

# Thomson Flats

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## Area Structure Plan Environmental Assessment (ASP13-0001) – Phase Two

Submitted To:

**Melcor Developments Ltd**

&

**Canadian Horizons Ltd**

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## 1.0 Introduction

Spring of 2016 Canadian Horizons Ltd & Melcor Developments Ltd undertook the Phase One of the Thomson Flats Area Structure Plan approved by the City of Kelowna, ASP13-0001. The environmental reviews and surveys for this process were undertaken from 2016 to 2018 and spanned two full field seasons. Phase One environmental reporting provided the findings and identified the sensitivities and natural features of the Thomson Flats ASP lands in 2018. This document, the Phase Two of the ASP process, will provide a context of the sensitivities and natural features as required under current federal, provincial and municipal policies – regulations. Where the multiple discipline team of the Thomson Flats ASP worked through conceptual design and development aspects in regard to environmental needs, stresses and requirements.

What has not been recorded in this process were the many discussions, iterations and meetings with the Thomson Flats ASP team, federal Environment and Climate Change - Canadian Wildlife Service, provincial Ministry of Lands, Natural Resource Operations and Rural Development – Ecosystems and experts. The plans as presented in the ASP have been reviewed in light of many conflicting and supporting environmental needs and requirements. One key element as noted by the City of Kelowna in issuing the ASP13-0001 has been fundamental.

“Identify preservation, conservation, loss and mitigation development strategy, in accordance with the City’s “no net loss / net gain” policy, concerning environmental resources including:

- Natural areas and or systems;
- Waterbodies, all wetlands, drainage courses, and watershed management within an integrated and connected system; and
- Area wildlife (i.e. terrestrial and aquatic) habitat and movement.”

### 1.1 Subject Properties

Located in the City of Kelowna the subject properties total 258.17 hectares, approximate. Legal property description for the parcels are

- Plan T28 S24 Lot SE1/4; Part SE ¼, Except Plan PCL C PL A499, KAP49406. Civic Address: 5265 Upper Mission Drive. (PID 015-122-913). 64.13 hectares.

- Plan T29 S19 Lot W 1/2; Part SE ¼, Part W ½ of SW ¼, End of Frost Rd. Civic Address: 5300 South Ridge Drive. (PID 015-146-910). 32.43 hectares.
- Plan T29 S19 Lot E 1/2; Part SW ¼, Except Plan THE W 80ac, End of Frost Road. Civic Address: (S of) Kuipers Cr. (PID 015-146-936). 32.74 hectares.
- Plan 28237, Lot 1 (PID 004-604-261) Civic Address is (S of) Heweston Ave. 40.48 hectares.
- Plan 28237, Lot 2 (PID 004-604-288) Civic Address is (S of) Redstem St. 88.39 hectares

The combined properties will be referenced throughout this report as the “subject area” or “ASP”.

## 1.2 Phase II

### *Framework*

The Okanagan supports more species of plants and animals than most areas of British Columbia and the rest of Canada (BMP 2006), where some species and habitat are found nowhere else in Canada. Thomson Flats ASP is located at City of Kelowna’s most southern reaches where urban development since the 2003 Kelowna Mountain Fire has touched the northern and western ASP boundaries. The ASP represents a portion of the City of Kelowna’s interface to the South Slopes natural and rural landscape of the Regional District of Central Okanagan. Where focus found in the South Slopes OCP is to preserve the rural and natural characteristics by focusing urban development in the City of Kelowna (2015). Not only is this ASP’s focus to current City of Kelowna’s environmental policies, provincial and federal legislations, there is a need to ensure future development will protect communities, natural and sensitive ecosystems and species along this interface. Along with City of Kelowna core concept on “No Net Loss / Net Gain” several fundamental conservation aspects were also continuously reviewed.

- Avoid Hydrological changes
- Avoid habitat destruction, fragmentation and islandization and/or reduced biodiversity
  - Provide linkages
  - Many smaller habitats can be critical to survival via linkages
  - Retain refuges
- Wildlife conflicts

Although, there is no single determinant of how much interface areas should be left intact to the rural South Slope lands, a simple measure of natural green spaces, parks and corridors were looked reviewed.

### **Terrestrial**

Thomson Flats ASP Phase I was undertaken from 2016 to 2017 and spanned two field seasons.

These natural features have been significantly impacted by local recreational vehicle, mountain biking and dog walking. The entire area was impacted in 2003 by the Okanagan Mountain Fire where over 95% of the forested ASP landscape was altered. Construction of a debris flow berm for the 2003 fires contributed to this impact by damming up Rembler creek in spring flows where off-roading has now created a wetland feature where previously there was none.

