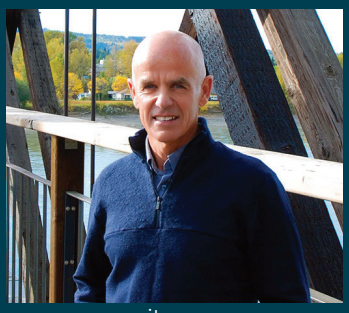
May 2022

CITY OF Quesnel

West Quesnel Land Stability

Message from the Mayor



West Quesnel is a vital part of our City. It contains a large residential population, a busy retail sector, and is an area Council is keenly interested in developing further as we continue to attract new residents and investment to our community.

Unfortunately, a large portion of this important part of our community is built on an ancient landslide. The City engaged specialists to conduct a comprehensive assessment of the slide area and develop a strategy to dewater the slide zone. The hope was that this program would stabilize or dramatically minimize the land movement.

Despite investing $17 million to dewater the slide zone, including $7.5 million from City of Quesnel ratepayers, the land continues to move and cause damage to homes and the City's infrastructure. In 2020, we saw more land movement than the historical average, due in part to major, climate change induced changes in snow melt and precipitation in the area. Unfortunately, we'll never know what impact the investments we've made in dewatering had on reducing the land movement, we can only assume that the movement would have been more severe if we had not had the dewatering program in place.

Notwithstanding this setback, Council remains committed to West Quesnel. As you'll see in this householder, we have major investments planned for the area, will continue to maintain the dewatering system, and we've made changes to our Official Community Plan to enable some reinvestment in the private properties in the slide zone.

I hope you'll join us on June 2 to discuss this situation further and learn firsthand what you can do to help reduce the land movement and ensure West Quesnel remains a vibrant and vital part of our community.

Mayor Bob Simpson

Latest findings and results

Multiple studies have confirmed that West Quesnel sits on a large, ancient, slowly moving landslide. Since 2018, our full system of pumps and drains has been removing water from the ground. The groundwater and movement in this area was gradually reducing. However, in recent years of significant rain and snowfall, the ground movement has significantly increased again.

In 2020, our system measured an average of 84 mm of ground movement compared to an average ground movement of 13 mm in the years 2013 to 2019 .In 2020 123 million litres of water was removed by the pumping wells which is the most since the inception of the program. An additional 74 million litres were removed by the horizontal drains. This significant jump in groundwater and ground movement is linked to the high rainfall and snowfall amounts in 2019.



Background

A large, ancient landslide underlies a significant part of West Quesnel. Land movement in the West Quesnel Land Stability Study Area has been occurring over a long period. This movement is linked to annual precipitation and snowmelt conditions. The impacts on buildings and infrastructure are significant

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The area is an attractive, established residential community, including 940 parcels of land, 750 homes, an elementary school and several businesses. The total value of the land, improvements, services and infrastructure in the study area exceeds $100 million; the area is important to the economic and social viability of the City of Quesnel and is home to more than 20% of the City's population.

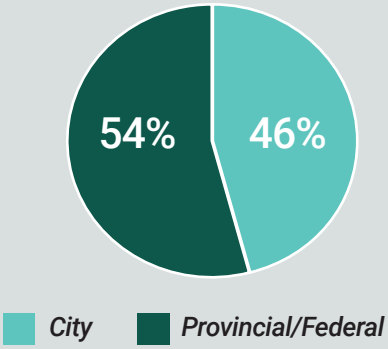
City's next steps

Although the City has made significant investments (over $7.8 million) in the WQLS area, the ground is still moving at a significant rate. The City will continue to monitor land movement in the WQLS area, but there are no planned major investments at this time. The monitoring will require the City to continue to invest in monitoring equipment that is damaged or destroyed due to land movement. This year, the City will spend $65,000 to replace damaged monitoring equipment.

The existing de-watering infrastructure must be maintained, including the pumping wells, horizontal fans, and related infrastructure. In 2021 the horizontal fans were rehabilitated and early indications suggest this was successful. The current estimate to maintain the existing equipment requires an annual contribution of $70,000.

Due to the large costs and unpredictable effectiveness of additional pumping equipment, there will be no more horizontal drains or pumping wells installed in the area at this time. If in the future more drains and pumps are recommended and West Quesnel residents agree to a parcel tax to fund more drains and pumps, Council will consider a parcel tax for West Quesnel. No parcel tax is being considered at this point.

