



PLANNING & DEVELOPMENT

**STEEP SLOPE
DEVELOPMENT PERMIT AREA GUIDELINES
COMMENT SHEET**

DEVELOPMENT PERMIT AREA 6

DPA 6 | Steep Slope Development

Justification for the Designation

Many of the remaining undeveloped residential lands in Nanaimo are on steep slopes and hillsides. These lands present special challenges in terms of erosion problems, storm water drainage, groundwater management, and other environmental and visual impacts. Protecting these slopes in the course of development is important to both the environment and the natural beauty of Nanaimo.

Conventional detached residential developments located on steep slopes are typically very disruptive to these slopes given the densities that need to be achieved. It is also very difficult to retain vegetation on steep slopes. For this reason, the City supports the use of larger single family lots or housing forms that concentrate development in less sensitive parts of steeply sloped areas, leaving a significant portion of the land in a relatively undisturbed state. Lands subject to Steep Slope Development are identified on [Schedule 11](#) of [City Plan](#).

Objectives

1. To achieve environmentally sound and livable hillside neighbourhoods.
2. To minimize the risk of erosion, landslip, or rock fall to development in steep slope areas.
3. To preserve steep slope areas in their natural state in order to protect natural vegetation and sensitive ecosystems.
4. To enhance the desirability and marketability of hillside developments, allowing flexibility and innovation in design, while recognizing the importance of preserving the natural features and the hillside character.

Compliance with the City of Nanaimo Development Permit Area Guidelines are a requirement with all development permit applications.

This comment sheet must be completed and submitted as part of your Development Permit Application.

This document has been provided for convenience only and the City does not warrant or guarantee the accuracy or completeness of the Information. Graphical and Appendix information has not been included in this document, and may be pertinent to completing certain guidelines. The complete Steep Slope Development Permit Area Guidelines document can be found [HERE](#).

Application Submission Requirements Checklist

As per section 3.5 of the Steep Slope Development Permit Area Guidelines

Site Survey Requirements

A topographic and feature survey of the site is required prior to site planning or design, and should include the following minimum information:

- Property lines, easements, rights-of-way;
- Contours (1.0 metre interval), spot elevations;
- Natural physical features including swales, knolls, ridgelines, bedrock outcrops, cliffs and slope transitions or break lines;
- Existing human made features including roads, curbs, sidewalks, above and below ground utilities, trails, buildings, structures, fences and retaining walls;
- Slope analysis showing slope intervals of 0-10%, >10-20%, >20-30%, >30%. This information should also be shown 20 m beyond the property line;
- Potential hazards and hazard areas (see “Geotechnical Evaluation” below);
- Environmental attributes (see “Environmental Assessment” below); and
- Archaeological and historic resources.

Geotechnical Evaluation

Undertake a geotechnical survey and evaluation of all or portions of the site, prior to site planning or design. The survey should include:

- An assessment of existing surface and subsurface conditions;
- Identification of hazards;
- Potential impacts of development; and
- Recommendations for safety, site protection, development and mitigation.

Use the “Guidelines for Preparation of Geotechnical Reports” in preparing this evaluation.

Environmental Assessment

An environmental assessment is required that consists of the following minimum steps:

- An inventory of environmental attributes on the site;
- An evaluation of the impacts of the proposed development on these attributes; and
- Proposals to avoid, minimize, mitigate or compensate for impacts.

The environmental inventory should coordinate with the site survey, and be based on available documented data and field investigations of the site. It should include the following information as a minimum:

- Watercourses (if applicable): characteristics to be surveyed and mapped include top of bank, wetland or natural boundary (as appropriate); leave strip boundary as defined in Schedule G of the Zoning Bylaw or Schedule B of the City Plan.
- Environmentally Sensitive Areas (ESA's): ecosystems that are ecologically important and in danger of disappearing. Known ESA sites are identified in Schedule B of the City Plan; however, any sites that meet the description of environmentally sensitive lands provided in the City Plan (see accompanying text box) are considered an ESA.
- Trees: location, species and dimensions of significant trees (as defined in the Tree Protection Bylaw) and their drip lines, significant stands of trees;
- Vegetation associations and their coverage;
- Existence of rare or endangered plant or animal species or ecosystems (referred to provincially as red- and blue-listed).

An assessment of the environmental attributes of the site, based on the results of the inventory work, is required and should address the following in relation to the proposed development activities:

- Opportunities and constraints of the environment as they apply to the proposed development;
- Measures to be taken to avoid impacts on environmental attributes of the site; and
- Measures to minimize, mitigate or compensate for environmental impacts where they are unavoidable.

Inventory and assessment work should be conducted and recommendations made by qualified professionals for issues within their area of expertise. Examples of professionals that may be required for some aspect of the environmental assessment include a Registered Professional Biologist, Professional Engineer, Registered Professional Forester or Arborist, Landscape Architect, etc.

Land Clearing and Tree Retention/Removal Plan

- A Tree Management Plan is required by the City. It shall illustrate existing stands of trees and understory vegetation to be retained and those to be removed. It shall also include specifications that describe how retention measures are to be implemented and maintained. Details of tree management plans are specified in the Management and Protection of Trees Bylaw.
- Clearing and tree removal should be phased to avoid creating large expanses of bare slopes, and thereby reduce the potential for erosion, land slumping and dust generation.

