



Strathcona Forestry Consulting



Proposed Development, Lot 20 7 lots, Johel Road

Wildfire Hazard Assessment

Prepared for: Pat and Sharon Smith
[REDACTED]

Prepared by: Strathcona Forestry Consulting
PO Box 387 Stn Mn
Duncan BC V9L 3X5
strathcona.fc@shaw.ca

13 September 2021

Executive Summary

In accordance with the Town of Lake Cowichan's Development Permit Guidelines for Wildfire, Pat and Sharon Smith retained Strathcona Forestry Consulting to conduct a wildfire hazard assessment of a 7-lot residential subdivision proposed at the west end of Johel Road.

Assessment determined that the wildfire threat at the subject property is currently Moderate to High. Main contributing factors are fuel loading (forest vegetation) loading at the site and surrounding forested areas, and intermix (> 1 structure/ha). Under the provincial Wildfire Threat Rating system, ratings must be moderate or less to be considered acceptable.

Living in a fire-prone ecosystem involves taking the necessary steps to protect homes, property, and community from wildfire. Development standards play a significant role in reducing the potential impact a wildfire will have on a community (FireSmartCanada.ca; FireSmartBC.ca). FireSmart strategies for wildfire prevention and preparedness are proven to prevent risk related losses to wildfire. This report contains FireSmart wildfire risk reduction recommendations intended to increase local community resiliency.

In my professional opinion, if the FireSmart recommendations contained in this report are followed through planning and construction – and continue after buildout, the risk of wildfire can be reduced to a level acceptable to ensure the safety of the intended development. It should be noted that the property owners are very proactive, and have already taken several steps to reduce the fire threat.

Fire prevention and protection in the interface zone are ongoing processes. Long-term implementation of FireSmart mitigation is essential to ensure protection for life, property, and ecological processes at the Town of Lake Cowichan's wildland interface.

Introduction

In accordance with the Town of Lake Cowichan's Development Permit Guidelines for Wildfire, Pat and Sharon Smith retained Strathcona Forestry Consulting to conduct a wildfire hazard assessment of a 7-lot residential subdivision proposed at the end of Johel Road.

The interface (wildland urban interface/wildland residential interface) describes any area where combustible wildland fuels are found adjacent to homes or other buildings. Under Section 919.1(1) (a) of the Local Government Act, development permits may be designated where protection of Natural Hazard Lands is justified. Natural hazards, including wildfires, may put life and property, and local biodiversity, at risk if development is inappropriately situated and not well planned. Areas rated at high or extreme risk from wildfire are designated in a Development Permit Area (DPA). The objective of the DPA is to properly manage the risks associated with the hazard (interface wildfires).

Hazard Assessment

This report describes the vegetation, terrain, and infrastructure on and around the subject property, and provides recommendations to reduce the risk of wildfire. Assessment criteria are based on Rating Interface Wildfire Threats in British Columbia (<https://www2.gov.bc.ca/>), FireSmart (FireSmart, Protecting Your Community From Wildfire (Second Edition. Partners in Protection Partners in Protection, 2003 (<https://www.firesmartcanada.ca/>), and the Home Owners FireSmart Manual (BC Edition (<https://www2.gov.bc.ca/assets/gov/public-safety-and.../homeowner-firesmart.pdf>)). Fire behavior modeling is standardized after the Canadian Forest Fire Danger Rating System (CFFDRS). Fuel Types listed in this assessment are customized from the CFFDRS Fuel Type list for applicability in south coastal BC. Wildfire threat assessment was conducted through an analysis of fuel threats in and adjacent to the proposed development, as described in the 2017 Wildfire Threat Assessment Guide and Worksheets (MFLNRO, 2017). This process, used by qualified environmental professionals, employs physical and biophysical factors, combined with fuel hazards, to determine the wildfire threat (low, moderate, high, or extreme). Fire risk is based on four classes: low, moderate, high, and extreme. Recommendations in this report conform to BC Building Code standards and fire hazard planning authorized by Section 3(2) of the BC Fire Services Act.

Field Inspection: I met with Pat and Sharon Smith to conduct a site assessment on site on Sept 1, 2021. Field investigation entailed an analysis of the interface fire hazard that the land is exposed to, from the perspective of the general area, local site, and proposed and existing structures in the general vicinity, up to 100+ m from property boundaries, where feasible.

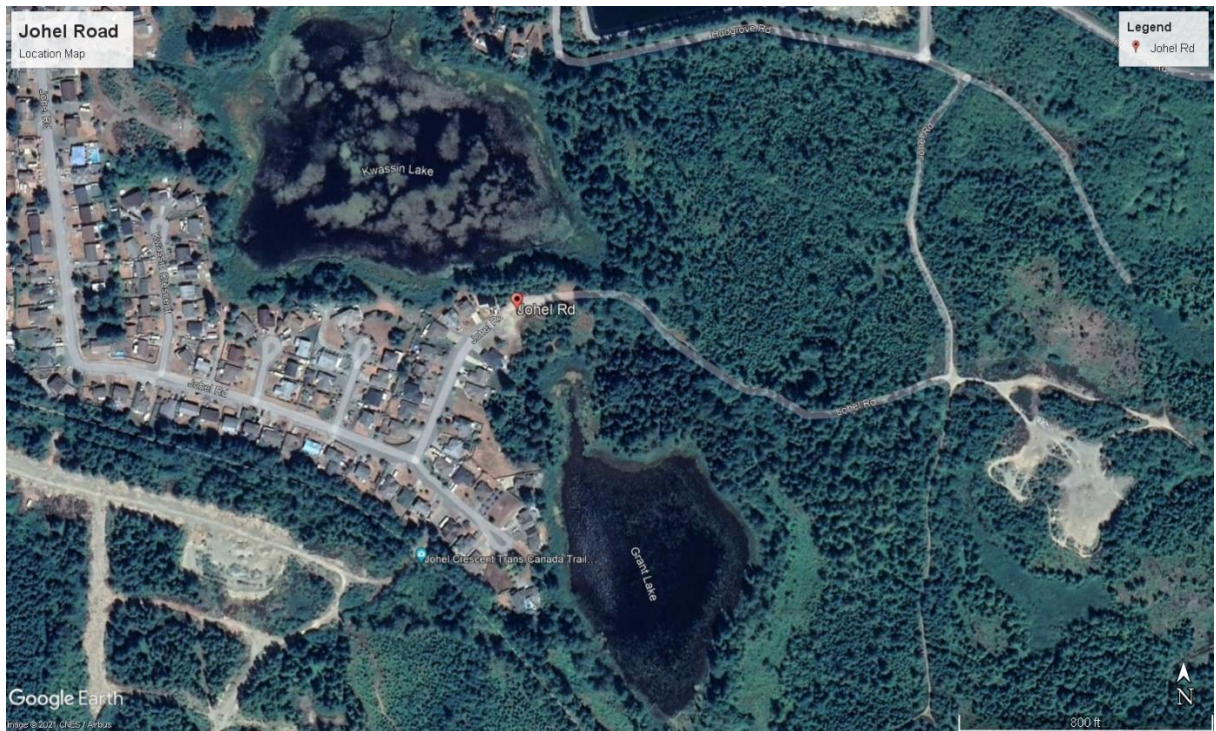
Location and Description of Proposal: The subject proposal approximately 3.5 acres on level ground at the east end of Johel Road between Kwassin Lake and Grant's Lake. Existing homes along Johel Road and Johel Crescent border the western and southern perimeters of the proposal. To the east there are private forest lands owned by Mosaic.

