Appendices

DEVELOPMENT PERMIT AREAS

Appendix I: Aquatic Ecosystem Development Permit Area & Guidelines

Designation

The Aquatic Ecosystem Development Permit Area is designated for the purpose of protection of the natural environment, its ecosystems and biological diversity and for the protection of development from hazardous conditions.

Aquatic Ecosystem Development Permit Areas include areas of land designated on Schedule E.

The Aquatic Ecosystem Development Permit Area was established through the identification of watercourses, riparian areas, wetlands and broadleaf woodlands utilizing a combination of field Inventory (using sub–metric global positioning system), interpretation of provincial TRIM[2] data, field surveys, and documentation of riparian locations.

Aquatic ecosystems are protected not only because of their great importance to the ecology of the Okanagan but also because Provincial and Federal legislation (*Riparian Area Regulation*, the BC *Water Act*, and the Federal *Fisheries Act*) require that the RDCO ensure the protection of aquatic ecosystems.

Justification

The importance of aquatic ecosystems is far reaching and is only briefly summarized here. In the dry ecology of the Okanagan, aquatic habitats are critical for the survival of wildlife and form necessary travel corridors between habitats. Water is an important part of maintaining biodiversity and is essential for many species. Many rare species in the Okanagan are associated with aquatic environments.

Such ecosystems are important not only in their own right but form a backbone of corridors between ecosystems that create a healthy diversity and better support the needs of a variety of species. These connections avoid the creation of isolated “islands” and increase ecosystem sustainability for the future.

The Okanagan also has a limited water supply and the water quality of surface water and aquifers (both below ground and in surface recharge areas) is important. The riparian habitat is a natural water purifier and pollution filtration system. A healthy riparian area also helps slow water flow and prevent erosion and soils stability.

Landform characteristics such as ravines, steep slopes and proximity to fluctuating water levels, may also be a hazard to development. Development in riparian areas needs to take natural hazards into consideration in order to protect development from environmental conditions such as flooding, erosion and land slip and ensure the safety of properties and residents,

[2] TRIM = Terrain Resource Inventory Mapping

The entire water system is highly interconnected and fragile. A change in one part of a stream or wetland can have downstream consequences on wildlife, people and property. Finally, the quality of the aquatic environment will affect fish habitat and fish population numbers.

The Aquatic Ecosystem Development Permit Area is established to meet the following objectives:

- Protection of ecological attributes and socio–economic values that is common to all Aquatic Ecosystems.
- To protect, restore and enhance Aquatic Ecosystems (water, wetland, riparian and broadleaf woodland).
- To protect Aquatic Ecosystems through the use of buffers.
- To protect water quality and quantity.
- To protect fish populations, fish habitat and vital wildlife functions such as (but not limited to) a travel corridor, a place of refuge, water source, fish habitat, and a breeding habitat to ensure future generations.
- Protection of development and lands from hazard conditions.

Further special conditions and objectives are in the specific section of the guidelines in relation to riparian and wetland ecosystems.

Exemptions

In Aquatic Ecosystem Development Permit Areas, a Development Permit must be approved before land is subdivided; construction of, addition to or alteration of a building or structure; or alteration or clearing of land (including but not limited to grading, blasting, preparation for the construction of services or roads). A Development Permit is required unless one of the following exemptions applies:

a. A Development Permit of this type has already been issued or a covenant substantially addressing aquatic ecosystem and hazard issues is registered on property title for the area in the past, and the conditions in the Development Permit or covenant have all been met, and the conditions addressed in the previous Development Permit or covenant will not be affected; or,

b. Where the Development Permit Area is fenced in a way acceptable to the Director of Development Services in order to prevent any accidental disturbance, and, there is a permanent protection of the Development Permit Area by means such as a restrictive covenant, return to Crown land, provided as public park, or similar method acceptable to the Director of Development Services; or,

c. A Qualified Environmental Professional (QEP)[3] certifies in a signed letter that an aquatic ecosystem feature (ie. stream, wetland, or riparian) is not present at the

[3] Qualified environmental professional means an applied scientist or technologist, acting alone or together with another qualified environmental professional, if

a. the individual is registered and in good standing in British Columbia with an appropriate professional organization constituted under an Act, acting under that association's code of ethics and subject to disciplinary action by that association,

b. the individual's area of expertise is recognized in the assessment methods as one that is acceptable for the purpose of providing all or part of an assessment report in respect of that development proposal, and

location specified. This may be the case where TRIM mapping interpreted a watercourse based on landforms such as gullies, which may not convey surface flows. Field Inventory and Mapping completed by the RDCO endeavoured to confirm the presence of aquatic features on the landscape. However, stream lines identified by TRIM base remain within the DP area until certified by a QEP that such a feature is not present; or,

d. The proposed works are site restoration and ecological enhancement, general parks maintenance and works in accordance with established Best Management Practices and Provincial approvals, as required, under purview of RDCO Parks Services; or,

e. There is change of use or a alteration of an existing approved building or permanent structure in which the building or structure foundation is not altered or increased; or,

f. The land is located within the Agricultural Land Reserve of the Province of BC and the activities are responsible, normal agricultural practices in accordance with the Farm Practice in BC Reference Guide and in accordance with the Farm Practices Protection Act or other applicable legislation. Interpretation or disagreements will be resolved through the provisions of the Act. Activities not covered by the Act or Guide will require a Development Permit; or,

g. The activity involves in-stream and associated riparian water management works conducted by water purveyors (i.e. by Irrigation Districts) under the auspices of the Regional Water Manager as defined under the Water Act provided the works are addressed under relevant Provincial permitting and is conducted in a manner consistent with the Development Permit Guidelines; or,

h. Environmentally sensitive removal of trees and shrubs designated as hazardous by a Professional Forester registered in BC in accordance with provincial "Firesmart" standards as outlined in a wildfire hazard report with provisions in place to ensure that tree removal is carried out in accordance with the report recommendations; or,

i. Environmentally sensitive removal of trees and shrubs designated as host trees by the Sterile Insect Release Program as indicated in a report by a Qualified Environmental Professional (QEP) or an ISA Certified Arborist and experienced in standard agricultural practices; or,

j. Environmentally sensitive removal of infested, diseased, or hazardous trees in accordance with the Best Management Practices for Tree Topping, Limbing, and Removal in Riparian Areas (http://www.env.gov.bc.ca/okanagan/documents/HazardTree_26May_09.pdf), as indicated in a report by a Qualified Environmental Professional (QEP) or an ISA Certified Arborist who are certified Wildlife/Danger Tree Assessors with provision of environmental monitoring to ensure that tree removal is carried out in accordance with the report recommendations; or,

k. The activity involves timber harvest, forest road construction, open livestock range, grazing enhancement, forest recreation or other forest management activity on Crown land that is conducted under the authority and approval of the Province; or,

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c. the individual is acting within that individual's area of expertise.

l. There is a technical subdivision for lot consolidation or boundary adjustments; or
m. The activity is conducted under direction of the Provincial Emergency Program.

GUIDELINES

Development Permits issued in this area will be in accordance with the following guidelines:

- An environmental assessment is to be prepared in accordance with the RDCO Terms of Reference for Professional Reports as well as these guidelines and will (at a minimum) consider:
- The Sensitive Ecosystem Inventory (SEI) and Sensitive Habitat Inventory and Mapping (SHIM),Foreshore Inventory and Mapping (FIM) and Aquatic Habitat Index (AHI) data and any other environmental information available from the RDCO or provincial ministries.
- Leave strips of sufficient width to accommodate the dynamic nature of the hydrologic system, maintain water quality, base flows and natural drainage patterns. A report prepared by a professional hydrologist may be required in circumstances where the hydrological condition has been or may be significantly disturbed.
- Provincial Best Management Practices Guidelines pertaining to aquatic habitats, groundwater management and drinking water protection.
- An indication of when monitoring of important environmental conditions by the professional will occur.
- Other studies may be required to address hazardous conditions or water management issues.
- The Assessment Area will include:
  a. A 30–m band (horizontal plane) measured perpendicular from the mean annual highwater mark of the watercourse; For a ravine that is less than 60 m wide, from the top of the ravine to a spot 30 m beyond the top of the ravine; for a ravine that is more than 60 m wide, a strip that is 10 m wide from the top of the ravine.
  b. Riparian, wetland, and other aquatic feature polygons identified in SEI mapping and corresponding Aquatic Development Permit Areas.