Grading Plan

A grading plan is required for development on steep slopes. Using the site survey information regarding topography, physical and natural features, it should indicate:

- Existing and proposed topography and features in plan view and key site sections;
- Limit of disturbance or limit of earthworks/grading;
- Delineation and shading to show cut and fill and cut and fill volumes; and
- At the request of the City, building envelopes and accesses to individual lots or building sites.
(ALWAYS REQUIRED UNLESS CONFIRMED BY THE CITY DURING PRE-APPLICATION MEETING)

Erosion and Sediment Control Plan

An erosion and sediment control plan is required for subdivision and development permit approvals on steep slopes. The erosion control plan should be prepared by a qualified registered professional engineer or erosion control expert. The plan should identify the potential for erosion and sedimentation and describe the measures to be taken to minimize that potential before, during and after site development.

Refer to the City's "Erosion and Sediment Control" brochure in developing an erosion control plan.

Drainage Management Plan

A Drainage Management Plan is particularly critical on steep slopes (Section 3.4.1). Developers of steep slope sites should pay close attention to the requirements of the City's Stormwater Management Goals, Objectives and Policies.

Application Requirements

Inventory requirements for a Drainage Management Plan on a steep slope site are:

- Definition of the existing drainage system, including identification of: the drainage basin to which the site contributes; existing minor and major flow routes and volumes; connections to existing drainage infrastructure.
- Hydrogeological investigation: groundwater conditions, recharge/discharge characteristics, and general flow.
- Geotechnical assessment: based on existing information of soil characteristics, provide an opinion on the potential for ground infiltration, for the purpose of groundwater recharge, as a drainage mechanism. Infiltration is encouraged on a site-by-site basis where appropriate soil and topographic conditions exist, but cannot be used in the calculation of detention volumes or drainage conduit sizes.
- Review of hydro meteorological data: if the site includes different hydro meteorological conditions than those established for the City, it may be necessary to adjust storm types or intensity distribution relationships.
- Water quality characteristics of proposed flows: suggest appropriate methods to deal with any quality concerns.
- Identification of catchment areas, flow routes, drainage capacities, flood plain issues, quality and hydraulic constraints, erosion potential and any specific environmental issues.

The Drainage Management Plan should make specific recommendations regarding:

- Stormwater routing using piped systems and/or open systems. Note that piped collection reduces groundwater infiltration and riparian base flows, and eliminates natural filtering processes that occur in ditches, swales or through natural percolation to the ground.
- Stormwater controls for infiltration or groundwater recharge, if appropriate or required, via ditch/swale seepage systems, infiltration galleries, or basins; detention or retention vs. direct discharge; water quality considerations.
- Impacts of irrigation on short and long-term stability of any slopes.
- Protection of drainage swales (e.g., covenant, rights of way).
- Proposed roof and footing drains for individual lots: on-site treatment or connections to storm sewers; appropriate means of controlling short or long-term erosion if on-site.
- Catch basins: conventional catch basins often have much lower inlet capacity when located on steeper hillsides. It may be appropriate to recommend alternative types of catch basins for correct foot size hillside conditions.
- Hydrogeological considerations: maintenance of existing groundwater regimes or attempts to correct known ground water problems.
- Energy dissipation into existing water courses, where necessary.
- Individual lot drainage and siltation control during and after construction: impacts of overland drainage from one lot to another.

Guidelines

Complete this Comment Sheet to address how the proposed subdivision complies with the Steep Slope Development Permit Area Guidelines.

3.1. Site and Subdivision Design		
<p>For planning new subdivisions on steep slopes, the following principles should be considered:</p> <ul style="list-style-type: none"> • The conventional 600 – 700 sq. m. single family lot development is typically the most disruptive housing type on steep slopes. • Open space development (Section 2 – Concepts and Definitions) can be more appropriate to protect steeper or more environmentally or geotechnically sensitive parts of the hillside. • Alternatively, larger lot sizes are required. 		
<p>3.1.1 Assessing the Site</p> <p>Objective</p> <p>To identify significant features prior to developing the building site and road design in order to acknowledge the hillside character and natural features of the site.</p>		
Guidelines	Complies (Y/N/NA)	How are you addressing or not addressing the guideline? Please reference section in professional report, if provided.
A review that includes a topographic survey (Section 3.5.1) to assess and plan the site in a manner that respects the slope and special features.		
A geotechnical assessment (Section 3.5.2) to identify and avoid hazardous areas, to make the site safe for human use and to maintain environmental quality.		
An environmental assessment (Section 3.5.3) to identify existing ecosystems and special natural and cultural features of a site. Using what nature has provided is both environmentally and economically wise. Emphasizing the existing characteristics of the site can help retain natural resources, allow for efficient construction and maintenance, and can reduce permitting and site development costs.		
Adherence to the guidelines associated with any Development Permit Areas affecting a site as designated in the Official Community Plan for other purposes is required. A Steep Slope Development Permit applicant may not be required to obtain separate approvals or duplicate assessments provided the intent of all permits are met.		

