Chapter 12: Natural Environment DP Guidelines
CATEGORY

Sec. 919.1(a) of the Local Government Act for the protection of the natural environment, its ecosystems and biodiversity.

Sec. 919.1(1)(i) of the Local Government Act for the establishment of objectives to promote water conservation.

PROPERTIES AFFECTED

Unless exempted (see Exemptions Section below) a development permit addressing natural environment and water conservation guidelines (see Guidelines Section below) must be approved before:

- Subdivision of land;
- Alteration of land, including but not limited to clearing, grading, blasting, preparation for or construction of services, and roads and trails;
- Drilling a well for consumptive or geothermal purposes; and/or
- Construction of, addition to, or alteration of a building or structure;

for those properties shown as Natural Environment Development Permit Areas (DPA) on Map 5.5.

JUSTIFICATION

The City of Kelowna has designated environmentally sensitive areas and groundwater resources which have a high intrinsic value and are therefore important to the City and its residents as DP areas. The City of Kelowna wishes to use this authority for developments that may impact on the environment, ground and surface water quality and/or quantity, or natural conditions. The Development Permit Area designation is intended to complement federal and/or provincial acts and regulations.

Aquatic ecosystems encompass watercourses of all types (creeks, streams, rivers, ponds, lakes, wetlands and springs) and their associated riparian management areas (areas of land and vegetation adjacent to watercourses that help to maintain healthy aquatic environments). These ecosystems have been identified through inventories commissioned by the City and through
partnerships with provincial and federal initiatives. These sensitive aquatic ecosystems are designated as Development Permit Areas because of their environmental significance as habitat for fish and wildlife, their vital functions in natural water storage and flood protection, their increasingly important role in reducing the effects of climate change (e.g. attenuating water flows and air temperature) and their sensitivity to disturbance by development.

Terrestrial ecosystems encompass areas such as old coniferous forests, coniferous woodlands, grasslands (includes antelope-brush, sagebrush and disturbed grasslands) and sparsely vegetated ecosystems (rock outcrops, talus and cliffs). These ecosystems have been identified through inventories commissioned by the City and through partnerships with provincial and federal initiatives. Due to their environmental significance as habitat and/or corridors for wildlife (including many rare, threatened and endangered plant and animal species), their contribution to local and regional biodiversity, and their sensitivity to disturbance by development, these sensitive terrestrial ecosystems are designated as Development Permit Areas.

With the exception of the City of Kelowna, the City’s four other major water suppliers rely heavily on groundwater to provide drinking water to residents in their respective service areas. Heavy reliance on groundwater for domestic use and consumption suggests that protecting Kelowna’s aquifers should be given first priority through the implementation of quality and quantity protection measures. Groundwater may also sustain important habitat as base flow or discharge to surface water sources. As a result, care must be taken within these areas to avoid contamination of underlying aquifers and to promote their sustainable use. Groundwater resource protection requires that existing land uses and future developments mitigate the introduction of contaminants. Mitigation will be promoted and enhanced through the issuance of natural environment development permits for affected properties. The protection of source drinking water is critical.

The development permit process will be used to determine how adverse environmental impacts can, or cannot be abated using appropriate precautionary measures as part of site and building design, construction, and long-term maintenance.

OBJECTIVES

The objective of Natural Environment Development Permit Areas is to ensure that negative impacts (disturbance) on environmentally sensitive areas are minimized by:

- Protecting, restoring, and enhancing environmentally sensitive areas to a functioning ecosystem;
- Protecting and/or enhancing water quality;
- Protecting drinking water sources against possible contamination from land use and development activities;
- Managing the introduction and spread of invasive species;
- Minimizing soil disturbance;
- Protecting the hydrological functions of environmentally sensitive areas;
• Protecting biological diversity, wildlife and important wildlife habitats, features and functions;

• Protecting subsurface aquifers forming part of the City of Kelowna water supply against possible pollution from land use and development activities; and

• Promoting the efficient use of water to ensure a sustainable hydrologic system in the watershed.