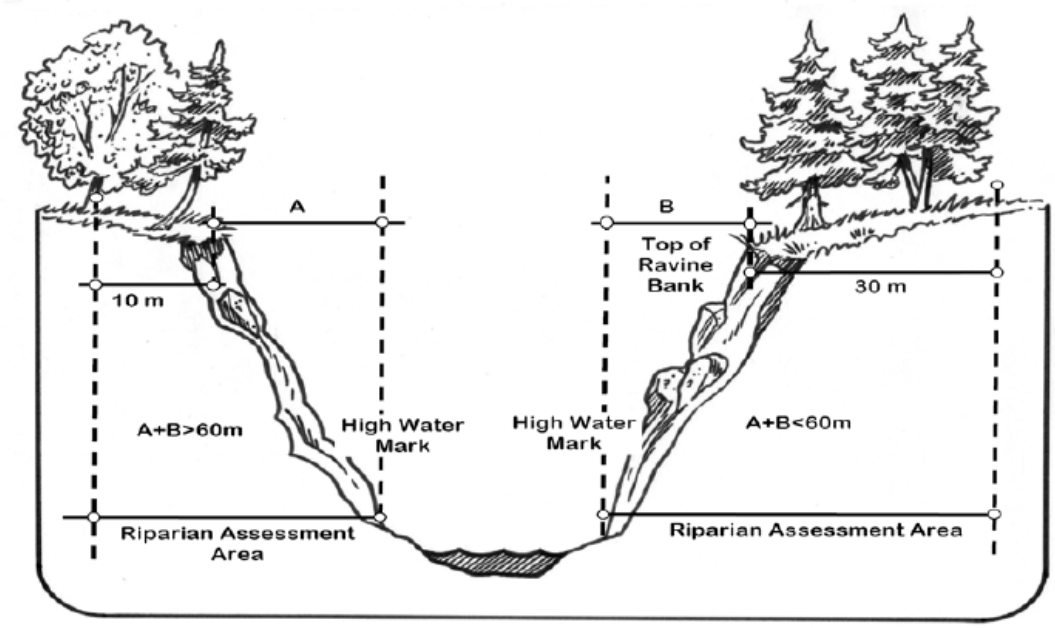
- Development permit conditions may include conditions that lands that must remain free of development; require specified natural features or areas to be preserved, protected, restored or enhanced in accordance with the permit.
- A leave strip for the protection and restoration of the riparian ecosystem is to remain undisturbed near watercourses and other aquatic features. The intention is that the leave strip will be untouched by development and left in its natural condition; or, if damaged by previous use or construction, the ecosystem restored or enhanced.
- The leave strip should be evaluated, established and monitored by a Qualified Environmental Professional (QEP), experienced in environmental assessment and design, registered in the Province of BC following evaluation of the leave strip requirements and recommendations.

- Leave strip widths will be determined based on the following factors:
  a. If **fish bearing** or connected by surface water to a fish bearing water body:

- For **creeks and wetlands**, the leave–strip area will be no less than 15–m (horizontal distance) from the bankfull level of the subject watercourse or aquatic habitat feature. If the setback determined using the Detailed Assessment Methods of the Provincial Riparian Areas Regulation (RAR) exceeds 15–m, the leave strip area will then comply with the Setback under the RAR.
- For an **active floodplain**, the leave strip (determined from (a.)) will start at the outer edge of this feature. *Active floodplain areas are those that are flooded more frequently than 1 in 5 years.* Seasonally inundated channels are to be included in the active floodplain;
- For **Okanagan Lake, (Brent Road Area),** leave strips will be commensurate with the riparian and shoreline condition (i.e., adjacent ESAs) and aquatic habitat values. The benchmark condition will be that identified by the 2010 Okanagan Lake Foreshore Inventory and Mapping (FIM) and Aquatic Habitat Index (AHI) and 2011 Sensitive Ecosystem Inventory Mapping. Two shoreline (FIM) segments have been identified along the Brent Road area. Based on the 2010 AHI, these segments have been assigned Moderate index ratings and are No Colour Zones as per the Okanagan Large Lakes Protocol. Accordingly, the setback will be no less than 15-m. On Okanagan Lake, the setback will be measured from the highwater mark. Further setback refinements will be determined in accordance with the Riparian Areas Regulation Detailed Assessment Methods as carried out by a Qualified Environmental Professional. Permitted land use will be harmonized with protection of these areas.

b. If **non–fish–bearing** and not connected by surface water to a fish bearing water body other considerations in determining an appropriate leave strip include:

- Whether the watercourse has downstream water intakes.
- What the intended land use is within the property (both within and outside of the Development Permit Area).
- Whether the land use includes livestock storage, on-site septic disposal, fuel storage, aggregate extraction, or other sources of potential surface or groundwater contamination.
- Proximity to stream or shore spawning areas.
- The location of the natural wetland, riparian and broadleaf woodland ecosystem communities.
- The location of important denning or nesting habitat.
- Ecosystem continuity off site and in the larger area.
- The extent of land clearing, berming, or removal of vegetation and topsoil.
- The timing of site work and rehabilitation.
- The natural slope of the land and potential for geotechnical instability and/or soil erosion.
- In consideration of the other guidelines of the development permit area.



- Networks of leave strips, open spaces and foreshore may provide for public access where such access is designed in a way that is not detrimental to the natural environment.
- Where temporary impact on the leave strip may be permitted during construction, provisions should be in place to rehabilitate the leave strip using native species. Rehabilitation is intended to restore or enhance the ecosystem in the leave strip.
- Should unpermitted damage occur to the leave strip during construction, the RDCO may require a professional assessment of the damage, a report on recommendations for rehabilitation, and rehabilitation completed.
- All leave strips are required to be identified along their perimeter during all phases of construction by means such as brightly coloured snow fencing in order to prevent any accidental disturbance.
- Active bird nests and the nests of eagles, peregrine falcons, osprey, burrowing owls or heron (whether occupied or not) are protected by the provincial Wildlife Act. The provincial Develop with Care: Guidelines for Urban and Rural Land Development document has suggested minimum buffer distances that are based on scientific research and professional observation.
- Avoid locating roads, driveways, and utility corridors within riparian ecosystems in order to maintain natural connectivity. Where it can be demonstrated that alternatives are not possible, design crossings that are narrow and perpendicular to riparian areas and elevated may be permitted in order to minimize the fragmentation of these habitats.
- Manage and minimize opportunities for livestock crossings and access to water.
- Maintain natural or pre-development hydrologic regimes. Changes to surface and ground water flow can negatively impact aquatic, riparian, and wetland ecosystems. Trails and road construction and development should be designed to maintain the hydrology of these ecosystems. Inflow and outflow streams should not be diked or dammed.

- Maintain normal wetland and water processes such as flooding, seasonal drawdown, and groundwater recharge.
- Maintain entire intact ecosystems wherever possible discouraging any disruptive uses. Damage from motorbikes, ATV's, unplanned and unmaintained trails, mountain bikes and vehicles can easily adversely alter sensitive ecosystems and water quality. Manage access actively with fencing and railings.
- In general, development design should reflect the objectives and guidelines of the Develop with Care document produced by the Province of BC.
- Riparian vegetation should be maintained where intact, or restored where disturbed or where invasive plants have intruded.
- On sites where the riparian setback has been degraded/modified with non-native species (e.g., urban shoreline area consisting of turf and horticultural plant varieties) restoration will occupy no less than 50% of the total setback area.
- The management of hazard trees within riparian setbacks, identified by a Qualified Environmental Professional (QEP) or an ISA Certified Arborist who are certified Wildlife / Danger Tree Assessors , will be in accordance with the Riparian Areas Regulation (RAR).Compensation for tree removal including dead or living hazard trees (from within specified riparian setbacks) will be in accordance with the Tree Replacement Criteria (DFO and MELP, 1996) as per Table 1 below. If tree replacement restoration is inconsistent with the natural habitat, the number of required trees can be amended by the QEP.

Table 1. Tree Replacement Criteria (Department of Fisheries and Oceans Canada and Ministry of Environment Lands and Parks. 1996)

Trees to be removed	**Replacement/ Compensation tree requirements**	
Diameter at Breast Height (DBH)	**Quantity**	**Size (min. height)**
DBH < 151 mm	2	1.5m or 4 shrubs
152 mm–304 mm	3	1.5m
305 mm–456 mm	4	2.0m
457 mm–609 mm	6	2.0m
610 mm–914 mm	8	2.0m
DBH > 914 mm	individual approval	individual criteria

- Where minor intrusions into the riparian setback are required development and mitigation planning will be in accordance with the Bend Option under the RAR. These instances will only apply to previously developed 'brownfield" sites and will not apply to previously undeveloped "greenfield' sites. The adjusted setback boundary will be no less than 10m from the high water mark and the overall riparian setback area will be unchanged from the original specified setback. Thus there will be no net loss in the amount of riparian area. New areas added to the setback to make up for those shifted out must be contiguous with the original setback area.

SPECIFIC GUIDELINES

The following specific objectives and specific guidelines pertain to the riparian and wetland ecosystem as identified by the Sensitive Ecosystem Inventory. In some instances, these ecosystems may extend beyond the setback determined for a specific watercourse and thus may not be protected by this leave strip alone. These guidelines are therefore to be considered in addition to the Objectives and Guidelines for aquatic ecosystems and relate to the ecological significance of riparian and wetland ecosystems. Accordingly, specified watercourse setbacks/leave strips will be combined with riparian and wetland ecosystem areas/polygons to establish a no disturb zone complex. The identification and delineation of riparian and wetland ecosystems and subsequent Environmental Sensitivity Ratings will be determined by a QEP in accordance with the RDCO Terms of Reference for Professional Reports and these Guidelines.

Riparian Ecosystems

Riparian ecosystems are defined as ecosystems that are adjacent to, and significantly influenced by a water body. These sites are more moist, and have a plant community that is distinct from the surrounding upland.

Riparian and streambank vegetation maintains the cohesive nature of the stream bank, and reduces the power of the stream. During flood events, riparian vegetation catches fine nutrient–rich sediment, thus maintaining the productivity of the site. Without this vegetation, streambank destabilization and erosion may occur, resulting in loss of land and a wider shallow stream channel. The accumulation of sediments (from erosion) can harm fish and aquatic habitats and reduce water quality. It can take many decades to stabilize denuded stream banks and restore narrow, deep stream channels. Riparian vegetation also provides inputs of organic matter into soils, which increases their capacity to absorb and store water. Additionally, riparian vegetation moderates water temperatures, provides an important source of food for many aquatic organisms, and provides important wildlife cover for reproduction/nesting and feeding.