3.1 Site and Subdivision Design

<h4>3.1.2 Planning the Development</h4> <p>Objective To undertake subdivision planning and design that respects the existing natural area's terrain, hazardous conditions, and ensure the form and character of the development enhances the natural setting.</p>		
<h5>3.1.2.1 Single-Family Subdivision Development</h5> <p>In general, the City supports the use of larger single-family lots or open space development or a combination of these two types of development, on steep slopes in order to provide appropriate building sites while retaining natural features and hillside character.</p>		
Guidelines	Complies (Y/N/NA)	How are you addressing or not addressing the guideline? Please reference section in professional report, if provided.
When calculating lot area within single-family subdivisions it should be exclusive of any slope of 30% or greater. Where the minimum lot size cannot be achieved on lands with slopes less than 30%, a larger minimum lot size may be considered.		
Each single family parcel created by subdivision must have a buildable site and show a building envelope on the subdivision grading plan.		
Use building setbacks in a flexible manner to protect slopes and natural features from development encroachments (see section 3.4).		
Show proposed setbacks, driveways and building pads on grading and subdivision development plans.		
<h5>3.1.2.2 Open Space Development</h5> <p>Open space development should be used as an alternative to a conventional single-family subdivision where one or more of these criteria can be met:</p>		
Guidelines	Complies (Y/N/NA)	How are you addressing or not addressing the guideline? Please reference section in professional report, if provided.
It reduces site manipulation and preserves more of the natural character of the hillside than a standard single-family subdivision.		
It protects designated Environmentally Sensitive Areas (ESAs) on the property.		
It avoids developing steep or hazardous (e.g., erodable (or erodible) or flood-prone) portions of the property.		

3.1 Site and Subdivision Design

Guidelines	Complies (Y/N/NA)	How are you addressing or not addressing the guideline? Please reference section in professional report, if provided.
The open space provides a natural corridor through or around the property, or connects to open space in the neighbourhood		
The open space buffers higher density development from neighbouring single-family development, if applicable		
The proposed building forms are of a character and quality that fit into and enhance the surrounding neighbourhood.		
The development maintains a visually attractive ridgeline (see Guidelines on ridgeline developments).		
Installation of infrastructure and provision of public services can be economized.		
A plan for a proposed open space development shall show how it meets the above criteria, where applicable.		
In existing residential areas, open space development should be in the form of smaller single-family lots, duplexes, triplexes, quadruplexes, patio homes or small-scale townhouse complexes.		
The amount and distribution of open space to be retained, the availability of undeveloped buffers to neighbouring properties and the nature of surrounding development must be considered when deciding the appropriate mix of building form.		
To qualify as open space development on those lots proposing to cluster, a minimum of 20% of the gross site area shall be provided as permanent open space.		
The undeveloped portion of the parcel shall be designated and secured as permanent open space and shall not be further subdivided. Dedication of the Open Space to the Department of Parks, Recreation and Culture for City parkland will be considered as a preferred approach. If parkland is not an option, other options such as a land trust or an organization capable of holding and managing the site should be considered. Smaller tracts could be managed through a strata arrangement.		

3.1 Site and Subdivision Design

3.1.2.3 Roads and Lot Layout		
Guidelines	Complies (Y/N/NA)	How are you addressing or not addressing the guideline? Please reference section in professional report, if provided.
Straight lines and rectilinear shapes generally do not complement natural hillsides. Lay out roads and lots in a pattern that offers a variety of sizes and configurations that complement the topography and features of the site.		
Use flag or panhandle lots only where they can minimize cut and fill and can provide access to developable areas not readily accessible by public roads. Panhandle accesses shall meet the requirements of the City for servicing and fire protection.		
3.1.2.4 Trails and Open Space		
Guidelines	Complies (Y/N/NA)	How are you addressing or not addressing the guideline? Please reference section in professional report, if provided.
Retain open space and corridors between development cells or lots to provide continuous habitat linkages within the site as well as with neighbouring sites.		
Use trails or linear systems to link parts of the hillside community which are not otherwise linked by roads due to topographic constraints. An open space, streetscape and trail system should be developed to provide pedestrian access within the hillside area and to/from key destinations in other parts of the community (e.g. schools, commercial or town centres, parks, other trails, etc.).		
Avoid extensive slope grading to accommodate parks. Establish “pocket” parks for respite, where natural terrain permits or very minor grading is needed, which could serve as a local amenity as well as protect more of the slope.		
Incorporate significant features such as rock outcrops, streams, cliffs, and stands of trees into the open space/trail system.		

3.1 Site and Subdivision Design

3.1.3 Earthworks & Grading		
Objective		
To minimize the impact of grading and retain the natural and topographic character of the site.		
3.1.3.1 Grading		
In preparation of a grading plan that indicates clear feasibility for roads and building envelope without massive manipulation of the site, the following must be considered:		
Guidelines	Complies (Y/N/NA)	How are you addressing or not addressing the guideline? Please reference section in professional report, if provided.
Avoid grading or alteration of key topographic features (eg, knolls, ridgelines, bedrock outcrops, cliffs, ravines, etc).		
Avoid a manufactured appearance for graded slopes. Avoid sharp cuts and long or wide slopes with a uniform grade.		
Establish contours and gradients that resemble the naturally-occurring terrain. Round out slope transitions and blend transitions between lots or adjacent to undisturbed areas.		
Refrain from grading large flat terraces on hillside sites in order to expand developable area or to develop housing or other uses characteristic of flat or gently-sloped sites. Developing smaller terraces (e.g., for building pads, lawn areas, patios, stepped retaining walls, etc.) is acceptable.		
3.1.3.2 Cut and Fill		
In designing and developing the site, minimize the total amount of cut and/or fill and its environmental and visual impact by:		
Guidelines	Complies (Y/N/NA)	How are you addressing or not addressing the guideline? Please reference section in professional report, if provided.
Where the volume of cut exceeds the volume of fill material for a proposed development, do not dispose of it on site in the form of unnecessary filling, berming or side-casting. Where necessary, dispose of excess material at appropriate locations off-site.		
Revegetating exposed slopes as quickly as possible to prevent erosion and slope stability problems.		