EXEMPTIONS

A Natural Environment Development Permit will not be required when:

A. a covenant which effectively protects the entire environmentally sensitive area is registered under the Land Title Act for the subject property, all the conditions in the covenant have been met, and the proposed development will not affect any portion of the environmentally sensitive area; or

B. a report prepared by a qualified environmental professional registered in British Columbia has been submitted and accepted by the City of Kelowna that concludes that the land is not environmentally sensitive and the natural feature is no longer present due to previously approved development, and cannot be restored; or

C. the proposed development will have no significant negative impacts to the environmentally sensitive areas identified on the property and/or the environmentally sensitive area is permanently protected. A report prepared by a qualified environmental professional registered in British Columbia may be required; or

D. the only activity being proposed onsite relates to the removal of hazardous and beetle kill trees and a report prepared by a certified forestry professional, registered in British Columbia and qualified as a Wildlife/Danger Tree Assessor, has been submitted which concludes the tree(s) is (are) hazardous; or

E. the development activity is on Crown Land and involves timber harvesting, forest road construction, open livestock range, grazing enhancement, forest recreation or other forest management activity that is conducted under the auspices of the province; or

F. actions and activities are necessary in order to prevent immediate threats to life or property; or

G. the activity proposed on the site will not impact an environmentally sensitive area and the activity relates solely to normal farm practices in accordance with the Farm Practices Protection Act and the landowner follows other requirements or regulations listed in the Act.

The following guidelines may be applied when setting Development Permit conditions:

GUIDELINES

In setting Development Permit (DP) conditions, the City may cite municipal, provincial or federal government policies, regulations, guidelines and best management practices (BMPs).
The general guidelines for issuing development permits in Natural Environment Development Permit Areas are set forth below; however, not all guidelines will apply to all developments. Typically an assessment report which has been prepared by a professional qualified in the relevant discipline and licensed to practice in British Columbia will be required. Report recommendations may be used by the Director of Land Use Management, or designate, to determine conditions for the Development Permit.

1.0 **Biodiversity**

1.1 Retain intact ecosystems and their connectivity and reconnect fragmented ecosystems, where practical and necessary, by establishing corridors and protecting habitats for isolated species or populations.

1.2 Wildlife corridors must be large enough to ensure sustainable populations and prevent isolated habitat patches. The exact location and extent of corridors will be determined utilizing contemporary best management practices.

1.3 Improve the viability of threatened and endangered species through the protection and enhancement of habitat, the rehabilitation of habitat, the development of contingency plans for major disruptions and transplanting wild or captive bred individuals.

1.4 Undertake recovery efforts to enhance or re-introduce species, subspecies and populations where species are threatened, endangered or extirpated.

1.5 Encourage the “eco-gifting” of ecologically sensitive, privately-held land, through a conservation easement, covenant, servitude or other mechanism as a means of protecting biodiversity.

2.0 **Habitat Protection**

2.1 Plan, design and implement land development and subdivision to protect environmentally sensitive areas. Habitats that provide for at-risk species, at-risk ecological communities and keystone species will be given priority for protection.

2.2 Maintain intact ecosystems. An intact ecosystem is considered to be a community or ecosystem that is maintaining proper function and has not lost significant species (for communities) or significant communities (for ecosystems).

2.3 Retain connectivity to adjacent ecosystems and avoid the creation of isolated islands of ecosystems.

2.4 Protect nesting, denning and breeding sites.

2.5 Protect rock outcrops, cliffs, and talus slopes.

2.6 Avoid disturbance to rock outcrops, cliffs, and talus slopes.
2.7 Retain wildlife trees (including fallen trees and snags, trees with cavities), leaf litter, fallen debris and natural grasslands in a manner that balances FireSmart principles with ecosystem sensitivity.

2.8 Locate artificial snags to improve habitat.

3.0 **Buffers**

3.1 Establish buffers that are large enough to protect the ecological integrity of the environmentally sensitive area. The exact location and extent of buffer areas will be determined utilizing contemporary best management practices.

3.2 Establish buffers on public land where possible.

3.3 Buffers on private land should be protected by covenant.

3.4 Fencing is to be installed along buffers where appropriate.

4.0 **Vegetation**

4.1 Maintain ecosystems in an undisturbed state during and after the development process (e.g. avoid disturbance to sites where rare plants are growing and where rare natural plant communities occur).

4.2 Plant native species of trees, shrubs and ground cover and discourage the use of vegetation that is not indigenous to the Okanagan Valley.

4.3 Use trees, shrubs and ground cover adapted to the soil type and climate (sun, shade, moisture) conditions of the site.

4.4 Protect moderate and high value wildlife trees from removal where the risk to humans is low.

4.5 Retain trees and vegetation in a manner that balances FireSmart principles with ecosystem sensitivity.

4.6 Protect grasslands from encroaching trees.

4.7 Restore ecosystems to a natural state.

4.8 Restore grasslands and shrub communities.

4.9 Rehabilitate using native species.

4.10 Plant gardens and landscaped areas with native, dry land species (i.e. xeriscape).

4.11 Remove invasive weeds (manually where feasible) and take measures to prevent the spread of invasive species.

4.12 Conserve trees and protect their root systems from disturbance.

4.13 Conserve trees in communities (groups of trees along with their associated understory) rather than isolating individual specimens.
4.14 Restore native vegetation where disturbance has occurred.