Riparian ecosystems are typically linear in nature. These ecosystems are also divided into distinct classes (bench, gully, and fringe) according to their environmental and vegetation characteristics:

- Bench riparian ecosystems are flood or fluvial ecosystems. They have distinct characteristics that are associated with moving water such as creeks, streams and rivers. Bench riparian ecosystems are rich in nutrients, species and vegetation structural diversity. Generally, these sites are productive and develop more quickly after disturbance than adjacent upland sites. Typically, these ecosystems occur as a band on either side of a creek and often form natural corridors through the landscape. Soils of this ecosystem type are typically sandy and gravely, and poorly developed. They usually have a mix of coniferous and deciduous trees in the overstory, with shrubby understories.
- Gully riparian ecosystems occur at the base and lower slopes of moderate to steep–sided linear sites (small valleys or ravines) with significant moisture. These ecosystems have either permanent or intermittent surface water flow, or significant subsurface flow, but are usually not subject to flooding. These are also rich and productive sites, and they form natural corridors, providing habitat that is distinctly different from the surrounding

landscape. These ecosystems usually have a mixed coniferous and deciduous overstory with shrubby understories. Slopes are often steep, and soils are variable.

- Fringe riparian ecosystems are those that occur as a narrow band along the shorelines of lakes and ponds. Sandy, gravely soils are common in these ecosystems and soils are often gleysols or mottled. This class also includes sites on fluvial fans, and sites with significant seepage that are sensitive to soil and hydrological disturbances; soils are typically medium–textured on these sites.

According to the Sensitive Ecosystem Inventory the importance of this ecosystem includes its rarity (most riparian plant communities as listed with the BC Conservation Data Center as rare), high biodiversity, fragility (sensitive to disturbance and changes in hydrology), aquatic habitat protection, water quality, wildlife corridors, flood protection and erosion reduction as well as social values.

Objectives specific to the riparian ecosystem:

- To conserve as much of the ecosystem as possible. Where there are changes intended, maintain the key characteristics of the ecosystem as much as possible including:
    a. riparian vegetation;
    b. large cottonwood trees;
    c. threatened or endangered species or natural plant communities;
    d. natural processes such as stream flow, flooding, and stream channel movement;
    e. nesting or denning sites;
    f. standing dead trees, and downed trees and logs; and
    g. riparian corridors, and connectivity with upland communities.

Specific Riparian Guidelines:

- Discourage human settlement or other development within or adjacent to riparian areas.
- Riparian vegetation should be maintained where it is present, and restored with native plants where it has been lost.
- Manage access actively (e.g. with fencing and railings) to minimize the effects of recreation and other human uses.
- Where practical or necessary, restrict livestock access with fencing. To allow safe wildlife access, fences should be top–railed, page–wire should not be used, and bottom wires should be no less than 45cm above ground level.
- Control pets. Pets should be restrained and hunting dogs should be trained away from riparian areas during the spring and summer. Other disturbances to waterfowl during the nesting season should also be avoided.
- Protect structural features: Large trees, snags, logs provide critical nesting habitat for many species of birds and animals. Large, old cottonwood trees and snags are especially important for birds, bats and other animals.
- Eliminate use of pesticides in or near water and important foraging areas for wildlife. Pesticide use near foraging habitat for animals that feed on insects (e.g., Olive–sided Flycatcher and Common Night Hawk) should be avoided.

- Allow natural disturbances to occur. Flooding, windthrow, channel changes, slope failures and debris flows are recognized as important factors in the creation and maintenance of high diversity riparian habitats. These events and processes should be maintained within established no disturb zones unless they pose a threat to safety or property.
- Where hazardous natural processes occur in potential development areas, additional setbacks or other mitigation measures may be required.
- Where measures are required to reduce potential for property damage, work within the natural boundary of a watercourse will require a *Water Act* Approval issued by the Province. Protective works shall be designed and constructed in an environmentally sensitive manner that recognized and maintains the intrinsic ecological values inherent with riparian ecosystems.
- Minimize bank or flood protection. Development that requires channel stabilization, deposition of rip–rap, and vegetation removal reduces riparian diversity and habitats.
- Maintain natural hydrologic regimes. Deforestation, removal of vegetation, or increased impervious surfacing can result in significant increases in the size, duration, and frequency of surface runoff and floods. Bank erosion can also worsen.

Wetland Ecosystems

Wetlands occur on sites where the water table is at, near, or above the soil surface for a sufficient period of time to influence soil and vegetation development. Wetland ecosystems characteristically have plants that are adapted to growing on saturated soils with low oxygen levels. Wetlands are divided into distinct classes according to their environmental and vegetation characteristics. These classes included swamps, marshes, and shallow water ecosystems.

Wetlands are focal points for wildlife because of their infrequent occurrence in this landscape. Wetlands provide wildlife and biodiversity values that are disproportionate to the area they occupy on the land base. Wetland vegetation provides food, shelter, breeding habitat, and cover for many species of amphibians, reptiles, mammals, birds, and insects. Wetland vegetation provides food for many aquatic organisms. Ponds and shallow open water bodies are important watering sites for many species and provide painted turtle habitat, especially if floating logs are present. Wetlands are also sources of insects that provide food to birds and bats. Properly functioning wetlands store and filter water, and maintain water quality. They reduce the levels of sediment, nutrients, and toxic chemicals in outflow water.

According to the Sensitive Ecosystem Inventory the importance of this ecosystem includes its extreme rarity, high biodiversity, fragility, maintenance of water quality as well as social values.

Specific Wetland Guidelines*:*

- Discourage human settlement and other land developments within, or adjacent to, wetland areas. Such activities in and around wetlands should be avoided. Roads should not be built near wetlands as they can alter hydrology and lead to extensive mortality of wildlife species that use wetlands.
- Maintain wetland hydrology. Draining or ditching in or around wetlands, the filling in of wetlands, and the discharge of stormwater into such sites should be avoided. Vegetation

cover should not be removed as this increases surface runoff and reduces the amount of groundwater infiltration, thus reducing available summer moisture. Additionally, areas of impervious ground surfacing (i.e., pavement) should be minimized. Wetland hydrologists may need to be consulted to determine how to protect wetland hydrology.

- Maintain water quality. Wetlands store and filter water and provide water quality benefits. Therefore, the addition of urban storm drainage, agricultural runoff, and sediment from road building into wetlands should be prevented. Wetlands that have artificially high nutrient levels may experience algal blooms, and vegetation in some marshes may convert from sedges or rushes to cattails.
- Restrict recreational access. Intensive recreational use of shoreline areas can reduce plant cover, compact soil, and disturb wildlife. Roots of trees and shrubs can be easily damaged by trampling and trail development in the moist soils of wetlands. Trails often become wide in wet, muddy areas, and sediments from trail damage may affect amphibians and insects. Motorized recreation, mountain biking, and horseback riding should be excluded from wetlands. Many recreational activities can potentially introduce or spread invasive plant species. In areas where trails to viewpoints in wetlands are desired, raised boardwalks should be used (avoid using rock or bark mulch on trails).
- Manage livestock access. Livestock use of many wetlands and ponds for water has significantly altered these sites. Overuse of wetlands by livestock can lead to soil compaction, damage and loss of vegetation cover and structure, and introductions of invasive plant species. Shrub and graminoid vegetation on many sites quickly recovers, however, when cattle use is reduced. Alternative watering sites, and fencing to allow a single access point to the water source can be used to maintain wetland functions and values while allowing some cattle use.
- Prevent disturbance of nesting or breeding areas. Recreational activities along wetland edges and canoeing in wetlands can impact amphibians, nesting waterfowl, and other birds, and thus, should be avoided during the breeding season (May through August). Disturbance of soils around wetlands, especially sandy soils that might be used by painted turtles for egg–laying, should also be avoided.
- Allow natural wetland processes to maintain wetland functions and values. Beaver activity, flooding, seasonal drawdown, and groundwater recharge and discharge should be maintained. Inflow or outflow streams should not be diked or channelized.
- Eliminate use of pesticides in or near wetlands.
- Untreated stormwater should not be directed into natural wetlands. Natural wetlands should not be used to treat stormwater. However, transitional basins (previously vernal ponds) may be used as detention areas and if stormwater treatment occurs prior.

See Schedule E: Aquatic Ecosystem Development Permit Areas

Appendix II: Sensitive Terrestrial Ecosystem Development Permit Area & Guidelines

Designation

The Sensitive Terrestrial Ecosystem Development Permit Area is designated for the purpose of protection of the natural environment, its ecosystems and biological diversity and, protection of development from hazardous conditions. Sensitive Terrestrial Ecosystem Development Permit Areas include areas of land designated on "

See Schedule F: Sensitive Terrestrial Ecosystem Development Permit Area

The Development Permit Area is established to include Coniferous Woodland, Grassland, Sparsely Vegetated, and Mature Forest Ecosystems identified in the Sensitive Ecosystem Inventory: Central Okanagan, 2000–2001, published by Canadian Wildlife Service, Technical Report Series Number 399. This inventory was updated in 2009 and gaps filled in 2011 to more specifically delineate the sensitive ecosystems.

Justification

The Central Okanagan basin of British Columbia is an area of great ecological significance within both the Province of BC and Canada as a whole. It is an area with high biodiversity values, and many rare and endangered ecosystems, plant and animal species. A 'sensitive' ecosystem is one that is ecologically fragile and/or is recognized as rare in the provincial landscape. Rare ecosystems are those that are considered to be provincially rare either because of limited distribution or because disturbance has significantly limited their distribution. The Regional District of Central Okanagan is committed to the protection of identified areas of high ecological and natural value. Terrestrial ecosystems in the Central Okanagan support a number of Red and Blue–listed (rare and at–risk) species and are a critical component to the health, vitality and economy of the local community. Sensitive ecosystems may be severely influenced by development unless there is effective community stewardship and land use planning.