3.1 Site and Subdivision Design

3.1.3.3 Earthworks		
In preparing an erosion plan, the following must be considered:		
Guidelines	Complies (Y/N/NA)	How are you addressing or not addressing the guideline? Please reference section in professional report, if provided.
Avoid potentially hazardous or unstable areas of the site.		
Do not clear more trees and vegetation than is needed to install services for any given phase of the development.		
Do not create deep scars or expose large areas of highly visible sub-soil and parent material of the site.		
Avoid side-casting of material along undeveloped road frontages.		
Avoid the excavations and the placement of fill that result in terrain forms that are not characteristic of the natural topography		
3.1.3.4 Retaining Walls		
Guidelines	Complies (Y/N/NA)	How are you addressing or not addressing the guideline? Please reference section in professional report, if provided.
Use retaining walls where they can reduce disturbing the slope to provide useable construction sites.		
Retaining walls should respect the natural character of the site and not be dominating or fortress-like.		
Retaining wall height should generally be limited to 3.0 metres for roads and site works, 1.2 metres for front yards and 2.4 metres for back and side yards. Higher walls may be appropriate where they are articulated, have a surface texture/pattern, or where sufficient landscaping is provided at its base		
Employ a system of smaller stepped retaining walls over the use of a large uniform wall. The height and depth of the wall steps should be consistent with the natural terrain or with the slope above and below the walls. For stepped retaining wall systems, landscape the intermediate terraces.		
If the retaining wall is related to the structural integrity of the building, it will be necessary to address the retaining wall through the building permit process.		

3.1 Site and Subdivision Design

3.1.4 Visual Quality		
Objective		
To protect and preserve the natural character of the hillside as well as to consider opportunities to provide scenic views from a hillside site.		
3.1.4.1 Ridgelines		
Certain ridgelines visible from strategic locations contribute significantly to the character of Nanaimo. A ridgeline is the continuous line that demarcates the contrast between the sky and the earth (i.e., the natural terrain or top of tree line), and can apply to ridges, knolls and significant topographic transitions. Attachment (b) of these Guidelines identifies significant ridgelines that are visible from many parts of the city and need to be protected for visual character.		
Guidelines	Complies (Y/N/NA)	How are you addressing or not addressing the guideline? Please reference section in professional report, if provided.
Intensive residential development (see section 2.4) in the vicinity of ridgelines should be sited so as to retain trees and other vegetation on ridgelines as much as possible, so that the ridgeline is seen predominately as a continuous line of natural terrain or vegetation.		
Where there are gaps or interruptions in the ridgeline caused by site development (e.g., buildings, road cuts, utility poles or corridors, site clearing, earthworks, etc.) plant trees and vegetation in front of and behind the disturbance to screen and restore a naturally appearing ridgeline.		
Interruptions should occur in several smaller components rather than one continuous interruption.		
Site building envelopes below the ridgeline. Avoid the placement of roads, clear cuts, and large or continuous buildings on or over ridgelines.		
On any parcel containing a significant ridgeline identified in attachment (b), where interruption of the natural terrain is [...] proposed to exceed 25% of the ridgeline length, within the parcel the siting and form of the development must compensate for this interruption by retaining most of the available slope below or beside the development in its natural state.		

3.1 Site and Subdivision Design

3.1.4.2 Scenic Features		
Scenic features are components of the site that are visually unique and visible to the site, neighbourhood or community (e.g., rock outcrops, cliffs, overhangs, ridgelines, knolls, ravines, gullies, water bodies, water courses, wetlands, etc.).		
Guidelines	Complies (Y/N/NA)	How are you addressing or not addressing the guideline? Please reference section in professional report, if provided.
Development should be sited and designed in a way so as not to alter, disturb or remove significant scenic features of a parcel such as a rock outcrop, cliff, overhang, ridgeline, knoll, ravine, gully, water body, water course or wetland.		
The form, exterior design and finish of buildings and structures should be complementary to the scenic feature, preferably through the use of muted colours and natural materials.		
Development should be sited so as to minimize the impact on down slope views by interrupting the view of imposing structures seen by the neighbourhood.		
3.1.4.3 Views from the Site		
Scenic view opportunities from hillsides are recognized as valuable to both hillside residents and the community as a whole. It is important, however, not to compromise the geotechnical or environmental integrity of the slope just to achieve views.		
Guidelines	Complies (Y/N/NA)	How are you addressing or not addressing the guideline? Please reference section in professional report, if provided.
Locate buildings to minimize interference with the views of nearby residences. For example, stagger buildings where appropriate to provide views between units that may otherwise limit the field of view.		
Locate buildings and set building heights so that upslope buildings can have views over downslope buildings. If massive grading of the slope is necessary to achieve this concept, it may be necessary to reconfigure the subdivision or layout. The priority is to avoid disruption of the terrain.		
Plan revegetation that will not encroach on views		
Locate key public open spaces (e.g., park, street end, etc.) to capitalize on scenic views from the site.		

3.2 Natural Environment

3.2 Natural Environment		
<p>This section of the guidelines addresses how to minimize the impact of development on the natural environment of the site and how to make residential development more compatible with the hillside environment.</p>		
<p>3.2.1 Environmental Protection</p> <p>Objective To identify and protect significant environmental features and natural systems.</p>		
Guidelines	Complies (Y/N/NA)	How are you addressing or not addressing the guideline? Please reference section in professional report, if provided.
Use the Environmental Inventory and Assessment (Section 3.5.3) to identify environmentally sensitive areas and features to be protected, and to determine measures to avoid, minimize or mitigate environmental impacts of the proposed development and development activities.		
Pay particular attention to sediment and erosion control during and after site development and construction. The City publishes a brochure “Erosion and Sediment Control” to assist landowners and developers in preventing and controlling erosion on their sites. An erosion control plan is required for subdivision and development permit approvals on steep slopes (Section 3.5.7).		
<p>3.2.2 Vegetation in the Landscape</p> <p>Objective To identify and protect significant stands of trees and vegetative communities.</p>		
<p>3.2.2.1 Strategies for Retaining Natural Vegetation</p> <p>Existing vegetation on steep slopes is important to the ecological and aesthetic values of the site as well to the maintenance of slope stability, drainage and erosion prevention. The decision to retain or remove vegetation should be based on an intimate knowledge of the site.</p>		
Guidelines	Complies (Y/N/NA)	How are you addressing or not addressing the guideline? Please reference section in professional report, if provided.
When preparing a land clearing and tree retention/removal plan apply the following criteria in determining existing vegetation to be retained:		