5.0 **Urban Development (roads, housing, services and utilities)**

5.1 Require that development take place outside riparian management areas.

5.2 Site all service lines to minimize slope disturbance and outside of environmentally sensitive areas.

5.3 Site all service lines to discourage weed growth and require minimal maintenance by heavy equipment.

5.4 Restore disturbed areas quickly (with consideration given to hydrologic and climatic variables) to minimize erosion, ensure sediment control and prevent the spread of weeds. Ensure ongoing monitoring and maintenance of restored areas by qualified professionals to improve success.

5.5 Avoid the location of infrastructure corridors along, parallel to, or across riparian and other sensitive ecosystems. Where it can be demonstrated that alternatives are not possible, design crossings that are narrow and perpendicular to sensitive areas and elevated in order to maintain connections.

5.6 Design infrastructure to maintain the hydrology of aquatic ecosystems. Inflow and outflow streams should not be dyked or dammed.

5.7 Locate urban development and infrastructure away from existing large, old trees and snags.

5.8 Design infrastructure corridors and trails to be as narrow as possible, creating the minimum disturbance and configure them to accommodate wildlife crossings.

5.9 Accesses such as footpaths and stairways will be constructed so as to minimize slope disturbance and changes to natural drainage patterns.

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**Figure 1: Illustration of Riparian Management Areas**

*Illustration of the moisture gradient in a typical riparian ecosystem*  
(from Stevens et al. 1995:2)
6.0 Soil Disturbance

6.1 Where appropriate, require that sediment and erosion control plans be developed and/or reviewed by a qualified environmental professional.

6.2 Implement measures to minimize soil disturbance.

6.3 Limit alteration of land and construction of structures to that which is compatible with the characteristics of the applicable ecosystems and features.

6.4 Minimize the removal of gravel, sand, soils and peat.

7.0 Erosion Control

7.1 Install both temporary and permanent sediment/pollutant containment and erosion control measures.

7.2 Design and construct to avoid increases to the volume or sediment loads of stormwater discharge above those that would occur under “natural,” pre-development conditions.

8.0 Water and Drainage

8.1 Ensure that development activities do not negatively impact the quality of surface water.

8.2 Ensure that land development and associated activities does not impact base flows, natural drainage patterns and the natural stream channel geometry.
8.3 Preserve natural watercourses and manage as open streams.

8.4 Maintain normal riparian processes such as flooding, seasonal drawdown, and groundwater recharge.

8.5 Implement measures to prevent spills of oil, grease and other contaminants into adjacent watercourses (e.g. oil/grit separators and siltation ponds).

8.6 Minimize impervious surfaces through use of permeable materials and techniques to improve absorption (e.g. gravel, pavers, grasscrete, grass field for overflow parking, “country lanes”).

8.7 Prohibit unnatural obstructions and impediments to the flow of a watercourse, ditch, drain or sewer.

8.8 Manage and minimize opportunities for livestock crossings and access to water.

8.9 Promote the collection, storage and use of rainwater.

8.10 Require that development proposals incorporate rainwater best management practices to ensure that post-development peak flows do not exceed pre-development peak flows (e.g. green roofs, underground rain water storage system and rain barrels).

8.11 Require that drainage plans address the effective and environmentally sensitive handling of peak flows.

8.12 Require that runoff is directed to suitable locations (e.g., granular and grass swales that discharge to open space).

8.13 Prohibit connection of rainwater leaders to the stormwater system and allow rainwater to drain to ground surface or soak away pits, except in those areas deemed unsuitable by a qualified professional.

8.14 Use constructed wetlands and detention ponds to improve the quality of rainwater through biofiltration.

8.15 Retain as much existing vegetation as possible and plant native trees and shrubs to restore the vegetative mass where clearing has occurred.

8.16 In the context of land disturbance, the applicant will ensure the safe collection and conveyance of onsite drainage such that no downstream or immediately adjacent properties are adversely affected. Such works will also divert drainage away from hazardous condition (e.g. steep slopes) areas.
9.0 Groundwater

Figure 4: Confined and unconfined aquifers and wells
(Environment Canada http://www.ec.gc.ca/eau-water/default.asp?lang=En&n=A6A38B97-1)

9.1 Encourage private wells to be closed when a parcel is connected to a community water system.

9.2 Require that the design and installation of earth energy systems (geothermal) conform to best management practices including those set by the Canadian Standards Association (CSA) and other municipal, provincial, or federal regulatory requirements.