Access to Lots 1-6 will be via a cul-de-sac at the end of Johel Road. An easement on Lot 3 is clarified as an easement on the panhandle driveway for the fire department only, to assist in fighting fires. It is not intended for any other use. Access to Lot 7 will be a private driveway access between Lots 18 and 19 on Johel Road. Forest cover from the balance of Lots 1-6 have been removed. The eastern portion of Lot 7 is forested. Existing development on Johel Road is served by fire hydrants. There are currently no structures at the subject proposal.

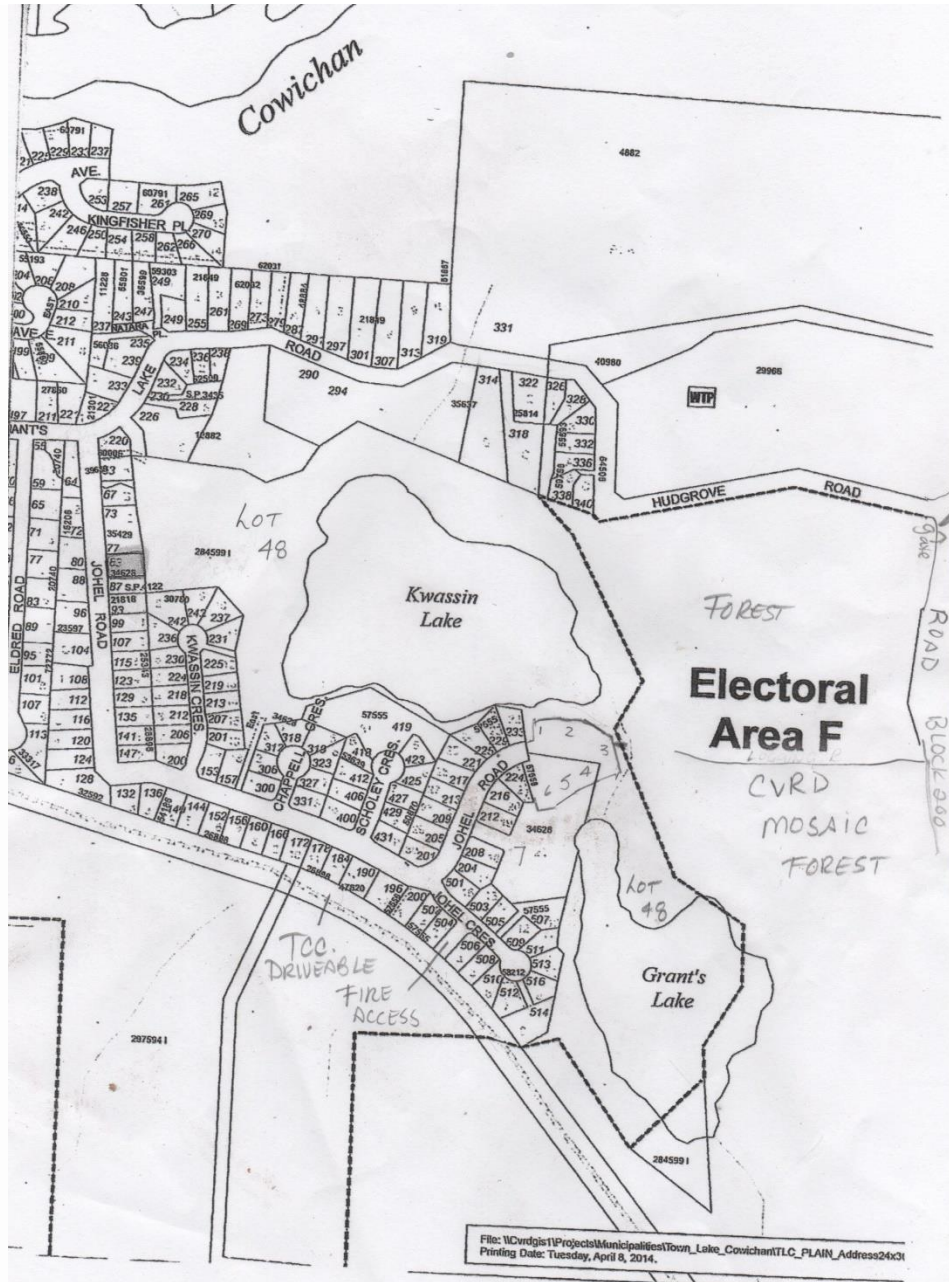
The owners are intent on maintaining a wildlife preserve around Kwassin and Grant's Lake as an integral part of the proposal. The Grants Lake shoreline at Lot 7 is a unique, low-elevation bog occupied by Labrador tea, sweet gale, bog cranberry, and sundew.



