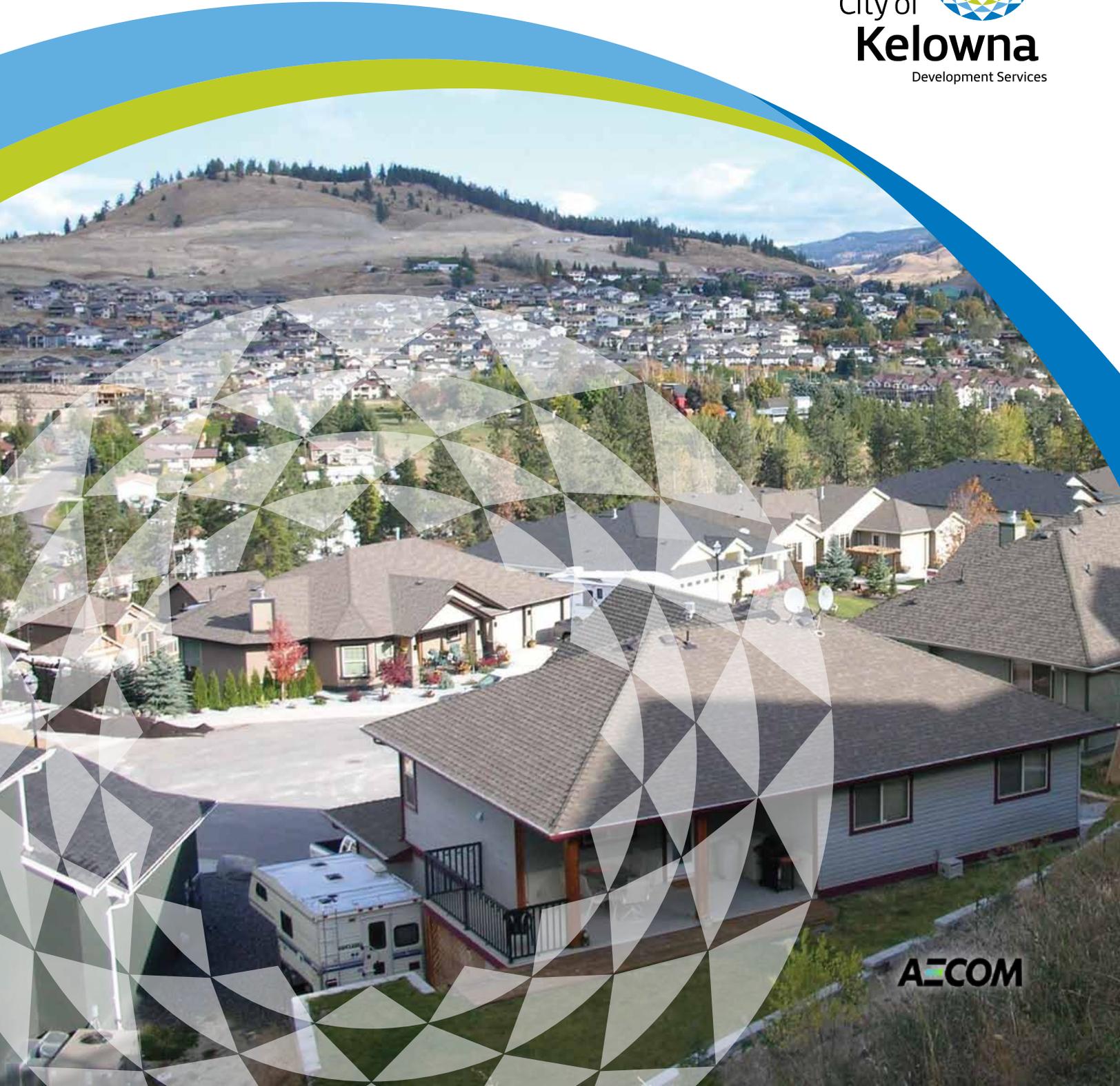


Hillside Development Guidelines

October 2009



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INTRODUCTION	1
VISION.....	1
PRINCIPLES FOR HILLSIDE DEVELOPMENT	1
WHERE DO HILLSIDE GUIDELINES APPLY.....	1
APPLICATION REQUIREMENTS.....	1
COORDINATING PROFESSIONAL.....	2
PROFESSIONAL REPORT AND TECHNICAL GUIDELINES.....	2
BYLAWS	2
EDUCATION.....	3
INNOVATION AND FLEXIBILITY	3
OBJECTIVES/DESIGN GUIDELINES	3
HILLSIDE DEVELOPMENT GUIDELINES	4
VISUAL OBJECTIVES	4
GRADING/RETAINING OBJECTIVES.....	6
GEOTECHNICAL AND HYDRO-GEOLOGICAL OBJECTIVES	8
ENVIRONMENTAL AND WILDFIRE OBJECTIVES	9
STREETSCAPE DESIGN OBJECTIVES	10
HOUSING DIVERSITY AND DESIGN OBJECTIVES.....	12
ATTACHMENTS	
SIGNIFICANT VIEWPOINTS	
APPLICATION CHECKLISTS	
PROFESSIONAL REPORT AND TECHNICAL DESIGN GUIDELINES	



VISION

Hillside developments will be environmentally sensitive, functionally appropriate, aesthetically pleasing and economically feasible.