Landform characteristics such as ravines, steep slopes and proximity to fluctuating water levels, may also be a hazard to development. Development in sensitive ecosystems need to take natural hazards into consideration in order to protect development from environmental conditions such as flooding, erosion and land slip and ensure the safety of properties and residents,

This development permit area has the following objectives, with the overriding goal of conserving important natural environments for current and future generations:

- To ensure that sensitive environments are identified and protected.
- To encourage and support the rural use of the land in a way that best conserves important and vanishing environments. The Development Permit Area is established to

include Coniferous Woodland, Grassland, Sparsely Vegetated, and Mature Forest Ecosystems identified in the Sensitive Ecosystem Inventory (shown on Map 4).

- To protect the ecological attributes and socio–economic values that are common to all Sensitive Terrestrial Ecosystems.
- To conserve Sensitive Terrestrial Ecosystems in a relatively natural state while supporting rural land uses.
- To plan land development and new subdivisions carefully in a manner that protects Sensitive Terrestrial Ecosystems.
- To protect Sensitive Terrestrial Ecosystems through the use of buffers.
- To identify feasible habitat corridors connecting core conservation and significant habitat areas.
- Incorporate wildfire management in a way sensitive to the ecosystem that mimics the effect of the natural fire cycles that once occurred in the Okanagan and helped to shape and maintain the natural balance.
- Protection of development from hazardous conditions.

Further special conditions and objectives are in the specific section of the guidelines in relation to grassland ecosystems, sparsely vegetated cliff and rock ecosystems and coniferous woodlands mature forests. .

Exemptions

In Sensitive Terrestrial Ecosystem Development Permit Areas, a Development Permit must be approved before land is subdivided; construction of, addition to or alteration of a building or structure; or alteration or clearing of land (including but not limited to grading, blasting, preparation for the construction of services or roads). A Development Permit is required unless one of the following exemptions applies:

a. A Development Permit of this type has already been issued or a covenant dealing with sensitive terrestrial ecosystem issues is registered on property title for the area in the past, and the conditions in the Development Permit or covenant have all been met, and the conditions addressed in the previous Development Permit or covenant will not be affected; or,

b. Where there is a permanent protection of the Development Permit area by means such as a restrictive covenant, return to Crown land, provided as public park, or similar method acceptable to the Director of Development Services, (the Director of Development Services may require fencing to a standard satisfactory to the Regional District in order to prevent any accidental disturbance); or,

c. Where, upon site specific review the identification and location of the sensitive terrestrial ecosystem within the Development Permit area is more precisely determined by a Qualified Environmental Professional (QEP)to the satisfaction of the Director of Development Services, and, there is a permanent protection of the identified area by means such as a restrictive covenant, return to Crown land, provided as public park, or similar method acceptable to the Director of Development Services (the Director of Development Services may require fencing to a standard satisfactory to the Regional District in order to prevent any accidental disturbance); or,

d. The proposed works are site restoration, ecological enhancement, general parks maintenance and works in accordance with established Best Management Practices and Provincial approvals, as required, under purview of RDCO Parks Services; or

e. There is change of use or alteration of an approved existing building or structure in which the building or structure "footprint" is not altered or increased or addition to buildings and structures that are less than 10 m² in area; or,

f. There is placement of temporary construction and project sales offices, or storage of construction materials on a site provided that the use is removed within 20 days of completion of the project and does not have an impact on sensitive environmental values or critical habitat; or,

g. The land is located within the Agricultural Land Reserve of the Province of BC and the activities are responsible, normal agricultural practices in accordance with the Farm Practice in BC Reference Guide and in accordance with the Farm Practices Protection Act. Interpretation or disagreements will be resolved through the provisions of the Act. Activities not covered by the Act or Guide will require a Development Permit; or,

h. The activity involves replanting or replacement of agricultural crops on areas of a site that are currently in crop production; or,

i. The activity involves in-stream and associated riparian water management works conducted by water purveyors (i.e. by Irrigation Districts) under the auspices of the Regional Water Manager as defined under the Water Act provided the works are addressed under relevant Provincial permitting and is conducted in a manner consistent with the Development Permit Guidelines; or,

j. The activity involves the environmentally sensitive removal of trees and shrubs designated as hazardous by a Professional Forester registered in BC in accordance with provincial "Firesmart" standards as outlined in a wildfire hazard report, with provisions in place to ensure that tree removal is carried out in accordance with the report recommendations; or,

n. The activity involves the environmentally sensitive removal of trees and shrubs designated as host trees by the Sterile Insect Release Program as indicated in a report by a Qualified Environmental Professional (QEP) or an ISA Certified Arborist and experienced in standard agricultural practices; or,

l. The activity involves the environmentally sensitive removal of infested, diseased, or hazardous trees as indicated in a report by a Qualified Environmental Professional (QEP) or an ISA Certified Arborist who are certified Wildlife / Danger Tree Assessors with provision of environmental monitoring to ensure that tree removal is carried out in accordance with the report recommendations; or,

m. The activity involves timber harvest, forest road construction, open livestock range, grazing enhancement, forest recreation or other forest management activity on Crown land that is conducted under the authority and approval of the Province; or,

n. The activity is conducted under direction of the Provincial Emergency Program; or,

o. There is a technical subdivision for lot consolidation or boundary adjustments; or

p. The site has been assessed by a Qualified Environmental Professional (QEP) who has provided a report to the satisfaction of RDCO which concludes that the proposed development would not impact the values for which the Development

Permit Area was set or that the attributes on the site have been lost due to previously approved development.

OVERALL GUIDELINES

Environmental assessments will be required and must be prepared by a Qualified Environmental Professional (QEP) together with other professionals of different expertise, as the project warrants. Hydrologists and hydro–geologists should be consulted where wetlands, riparian areas, and broadleaf woodlands exist within the development area to ensure the proper hydrological function is maintained within these ecosystems. A professional geoscientist should be consulted where there are erosion potential or slope stability hazards. The consultant or team of consultants should have an understanding of wildlife biology, especially for Species At Risk, geomorphology, environmental assessment, and development planning in British Columbia. Specific expertise in Okanagan Valley wildlife species, wildlife habitat, and ecosystems is highly preferred. Other studies may be required to address hazardous conditions or water management issues.

The following general guidelines apply to development permit applications in all ecosystems within Sensitive Terrestrial Ecosystem Development Permit Areas:

- The identification and delineation of sensitive terrestrial ecosystems and subsequent Environmentally Sensitivity Area (ESA) ratings will be determined by Qualified Environmental Professional (QEP) in accordance with the RDCO Terms of Reference for Professional Reports and these Guidelines.
- Development permit conditions may include conditions that lands that must remain free of development; require specified natural features or areas to be preserved, protected, restored or enhanced in accordance with the permit.
- Discourage settlement, construction, land disturbance, and other development within or directly adjacent to sensitive terrestrial ecosystems.
- Review and adhere to the recommendations and guidelines of the Source to Tap Assessments for drinking water quality or other source water assessments and protection plans.
- Concentrations of high quality ecosystems and habitat for rare species should be prioritized for conservation.
- Delineate buffers around sensitive terrestrial ecosystems. Fencing may be necessary along some buffers where further adjacent development and activity is anticipated.
- Avoid the creation of isolated islands of ecosystems. Delineate corridors between sensitive terrestrial ecosystems to create interconnectedness especially for critical wildlife travel routes.
- Conserve snags and standing dead trees where safe to do so. Soft decaying wood is a valuable home and food source for many birds and animals. For some species it is essential. Standing dead trees are typically topped to within 6 meters of the ground in an area that is safe should it eventually fall. It is recognized that dead wood decays over time and the eventual removal of standing dead wood and snags is acceptable. Locate settlements, drives, construction and other development away from existing large, old trees and snags. Artificial snags can be located in safe areas to help improve habitat.
- Plan, design and implement land development and subdivision to protect endangered, threatened, or vulnerable species or plant communities. Avoid disturbance to sites where

rare plants are growing and where rare natural plant communities occur, and maintain critical habitat structures such as old trees, snags, trees with cavities, natural grasslands.

- Conserving trees in communities (groups of trees along with their associated understory) rather than isolating individual specimens is preferred. Groups of trees form a larger intact ecosystem and are more likely to maintain the important characteristics of the ecosystem over time than a few scattered trees. However, some ecosystems are characterized by or may contain some isolated trees and their conservation as well is important.
- The conservation of trees should extend beyond the drip line of the tree. The roots of established trees are very sensitive. A trees root system on the surface and below ground may be larger than the part of the tree you see above ground. Damage to the roots (especially in mature trees) can impede the trees ability to obtain water and nutrition and may eventually kill the tree. The drip line is an imaginary line drawn around the tree(s) outside the full extent of the branches.
- Maintain water quality. Water quality can be affected by excessive land alteration, erosion, and the improper use and storage of chemicals and hazardous materials.
- Prevent disturbance of nesting sites and breeding areas. It is important that animals have the habitat that supports their reproduction and so ensures future generations.
- Control invasive plant species.
- Restore native vegetation where it has been disturbed.
- Carry out erosion and sedimentation control measures to prevent ecosystem degradation.
- Restore the effects of the natural cycle of low intensity fire once common to the Okanagan. The suppression of fire by mankind has dramatically altered the ecology of the valley as well as increased the available fuel for wildfire. Wildfire hazard mitigation can happen in an environmentally sensitive way that restores ecosystems to the natural condition that would be expected if the normal cycle of fire was permitted to affect the environment.
- Prune lower branches and thin small–diameter trees in areas with high fire hazards (much of the IDFxh1 and cool slopes throughout) to reduce fuel loading and ladder fuels, while maintaining large diameter and wildlife trees
- Identify critical habitat. Where disturbance cannot be mitigated it may be acceptable, at the discretion of the, to do environmental improvements off the property in compensation for loss on–site with the intention of no net loss of critical habitat.
- Contain physical developments to as small an area as possible by restricting the amount of area that can be developed in a lot through restrictive covenants (this should be mapped when the lots are initially surveyed) and ensure that materials are not side–casted on exposed slopes.
- Post signs on wildlife trees so they can be retained, where possible.
- Conduct ecologically sound fuel reduction. Develop and follow prescriptions for fuel reduction that incorporates the fuel reduction in ESA.
- Determine where underpasses under new roads are required for small wildlife to avoid road mortality – these could be incorporated with surface water drainage plans.
- Promote good land stewardship (e.g. xeriscaping, problem wildlife management, weed control, pet management, water conservation) with residents and land users, through

developing neighbourhood stewardship guidelines – this is especially significant for the non–lethal and safe management of snakes.