3.2 Natural Environment

<p>RETENTION CRITERIA</p> <ul style="list-style-type: none"> • <i>To retain special features and the character of the site</i> • <i>To retain slope stability</i> • <i>To prevent erosion</i> • <i>To keep special or rare trees, plants and plant communities (e.g., Garry oak woodlands, manzanita communities, etc.)</i> • <i>To protect habitat values</i> • <i>To selectively screen development or act as buffers</i> • <i>To maintain vegetated open spaces</i> <p>REMOVAL CRITERIA</p> <ul style="list-style-type: none"> • <i>To accommodate site development/improvements</i> • <i>To ensure public safety</i> • <i>To reduce fire hazard</i> 		
<p>Use open space development, and varied lot size and configuration to retain tree stands and other vegetation communities to preserve environmental value (e.g., habitat, biodiversity, heritage trees, etc.), maintain soil stability, provide a buffer between development cells and define neighbourhood character.</p>		
<p>Make strategic use of existing vegetation to retain the site's natural character and to break up views of building facades, roadways (e.g., cut and fill slopes) and other site works.</p>		
<p>The alignments and profiles of roadways and utilities should avoid disruption of significant and unique stands of vegetation and critical environmentally sensitive areas. Provide sufficient clearance between roads, services and vegetation root zones to ensure viability of the vegetation.</p>		
<p>On forested slopes, retain trees and tree stands that represent a range of ages, to provide for natural succession and the long term sustainability of the forest ecosystem.</p>		

3.2 Natural Environment

3.2.2.2 Phased Vegetation Removal		
Guidelines	Complies (Y/N/NA)	How are you addressing or not addressing the guideline? Please reference section in professional report, if provided.
Phase land clearing to minimize the area exposed to soil loss and erosion at any one time. Phasing may be service related (e.g., clear initially only enough to install roads and main service lines), or spatially related (i.e., clearing only one portion of the parcel at a time; completing development and revegetation to control erosion before starting the next portion).		
On individual large lots, limit clearing to what is required for services and the building footprint. Any additional clearing should be revegetated immediately.		
For areas of the site where vegetation must be removed but no construction will occur, <u>leave soil intact</u> (i.e., avoid compaction, excavation, filling, etc.) to allow for more successful replanting in these areas.		
3.2.3 Revegetation & Landscaping		
Objective		
To plant vegetation that helps mitigate the impacts of development, enhances visual quality and address the needs of residents.		
3.2.3.1 Site Restoration		
Not only do site disturbances (cut and fill, clearing, compacted soil, dump sites, eroded areas, etc.) have short-term impacts but, if not properly treated, these disturbances may have long-term negative impacts on personal safety, property and the environment.		
Guidelines	Complies (Y/N/NA)	How are you addressing or not addressing the guideline? Please reference section in professional report, if provided.
Restore disturbed areas of the site that are not part of a roadway or formal yard landscaping, to a natural condition as soon as possible after disturbance.		
Employ restoration practices specifically tailored to address the type and degree of disturbance and the specific conditions <u>RESTORATION PRACTICES</u> <ul style="list-style-type: none"> • Grade to natural contours • Stabilize the slope/bank • Alleviate soil compaction 		

3.2 Natural Environment

<ul style="list-style-type: none"> • Control erosion • Prepare the soil • Hydraulic seeding • Plant trees and shrubs • Irrigate & Maintain and follow up 		
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3.2.3.2 Tree and Plant Replacement

Guidelines	Complies (Y/N/NA)	How are you addressing or not addressing the guideline? Please reference section in professional report, if provided.
<p>Replace trees in a manner that helps to restore the natural character of the hillside site. Specifically, plant trees to screen undesirable views and buffer incompatible uses. Arrange trees in natural groupings or clusters rather than in lines or formal arrangements.</p>		
<p>Utilize plant material for site restoration and residential landscaping that is native to the region as much as possible. Where the use of native plant material is not desirable given site or view constraints, select plant material that is similar in appearance, growth habit, colour and texture to native plants and that will not act as a “weed” in the natural environment (i.e., it will not out-compete native plants, provide habitat for undesirable wildlife or act as a host for insect pests).</p>		
<p>Plant shrubs and trees in masses and patterns characteristic of a natural setting and with the intent of encouraging biodiversity.</p>		
<p>Do not encroach on views of others. Take into account the location, height and “bushy-ness” of tree species planted.</p>		
<p>For restoration or creation of habitat areas (e.g., riparian areas, ravines, greenways, etc.) use plant species that have value as food or cover for wildlife.</p>		
<p>For dry or south facing slopes, re-plant with drought and fire-resistant species. Appendix A provides further suggestions for treating vegetation on dry slopes in order to reduce potential fire hazards.</p>		

3.2.3.3 Irrigation

Guidelines	Complies (Y/N/NA)	How are you addressing or not addressing the guideline? Please reference section in professional report, if provided.