It is anticipated these guidelines will provide clarity, tools and a common understanding when submitting development and building permit applications within hillside areas.

It is important to consider these guidelines prior to forming preliminary subdivision plans, determining built form, establishing development yield expectations or deciding on a house plan.

PRINCIPLES FOR HILLSIDE DEVELOPMENT

Development applications within hillside areas should work to achieve the vision for hillside development by focusing on the following principles:

- Damage to the environment and natural features should be avoided
- Suitable density and diversity of housing type mitigates impacts
- All users are accommodated on neighbourhood streets
- Views are preserved for residents and visitors
- Locally appropriate, drought tolerant plants are used
- Building sites are safe.

Traditionally land development projects have been constrained by detailed bylaw or policy requirements. These types of regulations impact the designer's ability to be innovative and flexible – the foundation for good hillside planning! The Hillside Design Guidelines provide City staff and designers with a clear set of objectives which need to be met to achieve the vision for hillside development. How the objectives are met is up to the designer. The design guidelines presented in this document are examples of how the objectives may be met; however they do not negate the opportunity for new, or alternate ideas to be explored and implemented.

To respect these principles greater emphasis on the cluster housing form is desired. By concentrating higher density and avoiding the impacts of development, hillsides can be sensitive to the environment, aesthetically pleasing and functionally appropriate, while maintaining suitable economic returns for the developer – a more sustainable approach. Further, it may not be practical, or desirable, to accommodate swimming pools, recreational vehicle storage and large flat yard space for all lots – hillside terrain may preclude some uses.

WHERE DO HILLSIDE DEVELOPMENT GUIDELINES APPLY

Hillsides are defined as lands with a slope angle of 20% or greater for a minimum horizontal distance of 10 metres and/or which can be viewed from viewpoints that are identified by Kelowna's Official Community Plan. These significant viewpoints are attached to this document.

APPLICATION REQUIREMENTS

Consistent interpretation by City staff, consultants and the development industry is key to successful implementation of hillside objectives. Relevant bylaws will be written and implemented with room for flexibility and innovation in mind. Negative development impacts, which include visual, geotechnical, environmental, hydro-geological and grading, should be avoided or mitigated where necessary.

A pre-application meeting is necessary to determine application requirements. Hillside Development Permit applicants may be required to submit reports, prepared by qualified professionals, to address visual, geotechnical, hydro-geological, environmental, wildfire, grading/retaining, and stormwater management needs. City staff can describe which reports are necessary.

Development Permit checklists, which are attached to this document, provide typical application requirements. Each application should address these requirements, where applicable, to the extent possible. Not all applications warrant the same level of detail; therefore City staff will provide direction at the pre-application meeting to the applicant. A single application should address all issues where a property is in more than one Development Permit Area.

COORDINATING PROFESSIONAL

Designing hillside projects requires a coordinated approach due to competing objectives – it is neither practical nor possible to equally and simultaneously satisfy all design objectives; hence compromises and design coordination is important to ensure one design element does not dominate at the expense of others. The developer is strongly encouraged to hire a coordinating professional, who recognizes that trade-offs may be necessary, in order to clearly identify where compromises are needed and are rationalized. Compromises should be clearly articulated at the outset.

Occasionally, it may be necessary to engage an independent peer review of hillside designs, reports or City requirements. A peer review would analyze the specific issue and provide non-binding commentary to assist with advancing project approvals.

PROFESSIONAL REPORT AND TECHNICAL GUIDELINES

Professional report and technical design guidelines will:

- Assist staff with processing development applications by ensuring sufficient detail and information is provided
- Create consistency with the level of effort required to obtain project approvals
- Provide clarity to the development community and applicants with respect to the City's expectations.

Specific technical guidelines, which address key hillside development impacts, are attached to this document.

BYLAWS

Embracing a new vision for hillside development requires amendments to the Development Application Procedures, Zoning, Building and Subdivision, Development and Servicing Bylaws to foster good hillside planning and development. Applicants are encouraged to review the relevant sections within each bylaw pertaining to hillside areas.





EDUCATION

Communicating the vision for hillside development leading towards desired outcomes will be necessary for all stakeholders. Methods of improving performance through educating the hillside resident and visitor can be accomplished through a variety of means including:

- Signage informing the public that hillside streets and private spaces are treated differently
- Covenants registered on title to inform residents some conveniences may not be provided on hillside projects, such as mobility, access and some service levels

A homeowner's information package describing hillside issues can be provided with the building permit application and at occupancy.