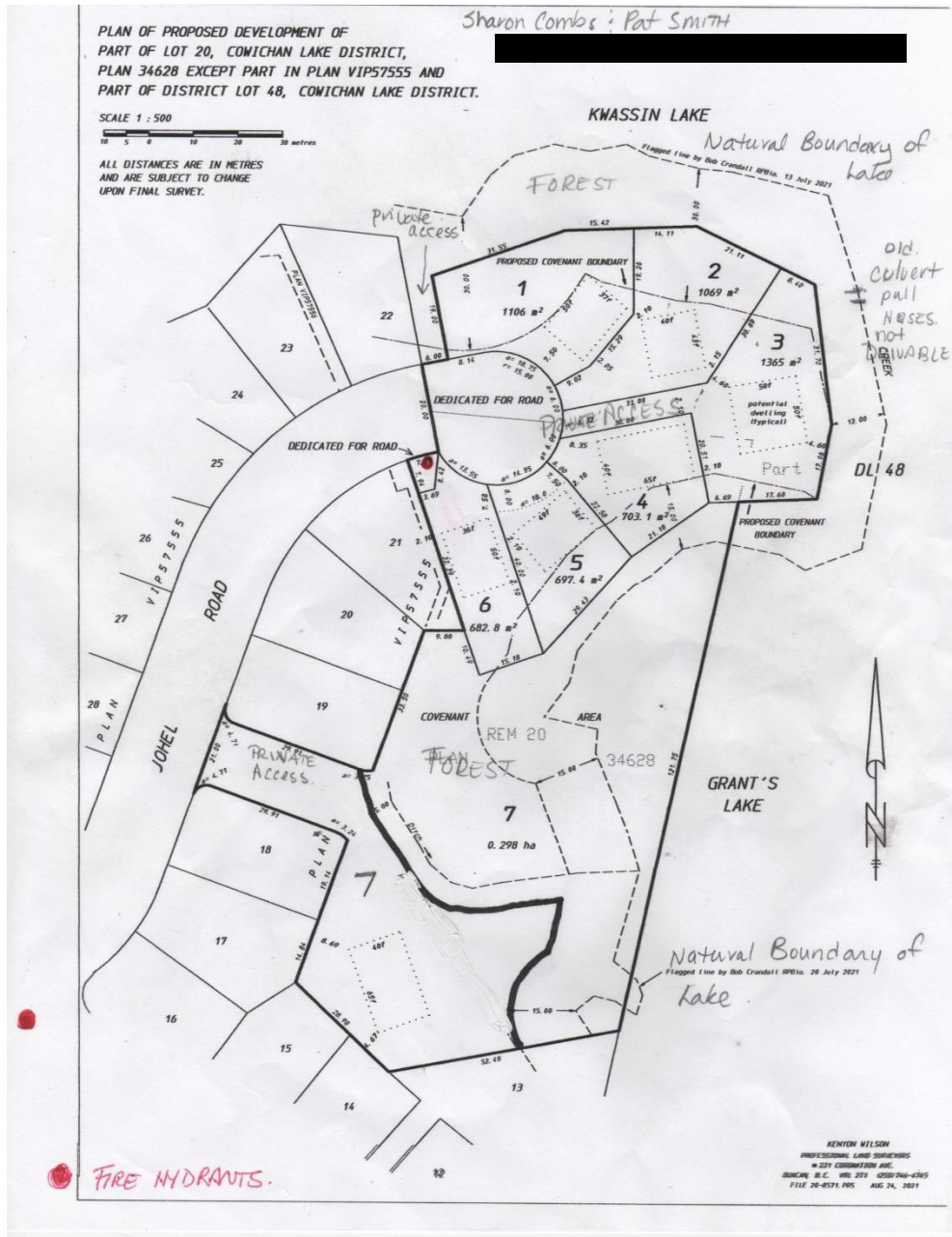
The Grants Lake shoreline at Lot 7 supports unique low elevation bog habitat.



Subject proposal is located at east end of Johel Road.



Subject proposal would create 7 lots at the end of Johel Road.



Subject proposal would be accessed from Johel Road. The area is hydrated.

Wildfire Hazard and Risk

Wildfire hazard is a process, a phenomenon or a human activity that may cause loss of life, injury, or other health impacts, property damage, social and economic disruption or environmental degradation. Wildfire hazard can be described qualitatively as a fire environment—fuel, weather, topography, and ignitions.

Risk assessment for wildfire and its impacts to communities considers both the likelihood of a wildfire and the potential consequence associated with that likelihood. For example, if the fuel (i.e. the hazard) ignites and the fire spreads towards the community (probability), the wildfire can become a threat to life and property (consequence) with an associated risk of loss.

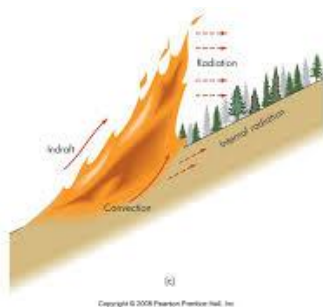
Determination of the wildfire hazard and risk involves a detailed assessment of potential fire behaviour, field reviewed fuel characteristics, proximity of fuel to the community, local fire spread patterns, topographical considerations and local factors.

Fire Behaviour. Fire behaviour has three components: weather, topography, and fuel. Fire behavior predicts how forest and wildland vegetation (fuel) will burn under different conditions. Weather and topography cannot be changed; alteration of fuels across the landscape is the only way to lower fire intensity and change fire behaviour.

Biogeoclimatic Classification. The subject proposal is located in the Coastal Western Hemlock very dry maritime (CWHxm) biogeoclimatic subzone. Summers are warm and dry, while winters are moist and mild. Growing seasons are long, and often feature pronounced water deficits on zonal (average) and drier sites. Fire Danger Ratings (i.e., the risk of a fire starting) often reach High and Extreme in summer. At the time of preparing this report, south east Vancouver Island had been in an Extreme Fire Rating for over two and a half months.

Prevailing winds in the local area are generally westerly (from the lake).

Topography. Physical site characteristics impact fire behavior by affecting ignition potential and the rate of fire spread. The subject property occupies a flat gradient.



Wildfires typically burn uphill. Warmer aspects tend to burn “hotter.”