3.2 Natural Environment

Employ water-conserving principles and practices in the choice of plant material (“xeriscaping”), and in the irrigation design and watering of residential and public landscapes on hillside sites.		
Limit over-spray and run-off due to watering.		
Provide automatic shut-off valves for irrigation systems to reduce the risk of accidental erosion in the event that a head or pipe breaks.		

3.3 Works and Services

<h3>3.3 Works and Services</h3> <p>This section of the guidelines addresses various means of designing and siting roads and utilities to lessen impacts on steep slopes while maintaining public and private safety, individual lot access, municipal and emergency access, and other operational needs. Reducing cost of development and minimizing maintenance costs are also benefits.</p>		
<h4>3.3.1 Stormwater Management</h4> <p>Objective To assess design methods for collection, conveyance, control and treatment of stormwater that will mitigate potential impacts on and downstream of steep slope sites.</p>		
<h5>3.3.1.1 Drainage Planning</h5> <p>The City’s Stormwater Management Goals, Objectives and Policies limit runoff from new development according to the capacity and sensitivity of the downstream watercourse systems. Attention to these Policies is particularly critical on steep slopes due to the potential for significant impacts on downstream drainage.</p>		
Guidelines	Complies (Y/N/NA)	How are you addressing or not addressing the guideline? Please reference section in professional report, if provided.
Plans for all development on steep slopes must indicate how stormwater runoff will be impacted by the development and how those impacts will be mitigated.		
<p>Depending on the size of the development and complexity of the site conditions, a Drainage Management Plan may be required for the entire site and downstream drainage areas. For steep slopes, special attention must be paid to:</p> <ul style="list-style-type: none"> • Hydrological conditions prior to and after development; • Protection of natural flow paths, volumes and storage resources; • Impacts on trees, vegetation and other environmental features due to changes in drainage patterns; • Water quality prior to, during and after development; • Sediment and erosion control; • On and off-site drainage impacts (e.g., drainage from an upper lot to a lower lot). 		

3.3 Works and Services

3.3.2 Road Design		
Objective		
To allow flexibility in road layout patterns and road widths that compliment hillside character and where visual and environmental objectives can be achieved.		
3.3.2.1 Road Hierarchy and Alignment		
Roads are the skeleton of a neighbourhood, providing car, pedestrian and emergency access. They contain many other necessary services (sewer, water, electrical, etc.) and establish a pattern for lot development. However, the cuts, fills and retaining walls associated with achieving a “flat land” road standard can have a devastating effect. Roads in steep slope areas should help achieve a sense of neighbourhood while being sympathetic to the terrain.		
Guidelines	Complies (Y/N/NA)	How are you addressing or not addressing the guideline? Please reference section in professional report, if provided.
Design roads with a hierarchy characterized by numerous local roads connecting to local collector roads which follow the topography as much as possible.		
Avoid large grid-like streets and major collector roads that do not adopt well to steep slopes.		
Align roads to conform to the natural topography. Gentle horizontal and vertical curves are preferable to straight line grid patterns that require significant earthmoving or create exceptionally steep grades.		
3.3.2.2 Local Roads		
Guidelines	Complies (Y/N/NA)	How are you addressing or not addressing the guideline? Please reference section in professional report, if provided.
Local roads (serving houses that front on them), should be kept to a minimum scale and reflect the local resident/pedestrian use.		
Split roads with 1-way access on each portion, may be utilized where: <ul style="list-style-type: none"> • Special features or significant natural habitat can be protected; • The amount of slope disturbance or the amount of cut and fill compared to a standard 2-way road is reduced; • The pre-development cross-slope on the road right-of-way exceeds 15%; • Using a conventional road on very steep sections makes parcel access difficult; 		

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<ul style="list-style-type: none"> • Through traffic can continue to a conventional road connection or a turn around can be provided; • Intersection clearance is maintained before the split is allowed to occur; • Signage is provided to warn motorists of changes in the road configuration and to identify the direction of the flow of traffic; • Pedestrian safety and emergency access is maintained. 		
Guidelines	Complies (Y/N/NA)	How are you addressing or not addressing the guideline? Please reference section in professional report, if provided.
<p>One-way roads may be utilized on a site-specific basis where:</p> <ul style="list-style-type: none"> • They will reduce slope disturbance significantly; • Through traffic can continue to a conventional road connection; and • Pedestrian and traffic safety is maintained. 		
<p>In these situations, one-way roads will have a minimum pavement width of 6 meters and a minimum right-of-way of 9 metres, and will not exceed 200 metres in length to the nearest cross-road.</p>		
<p>Where cul-de-sacs are contemplated, pedestrian connections linking the cul-de-sac to other streets and open spaces should be incorporated.</p>		
<p>Alternative road-ends (reduced cul-de-sac radii or hammerhead configurations) may be utilized on a site-specific basis where:</p> <ul style="list-style-type: none"> • There is lack of sufficient land for a cul-de-sac or very steep slopes would require excessive cutting and filling; • The road serves fewer than 16 lots and/or is less than 100 metres in length; and • The road end accommodates the turning of service and emergency vehicles. 		