- Ensure that sound management plans for natural lands, including wildlife corridors amongst developed areas, are prepared and implemented prior to the onset of development to prevent inappropriate and damaging uses of these sensitive areas, especially to deal with anticipated recreational uses and fire hazards.
- Fence the perimeter of the clusters or developable areas, especially in or adjacent to High Biodiversity Areas, or along covenanted areas, to ensure that impacts are contained – minimizing edge effects.
- Contain physical developments within lots. Where possible pair driveways between adjacent lots so they form a common, wider driveway until they must diverge to each building site.

Core Habitat Areas, Connectivity, and Buffer Considerations

- Proposed development will reflect the Biodiversity Conservation Strategy being conducted and the corresponding Conservation Analysis of the Central Okanagan.
- Core sensitive areas should be avoided wherever possible. If critical design considerations include encroachment into these areas, appropriate mitigation or compensation plans should be implemented.
- Habitat connectivity must be considered. This includes allowance of unimpeded movements for all native species. The retention of movement corridors in a native state is particularly important for smaller species, such as amphibians, that require vegetation cover to avoid desiccation during dispersal.

GUIDELINE FOR EXPECTED AREA RETENTION (OF POLYGONS) BASED ESA SCORES

The RDCO Environmental Advisory Commission (EAC) completed a review of Environmentally Sensitive Area (ESA) criteria and ranking to be used in the completion of Environmental Assessments required for Development Permit applications. The following criteria are intended to guide Qualified Environmental Professionals (QEPs) in determining ESAs within the study area for proposed development.

A fundamental task within the Environmental Assessment is the identification of sites within the study area that qualify as ESAs. Areas are considered to have some degree of environmental sensitivity if they fulfill one or more of the following criteria:

- Areas described according to the Standard for Terrestrial Ecosystem Mapping in British Columbia and qualifying as Sensitive or Other important ecosystems according to the regional Sensitive Ecosystem Inventory (SEI) or a similar evaluation protocol.
- Suitable habitat areas for threatened or endangered plant or wildlife species, so classified at the local, provincial or federal level.
- Natural areas that are known to be important in the life cycle of one or more indigenous plant, fish or wildlife species. This includes, but is not limited to, breeding/spawning areas, winter habitat, critical habitat features (e.g. hibernacula), wildlife corridors, or migration stop-over points.

ESAs differ in their biological value within the study area and within the context of their surrounding region. Their biological value at the time of assessment can be positioned along a continuum from very high to low biological value depending on a number of factors. The potential biological value must also be considered in ranking ESAs, particularly when considering areas to be avoided or mitigated and potential compensation areas.

ESA Stratification Criteria:

Several factors may contribute to an areas environmental sensitivity rating. The importance of various factors will vary from site to site. It is recognized that Qualified Environmental Professionals (QEPs) use a variety of methods to weight the various factors. The professional report must describe the rationale used to determine biological value and the methodology used to rank ecological sensitivity such that the rankings and weightings will be reproducible and is transparent. The current condition arising from previously approved development will be taken into account in the determination of ESA ranking; however, previous development not approved will consider habitat potential rather than current condition.

The four classes of ESA value will be called Very High (ESA 1), High (ESA 2), Moderate (ESA 3), and Low (ESA 4). The Qualified Environmental Professionals must utilize the best available local data for ecosystem mapping and biological values and are expected to refine the mapping to a suitable resolution appropriate to the size of the site. Smaller sites (e.g., single lots) require larger scales up to 1:200, while larger sites (e.g. sector plans, neighbourhood plans) require smaller scales as low as 1:5000. On small lots (e.g. less than 1 ha) it may not be possible to distinguish ESA rankings. In this case, the professional report will as a minimum identify important habitats/features for retention and mitigation for any proposed development.

At a minimum, the following factors are to be considered in assigning a value to ESA areas:

- Physical features
  a) ecosystem inventories and mapping
     - *Biogeoclimatic Ecosystem Classification* (BEC) zone
     - Sensitive Ecosystem Inventory (SEI)
     - Foreshore inventory and Mapping (FIM)/Aquatic Habitat Index (AHI)
     - Sensitive Habitat Inventory and Mapping (SHIM)
     - Seral and structural stage
     - Biodiversity Conservation Strategy[4]
     - Conservation Analysis for the Central Okanagan Valley[5]
     - Any and all past environmental assessments on the property and adjacent lots
  b) landscape context
     - contiguity to other ESAs (buffering function)
     - edge effects
     - cumulative impacts
     - relation / dependence of ecosystems beyond its boundaries. Examples include but are not limited to: water storage; recharge zones; range of lifecycle habitat requirements
  c) unique or rare landforms or other aesthetic considerations
  d) size of the lot under consideration

[4] Forthcoming
[5] Haney and Iverson, 2009

- Indigenous plant and animal species, and plant communities
  a) suitability for rare species (red- and blue-listed species provincially and Species at Risk federally).
  b) critical and specialized habitat features. Examples include but are not limited to:
     - breeding/ denning / roosting / nesting / spawning areas
     - migration routes / stop-over
     - hibernacula
     - connection / movement corridors/habitat connectivity
     - reported sightings of uncommon species and species at risk
     - winter range
     - wetland/aquatic habitats
     - fisheries sensitive zones
     - riparian communities
     - floodplains
  c) species diversity / habitat complexity / habitat potential
  d) rarity in the local / regional context

- Sensitivity
  a) ability to tolerate anthropogenic disturbance,
  b) resilience to imposed stresses on an ecosystem
  c) current condition such as biological integrity
  d) potential for rehabilitation or recovery after disturbance
  e) long term impacts on habitat values and ecosystem functionality
  f) severity or extent of the disturbance

The above factors shall be applied to the following four-class rating system and shall be applied to all ESA evaluations:

- **Very High (ESA – 1**): contain rare physical features, plants and animals or are ecologically functioning natural systems. Various types of habitat will qualify on the basis of sensitivity, vulnerability, connectivity and biodiversity. All wetlands, high value foreshore, locally/regionally rare plant communities, animals and habitats will be considered as Very High.

  Areas given this rating are considered the highest priority for protection of ecosystem function and values and should be left undisturbed. Avoidance and conservation of Very High ESA designations should be the primary objective. If development is required and justified within these areas, mitigation to reduce or eliminate environmental impacts shall be required. Only when residual, permanent loss of habitat is unavoidable and after it proves impossible or impractical to maintain the same level of ecological function, will compensation be considered. It is expected that there will be 100% retention of Very High value habitat. A minimum of 80% of these ESAs are to be retained and the rest will be compensated.

- **High (ESA – 2)** contain physical features, plants, animals and habitat characteristics which contribute toward the overall diversity and contiguous nature of the surrounding natural features. These will include Sensitive Ecosystems (SEI) as refined according to the ESA stratification criteria at the appropriate scale for the site. These may also include areas used to buffer ecological functions of Very High ecosystems.

An area given this rank is of only slightly lower priority for protection of ecosystem function and values. Therefore, clear rationale and criteria for distinction between Very High and High values shall be provided. Some degree of development may be considered as long as this does not have any potential impact on Very High priority ESA's on the site. If development is pursued in these areas, portions of the habitat should be retained (40% – 80%) and integrated to maintain the contiguous nature of the landscape. Any loss over 20% to these ESAs will be offset by habitat improvements to the remaining natural areas found on property and must ensure habitat function is maintained or improved in the retention areas.

- **Moderate (ESA – 3)** contain important features or remnant stands/sites with ecological value that are not identified in the Sensitive Ecosystems Inventory as refined according to the ESA stratification criteria at the appropriate scale for the site and are not locally/regionally rare.

  The moderate ESA still contributes to the diversity and connectivity of the landscape, and may contain natural habitats, and some features of interest (e.g. tree patches, rock outcroppings, drainages and corridors). Based on the condition and adjacency, portions of moderate ESA may have significant ecological functions within the landscape (e.g. buffers to ESA 1 or 2, corridors) that should be retained.

- **Low (ESA – 4)** polygons contribute little or no value to the overall diversity of vegetation, soils, terrain and wildlife characteristics of the area. These areas have generally experienced anthropogenic disturbances (e.g. a driveway or other approved land clearing but does not include land cleared for agriculture) with little or no possibility for recovery or rehabilitation.

  Development is encouraged to be focused to these sites before consideration developing higher rated sites of the area. These areas shall not be considered as areas for restoration and enhancement or as recruitment as higher value ESA in offsetting development in other areas.

Roads Considerations

- Roads should follow natural topography and be as narrow as possible to reduce cut and fill. Wildlife conservation should also be incorporated into transportation planning. Future road development should avoid core wildlife habitats and Environmentally Sensitive Areas.
- Roadways should be designed to minimize impacts to wildlife when bisecting Environmentally Sensitive Areas and should incorporate bridges and box culverts to facilitate movement of wildlife.

Stormwater Management Considerations

- Streams, ponds, and wetlands provide critical habitat for fish, and species such as painted turtles, snakes, amphibians (such as Pacific chorus frogs and long–toed salamander), as well as a diversity of invertebrate fauna, which play an important role in ecological processes. Inputs of untreated stormwater to any watercourse may have negative effects on these communities. The ecological integrity of watercourses and

wetlands and water quality should be protected through proper stormwater management in accordance with integrated stormwater management guidelines. .