Vegetation. Fire behavior predicts how forest and wildland fuels (vegetation) will burn under different conditions. Fuel hazard means the potential fire behaviour, without regard to the state of weather or topography, based on the physical fuel characteristics, including fuel arrangement, fuel load, condition of herbaceous vegetation and the presence of ladder fuels.

Benchmark vegetative fuel types developed by the Canadian Forest Fire Danger Rating System Fire Behavior System (CFFDRS) are used to forecast how a wildfire will react (cwfis.cfs.nrcan.gc.ca) (refer to Appendix 2).



Left: View looking northeast to Grant's Lake from the end of Johel Road; right: forest understory fuel loading reduced by property owners.

Major Fuel Types at Subject Property:

Fuel Types	Description	Forest Floor & Surface Fuels	Ladder Fuels	Wildfire Behaviour <small>(why and how a fire spreads)</small>
C-5 Coniferous forest / mixed forest	Coniferous 2nd-growth forest (Fd leading) / mixed forest (bigleaf maple/red alder & minor western redcedar)	Moderate fuel loading: patchy accumulations of woody downed material	Vertical CF continuity; moderate understory dead/dying. Lower branches of tall trees in this forest stand have been largely pruned.	Fire start during warm, dry windy weather could result in High potential for Crown Fire Initiation. Sloping topography increases potential for fire behaviour
C-2/3 & 0-1 Brush / Grass	Localized areas of grass, intermixed with native shrub species	Light to moderate fuel loading in open areas	Ladder fuels increase along forest edges	Fire spread (uphill) could be rapid in warm dry, windy weather

The property owners have been vigilant about removing surface and ladder fuels in forested areas of the subject proposal. The property owners acted very promptly after the assessment to prune ladder fuels along the forested edge of Lot 7 (see photos next pg.)



Top: Sept. 1: forested W edge Lot 7;

Bottom photos: Less than a week later: property owners took action – pruned forested W edge of Lot 7.



Property owners already had reduced ladder fuels by pruning lower branches of other trees at Lot 7.

Risk of Ignition. Risk of ignition represents the potential for fire starts. Risk of ignition could come from current and future property owners in the area, and construction activities. The property owners said there is no public access on their land at all; they do not allow anyone to cross through the property, and if they are, they are trespassing as posted signs indicate. This is part of the owner's fire safety plan. Risk of ignition at the subject proposal is rated low to moderate.

Fire Spread and Intensity. Head fire intensity is a numerical ranking of difficulty of control for specific fuel types. Flame length is a main visual manifestation. Head fire intensity is a major determinant of certain fire effects and difficulty of control. Numerically, it is equal to the product of the net heat of combustion, quantity of fuel consumed in the flaming front, and the linear rate of spread. Under warm, dry conditions, there is currently sufficient continuity of surface and ladder fuels in local forest stands to enable a fire to spread. Dry, windy conditions would increase the rate of spread.

The goal of Wildfire Risk Reduction (WRR) is to reduce HeadFire Intensity from 4 to 5 to less than 2000 kW/m (< 3, HFI column Moderate) (see chart following).

Fire Weather Indices

Hazard Rating	FFMC Fine Fuel Moisture Code	DMC Duff Moisture Code	DC Drought Code	ISI Initial Spread Index	BUI Build Up Index	FWI Fire Weather Index	HFI Head Fire Intensity
Low	0-76	0-21	0-79	0-1.5	0-24	0-4.5	1-2
Moderate	77-84	22-27	80-189	2-4	25-40	4.5-10.5	3
High	85-88	28-40	190-299	5-8	41-60	10.5-18.5	4
Very High	89-91	41-60	300-424	9-15	61-89	18.5-29.5	5
Extreme	92+	61+	425+	16+	90+	29.5+	6

Spotting Potential. Spotting is a fire behavior characteristic in which sparks or embers are carried up by the wind and/or convective column and fall into other downwind fuels to ignite additional fires beyond the zone of direct ignition by the main fire (Firewise.org). Fire spotting is one of the major ways that fires spread and homes are ignited and destroyed in wildland/urban interface fires. Firebrands can come down on and ignite combustible roofs, combustible items stored adjacent to homes, and other nearby combustible fuels. The resulting spot fires may go unnoticed and thus unsuppressed when an area has been evacuated of residents, when firefighters are spread too thin, or when spot fires are too numerous.

The maximum spotting distance in a particular fire varies according to several factors, including overall fire intensity, wind speed, fuel type, initial size of the ember when lofted up, and how rapidly it is burning (Firewise.org). If a fire start occurred during very warm dry, weather (High/Extreme Fire Danger Ratings), there is potential for spotting in the area.

Fire Protection. The subject site is located within the service area of Lake Cowichan Fire Department (LCFD), a volunteer fire department comprised of the Fire Chief and approximately thirty on-call members. The firehall is at #3 Northshore Road. Response can be delayed depending on the time of day/wk, and if there are multiple simultaneous calls.

Fire department response time is the elapsed time, in minutes, from when the first firefighting unit is dispatched to when the first fire fighting unit arrives at the emergency scene. Fire department intervention time is crucial in determining the consequences of a fire in terms of deaths, injuries, and loss of property and damage to the environment. An early aggressive and offensive primary interior attack on a working fire is usually the most effective strategy to reduce the loss of lives and property damage.

The British Columbia Building Code addresses situations where the firefighter response time 'exceeds 10 minutes in 10% or more of all calls' by requiring higher levels of non-combustible construction and reductions on allowable areas of unprotected openings.

There are fire hydrants on Johel Road. As of early September 2021, the LCFD Fire Chief had not yet been advised by the Town of the subject proposal.

Mutual Aid. Fire Departments within the CVRD operate under a mutual aid agreement with other fire departments within (and outside) the region. In the case of a serious fire, mutual aid from adjoining fire departments can benefit fire suppression by pooling manpower and resources (water supply, water tenders, etc.). Mutual aid, however, may not always be available.

Wildfires. Lake Cowichan Fire Department automatically responds to structure fires and small, easily accessible bush fires inside the fire service protection area (FPA). The Wildfire Management Branch generally responds to forested areas outside a FPA.