INNOVATION AND FLEXIBILITY

The following Hillside Development Guidelines must be considered with Development Permit applications in hillside areas to the extent determined at the pre-application meeting – not all guidelines apply in every instance! The Hillside Development Guidelines have been structured to encourage innovation and flexibility, rather than dictating specific standards or requirements. Designers will have freedom to prepare the most appropriate design given the characteristics of the site.

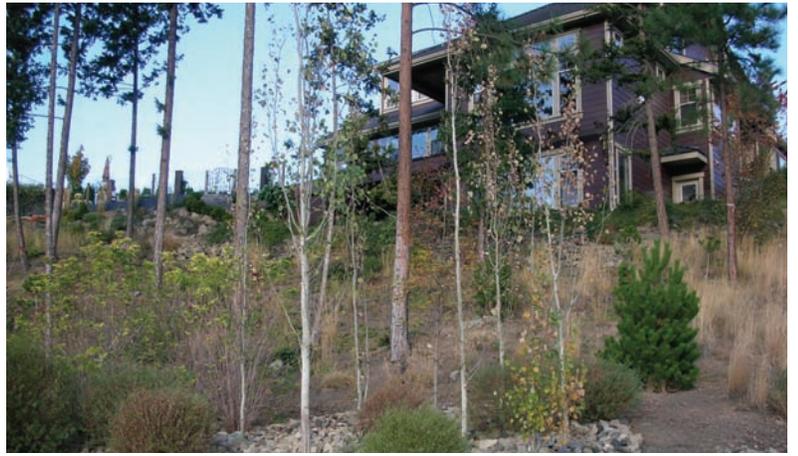
OBJECTIVES AND DESIGN GUIDELINES

Objectives shall be considered as goals for the designer to work towards. Each objective requires careful consideration and must be addressed with each submission; whereas, design guidelines offer suggestions how to achieve those objectives.

It is recognized all objectives cannot be equally or simultaneously attained.

VISUAL OBJECTIVES

- The impact of development on views should be mitigated to ensure:
 - Kelowna’s scenic beauty and hillside character is not compromised and trees are retained, where possible
 - Structures and building faces do not dominate the landscape
 - Structures are screened through effective use of landscape materials
 - Significant natural features and landforms, including ridgelines, are retained or enhanced
 - Street and building lighting is not dominant
- The project is designed to benefit all by ensuring view corridors from the project are maintained.



House blends into natural vegetation



Portion of street affords vista of attractive hillside



Natural feature within lot is left “in tact”



Solid privacy fence along collector road hides valley views



Road constructed “around” large natural feature



Before



After

Stark landscape can be improved with strategic placement of mature trees



Retaining wall mitigated with landscape treatment



Views from street retained by lowering building elevations



House orientation offers valley views from the street



Large retaining structure effectively screened with landscaping

VISUAL DESIGN GUIDELINES

- Rather than clearing the entire site of existing trees, buildings and roads should be sited to retain trees and natural vegetation, where possible
- Buildings should be sensitive to the visual impacts associated with development along ridgelines and edge of cliffs – sensitivity can be achieved through extensive screening with mature landscape materials, providing greater rear yard setbacks, stepping back second and third stories, limiting building heights, eliminating fences and providing public access, where appropriate
- Unavoidable interruptions along ridgelines should be re-vegetated with natural landscaping
- Scenic natural features should be incorporated into the subdivision design as natural open space - City is encouraged to assume ownership of these areas
- Cluster development is strongly encouraged for the purpose of maintaining natural open space and protecting steep slopes and ridgelines, otherwise larger lots should be considered
- View potential can be optimized through strategic placement of roads, parks and vacant land, staggered lot configuration, sensitive lot grading, transparent fencing, etc.
- Buildings, retaining walls and fences should be set back from the edge of a natural feature, such as a cliff, rock knoll or outcrop
- Linear roads, utility cuts, retaining walls and uniform building rooflines should be avoided, or mitigated with mature landscaping
- Landscaping is capable of hiding views of imposing building facades, reflective glass, retaining walls, roadways and utility corridors, while protecting views from the site
- Timely restoration is able to mitigate impacts; consider using mature vegetation
- Building and retaining design, color and finish can complement natural features and terrain
- Landscaping can minimize encroachment on viewsapes
- Landscaping should occur in clusters to mimic the natural environment
- View corridors can be created by designing lower rooflines, stepped rooflines and staggered lots
- Building ground floor elevations and heights should consider up-slope views
- Views from the street should not be blocked with solid fences.

GRADING/RETAINING OBJECTIVES

- Site grading and retaining walls respect existing terrain; that is, large cuts/fills are not used to create 'build-able lots' or flat yards. Driveway grades follow the natural terrain, large single level building platforms are avoided, final lot grades mimic the natural slope and slopes are promptly re-vegetated
- Lot grading/disturbance should occur at the stage of development where it best accommodates existing terrain and vegetation around the perimeter of the building envelope
- Road, driveway, retaining wall and fence layout and design conforms to the natural terrain, where possible
- Significant natural scenic features, such as gullies, rock outcrops and knolls are at a minimum retained and preferably enhanced
- Manufactured grades mimic natural slopes
- Site and lot grading does not compromise visual objectives
- Retaining structures integrate well with the onsite architectural character and natural environment
- Visual dominance as a result of development is reduced by sensitive grading.