- Stormwater management plans should seek to maintain existing natural, or predevelopment drainage patterns, rates and flows and shall include measures to maintain or improve water quality before runoff flows are discharged to existing watercourses and wetlands.

Recreation Considerations

- Any park/trail systems proposed adjacent to or bisecting Environmentally Sensitive Areas or movement corridors, should be designed to include minimal lighting.
- Uncontrolled access to sensitive ecosystems may result in continuous operational impacts. Designated trails should be established with interpretive signage posted to educate residents regarding the significance of sensitive habitats. In addition, fencing should be erected to further control access to ESAs.[6]
- Interpretive signage should be posted at viewing areas and along trails to encourage environmentally responsible use of recreational trails, and to foster environmental stewardship to assist with the protection of neighbouring environmentally sensitive areas and wildlife habitat.

Wildlife Considerations

- Areas with multiple high habitat values may be covenanted or otherwise designated for conservation.
- The proposed development should be landscaped to emphasize natural features and to create additional habitat niches through diversification.
- Development within natural corridors (e.g. riparian areas) should be kept at a minimum as to minimize disturbance to natural movement and behaviour of wildlife. For instance, roads that bisect corridors should be designed such that movement into or off and within the subject property is not impeded. Bridges and large box culverts are options to maintain safe crossing for smaller wildlife.
- Connectivity must be maintained between important habitat areas (e.g. wetlands) and identified nesting areas.
- Reptile denning (security/thermal) habitats should not be developed.
- Recreational corridors should avoid these areas to minimize human–snake conflicts, including mortality from mountain bikes and vehicles.

SPECIFIC GUIDELINES

The following specific objectives and specific guidelines pertain the specific sensitive ecosystems as identified by the site–specific assessment or by the Sensitive Ecosystem Inventory. These are in addition to the Overall Objectives and Overall Guidelines and relate to the important characteristics of that particular ecosystem.

[6] Fencing should be designed in such a way that connectivity, wildlife movement and other environmental factors are considered.

Grassland Ecosystems

Grasslands are dominated by bunchgrasses with scattered broadleaf perennials and wildflowers. Grasslands are found in dry areas where frequent, low intensity natural fires historically occurred. There are two categories of grassland. “Grassland” ecosystems are open and dominated by grasses and wildflowers with a surface mulch of decaying vegetation, lichens and mosses. “Shrubland” ecosystems are grasslands that contain shrubs such as snowberry, Saskatoon berry, and roses. This ecosystem is typically not as dry as the grassland ecosystem and so can sustain some scattered shrubs. The soils of the shrubland ecosystem are typically richer than open grasslands.

According to the Sensitive Ecosystem Inventory the importance of this ecosystem includes its rarity, high biodiversity, high sensitivity to disturbance (due to very fragile soils), as well as social and visual values.

Objectives specific to this ecosystem

- To conserve, intact, as much of the ecosystem as possible.
- Limit disturbance. Because of the lack of moisture and the poor nature of the soils disturbance in the grassland ecosystem can damage the thin crust of viable soil and recovery is very tenuous and slow.
- Where there are changes intended, maintain the key characteristics of the ecosystem as much as possible:
    a. a predominance of native grasses and perennials (with some scattered shrubs on the moister sites with better soils); and
    b. Conservation of the vital thin active surface soil layer.
- Remove invasive plant species and maintain a healthy ecosystem so that invasive plants cannot re–establish themselves.
- There is potential that changes may actually help improve and restore this ecosystem by removing the in-growth of young trees encroaching into the grasslands that natural fires would have normally periodically cleared out.

Grassland Guidelines

- Protect nesting and denning sites that were identified on site through an initial reconnaissance or in the ecological inventory. It is important for animals and birds to reproduce and ensure future generations. Many grassland birds are ground nesters.
- Manage access to minimize vehicular and livestock access. The root systems and thin soils of grasslands are sensitive to disturbance and rely on a very thin active layer of the soil. This ecosystem is one of the most sensitive to surface disturbance.
- Protect large old trees (and their root systems) and snags. Such isolated trees scattered through the grasslands provide shelter, nesting habitat, and food source for wildlife.
- Remove encroaching trees. Without the natural cycle of fire in the Okanagan, the forests that neighbour the grasslands eventually encroach and destroy this very rare ecosystem.
- Minimize soil disturbance.
- Manage livestock use. Overgrazing can seriously damage or destroy native grasslands. Also the poor timing of grazing can mean that native plants cannot reproduce or suffer

damage. Excessive or improper grazing can cause enough damage to allow invasive plants (often detrimental to grazing animals) to colonize an area.

- Encourage the maintenance of natural sites and the planting of gardens with native, dry land species. This can actually extend habitat for native birds and animals into the backyard.

Sparsely Vegetated Cliff and Rock Ecosystems

Sparsely vegetated cliff and rock ecosystems occur on sites where rock, cliffs, or talus slopes only allow for discontinuous vegetation cover interspersed with bedrock or blocks of rock. This ecosystem provides protected shelves and crevices that are important for shelter, breeding, and overwintering for a variety of reptiles, animals and birds. Slopes with a warm orientation are especially important.

Extreme rarity (confirm abundance), high biodiversity, specialized habitat (a number of species including some threatened or endangered species are dependent on these habitats), as well as social and visual values.

Objectives specific to this ecosystem

- To conserve, intact, as much of the ecosystem as possible;
- Where there are changes intended, maintain the key characteristics of the ecosystem as much as possible;
- Exposed rough rock and its surrounding plant community;
- Talus slopes and debris accumulation at the base of cliffs and rock outcrops;
- Access to and from the area for wildlife that needs this as essential habitat; and
- Future protection from disturbance.

Sparsely Vegetated Cliff and Rock Ecosystem Guidelines

- Protect nesting and denning sites that were identified on site through an initial reconnaissance or in the ecological inventory. It is important for animals and birds to reproduce and ensure future generations. Important features include hibernacula (hibernation chambers) for snakes and reptiles, raptor nests or perch trees, nesting cavities, woodpecker cavities, and bat roosts.
- Manage access to minimize vehicular and livestock access. Avoid roads near hibernacula and prevent the disturbance of snake hibernacula. Manage road location to prevent snake mortality.
- Minimize soil disturbances and minimize disturbance of rock debris.
- Areas within the Sensitive Terrestrial Ecosystem Development Permit Area that are classified as Sparsely Vegetated Cliff and Rock ecosystems may be subject to rockfall hazard. Unless there is a threat to safety or property, disturbance to soil or rock debris (talus or scree) at the base of rock outcrops or steep slopes should be avoided.
- Where rock fall mitigation measures are required to improve safety, measures shall be designed and constructed in a manner that recognizes and maintains the ecological importance of these ecosystems. Special consideration for potential occurrences of

nesting, denning, or other features as determined by a Registered Professional Biologist may warrant scheduling and/or specific avoidance measures.

- Plan, design and implement land development and subdivision to protect endangered, threatened, or vulnerable species or plant communities. Avoid disturbance to sites where rare plants are growing and where rare natural plant communities occur, and maintain habitat structures such as talus slopes at the base of rock outcrops, steep faces or rock outcrops and cliffs, scattered large old trees and snags.
- Protect large old trees (and their root systems) and snags. Such isolated trees scattered through the sparsely vegetated areas provide shelter, nesting habitat, and food source for wildlife. Discourage rock climbing in areas that have not been assessed for important habitat considerations. Do not allow rock climbing in important nesting, denning and other habitat features when identified.

Coniferous Woodlands and Mature Forests

Coniferous woodland ecosystems in the study area have open coniferous tree canopies. They occur in drier climates, on rocky knolls, and on steep south–facing slopes where limited moisture or shallow soil limited tree establishment. These ecosystems have scattered ponderosa pine and interior Douglas–fir trees, and saskatoon growing in rock fractures with patches of grasses and forbs in shallow soil pockets. Historically, these ecosystems would have burned frequently, except on sites with minimal vegetation and lots of exposed rock. Fire exclusion has resulted in forest in-growth and encroachment (on grassland mosaics) on some sites.

Coniferous woodland ecosystems comprised the largest sensitive ecosystems category with the Central Okanagan Sensitive Ecosystem Inventory. Mature forests are a High Priority for conservation and preservation. Younger structural stages can be important in forming buffers and providing recruitment for older structural stages.

Objectives specific to this ecosystem

- Delineate buffers around coniferous woodland ecosystems;
- Avoid direct and indirect impacts; and
- Plan land development carefully.

Coniferous Woodlands and Mature Forests Guidelines

- Prevent the spread and establishment of invasive plant species and help maintain ecological viability and connectivity to other ecosystems.
- Discourage human settlement or development.
- Manage access.
- Prevent soil disturbance.
- Require an ecological inventory be conducted by qualified professional.
- Design and implement land development activities to protect the ecological integrity of these ecosystems.

See Schedule F: Sensitive Terrestrial Ecosystem Development Permit Area

Appendix III: Hillside Development Permit Area & Guidelines

Designation

The Hillside Development Permit Area is designated in accordance with the Local Government Act for the purpose of protection of the natural environment, its ecosystems and biological diversity and protection of development from hazardous conditions.

Hillside Development Permit Areas include areas of land designated on Schedule G. The Development Permit Area has been established through interpretation of provincial Terrain Resource Information Mapping and 1–m contour data and identification of lands containing slopes 30% or greater.