Water Supply. The subject proposal would be fully serviced. Johel Road is serviced by fire hydrants.

Access. Safe access increases safety for both residents and firefighters, and also facilitates quick response by firefighters. Johel Road will provide access from two points to the subject proposal.

Wildfire Threat Assessment Results

Scoring from the FireSmart assessment and fire behavior analyses determined the subject property currently has a Moderately High Fuel Assessment rating (see chart next page), contributing to a Moderately High Local Wildfire Threat Rating (below). Factors contributing to the elevated rating include: continuity and extent of fuel loading in the general area; potential for delayed response; sloping topography and warm aspect; lack of current fireflow throughout the site; and intermix >1 structure/ha. Threat ratings must be low/moderate to ensure an area and/or structure(s) are safe.

LOCAL WILDFIRE THREAT SUMMARY: Proposed Subdivision – 7-lot subdivision Johel Road			
System:	Subcomponents	CURRENT ratings	Projected Ratings post-development*
MFLNRO Wildfire Threat Assessment	Fire Behaviour: Fuel, Weather, Topography	Fuel Assessment Class: Moderate to High (see chart next pg.)	Moderate
	Structural (incl vicinity)	High	Moderate
Overall Rating:		Moderate to HIGH	
HIRV Model	Hazard Impact Risk Vulnerability	High High High High	Moderate Moderate Moderate Moderate
Wildfire Risk	Likelihood Intensity Susceptibility	Moderate to High	Moderate

*Projected ratings conditional upon compliance with recommendations contained in this report.



Wildfire risk triangle. (Scott et al. 2013).

Implementation of the recommended mitigation is expected to reduce the fire threat to moderate (acceptable).

Generalized Descriptions of the “Fuel Assessment Rating” classes:

Low	Fires may start and spread slowly. There will be minimal involvement of deeper fuel layers or larger fuels.
Moderate	Forest fuels are drier and there is an increased risk of surface fires starting. There will be involvement of the organic layer but larger dead material will not readily combust.
High	Forest fuels are very dry, new fires may start easily, burn vigorously; aerial fuel will be engaged in the flaming front. Most fuel in the organic layer will be consumed and larger dead fuel will be consumed in the smoldering combustion.
Extreme	Extremely dry forest fuel, new fires will start easily, burn vigorously; all aerial fuel will be engaged in the flaming front. Most fuel in the organic layer will be consumed and larger dead fuel will be consumed in the smoldering combustion.

FMC (Fuel Moisture Content) 95% value based on 90th percentile drought conditions.

Fuel reduction targets should be sufficient to be effective to meet treatment objectives of reduced fire behaviour under 90th Percentile Fire Weather Index (FWI) Conditions (FFMC, ISI, BUI) from the BCWS weather network.

Recommendations

Living in a fire-prone ecosystem involves taking the necessary steps to protect homes, property, and community from wildfire. FireSmart principles and best practices (wildfire prevention, mitigation, and preparedness) are advised to manage wildfire risk and impact (FireSmartCanada.ca; FireSmartBC.ca).

Application and continued implementation of the following mitigative actions will reduce the risk of wildfire at the proposed 7-lot subdivision at the end of Johel Road.

Vegetation Management

General Precautions During Land Clearing and Construction

- Ensure any land clearing activities are conducted in compliance with BC's Wildfire Act local bylaws.
- As per the BC Wildfire Act, if a high risk activity (i.e., land clearing) is taking place between 1 April and 31 October, the operator must keep at the activity site fire fighting hand tools, in a combination and type to properly equip each person who works at the site with a minimum of one fire fighting hand tool, and an adequate fire suppression system (onsite portable water tanker and fire fighting tools – shovels, pulaskis, portable water backpacks). In addition, efforts must be made to maintain an adequate fire break between any high risk activity and areas of continuous forest to ensure a fire originating at the site does not escape the site.
- During landclearing, develop an Emergency Plan of Action, listing key contact information in case of fire and/or other emergency at the site.
- Hazard abatement (removal of slash/disposal of debris piles) must take place in compliance with Town of Lake Cowichan bylaws.
- Ensure construction workers are made aware of the risk of fire in the interface zone, especially during dry summer weather.

Hazard Tree Management

- *Prior to commencement of work at the site, potential hazard trees to be inspected by a certified Danger Tree Assessor. Trees identified as Danger Trees will require removal. Where safely practical, hazard trees could be modified (i.e., pruned, topped [deciduous trees] to provide wildlife habitat).*

FireSmart Zones – (see Appendix 1)

- **Home Ignition Zone: Zone 1a: 0-1.5 m**

A noncombustible surface should extend for 1.5 m around homes, accessory structures, and any attachments, such as decks. Avoid storing flammable outdoor items, such as wicker or wooden patio furniture, cushions, doormats, window boxes and planters, garbage cans without lids and BBQ propane tanks, which are all places where embers can land and start a fire, in this critical area adjacent to the home.

- Landscape with noncombustible landscaping materials, such as gravel, brick, or concrete

- Avoid woody shrubs, trees, or tree branches in this zone
- Create a noncombustible zone underneath and for 1.5 m around any RVs/vehicles
- Mitigate any auxiliary structures to same standards as those of home

- **FireSmart Priority Zone 1: 0-10 m**

Establish and maintain an environment around homes and accessory structures that will not support fire. Focus on fuel removal, conversion, and reduction.

- Plan on landscaping with a low density of fire resistant plants and shrubs. Avoid the use of cedar hedging.
- Maintain landscapes with regular irrigation, mowing, pruning, raking, weeding and dead plant removal.
- Create non-flammable hardscapes, such as rock, gravel, and water features, which, function as firebreaks by breaking up areas of fuel. Rock can provide a natural looking, low-maintenance and water-efficient mulch and as well as a fire-resistant buffer zone.
- Group fire resistant plant materials in islands. Group plants in islands surrounded by nonflammable materials, such as rock; employ landscape elements together to create breaks between fuels.
- Limb (prune) trees 1.5 to 2m from the ground. Create space between trees and shrubs – a general rule is twice the height of what the plant will be at maturity. Remove tree limbs closer than 15-feet from power lines and any touching the house or other structures.
- Avoid using woody debris, including bark mulch, as it provides potential places for fires to start
- Store items such as firewood piles, construction materials, patio furniture, tools and decorative pieces at least 10 m from the homes and any structures

- **FireSmart Priority Zone 2: 10-30 m** (where applicable)

Extend the fuel modified area 10-30 m around structures. Conduct FireSmart thinning, pruning, and fuel reduction strategies in this zone to reduce fuel loading.