9.3 Designers, installers and drillers of earth energy systems must be accredited by Canadian Geoexchange Coalition (CGC) and installations must be certified by the Canadian Geoexchange Coalition.

9.4 A hydrogeological assessment, conducted by a qualified hydrogeological professional registered in British Columbia, may be required prior to the installation of earth energy systems and must conclude that the system will result in no significant impacts to existing ground and surface water conditions (e.g. temperature and quality).

9.5 A hydrogeological report from a qualified professional must address the appropriateness of the proposed property and the location of underground fuel storage tanks, chemical storage, and use/storage of other potential sources of groundwater contamination. If the subject property is considered appropriate, the qualified professional will provide recommendations with respect to the installation and maintenance of tanks/storage containers and other associated infrastructure.

9.6 Strongly discourage the use of chemical fertilizers, pesticides and herbicides in order to protect highly vulnerable aquifers.

9.7 Prohibit land disturbance that would have a negative impact on groundwater recharge and wellhead protection areas.

9.8 Minimize the frequency with which the landscape and aquifers are disturbed (e.g. boreholes) to access groundwater flow. As an example, where possible, district energy systems are preferred over a series of individual wells for geothermal purposes.
10.0  **Fill**

10.1  Require that the toe of any fill be located outside the riparian management area and that the face of the fill be no steeper than a 3:1 slope unless retained by an approved structure, and shall be adequately protected against erosion from potential flooding, wave action, ice or other debris.

11.0  **Use of Environmentally Sensitive Areas**

11.1  Minimize the negative impacts of livestock (e.g. grazing) in riparian areas.

11.2  Limit access to environmentally sensitive areas and important nesting, denning and other habitat features.

12.0  **Riparian Management Areas**

12.1  Require that all development meets or beats the requirements of the provincial Fish Protection Act (Riparian Areas Regulation). Projects must comply with Riparian Management Area Setbacks in Table 12.1 subject to section 12.3.

12.2  Riparian management area setback widths are measured perpendicular from the watercourse according to the following (see Table 12.1):

- streams - measured from the top-of-bank, or where the top-of-bank is poorly defined, measured from the natural boundary;
- ravines and other stream corridors with steeply pitched banks - measured from the top of ravine bank;
- wetlands and lakes with gradually sloping shores - measured perpendicularly from the natural boundary; and
- Okanagan Lake, as determined by the Province based on the 1:5 year flood level. In the absence of a 1:5 year flood level, the geodetic elevation of 342.5m will apply.

12.3  Applicants may apply to vary the width of the Riparian Management Areas listed in Table 12.1. The City will only consider supporting an application to vary in order to achieve “no net loss” and where an assessment has been completed and provides recommendations to protect the integrity of the riparian area. Any proposed relaxation of stream setback widths, storm water requirements, erosion and sediment control requirements are to be referred to the City for review prior to filing the assessment report by a Qualified Environmental Professional (QEP) with the appropriate provincial ministry or agency. Within the Riparian Management Area (RMA), restoration of streamside vegetation may be a requirement of the development process.

12.4  Any proposed flexing of riparian management areas must be referred to the City for review prior to filing the report with the appropriate provincial or federal agency.
### Minimum Riparian Management Areas (RMA)