Driveway slope does not respect natural terrain



Natural feature retained and incorporated within subdivision design



Downhill home well below road elevation



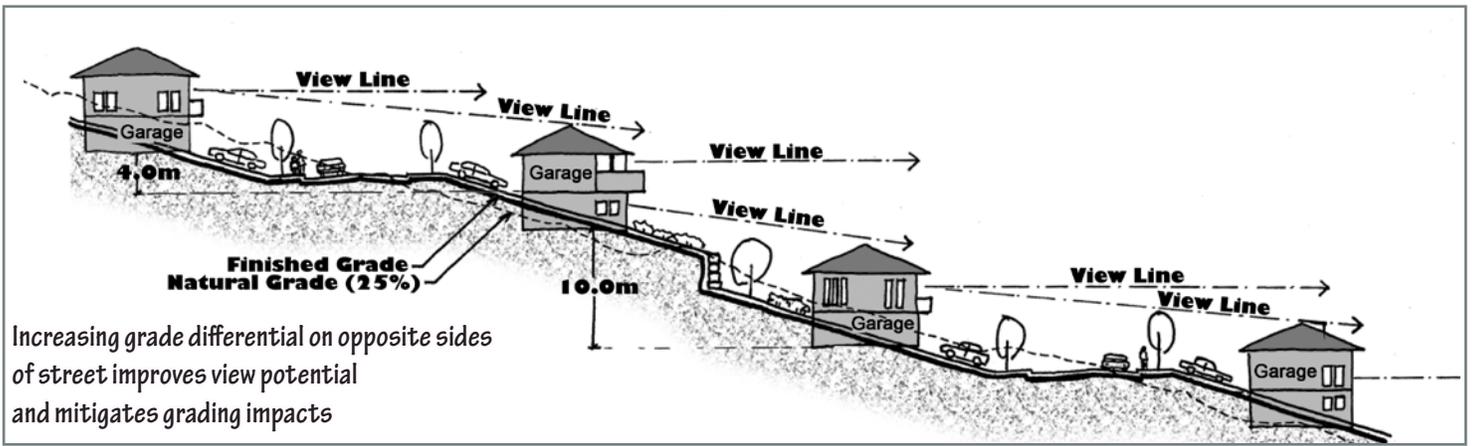
Garage elevation accommodates steep terrain



Retaining wall in appropriately used to improve views and create a flat rear yard



Lot grading does not respect natural terrain



Steep driveway slopes reduce grading



GRADING/RETAINING DESIGN GUIDELINES

- Consider grade difference on opposite sides of the street; opposing slab elevations should be set at a higher grade than the natural slope
- Manufactured slopes can be placed behind buildings
- Avoid retaining walls within the front yard
- Retaining walls can be used to reduce slope disturbance, rather than modify natural terrain – lot sizes should increase as the natural slope increases
- Use single loaded streets or split lanes and narrow roads to avoid scenic features and reduce grading
- Avoid side-casting fill excess material along road frontages and attempt to balance earthworks where impacts to hillside objectives are not compromised
- Boulevards and driveways can be graded from the curb to match existing terrain
- Consider terraced building foundations, where the bottom slab elevation matches existing terrain, multiple lots with shared access/driveways, detached garages, pan-handle lots, etc.
- Extreme grades may necessitate detached garages
- Position driveways to minimize lot grading requirements and reduce the impact on adjoining properties
- Combine service connections, utilities and utility cuts in a single trench, where necessary
- Consider alternate road-ends.



Small rear yard with manufactured slope mimics natural terrain



House and yard construction respects natural slope

GEOTECHNICAL AND HYDRO-GEOLOGICAL OBJECTIVES

- Risks are appropriately identified and quantified prior to site disturbance
- Changes to natural slopes are structurally sound and avoid or mitigate hydro-geologically sensitive areas
- Mitigation strategies/recommendations are implemented during subdivision development and building construction
- Where appropriate, geotechnical recommendations are filed at the Land Title Office
- Mitigation strategies are prepared to reduce impacts to groundwater supplies and surface run-off for both minor and major storm events, while retaining natural features/vegetation/trees, where possible
- Impervious surfaces are minimized and irrigation needs are addressed.

GEOTECHNICAL AND HYDRO-GEOLOGICAL DESIGN GUIDELINES

- Geotechnical/hydro-geological issues, including down-slope potential impacts, should be considered prior to subdivision design in order to avoid development in unsuitable areas
- Recommendations should be carried forward into the design process, grading plans should be signed off by the design team and the coordinating professional should monitor implementation recommendations
- Regular monitoring and test results should be provided for all construction, including that on private property
- Quality assurance systems should be employed by professional consultants
- Sign-off from the geotechnical engineer(s) should be provided at appropriate stages of construction, such as pre-clearing, pre-site grading, post-site grading, upon substantial completion, before foundation pour, and prior to occupancy
- Covenants may be registered upon subdivision approval
- Technical guidelines attached to this document shall be incorporated into the geotechnical/hydro-geological review.