- Thin and prune evergreen trees to reduce hazard in this area
- Within 30 m of home and any other structures, selectively remove evergreen trees to create at least 3 m of horizontal space between the single or grouped tree crowns, and remove all branches to a height of at least 2.5 m from the ground on the remaining evergreen trees. (For smaller evergreen trees; general rule of thumb is prune branches up to a third the height of the tree)
- Regularly clean up accumulations of fallen branches, dry grass, dried arbutus leaves, and conifer needles from the ground to eliminate potential surface fires

- **FireSmart Priority Zone 3: 30-100 m** (where applicable)

Where fuel modification in PZ1 and PZ2 is insufficient to protect structures and/or property, and where property boundaries permit, thin and prune trees in order to create an environment that will not support high-intensity crown fires.

- Look for opportunities to create a fire break by creating spaces between trees and other potentially flammable vegetation
- If possible, prune the trees located up to 100 m from the homes

- Thin and prune overgrown trees to reduce hazard
- Regularly clean up accumulations of fallen branches, dry grass, and needles from the ground to eliminate potential surface fires

General Principles of FireSmart Landscaping

- Incorporate FireSmart landscaping by using fire-resistive, widely spaced trees, native shrubs and groundcover in combination with stone and/or water features and/or maintained lawn areas. See FireSmart Guide to Landscaping.
<https://www.firesmartcanada.ca/resources-library/firesmart-guide-to-landscaping>
- Promptly re-vegetate any areas of soil disturbed during clearing and construction with approved landscaping materials and/or native plant species to prevent encroachment from invasive plant species (i.e., broom, etc.).
- Powerlines should be clear of branches and other vegetation.

Slope Protection

- As planned, construct a page wire fence along the back property lines of the lots to keep domesticated animals and people out of the zone along the lake and the forest edge. The wildlife trail is primary objective for the owners. Fencing will maintain integrity of lakeshore habitat.

Construction

The roof is the most vulnerable component of a structure. Sparks and burning embers from a wildfire can travel long distances and quickly ignite flammable roofing material.

Siding material is also vulnerable to wildfire. Combustible debris can accumulate at the vents and openings on your home and be ignited by embers during a wildfire.

- Use fire-retardant roof covering assemblies rated Class A, B, or C (i.e., metal, tile, ULC-rated asphalt) and feature non-combustible siding materials (i.e., stucco, metal siding, brick, cement shingles or cementitious materials, poured concrete, or ULC-rated wood siding) on new structures. Metal, clay tile, and rated asphalt shingles are the most fire resistant roofing materials. Siding materials such as stucco, metal, brick and concrete offer superior fire resistance to wildfire. Logs and heavy timbers are less effective, while wood and vinyl siding offer very little protection.
- Follow FireSmart guidelines for design, construction, and maintenance of window and door glazing, eaves and vents, and decking. Install noncombustible material for all vents (should be 3 mm screening or ASTM fire rated vents). Metal products are recommended for vents and vent flashing. <https://www.firesmartcanada.ca/>
- Ensure structures are equipped with working smoke alarm(s).
- Do not allow wood burning fire pits.
- As an owner preference, do not allow wood burning stoves.
- Sheath in the base of decks, balconies and homes with fire-resistant material to reduce the risk of sparks and embers igniting the home. Use metal railings or tempered glass for decks and balconies. Select noncombustible patio furniture and decorations.
- If wood fences are installed, ensure at least a 1.5 m noncombustible break between the fence and a structure (i.e., a metal gate with a stone wall to break up combustible fence).

Maintenance

- Regularly inspect siding for locations where embers could accumulate and lodge.
- Maintain and remove combustible debris near exterior walls to reduce a building's vulnerability to ignition during a wildfire.
- Regularly remove debris from gutters – sparks and easily ignite these dry materials.
- Inspect vents and openings regularly to ensure vents are in good repair, and remove any accumulated combustible debris.

Water Supply / Fire Protection

- Ensure water main, fire hydrant capabilities and servicing meet local Engineering specifications.

Access

- Ensure road and driveway accesses meet BC Building Code and municipal Engineering requirements.
- Ensure address signage is clearly evident during the construction phase and at build-out. Letters, numbers, and symbols should be at least 10 cm high, with a 12 mm stroke, contrast with the background colour of the sign, and be reflective.
- Ensure new structures are mapped on fire department “pre-org” (fire planning) maps.

Public Education / FireSmart Community Resilience

- In liaison with the Town of Lake Cowichan and the Lake Cowichan Fire Department, encourage new residents to get involved in the local FireSmart Neighbourhood in order to enhance community resiliency. Information available at the FireSmart website <Firesmartbc.ca>

Regulatory Provisions

- Conduct follow-up assessment (at building permit) to ensure appropriate mitigation measures have been implemented.

Appendix 1. FireSmart Interface Priority Zones

In interface areas, FireSmart advocates the establishment and maintenance of Fuel Management Zones* extending outward from structures and along access routes:

Zone 1 a (0-1.5m)

Zone 1 (0-10 m).

Zone 2 (10-30 m).

Zone 3 (30-100 m).