Justification

Hillsides are important, visually dominant features in the Okanagan. Hillside locations can also be subject to hazards and adverse impacts from land clearing, alteration, subdivision, construction and road building. It is important that future subdivision or proposed major landform changes on the OCP hillsides be undertaken sensitively, in consideration of environmental and visual impact, and also in consideration of the potential impact on neighbouring properties as well as development on subject properties. OCP Section 5.2 discusses the context of natural hazards in the area.

Hillside development is more difficult to construct and can have more prominent environmental, physical and visual impact than on flatter areas. All these factors mean that hillside development must be carefully designed and sensitive to its location.

The purpose of this development permit area is intended to support rural subdivisions, road building and construction on hillsides that:

- Protects and enhances the natural characteristics of the hillsides which are a significant component of the OCP area.
- Protect hillsides in a manner that minimizes damage to property and developments (both the property under application and neighbouring property) from erosion, soil instability, rock fall or other identified hazard.
- Are sensitive to natural topography and maximizes the retention of existing landscape, vegetation and soils.
- Are sensitive to the natural environment and drainage patterns.
- Prevent the substantial re-contouring of lands to facilitate development

Exemptions

In Hillside Development Permit Areas, a Development Permit must be approved before land is subdivided; construction of, addition to or alteration of a building or structure; or alteration or clearing of land (including but not limited to grading, blasting, preparation for the construction of services or roads). A Development Permit is required unless one of the following exemptions applies:

a. A property is less than 1 hectare in area and less than 10% of the site contains slopes of greater than 30%; or

b. It is shown, to the satisfaction of the Chief Building Inspector, that any proposed alteration or change to the land is not in a geotechnically sensitive area and will not affect geotechnical stability. A report prepared by a professional engineer experienced in geotechnical evaluation licensed in the Province of BC may be required at the discretion of the Chief Building Inspector; or,

c. Construction of fences, solid screens less than two (2) meters in height or, construction of retaining walls less than 1.5 meter in height, or

d. Alteration of land or construction is for a purpose other than human settlement and where a topographic survey is conducted by a BC Land Surveyor (or other person as permitted by the Land Surveyors Act) and submitted to the Director of Development Services and indicating that the development site area slopes are less than 30% slope, or

e. A Development Permit of this type has been issued or a covenant has been or will be registered on property title identifying that areas greater than 30% slope will remain undisturbed, and the conditions in the Development Permit or covenant have all been met, and the conditions addressed in the previous Development Permit or covenant will not be affected; or,

f. There is a change of use or alteration of an approved existing building or structure in which the building or structure footprint is not altered or increased or addition to buildings and structures that are less than 10 m^2 in area; or,

g. There is placement of temporary construction and project sales offices, or storage of construction materials on a site provided that the use is removed within 20 days of completion of the project and does not have an impact on sensitive environmental values or critical habitat; or,

h. The proposed works are site restoration, ecological enhancement, general parks maintenance and works in accordance with established Best Management Practices and Provincial approvals, as required, under purview of RDCO Parks Services; or,

i. T timber harvest, forest road construction, open livestock range, grazing enhancement, forest recreation or other forest management activity on Crown land that is conducted under the authority and approval of the Province; or,

j. The land is located within the Agricultural Land Reserve of the Province of BC and the activities are responsible, normal agricultural practices in accordance with the Farm Practice in BC Reference Guide and in accordance with the Farm Practices Protection Act. Interpretation or disagreements will be resolved through the provisions of the Act. Activities not covered by the Act or Guide will require a Development Permit; or,

k. In-stream and associated riparian water management works conducted by water purveyors (i.e. by Irrigation Districts) under the auspices of the Regional Water

Manager as defined under the Water Act provided the works are addressed under relevant Provincial permitting and is conducted in a manner consistent with the Development Permit Guidelines ; or,

l. Replanting or replacement of agricultural crops on areas of a site that are currently in crop production; or,

m. Environmentally sensitive removal of trees and shrubs designated as hazardous by a Professional Forester registered in BC in accordance with provincial "Firesmart" standards as outlined in a wildfire hazard report, with provisions in place to ensure that tree removal is carried out in accordance with the report recommendations; or,

n. Environmentally sensitive removal of trees and shrubs designated as host trees by the Sterile Insect Release Program as indicated in a report by a Qualified Environmental Professional (QEP) or an ISA Certified Arborist experienced in standard agricultural practices; or,

o. Environmentally sensitive removal of infested, diseased, or hazardous trees as indicated in a report by a Qualified Environmental Professional (QEP) or an ISA Certified Arborist who are certified Wildlife / Danger Tree Assessors with provision of environmental monitoring to ensure that tree removal is carried out in accordance with the report recommendations; or,

p. There is a technical subdivision for lot consolidation or boundary adjustments; or

h. The activity is conducted under direction of the Provincial Emergency Program.

GUIDELINES

The general guidelines for issuing development permits for Hillside Development are set forth below, however not all guidelines will be applicable to all developments. Typically, an assessment report prepared by a qualified geotechnical professional in the relevant discipline and licensed to practice in British Columbia will be required. Where a report has been accepted by the Regional District, recommendations will be used to establish conditions for the Development Permit. Care will be taken that guidelines intended to mitigate hazardous conditions are implemented in a manner sensitive to the environmental protection and preservation guidelines.

The following guidelines apply within the Hillside Development Permit Area:

- Require all areas with slopes, greater than or equal to 30%, be investigated as hazardous as determined in a professional engineers report and that the findings of the report be conditions contained in the Development Permit as part of the zoning, subdivision and building permit approval process.
- No excavation or filling shall be undertaken, nor any building or permanent structure erected, constructed or placed in areas subject to hazardous conditions. Further, buildings and structures shall be sited in accordance with setbacks determined by the Regional District or a geotechnical report.
- Development permit conditions may include conditions that lands that must remain free of development; require specified natural features or areas to be preserved, protected, restored or enhanced in accordance with the permit.
- Development opportunities, constraints and conditions of design will be identified on the basis of a topographic and feature survey showing natural slope contours (in 2 to 5

meter contour intervals), spot elevations, swales, knolls, ridgelines, bedrock outcrops, cliffs and slope transitions, seasonal and permanent watercourses, drainage routes, vegetation, top of bank, and break lines.

- Development shall be set back a minimum of 10 metres from the top of ridgelines, cliffs or ravines. Variation of the setback may be considered if a geotechnical review can justify a reduced setback.
- The Regional District may request the registration of restrictive covenants for areas that have been identified as hazardous.
- Existing vegetation shall be maintained to control erosion and protect slopes.
- The topographic survey will include current and future roads (public, strata, and forest), site grading and post development contours (in 2 to 5 meter contour intervals), water intakes on or adjacent to the development site, prominent views, and will identify potential hazards to neighbouring properties from existing or future development.
- A plan of site remediation including but not limited to; sensitive grading, revegetation (reflecting the Okanagan landscape), erosion control, and soil amelioration, prepared by appropriate qualified professional (registered landscape architect, professional forester) should be provided in advance of any site grading or removal of forest vegetation.
- The pattern of development should be responsive to the varied topography and natural landscape. Changes to existing terrain should be kept to a minimum.
- Cluster developments on steep slopes in a manner which responds to the site's natural contours and preserves more unbuilt open space for conservation or recreation/amenity space.
- Roads, access, and driveways should follow topography and avoid excessive cut and fills. Roads are encouraged to incorporate gentle curves and avoid long stretches of straight road.
- A reduction of road widths for local roads in order to reduce construction impact may be considered subject to agreement by the road authority.
- The impact of road design on potential road access to neighbouring lands beyond should be considered in accordance with the principles of these guidelines.
- Fill or cut slopes exceeding 10 meters in vertical height should be graded to resemble naturally occurring terrain and revegetated.
- Cut and fill slopes and road construction should be safe and not create a hazard of debris torrent or landslide.
- Hillside development must preserve or protect unique or special natural features of the site, such as land forms, rock outcroppings, mature trees and vegetation, natural drainage, hilltops and ridge lines.
- Manmade storm drainage and retention ponds should have a natural appearance and be restored to the condition of natural environment. Drainage should be designed as natural environmental corridors wherever possible.
- Drainage flow rates offsite should be retained as close as possible to pre–development conditions and drainage retention and detention is encouraged.
- The protection of water quality should be ensured.

See Schedule G: Hillside Development Permit Area

Appendix IV: Wildfire Development Permit Area & Guidelines

Designation

The Wildfire Development Permit Area is designated for the purpose of protection of the natural environment, its ecosystems and biological diversity and protection of development from hazardous conditions. Overall guidelines and specific conditions guidelines are included here for building and construction materials, landscaping alternatives and developments.

Wildfire Development Permit Areas include areas of land designated on "See Schedule H: Wildfire Development Permit Area". Using fuel typing and associated potential fire behaviour modelling, similar to that completed in the RDCO Community Wildfire Prevention Plan, this Development Permit Area has been established as indicated in Schedule H.

Justification

The Okanagan has a naturally dry climate and a community interface with large forested areas. Wildfire will be an ever present threat. The Okanagan Valley contains ecosystems within which wildfire is a natural disturbance agent, and since wildfire cannot be eliminated from these ecosystems, the threat of wildfire will always be present. However, the risk wildfire poses to urban development can be managed through appropriate development policies and continual management efforts.

Reducing wildfire hazard is a multilayered approach including education, larger community prevention activities, requirements at the time of rezoning or subdivision for new development, and changes in how residents build homes. These Development Permit Guidelines are considered a minimum and relate to the subdivision of land, construction of new homes, large additions and their immediate vicinity. Other community protection requirements may be determined and required through other development approval processes.

An important part of reducing wildfire risk and fuel hazards is modifying how individual homes are constructed and designed within proximity of forest or grass fuel type areas. . The accumulation of small choices such as siding material, building material, screening of soffits, screening the tops of chimneys, using non–combustible landscape mulch, and choosing plant material, can critically impact the survivability of a home or neighborhood.