Development values enhanced through retention of natural features



Potential slope instability



Stringent road standards may contribute to instability concerns



Foundation settlements are difficult to repair



Natural wetland preserved



Low-impact street drainage



Larger lot sizes permit greater tree retention



Trees retained within road right of way

ENVIRONMENTAL AND WILDFIRE OBJECTIVES

- ESA polygons are established and verified onsite prior to site disturbance
- ESA-1 areas are protected and/or enhanced, where appropriate
- Integrity of ESA-2 areas is maintained
- Development takes advantage of natural environment features; natural vegetation and landforms are retained to extent practical – landscape is a key determinant of where development should and should not go
- Ecological linkages are maintained
- Development is sensitively integrated to minimize impacts
- Native landscape materials complement existing natural environment
- Development meets provincial and federal regulations
- Wildland fire risk is mitigated in a way sensitive to the ecosystem.

ENVIRONMENTAL AND WILDFIRE DESIGN GUIDELINES

- Reference SEI inventory mapping and environmental inventories available at the City
- Consider higher density cluster housing to protect significant natural environments, where appropriate
- Create natural open spaces in the subdivision design to retain natural vegetation
- Use varied lot size and configuration to retain trees and natural vegetation
- Retain substantive trees and natural features within the road right of way, to the extent possible – consider alternate road design
- Integrate wildlife corridors into the subdivision layout
- Replant with native species, limit non-xeriscape landscape treatment
- Retain and create natural open ditch environments with minimal maintenance requirements
- Augment natural environments with improved habitat features, where appropriate
- Conduct wildfire hazard reduction through accepted practices, such as thinning and removal of fuel sources, which are also designed to improve forest health.



Natural slope retained between houses

STREETSCAPE DESIGN OBJECTIVES

- Neighborhood streets are narrow, designed for a low design speed
- Automobiles are tolerated; resident, pedestrian and cyclist needs dominate
- Low-impact design standards are utilized
- Road aesthetics are valued as a significant contributor to the character and quality of a neighbourhood.

STREETSCAPE DESIGN GUIDELINES

- Consider 3-D computer modeling to create an attractive streetscape design, one which favors pedestrian and neighbourhood activities and creates amenity space capable of accommodating all users, including children
- Consider adopting a 20-40 kph design speed for selected local streets, where appropriate
- Consider open drainage systems, where appropriate, and reduced impervious surfaces, xeriscape boulevard landscaping, lower ambient lighting levels, streets without curbs or flat curbs, pervious parking bays, street furniture, fewer or no sidewalks, etc.
- Reduce impervious surfaces to extent possible, incorporate bio-swales where appropriate, consider alternate surface treatments
- Consider mature street trees and heavily landscaped boulevards on all roads, including local streets
- Reduce right of way requirements and conflicts with outside utility providers by sharing utility corridors.



Automobiles tolerated with narrow pavement width and parking bays



Attractive landscaping adds character



Alternate road design accommodates difficult terrain



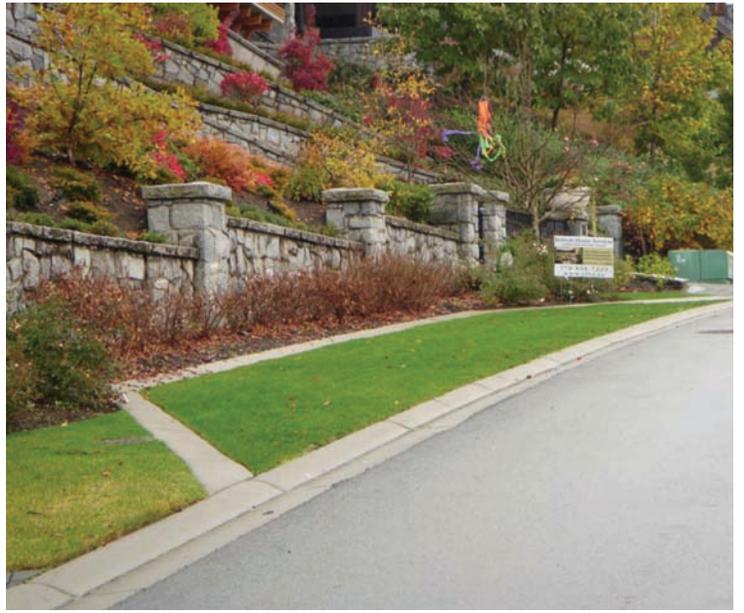
Hillside roads require non-traditional design standards



Narrow pervious road surface with parking bays



Narrow street with tight radius



Grassed parking bay integrated into landscape



Attractively landscaped boulevards improve aesthetics



Pedestrians feel comfortable on the street



Alternate road standards and housing mix can reduce impacts



Low-impact street design

HOUSING DIVERSITY AND DESIGN OBJECTIVES

- Cluster housing is used to retain significant natural areas or avoid/mitigate development impacts
- Colors blend into the natural landscape for all structures, including retaining walls and fences; reflective roof materials and glass are discouraged
- Multiple-unit housing becomes an acceptable housing type on hillsides and flexibility for the size and layout of single family lots is encouraged
- Density is influenced by visual impacts, slope, natural features and vegetation
- Visual dominance is reduced.



