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Dear Mayor and Town Council:

My name is Peter Patsula of . On behalf of the property owners bordering lots 10, 11, 12, 13, 14, and 15 of the Point Ideal Phase 3 Development, we have "serious concerns" regarding the **30 foot height** of the proposed monolithic retaining walls behind our properties exacerbated by problematic lot sizes, homes being built on fill, and rain forest weather. These problematic walls pose a serious safety hazard leaving us **vulnerable to a devastating, catastrophic collapse** with new homes sliding into ours if and when the walls fail. As the town is responsible for approving all subdivision plans and safe construction methods based on expert advice, studies, bylaws, building codes, and research deemed necessary, we hope we are protected from what is becoming a **highly problematic and unsafe ridge design**. We have communicated our concerns and questions to the town's CAO, Joe Fernandez on March 6<sup>th</sup>, March 25<sup>th</sup>, April 1<sup>st</sup>, and April 13<sup>th</sup> and the Senior Project Manager of BV Developments Brian Locher, April 24<sup>th</sup>. We have also met with the town's planning consultant James Van Hemmert March 17<sup>th</sup> and shared our safety concerns pertaining to ridge design. Some of this or perhaps all of this information may be unknown to Town Council and we hope council members appreciate the long-term implications to the town and potential liability concerns. Since the developer is pushing forth with the stripping of the land for Phase 3 this coming Monday (as far as we know), we believe we need to make **an urgent formal request to present our concerns** and clarify the dangers of such retaining walls to the Town Council. This letter is a summary of those dangers and our concerns.

### Summary of Concerns

1. **BYLAW INFRINGEMENT:** Proposed retaining wall height contravenes the Town's **Bylaw 4.10.4** restriction of 2 meters in height including any fence on top of retaining wall. This bylaw was put in place for aesthetic and safety reasons for commercial and residential construction.
2. **SERIOUS SAFETY RISK:** Proposed 30 Foot monolithic retaining walls that are near-vertical and constructed on sloped land with a base of fill pose a serious safety risk in a rain forest climate and wet land area with dangerous erosion, seismic, and hydrostatic forces omnipresent.
3. **INEVITABLE FAILURE:** Proposed "Gabion" Retaining Walls are aesthetically unsightly and notorious for failure. The galvanized cages used to construct them have a limited 50-year life span under ideal conditions and once they rust, the walls collapse creating landslides onto property and into homes. Gabion walls **DO NOT** control for surface water mandated by subdivision design requirements. All surface water passes through the structure and down to its base and into our properties. Gabion Walls are highly permeable. This promotes erosion and base instability which further decreases the life span of such walls, especially in a rain forest. The "green" hydro-seeded plants proposed for this wall will likely die during our hot, dry summers leaving us with rusting galvanized wire cages and unsightly exposed geotextile fabric.
4. **RESPONSIBILITY for SAFETY:** There is a responsibility to ensure tiered retaining walls are built to meet town bylaws of no height greater than 2 meters including any fences. A 2 meter setback between each tier following BC Building Code is also required so tiered retaining walls have a safer angle of 45 degrees in case of collapse. Tiered retaining walls are safer, time-tested, and near-permanent if engineered well. They are also aesthetically in line with other Point Ideal homes and have built-in features to control and channel surface water instead of shedding it.
5. **LIABILITY IMPLICATIONS:** The precedent of allowing problematic retaining walls that go against town safety bylaws, as well as retaining wall designs with limited lifespans and the potential to collapse catastrophically, opens the town up to liability, as well as any businesses that unknowingly construct such dangerous retaining walls.

## SUMMARY of TOWN BYLAW

The Town of Lake Cowichan has a "Fences and Retaining Wall" bylaw as follows (consolidated August 22, 2019; No. 935-2013, Section 4.10):

### **Line 4.10.2**

"in zones where commercial uses are permitted, a fence or wall erected along any parcel shall not exceed 2.0 meters in height."

### **Line 4.10.4**

"in zones where residential uses are permitted, a fence at the front of the lot shall not exceed 1.2 meters and at the sides and rear shall not exceed 2.0 meters; and ..."