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3.3.2.3 Local Road Widths and Cross Sections		
<p>Cross sectional aspects of a road can have a dramatic impact on the area of disturbance caused by construction. For instance, the Subdivision Bylaw requires urban local collector roads to provide parking and sidewalks on both sides of the street. Flexible cross-sectional standards can lessen these impacts.</p>		
Guidelines	Complies (Y/N/NA)	How are you addressing or not addressing the guideline? Please reference section in professional report, if provided.
<p>Reduced road widths (e.g. from 10m to 8.5m) and cross-sectional design standards may be used on steep slopes where:</p> <ul style="list-style-type: none"> • slope disturbance is significantly reduced and/or special features or habitat are protected; • parking requirements can be met on-site rather than on the road; • public safety is maintained; and • access for maintenance and emergency vehicles is assured. 		
<p>Similarly, reductions in the required width of rights-of-way may be considered where grading for the full width will significantly impact topography or natural features. See Section 3.4.4 regarding the location of utilities for further guidelines on reducing the width of rights-of-way.</p>		
<p>If access to a particular site by public or municipal service vehicles is considered too challenging or difficult, it may be beneficial to consider a strata development.</p>		
3.3.2.4 Sidewalks		
Guidelines	Complies (Y/N/NA)	How are you addressing or not addressing the guideline? Please reference section in professional report, if provided.
<p>The requirement for sidewalks on both sides of minor collectors and local roads on steep slopes may be reduced to one side where the predevelopment cross-slope on the road right-of-way exceeds 20%. Pedestrian safety must not be compromised by exclusion of the second sidewalk; e.g. the road should not be within 0.5 km of a school or other public destination.</p>		
<p>The requirement for sidewalks on local roads may be reduced or eliminated on particularly difficult topography where large lot</p>		

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development generates low traffic volume. Again, pedestrian safety must not be compromised; e.g., the road should not be within 0.5 km of a school or other public destination.		
Curvilinear or meandering sidewalks and pathways may be used where they eliminate long sustained grades. Varying offsets between the road and the sidewalk may also be considered where it will save a significant feature or reduce grading requirements.		
<h4>3.3.2.5 Design Speed and Road Grade</h4> <p>Conventional design road grades and design speeds require road geometry that may be less able to respond to local topography and increases the need for significant cut and fill sections. More flexible grades and design speeds may be appropriate in some cases.</p>		
Guidelines	Complies (Y/N/NA)	How are you addressing or not addressing the guideline? Please reference section in professional report, if provided.
Design speeds of less than 50 km/h may be considered on local roads or local connectors on steep slopes where this allows roads to be more responsive to topographic conditions and significantly reduces grading requirements.		
The maximum grade on local roads currently allowed under the City's Manual of Engineering Standards and Specifications is 12%. For local roads on steep slopes, grades up to 15% may be permitted for short sections (not exceeding 100 metres in length) if overall impacts are reduced and the natural character of the slope is retained. The "stopping sight distance" at intersections must not be negatively affected. Where future development on adjacent parcels will allow, an alternative, lower grade access into the neighbourhood is encouraged over the long term.		
<h4>3.3.2.6 Consideration of Alternative Standards</h4>		
Where alternatives to the City's existing Engineering Standards and Specifications are being proposed to accommodate steep slope conditions, the City commits to review these alternatives on a priority basis.		

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3.3.3 Property Access		
Objective		
To provide safe and functional access to individual properties throughout the year.		
3.3.3.1 Individual Driveways		
On steeply sloping sites, designing and installing driveways presents many challenges, such as: significant elevation difference or short travel distance or tight corners; limited parking capacity; limited visibility at the road; difficult access in winter conditions; and space for residential pick-up and delivery.		
Guidelines	Complies (Y/N/NA)	How are you addressing or not addressing the guideline? Please reference section in professional report, if provided.
In general, driveways should have a grade no greater than 20%.		
Where a driveway grade exceeds 20%, there should be two readily accessible off-road parking stalls for the property.		
On downslope parcels, the driveway grade on the first 3.5m from the property line can be no greater than 7% .		
Consider the needs of access by emergency vehicles in locating and designing driveways.		
3.3.3.2 Common Driveways		
Common driveways are vehicle access routes shared by two or more lots.		
Common driveways are encouraged when significant site grading can be reduced.		
The grade of a common driveway should not exceed 14%.		
In general, limit in-and-out common driveways to servicing 6 lots.		
Up to 15 lots may be serviced with a one-way through-access driveway exiting onto a municipal road, depending on site-specific conditions.		
3.3.3.2 Common Driveways (cont.)...		
Guidelines	Complies (Y/N/NA)	How are you addressing or not addressing the guideline? Please reference section in professional report, if provided.
Provide one on-site guest parking spot per dwelling serviced by the common driveway.		

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<p>A “reciprocal access and maintenance agreement” among property owners is required for approval of a common driveway. The City is not a party of these agreements.</p>		
<p>The civic addresses of the residences located on a common driveway must be displayed on a sign visible from the street.</p>		
<p>An appropriate location and space must be provided at the street for common garbage and recycling pick-up, and postal delivery. The space must be sufficient to allow a service vehicle to pull over off the street. These provisions must be included in the reciprocal access and maintenance agreement</p>		
<p>3.3.4 Municipal Services and Utilities Objective To provide municipal services and utilities on steep slope developments that has the least environmental and visual impact, meets service requirements, and minimizes redundancy, capital costs and ongoing maintenance costs.</p>		
<p>3.3.4.1 Municipal Services Development on steep slopes requires additional infrastructure for water systems, including booster pump stations, reservoirs, pressure reducing valves, individual pressure regulators and pipe anchors. Sanitary sewer systems require additional infrastructure such as lift stations and forcemains. If these systems are not comprehensively designed and phased, costly redundancy or insufficient capacities can result. Comprehensive design of water and sewer systems could be accomplished as part of, or in response to, neighbourhood concept plans. This approach eliminates ad hoc expansions, which can result in costly future upgrades as services are extended. Comprehensive planning ensures appropriately sized services and logical phasing and expansion of the systems in a cost-effective manner.</p>		
<p>Guidelines</p>	<p>Complies (Y/N/NA)</p>	<p>How are you addressing or not addressing the guideline? Please reference section in professional report, if provided.</p>
<p>All services and utilities will be installed underground.</p>		
<p>Where practical, install more than one service in a common trench to reduce the number of trench excavations and therefore the impacts on the terrain. Where the design profile permits, increase the pipe separation to obtain more than one service in a trench. The works must be constructed in accordance with City and Provincial standards regarding separation of water and sewer lines.</p>		
<p>Design water service valve and meter boxes with flexible offsets to property lines to maintain ease of access and maintenance. Locate</p>		