House orientation reflects slope rather than road layout



Unattractive, visually dominant retaining wall



Flat roof and low-profile blend into natural terrain



House colors blend into natural landscape



House stepping up hill parallel to slope, roof line matches terrain



Extreme grade differential respects slope



Detached garage respects terrain



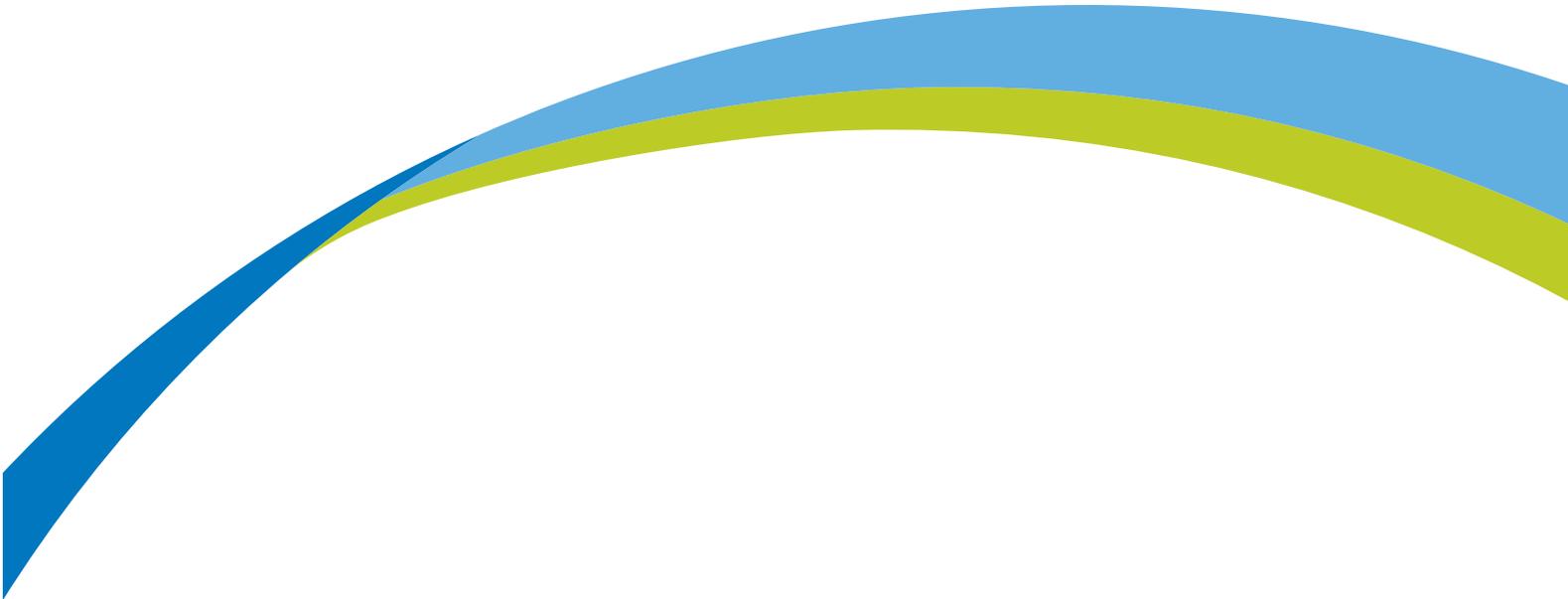
Roof pitch follows natural slope



House blends into natural landscape

HOUSING DIVERSITY AND DESIGN GUIDELINES

- Consider alternatives to single family housing
- Create building design schemes, in cooperation with the City to attain performance
- Engage a coordinating architect to administer and monitor design guidelines
- Work with City staff to assist with design guideline implementation
- Consider using local, site-specific natural building and retaining materials, where practical
- Building and retaining design, color and finish can complement natural features and terrain
- Consider reduced setbacks to minimize the extent of grading
- Orient buildings to run parallel to the natural slope
- Articulate buildings to reduce mass, vary rooflines
- Avoid large vertical planes, step back stories above second level
- Terrace back yards to reduce grading/retaining
- Dispose excess excavated material offsite or re-use on adjacent sites where possible
- Buildings, retaining walls and fences should be appropriately set back from the edge of a natural feature, such as a cliff, rock knoll or outcrop
- Landscaping can hide views of building facades, reflective glass, retaining walls, roadways and utility corridors, while protecting views from the site
- View corridors can be created with lower rooflines, stepped rooflines and staggered lots
- Steeper roof pitches can increase view potential between structures and align with natural slopes
- Building ground floor elevations and heights should be sensitive to up-slope views
- Driveway grades follow the natural terrain, large single level building platforms are avoided, final lot grades mimic the natural slope and slopes are promptly re-vegetated
- Manufactured slopes can be placed behind buildings
- Retaining walls are avoided within the front yard
- Consider terraced building foundations where the bottom slab matches existing terrain
- Consider multiple lots with shared access/driveways
- Extreme grades may necessitate detached garages
- Replant with native species, limit non-xeriscape landscape treatment.