(FireSmart, 2003; updated 2018)

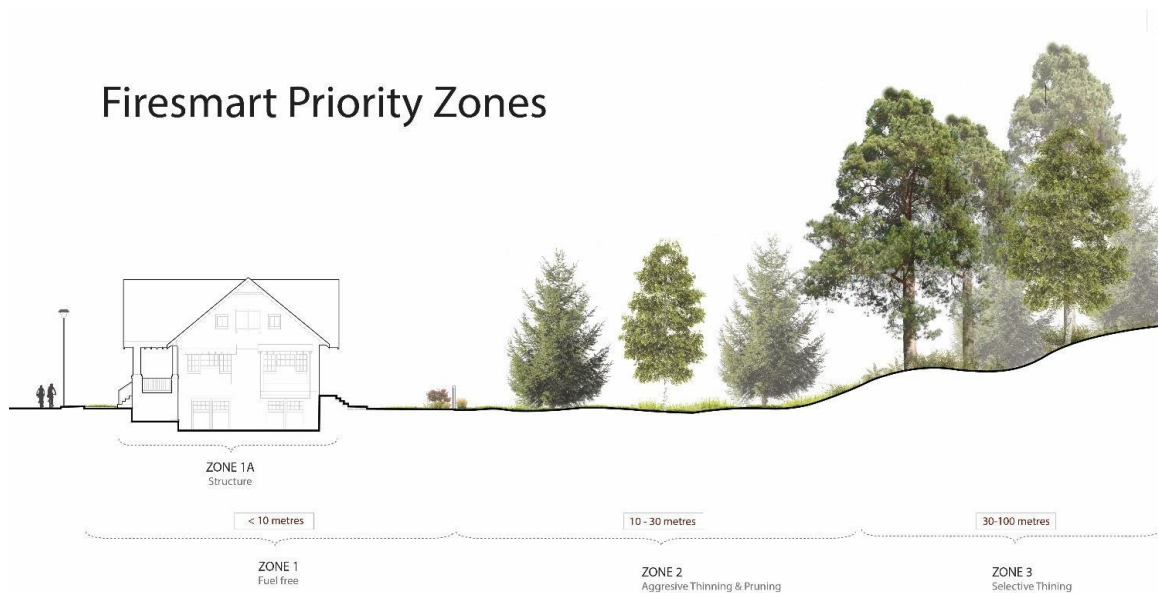
Zone 1a (0-1.5 m): This is the noncombustible zone, where it is very important not to have any combustibles next to buildings.

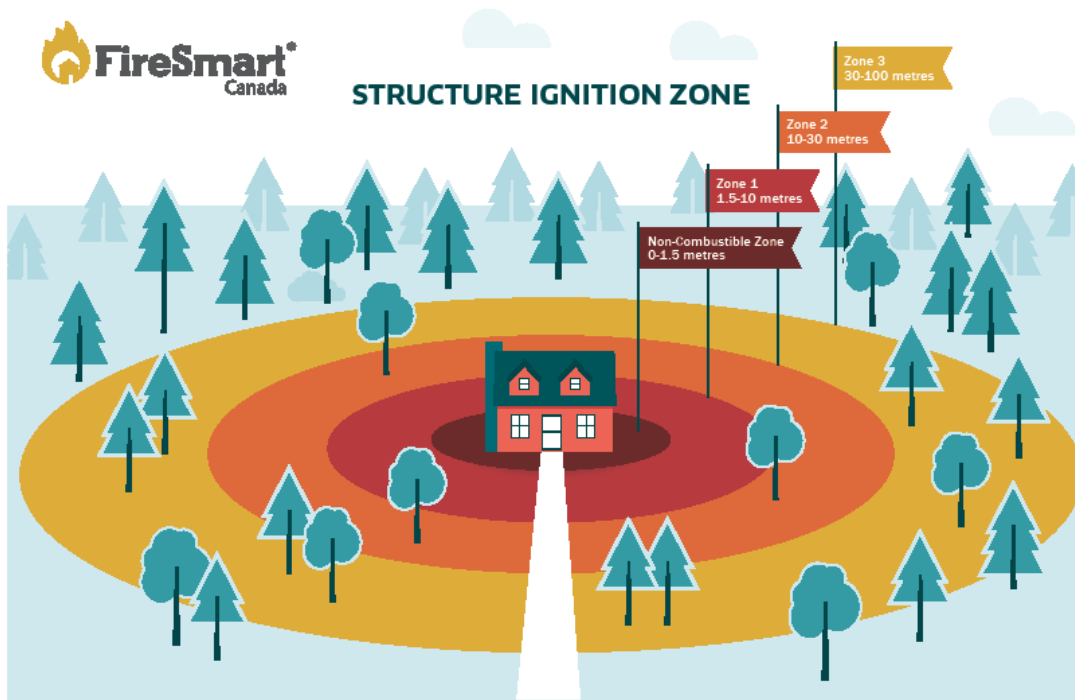
Zone 1 (0-10 m): The main objective of vegetation management is to create an environment that will not support fire. Vegetation management focuses on fuel removal, conversion, and reduction.

Zone 2 (10-30 m): Where treatment in PZ 1 is not sufficient to significantly reduce the fire hazard due to fuel loading, extend the fuel modified area with a variety of thinning and pruning actions.

Zone 3 (30-100 m): Where fuel modification in PZ1 and PZ2 is insufficient to protect structures and/or property, FireSmart advocates treatment in Priority Zone 3 with a variety of thinning and pruning actions in order to create an environment that will not support high-intensity crown fires.

*Setback Zone distances may be extended depending on aspect, slope, fuel loading, etc.





Work with your neighbours in any overlapping priority zones!