The City will continue to focus on the surface drainage in this area. A new storm sewer mainline is planned for Avison Street in 2022 at $640,000. A major rebuild of the roads and storm sewer for Patchett Street is planned for 2023 at $950,000. Funding for these projects is allocated from regular capital funds.



Funding the program

The WQLS program formally began in 2000, funding was supplied from the City and the Provincial and Federal governments. Over $17 million was invested into the program since then. This funded the long-term capital program including engineering studies, de-watering infrastructure and ongoing maintenance.

The City will provide future funding, from general taxation, for the ongoing maintenance of the horizontal drains and pumping wells.

Living in the slide area

Residents living in the slide area can assist in reducing groundwater pressures by taking measures to reduce the amount of water entering the ground.

WATER CONSERVATION

Minimize lawn watering

Water your lawn once or twice a week, giving your grass 1 to 1.5 inches of water each time.

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

Xeriscape gardens are composed of plants native to an area and those which are drought tolerant and can thrive when given little water. These landscapes require very 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 in photos: micro clover lawn; sunflowers; and chives.

LIMIT GROUND MOVEMENT

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

The removal of trees can be associated with localized accelerated movements. Tree Removal Permits are required in the WQLS area.

Utility Breaks

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

Water Diversion

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

Factors impacting ground movement and properties

Residents living in the slide area can expect impacts on their properties to depend on:

- amount of watering entering the ground and increasing groundwater pressure;
- unusual weather events and climate change
- amount of vegetation throughout the area
- topographic changes including building and development
- residents' commitment to xeriscaping, snowmelt and rainwater diversions

Funding for homeowners

In 2021, at the request of the City, Emergency Management BC searched for provincial programs to reimburse owners with significant property damage and concluded that there is no provincial funding available.

Building in the area

In the West Quesnel Land Stability Area (WQLSA), most new development requires a qualified professional to undertake a geotechnical and/or geohazard assessment to confirm conditions of development are safe for the use intended. The area guidelines do provide some exemptions to City Staff to allow some limited development where there is minimal risk.

Exemptions to requiring a Hillside Hazard Development Permit are limited to projects where geotechnical and geohazard assessments are not required by the Chief Building Official due to the site having no signs of differential movement on or near that site and include only;

- renovation of existing buildings where there is no expansion of the footprint of the existing principal building;
- accessory buildings where there is no human occupation; or
- mobile homes as long as they are built to CSA-Z240 mobile home specifications, subject to Z240.10.1-08 site preparation and foundation requirements, and include flexible utility connections. The zoning bylaw permits mobile homes in the West Quesnel Uplands Stability Area but they are required to have a pitched roof, horizontal siding and be a minimum of 24 ft wide.

For more info visit: quesnel.ca/land-hazards

Program Timeline

2000

Preliminary drilling and installation of instrumentation and GPS system. Large landslide confirmed.

2001 - 2002

Preliminary analyses and findings require surface and subsurface drainage

2003 - 2004

A preliminary pilot test well was installed and resulted in poor results.

2005

Morgenstern completed a detailed investigation.

2006 - 2007

Detailed geotechnical and hydrogeology studies completed.

2007 - 2008

The trial dewatering program started and included four pumping wells and two horizontal drains.

2008 - 2010

The full-scale dewatering design was completed as well as supporting environmental and archaeology studies.

2012 - 2013

The phase I dewatering program included the installation of a subsurface drainage system and ongoing monitoring. 17 pumping wells were monitored for flow and water level and 10 horizontal drain sites were monitored for flow.

2016 - 2017

The phase II drainage and groundwater monitoring system consists of four pumping wells monitored for flow and water level and four horizontal drain sites monitored for flow. Stormwater mainlines were replaced along Anderson Dr, Abbott Dr, Broughton Ave, Panagrot Ave and Healy St. Roads, and gutters and sidewalks were replaced or added in most of these areas. This phase also included the installation of an outfall area along Anderson Drive. The outfall area filters the stormwater mainline water before it enters Baker Creek.

2018 - 2020

Monitoring and regular maintenance have been ongoing through this period. Three full years of land movement data have been gathered since the completion of phase II. 47 GPS hubs are surveyed twice annually to provide information on horizontal movement. Historical movements of up to 87 mm per year have been previously observed.

Public Meeting

Thursday, June 2, 2022 | 6 pm
Voyageur Elementary School
Gymnasium

Join Mayor, Council, and City Staff for a presentation sharing the latest news about the WQLS Program.

This meeting is subject to change to an online meeting pending COVID-19 restrictions.

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