City of
Kelowna

Development Services

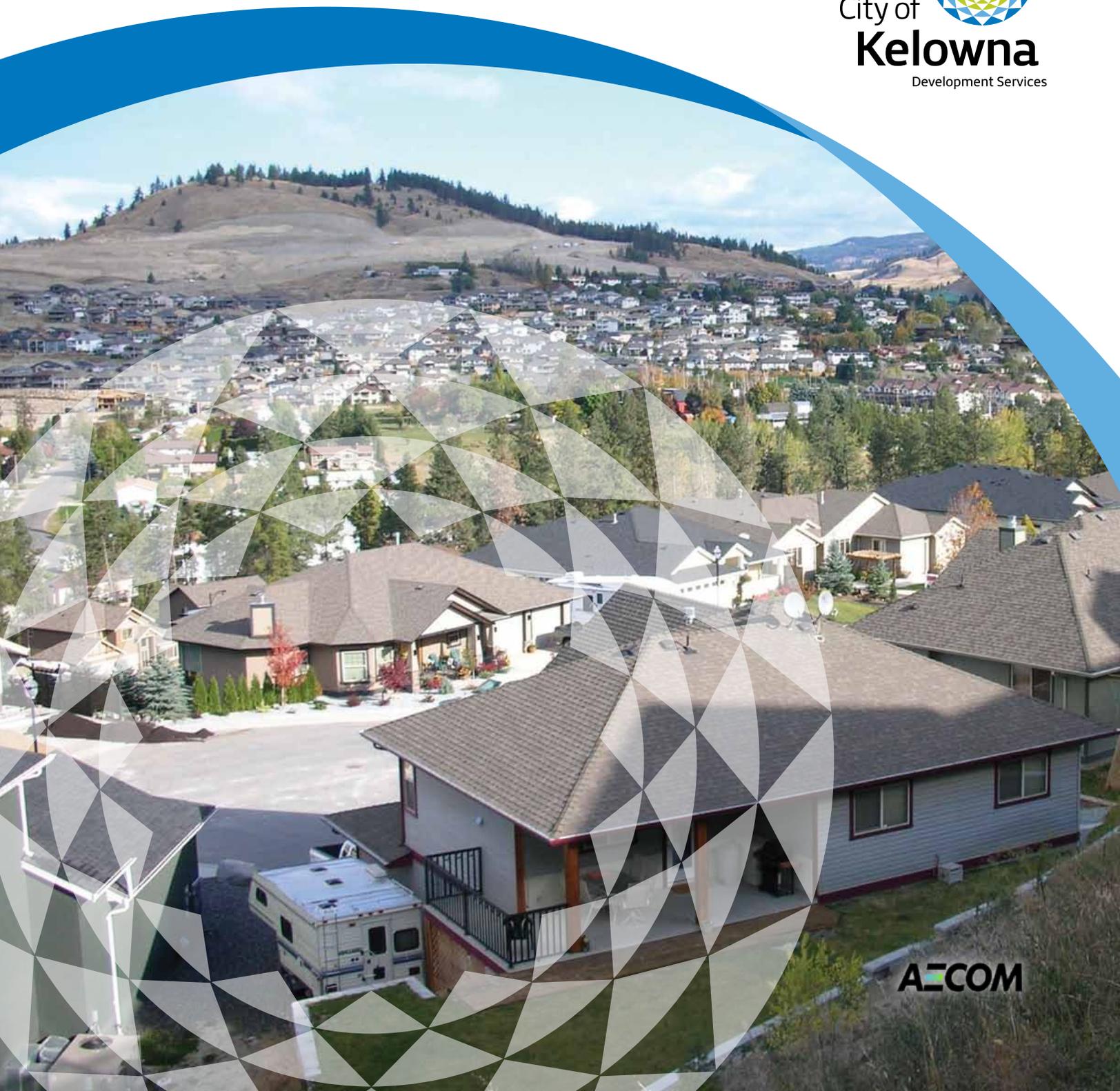
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Hillside Development Guidelines

Builder's Package

October 2009



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builder's package

The City of Kelowna has adopted a series of objectives and ways of meeting those objectives in order to produce hillside development projects which are environmentally sensitive, functionally appropriate, aesthetically pleasing and economically feasible. For each hillside project the developer is required to obtain a Development Permit in accordance with the City's Hillside Development Guidelines. Each building permit located on hillsides should refer to the Hillside Development Guidelines and the specific Development Permit issued by the City to determine what is expected. The Hillside Development Guidelines contain photographic examples and suggestions on how everyone can make Kelowna's hillsides more attractive.