### **Line 4.10.5**

"In the case of a retaining wall constructed in accordance with section 4.11, the combined height of a fence on top of a retaining wall shall not exceed the heights permitted for the zone and measured from average grade at the property line."

We believe that the 2 meter retaining wall bylaw was written by the town to address safety and aesthetic concerns for all neighbors especially in residential areas.

## DETAILS of OUR CONCERNS

### *Concern 1: BYLAW INFRINGEMENT*

#### **Proposed Retaining Wall Height Violates the Town's Bylaw**

The Phase 3 Development is proposing a Monolithic Retaining Wall Structure anywhere from 10 to 30 feet high directly behind our properties. This is a near-vertical structure. This is five times higher than the town's retaining wall bylaw height of 2 meters (6.56 feet). On top of these retaining walls will also be fences to protect new homeowners from falling off the cliff-like structures bringing the total height behind our properties anywhere from 15 to 35 feet. Driving around town, we cannot find any examples violating the 2 meter bylaw other than those in a commercial school area and two lots around town facing public streets, but all of these max out at 10 feet not 30 feet. We cannot support a 30 foot height directly behind our houses and strongly object to the developer being allowed to build such structures ignoring the town's bylaw. The building of such high monolithic retaining wall structures on fill so close to homes beneath is unprecedented in the town and Cowichan Valley and highly negligent in a rain forest climate.



### *Concern 2: SERIOUS SAFETY RISK*

#### **Proposed Monolithic Retaining Wall Poses a Significant Safety Risk**

The developer is hoping to maximize views and backyard space at the expense of our safety and peace of mind. Not only are such monolithic retaining walls unsightly and prison-like, but they are being built on slopes and in wetland areas where underground streams are prevalent. The base of these retaining walls will be fill on sloped land. Any erosion at the base will lead to catastrophic failure and a devastating collapse of the wall into houses and secondary structures. I've provided a link to a YouTube video I've created showing the prevalence of underground streams at the back corner of my property

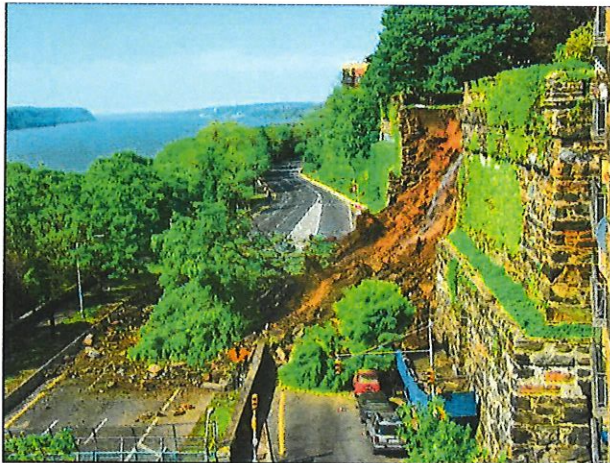
where the base of a 30 foot retaining wall is planned. Our properties are filled with soil that is very soft and muddy when saturated and unable to support any monolithic retaining wall structure of any design.

### VIDEO of UNDERGROUND STREAMS

<https://youtu.be/pb9h453JG7M>

**NOTE:** Video shows night and day drainage at my back property line. This video is not of my code-required French Drain around my house but additional curtain drains I've installed for underground streams coming from Phase 3 Development land. I have used over 100 tons of  $\frac{3}{4}$  inch and 1.5 inch drain rock to protect my house from underground streams and heavy rain surface water originating uphill. The Phase 3 Subdivision Plan indicates a 30 foot retaining wall directly on top of my main underground stream and greatest threat of surface water streaming.