There are two fuel types within the Development Permit Area: grass and forest fuel types. The guidelines apply to all development within the fuel types with the exception of being those guidelines involving fuel management, which are only applicable to development and construction occurring within the forest fuel types or within 100m of these forest fuel types.

This development permit area has the following objectives:

- Reduce the susceptibility to wildfire of new construction or large additions;
- Address wildfire risk reduction at time of subdivision;
- Ensure important ecosystem values are addressed in wildfire mitigation recommendations and activities'.

Exemptions

In Wildfire Development Permit must be approved before land is subdivided; construction of, addition to or alteration of a building or structure. A Development Permit is required unless one of the following exemptions applies:

a. The construction or alterations in accessory buildings or structures are not in excess of 55 square meters, and additions to existing approved buildings that are not in excess of 25% of the existing gross floor area; or

b. Where plans for construction are submitted for a building permit, and the plans show compliance with the guidelines "Wildfire Development Permit Design Guidelines"; and, a restrictive covenant is registered on the title of the property in order to ensure that future property owners are aware of and obligated to the wildfire risk and fuel hazard reduction measures, or

c. A development permit of this type or a covenant registered on property title has already been issued for the area in the past, and the conditions in the development permit or covenant have all been met, and the conditions addressed in the previous development permit or covenant will not be affected.

d. A Professional Forester registered in BC, specializing in wildfire risk and fuel hazard assessments and fuel management, has completed a report on the property or building in question that: indicates there is a low fuel hazard; and has provided recommendations for mitigating any existing or potential risk associated with the new development with provisions in place to ensure that development is carried out in accordance with the recommendations; or

e. There is a technical subdivision for lot consolidation or boundary adjustments; or

f. The proposed works are site restoration, ecological enhancement, forest fuel management, general parks maintenance and works in accordance with established Best Management Practices, RDCO Parks Operational Wildfire Protection Plan and Provincial approvals, as required, under purview of RDCO Parks Services.

Guidelines Background and Applicability

The guidelines will be used in reviewing Development Permit applications. It is important that construction within the Wildfire Development Permit Area designated in the Official Community Plan demonstrate an application of these guidelines.

The basis for these Guidelines is the FireSmart Manual developed by Partners in Protection and adopted by the BC Wildfire Management Branch as well as the RDCO's *Community Wildfire Protection Plan*.

These Design Guidelines do not cover all possible measures for wildfire risk reduction but should be considered minimum standards that focus mainly on new home construction, substantial additions, subdivisions and the immediately adjacent surroundings.

These guidelines will be used in reviewing Development Permit applications. While these guidelines only apply to WDP areas, flying embers can ignite structures several kilometers away from the fire source, and the recommendations contained within this document would be wise consideration for many homeowners in the Regional District.

These guidelines are to be used in conjunction with the WDP area maps as designated within the OCPs or otherwise defined as any location within forest and grass fuel types for building construction and within or 100m from forest fuel types for subdivision.

Development permit conditions may include conditions that lands that must remain free of development; require specified natural features or areas to be preserved, protected, restored or enhanced in accordance with the permit.

PRIORITY ZONES

Priority Zones have been developed to assist in the assessment and design of new and existing structures that may be threatened by wildfire. The priority zones are defined by a measured distance from the structure and there are specific guidelines that apply within each zone. The priority zones should be extended on downhill slopes and on windward exposures. The following descriptions for each zone are extracted directly from the FireSmart Manual and additional details on these Priority Zones, including objectives and specific vegetation management guidelines, are available in Chapter 3 of the manual.

Priority Zone 1 (0 – 10 meters)

This area is immediately adjacent to a given building and extends outward in all directions for a recommended minimum of 10 meters in flat terrain. The main objective of vegetation management in this zone is to create an environment that will not support fire of any kind. In some situations, this may be the only zone or area that homeowners need to manage.

Priority Zone 2 (10 – 30 meters)

This area begins 10 meters from the building and extends to 30 meters from the building. The main objective of fuel management within this zone is to create an environment that will only support fires of lower intensity and rate of spread.

Priority Zone 3 (30 –100+ meters)

This area begins 30 meters from the building and extends to 100 meters or farther from the building. Fuel management in this area may only be needed in specific cases, when high hazard levels resulting from heavy continuous forest vegetation and steep topography are not reduced enough by fuel management in Priority Zone 2.

SPECIFIC CONDITIONS GUIDELINES

It is not possible to entirely remove the threat of wildfire to a structure built within the wildland–urban interface. Instead, the design guidelines are intended to reduce the overall susceptibility of a structure to the threat of wildfire and thereby improve structure survivability.

Building Construction and Materials

1. Roofing
The roof coverings shall conform to Class A, B or C fire resistance as defined in the BC Building Code. Preferred roofing materials are metal, clay and asphalt shingles that meet the Class A, B or C requirements.

2. Exterior Wall Finishes
Any material used for exterior wall finishes should be fire resistant such as stucco, metal siding, brick, cement shingles, concrete block, poured concrete, rock and logs or heavy timbers as defined in the BC Building Code. If log or heavy timber materials are used, the property owner must have an approved development permit or covenant for fire resistant landscaping, concrete, rock material or irrigated lawn within 30m of the home (Priority Zone 2).

3. Chimneys
All chimneys should be constructed to meet BC Building Code requirements with an approved spark arrester consisting of 12 gauge welded or woven wire mesh screen with mesh openings 12 millimeters or less.

4. Eaves, Vents and Openings
All eaves, attic and under floor openings should be screened with corrosion–resistant, 3–millimeter non–combustible wire mesh.

5. Windows and Glazing
All windows must be double paned or tempered glass.

6. Balconies, Decks and Porches
All ground level decks, balconies and porches should be skirted with fire resistant materials as outlined in the Exterior Wall Finishes section above. These features should not be open to the environment such as to allow vegetation to grow beneath the feature or that allows combustible material to be stored beneath the feature (i.e. firewood, lumber, paint, etc).

Building Construction Alternatives

The following is an alternative to the *Building Construction and Material – Guideline # 6*:

a) Balconies, decks and porches can be built with construction utilizing the following materials as a minimum equivalent to the requirements:

   i. Wood columns – 6”x 6” minimum nominal dimension (solid sawn or built–up)

   ii. Wood beams – 6”x 8” minimum nominal dimension (solid sawn or built–up)

   iii. Exposed joists – 3”x 6” minimum nominal dimension (solid sawn or built–up)

   iv. Joists – may be dimension lumber provided that the underside of the joists is clad with 1” lumber, ½ panel type sheathing or non–combustible finishes.

b) As an alternative to the materials listed in a(i) the structures may be enclosed from the deck floor to the grade with wood frame wall or skirting construction clad.

Landscaping

Any combustible fuels surrounding the building within the Priority Zones may require modifications or removal. Managing these areas around the buildings is important for safe and successful fire protection. . Any landscaping work should also take into consideration ecosystem retention and restoration objectives and values. The guidelines below provide specific landscaping recommendations.

1. A fuel free space should be achieved in Priority Zone 1. This includes the removal of coniferous evergreen shrubs such as junipers, mugo pines, or coniferous evergreen hedges.

2. No additional evergreen trees are to be planted within Zone 1.

3. Forested areas within Zones 2 and 3 should be thinned to achieve 3–6 meter spacing between crowns.

4. Prune retained trees to a minimum height of 2 meters above the ground on flat terrain and 3 meters on slopes greater than 15%.

5. Less combustible or fire resistant plants and shrubs should be used during landscaping design (for example, deciduous shrubs, annuals, perennials and mowed grass)

6. Combustible landscaping materials, specifically mulch or wood chips should not be used in Zone 1.

Landscape Alternatives

It is not advisable to retain previously existing mature coniferous trees within 10 meters of a building. Any coniferous trees retained in Priority Zone 1 must:

a. Have the branches pruned to 3 meters above the ground.

b. Be spaced so that no tree crown, or group of tree crowns, is closer than 3 meters to the next trees crown or group of tree crowns.

c. No branches be within 3 meters of the buildings or balconies.

Alternatives for Any Guidelines

Where a Development Permit is required, and subdivision of land, development or construction is proposed to vary from the Wildfire Development Permit Design Guidelines, a report by a registered professional forester or other registered professional with wildfire management experience is required to ensure wildfire risk reduction is occurring.

Fuel Management Guidelines

Subdivisions that are planned within the forest fuel types or within 100m of the forest fuel types on the Development Permit Area maps must engage a registered professional forester with wildfire management experience to undertake a Wildfire Risk Reduction Report for the development prior to receiving a development permit.

This report should include, but not be limited to, the following contents:

- Fuel Hazard Assessments for all proposed structures
- Fuel Management Treatment Recommendations for areas and natural area reserves
- Fuel Management Prescription to mitigate the existing fuel hazard in the above areas
- Community design guidelines as per the FireSmart Manual (road design, emergency vehicle access needs, bridge load limits, water supply, landscaping, building materials, etc)

Other Guidelines

- Improve access in areas of the community that are considered isolated and that have inadequate developed access for evacuation and fire control.
- Require access points suitable for evacuation and the movement of emergency response equipment are provided.
- Development shall be set back a minimum of 10 metres from the top of ridgelines, cliffs or ravines. Variation of the setback may be considered if a Professional Forester registered in BC specializing in wilfire risk and fuel hazard assessments and fuel management can justify a change in the setback distance.
- May request the registration of a restrictive covenant to ensure long term wildfire risk reduction and that reflects the wildfire risk reduction guidelines and best practices included in this Development Permit Area.
- Encourage wildfire risk reduction through conducting fuel hazard abatement in a way that is supportive of retaining or restoring the natural environment.

See Schedule H: Wildfire Development Permit Area