<p>Non-combustible Zone (0- 1.5 metres)</p>	<p>Reduce the chance of wind-blown embers igniting materials near your home. A non-combustible surface should extend around the entire home and any attachments, such as decks. Creating a non-combustible surface can be as easy clearing vegetation and combustible material down to mineral soil. To add to your landscape design, use non-combustible materials such as gravel, brick, or concrete in this critical area adjacent to your home. Woody shrubs, trees or tree branches should be avoided in this zone, any that are present should be properly mitigated.</p>
<p>Zone 1 (1.5-10 metres)</p>	<p>Create a landscape that will not easily transmit fire to the home. A FireSmart yard includes making smart choices for your plants, shrubs, grass and mulch. Selecting fire-resistant plants and materials can increase the likelihood of your home surviving a wildfire. Plant a low density of fire-resistant plants and shrubs. Avoid having any woody debris, including mulch, as it provides potential places for fires to start. Storing items such as firewood piles, construction materials, patio furniture, tools and decorative pieces against or near a house is a major fire hazard. Move firewood piles, trailers/ recreational vehicles, storage sheds and other combustible structures out of this zone and into Zone 2. If unable to move, store firewood inside your mitigated garage, shed or other ember resistant structures, create a non-combustible zone underneath and for 1.5 metres around trailers/ vehicles and mitigate sheds and other structures to the same standards as those of your home.</p>
<p>Zone 2 (10-30 metres)</p>	<p>If your property extends out to this zone, thin and prune evergreen trees to reduce hazard in this area. Within 30 metres of your home, selectively remove evergreen trees to create at least 3 metres of horizontal space between the single or grouped tree crowns and remove all branches to a height of 2 metres from the ground on the remaining evergreen trees. If possible, pruning trees up to 100 metres from your home (Zone 3) is recommended. Regularly clean up accumulations of fallen branches, dry grass and needles from on the ground to eliminate potential surface fuels. Consider seeking the guidance of a forest professional with wildland fire knowledge on appropriate management options for this zone.</p>
<p>Zone 3 (30-100 metres)</p>	<p>Taking FireSmart actions in Zone 3 on your property will influence how a wildfire approaches your home. You can change the dynamics of wildfire behaviour by managing vegetation within this zone. Look for opportunities to create a fire break by creating space between trees and other potentially flammable vegetation. Thinning and pruning is effective here as well. These actions will help reduce the intensity of a wildfire. Consider seeking the guidance of a forest professional with wildland fire knowledge on appropriate management options for this zone.</p>

Appendix 2. Generic Fuel Types (adopted from CFFDRS).

Fuel Type	Description	Wildfire Behaviour Under High Wildfire Danger
Coniferous:		
C1	Terrestrial herbaceous ecosystem: mossy rock outcroppings	High potential for surface fire, especially if high moss/lichen
C2	Dense regeneration to pole-sapling (immature) forest with crowns almost to ground	High potential for crown fires; low to very high fire intensity and rate of spread
C3	Fully stocked, mature forest, crowns separated from ground; sparse understorey	Surface and crown fire, low to very high fire intensity and rate of spread
C4	Dense, pole-sapling (immature) forest, heavy standing dead and down, dead woody fuel; continuous needle litter; continuous vertical crown fuel continuity	High potential for crown fires, high to very high fire intensity and rate of spread
C5	Moderately well-stocked, mature forest, moderate dense understorey crowns well separated from ground; continuous needle litter	Low to moderately fast-spreading, low to moderate intensity surface fire
C6	Fully stocked conifer plantation; absent understorey; tree crowns separated from ground; continuous needle litter	Surface fire may spread rapidly to become high intensity fire with high rate of spread
C7	Open, mature coniferous stand; uneven-aged; discontinuous understorey; tree crowns mostly separated from ground	Surface, torching, rarely crowning (except on steeper slopes), moderate to high intensity and rate of spread
Deciduous:		
D (Deciduous)	Moderately well-stocked deciduous stands; moderate medium to tall shrubs and herb layers D-1 Leafless D-2 In leaf	Typically a surface fire; low to moderate rate of spread and fire intensity
Mixed Forest:		
M (Mixed Forest)	Moderately well-stocked mixed stand of conifers and deciduous tree species; moderate shrub understorey; conifer crowns extend nearly to ground M-1 Leafless M-2 in Leaf	Surface, torching and crowning; moderate to very high intensity and spread rate (varies with slope and % vegetation cover) Fine fuel % and cedar foliage retention will result in faster ignition and spread
Slash:		
S (Slash)	Slash from logging and land clearing	Rapid spreading, moderate to high intensity surface fire
Grass:		
01-Long	Continuous standing grass – fuel loading is 0.3 kg/m ² ; scattered trees 01-a Matted 01-b Tall	The taller, and more cured the grass, the more rapid spread; low to moderate intensity surface fire
01-Short	Continuous human modified short grass	Typically low rate and spread and low fire intensity.

Appendix 3. Fire Risk Classes.

RELATIVE WILDFIRE RISK
Low
Moderate
High
Extreme

Fire Risk Classes

Low (Green): The combination of the local fuel hazard, weather influences, topography, proximity to the community, fuel position in relation to fire spread patterns, and known local wildfire threat factors make it a lower potential for threatening a community. These stands will support surface fires, single tree or small groups of conifer trees could torch/ candle in extreme fire weather conditions. Fuel type spot potential is very low, low risk to any values at risk.

Moderate (Yellow): The combination of the local fuel hazard, weather influences, topography, proximity to the community, fuel position in relation to fire spread patterns and known local wildfire threat factors make it possible that a wildfire in this area would threaten the community. Areas of matted grass, slash, conifer plantations, mature conifer stands with very high crown base height, and deciduous stands with 26 to 49% conifers. These stands will support surface fires, single tree or small groups of conifer trees could torch/ candle. Rates of spread would average between 2-5 meters/ minute. Forest stands would have potential to impact values in extreme weather conditions. Fuel type spot potential is unlikely to impact values at a long distance (<400m).

High (Orange): The combination of the local fuel hazard, weather influences, topography, proximity to the community, fuel position in relation to fire spread patterns, and known local wildfire threat factors make it likely that a wildfire in this area would threaten the community. This includes stands with continuous surface/ crown fuel that will support regular torching/ candling, intermittent crown and/or continuous crown fires. Rates of spread would average 6 -10 meters/ minute. Fuel type spot potential is likely to impact values at a long distance (400 -1 000m).

Extreme (Red): The combination of the local fuel hazard, weather influences, topography, proximity to the community, fuel position in relation to fire spread patterns, and known local wildfire threat factors make it very likely that a wildfire in this area would threaten the community. Stands with continuous surface/ crown fuel and fuel characteristics that tend to support the development of intermittent or continuous crown fires. Rates of spread would average >10 meters/ minute. Fuel type spot potential is probable to impact values at a long distance (400 -1 000m or greater). These forest stands have the greater potential to produce extreme fire behaviour (long range spotting, fire whirls and other fire behaviour phenomena).

Limitations

This report provides an assessment of site conditions. Evaluation is based on professional judgment. The investigation involved field observation. Recommended treatment pertains only to the particular site as disclosed at the time of inspection. The report was prepared considering site-specific circumstances and conditions. It is intended only for use by the client for the purpose for which it was commissioned and for use by local government regulating the activities to which it pertains.