All our houses, bordering this wetland area have similar issues with underground and surface water that will be made worse with monolithic retaining walls acting like giant mud dams that sprout streams and waterfalls during the rainy season. The proposed walls will be dangerously problematic during heavy rains. Water will pass right through the proposed retaining walls on to our property. Water will also tend to be funneled down to the base where the clayish soil will become saturated and soft, undermining the bottom of the retaining wall structures. Loose falling rocks from the retaining wall or objects cast over the fence on top of these retaining walls, whether by accident or on purpose, will also have the added force of gravity hitting our properties and homes with potentially fatal consequences. We live in an earth quake zone. The town should not set a precedent by allowing unsafe retaining walls above the bylaw height of 2 meters that upon failure can destroy the homes and lives beneath them.



#### *Concern 3: INEVITABLE FAILURE*

#### **Proposed “Gabion” Retaining Walls are Aesthetically Unsightly and Designed to Fail Due to Rust and other Forces of Nature**

We understand that the “current” proposed retaining walls will be made by filling galvanized cages with Pit Run and then using plastic geotextile fabric to hold them in place. The geotextile fabric would then be hydro-seeded to be “green”. The Pit Run is made of clay, sand, and rock that vary from light to heavy and is more porous than typical Lake Cowichan soil. These walls will not catch and direct water, but allow water to pass right through them to feed the green wall and then stream down to our property. They are designed to do this to reduce hydrostatic forces so they won't collapse. This contravenes subdivision guidelines for controlling surface water. We were informed by the town's planning consultant that **new subdivisions must control for surface water**. They can't allow surface water to

run downhill on to adjacent properties underneath. Overtime however, even those these walls are highly permeable, the geotextile fabric will become saturated with clay particles to create a water barrier and subsequently allow a build up of dangerous hydrostatic forces. This can occur anywhere at any height of the retaining wall including the base. This can happen after 20 years or one week especially during heavy rains. Anyone who lives in Lake Cowichan with clay soil knows how quickly clay can erode down hill. It is inevitable that the geotextile fabric will be clogged or get torn creating caverns in their galvanized wire cages and the walls will bulge, distort, and then collapse.

*Gabion Walls Eventually **RUST***: The proposed retaining wall structures are referred to as **Gabion Walls** or **Gabions**. I have included some links to information on Gabion Wall failures below. A quick search on the Web provides hundreds of photos of failed Gabion walls of numerous designs. Gabion Retaining Walls are cheap, short-sighted solutions that always fail, as soon as the galvanized wire **rusts** and then breaks and/or the ground becomes unstable during freeze thaw cycles, saturation and drying cycles, sink holes, ground erosion, underground streams, seismic activity, rodent infestation, and numerous other acts of God and nature. Gabion walls are designed to drain all water to the properties below them. Water goes right through them. During the rainy season, we will see water falls from surface water and underground streams. This water will further erode the Pit Run fill and eventually cause rust and cage collapse. To make matters worse, the developer will be adding thousands of tons of additional fill behind the retaining wall structures to raise the land. Not only are they NOT building on native soil, but they are adding fill on fill on fill. None of us imagined when we bought our properties that we would be living behind the **Great Wall of Point Ideal**, a huge, irresponsibly dangerous mud dam with 20 to 30 feet of added fill pushed to the backs of our property. Who wants to live behind a 30 foot vertical wall with a 30 to 40 foot house as close as 20 feet from their back property line?! It's a 70 foot high rise building that **blocks the sun** Winter, Spring, and Fall putting our homes at risk and in constant shadow. We will live in constant fear of the wall collapsing onto us (especially during heavy rains), potentially destroying our homes or secondary structures, and even killing loved ones. Who will buy a house with such danger behind it? What will happen with our ability to get home insurance? Anyone who sees these monolithic retaining walls will instantly recognize the threat and potential for catastrophic failure and even death.

#### **LINKS to GABION WALL FAILURE**

*Gabion Retaining Wall Collapse Leads to Litigation*

<http://www.ericjorden.com/blog/2013/02/09/gabion-retaining-wall-collapse-results-in-litigation/>

**NOTE:** The report concludes that the Base of the Gabion Wall must be 2/3 rds its height to be safe. In other words, a 30 ft Gabion Wall requires a 20 ft base. The Phase 3 development will not be following this instead using plastic Geotextile Fabric to hold back thousands of tons of pit run and clay soil. Wall failure will be dependent upon the load bearing capacity of thin cloth-like plastic.