<table>
<thead>
<tr>
<th>Watercourse</th>
<th>Watercourse Reach</th>
<th>RMA (meters)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 Bauer Brook</td>
<td>All</td>
<td>15</td>
</tr>
<tr>
<td>2 Bellevue Creek</td>
<td>All</td>
<td>15</td>
</tr>
<tr>
<td>3 Bellevue Creek (North Arm)</td>
<td>All</td>
<td>10</td>
</tr>
<tr>
<td>4 Bertram Creek</td>
<td>All</td>
<td>15</td>
</tr>
<tr>
<td>5 Brandt Creek</td>
<td>All</td>
<td>15</td>
</tr>
<tr>
<td>6 Bruce Creek</td>
<td>All</td>
<td>15</td>
</tr>
<tr>
<td>7 Campbell Brook</td>
<td>All</td>
<td>15</td>
</tr>
<tr>
<td>8 Cedar Creek</td>
<td>All</td>
<td>15</td>
</tr>
<tr>
<td>9 Dewdney Creek</td>
<td>All</td>
<td>15</td>
</tr>
<tr>
<td>10 Duggan Brook</td>
<td>All</td>
<td>15</td>
</tr>
<tr>
<td>11 Fascieux Creek (North and South Arm)</td>
<td>All</td>
<td>15</td>
</tr>
<tr>
<td>12 Francis Brook</td>
<td>All</td>
<td>15</td>
</tr>
<tr>
<td>13 Gopher Creek</td>
<td>All</td>
<td>15</td>
</tr>
<tr>
<td>14 Hachey Creek</td>
<td>All</td>
<td>15</td>
</tr>
<tr>
<td>15 Hydraulic Creek</td>
<td>All</td>
<td>15</td>
</tr>
<tr>
<td>16 Industry Brook</td>
<td>All</td>
<td>15</td>
</tr>
<tr>
<td>17 K.L.O. Creek</td>
<td>All</td>
<td>15</td>
</tr>
<tr>
<td>18 Okanagan Lake</td>
<td>All</td>
<td>15</td>
</tr>
<tr>
<td>19 Lebanon Creek</td>
<td>All</td>
<td>15</td>
</tr>
<tr>
<td>20 Leon Creek (aka Thompson Creek)</td>
<td>All</td>
<td>15</td>
</tr>
<tr>
<td>21 Michael Brook</td>
<td>All</td>
<td>15</td>
</tr>
<tr>
<td>22 Mill Creek</td>
<td>Downstream of Hardy Street</td>
<td>15</td>
</tr>
<tr>
<td>23 Mill Creek</td>
<td>Upstream of Hardy Street</td>
<td>30</td>
</tr>
<tr>
<td>24 Mission Creek</td>
<td>Downstream of Gordon Drive</td>
<td>15</td>
</tr>
<tr>
<td>25 Mission Creek</td>
<td>Upstream of Gordon Drive</td>
<td>50</td>
</tr>
<tr>
<td>26 Priest Creek</td>
<td>All</td>
<td>15</td>
</tr>
<tr>
<td>27 Rembler Creek</td>
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<td>15</td>
</tr>
<tr>
<td>28 Rumohr Creek</td>
<td>All</td>
<td>15</td>
</tr>
<tr>
<td>29 Scotty Creek</td>
<td>All</td>
<td>15</td>
</tr>
<tr>
<td>30 Simpson Spring</td>
<td>All</td>
<td>15</td>
</tr>
<tr>
<td>31 Thompson Brook</td>
<td>All</td>
<td>15</td>
</tr>
<tr>
<td>32 Varty Creek</td>
<td>All</td>
<td>15</td>
</tr>
<tr>
<td>33 Upper Vernon Creek</td>
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<td>15</td>
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<tr>
<td>34 Whelan Creek</td>
<td>All</td>
<td>15</td>
</tr>
<tr>
<td>35 Wilson Creek</td>
<td>All</td>
<td>15</td>
</tr>
<tr>
<td>36 Wetlands (no association with fish habitat)</td>
<td>All</td>
<td>15</td>
</tr>
<tr>
<td>37 Wetlands (associated with fish habitat)</td>
<td>All</td>
<td>30</td>
</tr>
<tr>
<td>38 Escarpments or Ravines</td>
<td>All</td>
<td>10</td>
</tr>
<tr>
<td>39 Springs</td>
<td>All</td>
<td>15</td>
</tr>
</tbody>
</table>

**Notes for Table 12.1**

1. Any watercourse not in this list is subject to the provincial acts and regulations.
2. Measured perpendicularly inland from the top of the bank, top of ravine or natural boundary, as applicable. RMA’s apply to both sides of the stream.
3. Minimum RMA widths are intended to achieve “no net loss” when considering individual site conditions.
13.0 Mitigation

13.1 Where disturbance cannot be mitigated onsite, ensure that offsite environmental improvements occur with the intention of achieving no net loss of critical habitat.

14.0 Ongoing Maintenance

14.1 Require ongoing maintenance of areas that have been rehabilitated or restored.

14.2 Require the registration of covenants for areas that have been rehabilitated or restored.

15.0 Monitoring

15.1 Require that a qualified professional provide ongoing monitoring of Development Permit conditions.

Performance Bonding

The City may require the applicant to submit to the City a cost estimate, prepared by a qualified professional and accepted by the City, of the total cost of rehabilitating and/or restoring the environmentally sensitive area.

The applicant will provide adequate financial security, as determined by the City, prior to the issuance of approvals of any building or site disturbance.

The value of the financial security will be based upon the estimated cost of:

- rehabilitating and/or restoring an environmentally sensitive area;
- rehabilitating and/or restoring an environmentally sensitive area, in the event that an environmentally sensitive area is damaged as a consequence of a contravention of a condition contained in the development permit;
- restoring fish habitat; and
- repairing damage caused by construction or site disturbance.