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boxes where future grading or landscaping of boulevards will not make access difficult.		
Design water system pressure zone boundaries with sufficient range to ensure fire fighting pressures in the highest side of parcels.		
3.3.4.2 Utilities Development of utility service strategies should also be included in the neighbourhood planning process. Any major infrastructure requirements such as new transmission lines, telephone switching facilities, primary gas mains or pumping stations should be identified and located early		
Guidelines	Complies (Y/N/NA)	How are you addressing or not addressing the guideline? Please reference section in professional report, if provided.
Design roads and road rights-of-way to allow flexible offsets for utility trenches and other facilities such as transformers. This will allow more flexibility to grade rights-of-way to match existing ground within the road rights-of-way, which will reduce physical impacts and provide easier servicing in steep slope neighbourhoods.		
Where practical, install power, telephone and cablevision in a common trench in accordance with the City's Standards. Installation of these services under sidewalks is encouraged where this can reduce the effective right-of-way required on a steep slope.		
Alternatively, if no sidewalks are installed on the upper side of a road right-of-way, utilities could be installed deeper than standard, allowing the slope to grade upward from the back of the curb within the road right-of-way. Utility service and transformer boxes, which need to be at road grade, would require suitable grading and retaining structures. However, the net effect can significantly decrease earthwork volumes and grading required to install a road into a steep slope.		
Locate access to utility boxes, fire hydrants and other services that require periodic inspection in areas where slopes do not exceed 15% and where they are clearly visible from the road.		
Consider providing hydrants and access behind lots that back onto forested areas where vegetation can be a potential hazard.		

3.4 Buildings and Structures

<h4>3.4 Buildings and Structures</h4> <p>This section addresses the height, mass and setbacks of buildings on steep slopes to reduce slope disruption, minimize visual impact and avoid impinging on sight lines from neighbouring lots.</p> <p>Appendix B complements this section by offering suggestions on building design and architecture that complements steep slope settings.</p>		
<h4>3.4.1 Building Setbacks</h4> <p>Objective To allow greater flexibility in locating a building on a steep slope lot.</p>		
<h5>3.4.1.1 Front Yard</h5> <p>Providing some leeway in front and side yard setbacks prescribed under the Zoning Bylaw can help to reduce the amount of cutting or filling required, and better support level entry and presence of the house to the street.</p> <p>The Zoning Bylaw now requires a minimum 6m setback from the front property line for most residential zones. On steep slopes, allowing a lesser setback may reduce the need for cut/fill for driveways, create more street presence and provide a more level entry.</p>		
Guidelines	Complies (Y/N/NA)	How are you addressing or not addressing the guideline? Please reference section in professional report, if provided.
Where demonstrated that it will reduce excessive cut/fill, help to avoid hazardous slopes or sensitive areas, and enhance the neighbourhood a front yard setback can be reduced to 3m.		
<h4>3.4.2 Building Height and Mass</h4> <p>Objective To avoid overheight buildings and minimize the visual impact of new buildings on steep slopes.</p>		
<h5>3.4.2.1 Height of Single-Family, Duplex and Triplex Dwellings</h5> <p>The Zoning Bylaw deals with the maximum height and mass of houses in most residential zones.</p> <p>Determining building height on steep slopes has frequently resulted in two problems: a) house entries that are well below the road grade; or b) three-storey walls on the downhill side that create an overbearing presence on properties below.</p>		
Guidelines	Complies (Y/N/NA)	How are you addressing or not addressing the guideline? Please reference section in professional report, if provided.
Height of adjacent buildings should be considered and consistency maintained.		
Overall height should be reduced for flat-roof buildings.		
Consider higher building heights in exchange for a steeper roof.		

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<p>Limit the perimeter walls to approximately 2.5 stories. This is required to limit the impact of downslope facades on neighbours. Any additional wall height should be set back in order to have the house step up hill.</p>		
<p>Consider the use of a reduced front yard set back to resolve issues such as steep driveways.</p>		
<p>3.4.2.2 Building Mass “Mass” refers to the perceived prominence of a building on a hillside in relation to the site, other buildings, and the street or views from below. The Zoning Bylaw stipulates a maximum lot coverage for each residential zone, which addresses building mass to some extent. The following provide some additional guidance for steep slopes.</p>		
Guidelines	Complies (Y/N/NA)	How are you addressing or not addressing the guideline? Please reference section in professional report, if provided.
<p>Respond to the natural slope of the hillside by using a stepped foundation and setting the building into the hillside to help integrate it with the natural landform.</p>		
<p>On downhill elevations, avoid the use of single plane walls that exceed one storey. Rather, step upper storeys back from the level below.</p>		
<p>Avoid large, unbroken expanses of wall and long building masses. Rather, design buildings with smaller or less massive building components which reflect the sloped character of the site.</p>		