*Failures of Gabion Walls (Published Journal Article)*

<https://www.ijitee.org/wp-content/uploads/papers/v8i11/J97310881019.pdf>

**NOTE:** Gabion Walls fail because of corrosion, fill erosion, bulging, cracks, cage collapse, and foundation erosion especially on sloped land.

*All Gabion Retaining Walls Fail*

From Wikipedia.

*“The life expectancy of gabions depends on the lifespan of the wire, not on the contents of the basket. The structure will fail when the wire fails. Galvanized steel wire is most common, but PVC-coated and*

*stainless steel wire are also used. PVC-coated galvanized gabions have been estimated to survive for 60 years. Some gabion manufacturers guarantee a structural consistency of 50 years."*



**NOTE:** Monolithic Gabion retaining walls have not been very successful in residential areas as the inevitable failure of the wall is a liability. They are more typically used on roadways where their failure is not as damaging and litigious. The threat of collapse is emotionally stressful and creates unnecessary anxiety and fear. Who wants to go out to a backyard with a colossal force waiting to collapse disastrously? It's more threatening and ominous than a forest of trees ready to snap in heavy winds.

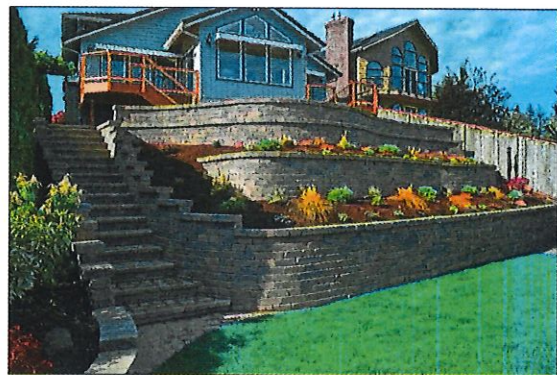
#### *Concern 4: RESPONSIBILITY for SAFETY*

##### **There is a Responsibility to Ensure Retaining Wall Structures are Safe**

Retaining Walls need to follow the town's bylaw and not be greater than 2 meters in height including any fences erected. This bylaw was created to protect residents from dangerous irresponsible development. This does not mean that the Phase 3 Development cannot be successful. The town can ask the developer to rethink the current unsafe design of this ridge to ensure the safety of our lots, as well as properly drain and control surface water and not exacerbate the damaging effects of underground streams. What follows are 3 possible resolutions to ensure retaining wall safety:

##### **a) Use tiered 2 meter high retaining walls.**

When tiered, 2 meter high retaining walls need to follow BC Building Code and be setback a minimum of 2 meters before the next 2 meter retaining wall is constructed. The ratio is 1 to 1+. This can be verified by the town's building inspector. These retaining walls should be green as planned to keep in line with the aesthetics of the neighborhood. The tiered retaining walls should be designed and engineered to be **permanent** structures that control surface water instead of structures designed to rust out, collapse, eventually fail, and shed water to the properties below.



##### **b) Lower main access road to lower overall retaining wall height.**

The main access road could be lowered 3 to 4 meters reducing the height of the retaining walls and allowing safer engineered retaining walls that are tiered and keep in line with the aesthetics of the rest of the Point Ideal Neighborhood. This is the safest resolution with the least liability.

**c) Reduce the six lots behind our homes to three lots and follow existing topography.**

There are three lots behind our homes with the most problematic topography, necessitating giant unsafe retaining walls to properly serve these lots with utilities. These three lots could be removed from the subdivision plan. The remaining three lots could then be widened allowing safer tiered retaining walls to be constructed that follow existing topography instead of adding large amounts of fill to create an additional safety hazard. Not only would this **reduce the high density suburbia look of row houses on top of a dangerous monolithic retaining wall**, but these homes could be built as close as possible to the access road making the backyard setbacks larger and safer and in line with the rest of the Point Ideal Neighborhood. The access road could also be lowered by 1 or 2 meters to completely eradicate the need for unsafe retaining wall structures. We believe this is the best compromise to ensure the safety and aesthetics of the neighborhood and maintain value in our properties and the **new property owners who will also suffer greatly from wall collapses**. If BV Developments argues that tiered retaining walls are too expensive and the only viable solution for them is to build what they are proposing than perhaps it is better to completely redesign the ridge and remove all problematic houses with dangerous retaining wall structures. Abandoning problematic ridge houses may also be a viable solution to keep our properties safe.