To assist the single family building permit applicant, the following should be considered:

- Building Code requirements
- Geotechnical review of footings/foundations
- Grading and Retaining Wall Guidelines are appended to the Hillside Development Guidelines - lot grading and retaining wall construction should meet the intent of those guidelines
- Lot Grading Plan prepared by the developer indicates proposed elevations - requests for variations must address impacts to adjoining properties, streets, etc.
- Position driveways to minimize lot grading requirements and reduce the impact on adjoining properties
- The house design respects the natural terrain, to minimize grading, reduce visual impact and reduce the difference from the rear slab to finished elevation
- Retaining walls are referenced on the Lot Grading Plan - requests for modifications or additional retaining walls must address impacts to adjoining properties
- Accepted Development Permit typically includes building design guidelines for colors, materials, finishes, architectural styles, articulation, roof lines, roof pitch, landscaping, etc. - details should be provided by the developer
- Large horizontal and vertical planes are avoided by stepping back storeys, stepping foundation walls, varying roof pitch, etc.
- Excess excavation material should be disposed offsite
- Fences are setback from natural areas and consider views to/from the site
- Landscape screens or filters building facades, reflective glass and retaining walls
- Oriente house parallel to slope, where practical
- Xeriscape landscape materials is encouraged.



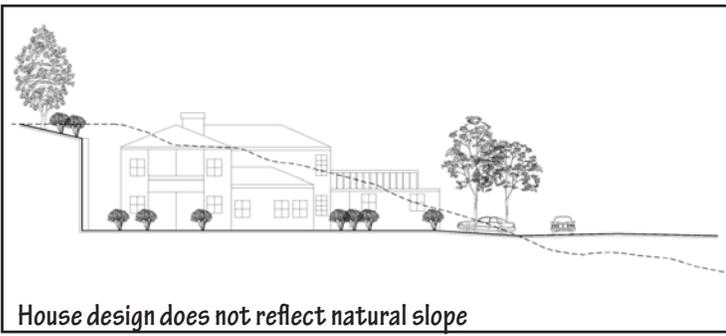
Small rear yard respects steep slope



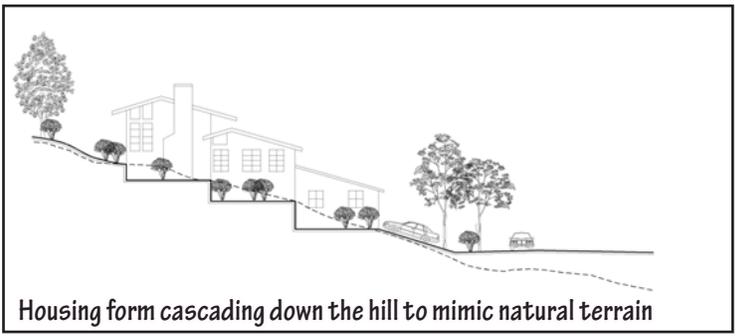
Roof pitch follows natural slope



Avoid front yard retaining walls which do not relate to streetscape



House design does not reflect natural slope



Housing form cascading down the hill to mimic natural terrain



Artificial grading to improve views to the Lake creates a visual impact from the street



House stepping up hill parallel to slope, roof line matches terrain



Retaining wall mitigated with landscape treatment



Detached garage respects terrain



Retaining wall should integrate into natural environment



Attractive building articulation

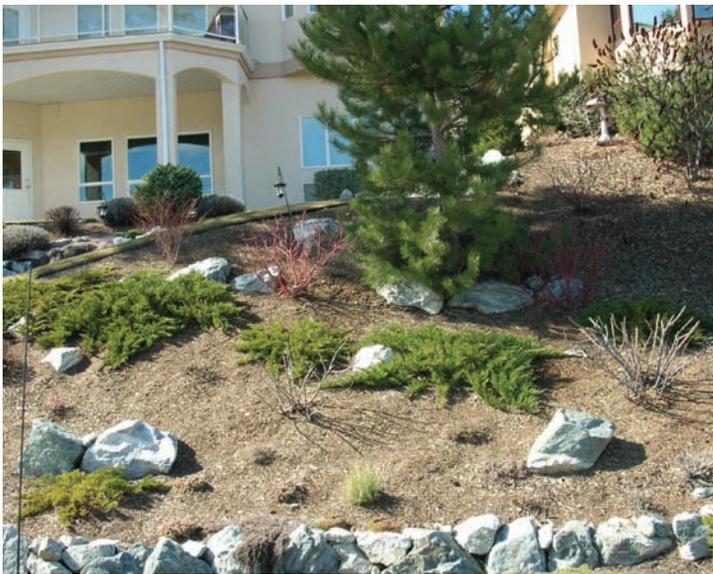


Before



After

Stark landscape can be improved with strategic placement of mature trees



Landscaping respects natural environment



House and yard construction respects natural slope



House blends into natural landscape



House orientation reflects slope rather than road layout



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