, they can also

pose a hazard to persons or property during flood events – particularly during spring freshet.

To help mitigate the impacts of flooding for new developments, the City has updated our floodplain mapping and adopted Floodplain Management Bylaw 1922. This Bylaw regulates development within the floodplain by establishing setbacks and flood construction levels. Speak to City Planning Staff to learn if a property is in the floodplain and how it will affect development of the property.

Bylaw and mapping: quesnel.ca/floodplain



When hazards become emergencies

On rare occasions, hazards can turn into emergencies. Hazards in Quesnel include flooding, landslides, wildfires and severe weather. Every resident living in Quesnel should be prepared for emergencies regardless of where they live.



Flooding

Depending on the type and severity of flooding, it could take weeks or months for the water to recede. It's important to take time to prepare and understand what to do before, during and after a major flood.

Learn more: bit.ly/3tCzDF9



Wildfires

When wildfires burn away from houses or infrastructure, they can have ecological benefits. Other times, they can threaten homes, businesses and vital infrastructure. Understand what to do before, during and after a wildfire.

Learn more: bit.ly/3WkhPdS



Landslides

Landslides are the down-slope movement of rock or debris. It's important to take time to prepare and understand what to do before, during and after a major landslide.

Learn more: bit.ly/3W16oaY



Severe Weather

Weather events are dangerous for the health and wellbeing of our communities and can cause illness and death. Understand what to do before, during and after severe weather.

Learn more: bit.ly/3PumTdl

Build your kits

During a disaster, you may need to stay at home with an emergency kit or leave immediately with a grab-and-go bag.

Learn more: bit.ly/3HHqC5z



Make your plan

An emergency plan says how you and your household will respond to a disaster. Knowing what to do will reduce anxiety and help keep you focused and safe.

Learn more: bit.ly/3FS2qMg



Stay connected

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- Twitter [@cityofquesnel](https://twitter.com/cityofquesnel)
- Website www.quesnel.ca

Other City news - Budget 2023

Every year, the City completes operational and capital budgets which are adopted by Council. The City is currently in the process of completing its Budget for 2023 which then determines the property tax rates which must be adopted by May 2023.

Learn more about the budget process and any engagement opportunities at letsconnectquesnel.ca/budget-2023



T: 250-992-2111 • F: 250-992-1512 • quesnel.ca

City Hall • 410 Kinchant Street • Quesnel • British Columbia • V2J 7J5

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