*Concern 5: LIABILITY IMPLICATIONS*

**There is a Liability Risk in the Design of Unsafe Retaining Walls that Will Only Increase and Compound as Time Passes**

As stakeholders in the Point Ideal Neighborhood, we want this development to be successful and are more than willing to work with BV Developments to create a win-win project. We hope that the Town Council understands how deeply these monolithic retaining walls impact the value and safety of our properties, our neighborhood, and the problematic, dangerous precedent they set for the town. The precedent of allowing high monolithic retaining walls opens up the town and small businesses that build them to be responsible for any future damage caused by collapse, especially since the heights are notably dangerous. This collapse may happen after one Winter of heavy rain or twenty years down the road when the developer is long gone. The proposed retaining walls are designed to fail using problematic materials. If the town permits such questionable structures to be built by approving the subdivision plan without controls, they in effect relieve the developer of liability. The developer if sued could possibly sue the town for allowing them to build unsafe retaining walls. The 2 meter bylaw was put into place to protect residential and commercial properties **and protect the town**. We see no benefit for the town to allow themselves to become in part responsible for dangerous retaining walls that could easily be redesigned. We live in a rain forest. This year our streets flooded. We live in an earth quake zone with regular seismic activity. We live in a world where climate is changing and who knows what flash floods loom in our future?! We have freeze and thaw cycles that can lift soil three inches overnight and will certainly bend and disfigure flimsy metal cages. We have summer shrinkage due to hot weather that severely cracks clay soil that can certainly undermine the base of these retaining walls. Why should the town put themselves and home owners underneath and above at such a risk, when this risk can easily be mitigated with responsible design?!

**CONCLUSION**

The proposed monolithic retaining walls could lead to catastrophic landslides with the new homes sliding down with mud into our homes. **These homes are being built on floating slabs not on native fill which increases this danger**. Not only do such retaining walls decrease our property values, but they instill daily fear and stress, increase home insurance risk, subject us to the threat of injury with loose falling rocks, and in case of catastrophic failure can lead to death. The potential for wall failure is

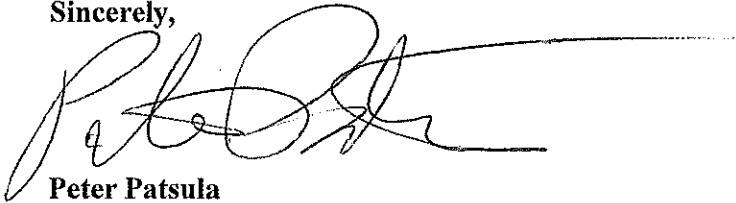
unacceptably high due to:

- rain and surface water erosion
- underground stream erosion
- seismic activity
- flash floods
- build up of hydrostatic forces over time
- wall collapse due to material failure
- winter freeze and thaw cycles
- summer saturation expansion and drying shrinkage cycles
- clogged or ripped geotextile fabric
- rodent infestations
- cracking and bulging
- improper construction technique
- damaged cages

... the list goes on and on, just search the Web for all the catastrophes caused by this design.

With so many unknowns, it is better to be conservative, safe, and responsible in subdivision planning. There are many ways to create a safe neighborhood and help build Point Ideal Phase 3. Let's encourage a win-win development that benefits all stakeholders and does not endanger public well-being. Socially responsible design on the part of the development is the best and safest way forward.

Sincerely,

A handwritten signature in black ink, appearing to read 'Peter Patsula', with a long horizontal line extending to the right.

**Peter Patsula**