The Thomson Flats ASP is approximately 258.17ha in size and the ASP conceptual plans look to develop 45% of this area, or 116.97ha. While 55% of the ASP will remain as natural, undisturbed lands, or 141.2ha. Some of the natural areas to be discussed further are also to be restored and/or enhanced from the disturbed conditions currently seen.

Table one below itemizes the proposed ASP concepts overlaid with the Phase One ecosystem inventory. During subdivision planning and buildout there are always opportunities to expand on the natural areas within these proposed development nodes.

Table One. The following ecosystems were inventoried for the Thomson Flats ASP:

Ecosystem Name	Total Area (ha.)	% of Study	Natural %	Impacted %	Use
Trembling aspen – Snowberry – Kentucky bluegrass	0.22	0.09	5	95	Single
Kentucky bluegrass – Stiff needlegrass	0.19	0.07	2	98	Single
Baltic Rush Marsh-Meadow	1.84	0.71	100	0	-
Black cottonwood - Douglas-fir – Snowberry – Red-osier Dogwood	1.15	0.45	100	0	-
Cultivated Field(s) – Abandoned Fields	35.03	13.60	35	65	Single/Multi
Cliff	1.10	0.43	100	0	-
Debris Berm	0.14	0.05	0	100	Road
Douglas-fir-Ponderosa pine – Pinegrass	73.87	28.67	57	43	Single
Douglas-fir-Ponderosa pine – Snowberry – Spirea	5.63	2.19	34	66	Single
Douglas-fir – Ponderosa pine – Bluebunch wheatgrass – Pinegrass	29.37	11.40	24.1	75.9	Single/multi
Lake	0.33	0.13	100	0	-
Borrow Pit/Mine	0.27	0.10	0	100	Single
Open Water	0.42	0.16	100	0	-
Douglas-fir – Ponderosa pine – Bluebunch wheatgrass – Balsamroot	24.16	9.38	64	36	Single/Multi
Douglas-fir – Ponderosa pine - Spirea - Feathermoss	4.13	1.60	25	75	Single
River	0.84	0.33	100	0	-
Rock/Bedrock outcropping	1.40	0.54	65	35	Single Multi
Road	1.51	0.59	0	0	FSR
Hybrid white Spruce – Douglas-fir – Douglas maple – Dogwood	12.89	5.00	100	0	-
Douglas-fir – Ponderosa pine – Snowbrush – Pinegrass	56.47	21.92	33	67	Single/Multi
Talus/Scree	0.15	0.06	100	0	-
Bluebunch wheatgrass – Balsamroot	6.55	2.54	38	62	Single/Multi

The small portion of forest that survived the 2003 fire along the western ASP and central ASP along Rembler Creek will for the most part not be impacted. This keeps to the diversity of habitat, structure and ecological composition seen in the ASP currently. Allowing the fire ravaged areas of the ASP to progress through ecological succession of recovery presenting differing aspects of biodiversity and function at each step-in time.

The Environmental Sensitive Areas (ESA) for the ASP were found to be:

ESA-1: 8.98ha, or 89,835.5m<sup>2</sup> (3.5% of ASP)

There are three points of proposed development impact that is associated with the South Perimeter Road Crossing and future road and services crossings of Rembler Creek. These impacts will have to be mitigated during detailed planning and be approved by the Province and City of Kelowna. The total proposed areas of ESA-1 impacts are 2%, or 0.20ha, approximately.

ESA-2: 131.5ha, or 1,314,924.9m<sup>2</sup> (51.0% of ASP)

67.5ha of ESA-2 has been proposed to be impacted by development, or 51%. These ESA-2 are mostly noted as the forested areas that were impacted by the 2003 fire and are now at early stages of recovery. As mentioned above the remaining 49% of these once forested areas will remain natural and continue to recover through several stages.

ESA-3: 115.9ha, or 1,159,806.0m<sup>2</sup> (44.9% of ASP)

48.36ha of ESA-3, or 42% is proposed to be impacted by the concept plans of the ASP. These are areas where the 2003 Okanagan Mountain fire burned extensively hot over shallow soil habitat and removed much of the soils. The remaining 58% of these habitats are to remain in a natural state and offer conditions to a wide range of species.

ESA-4: 1.93ha, or 19,356.7m<sup>2</sup> (0.6% of ASP)

All of this ESA is proposed to either remain as is, Gillard FSR, or incorporate into the new proposed road network in the ASP.

## **AQUATIC**

Two significant water features are found in the Thomson Flats ASP. Rembler Creek bisects the Thomson Flats ASP east to west for over three kilometers. This perched valley opens from the east with a deeply incised Bellevue Creek to drain to the north-west in the upper Mission.

Bellevue Creek flows south to north along the eastern portion of the Thomson Flats ASP. It is a wide deeply incised ravine approximately a kilometer long. Public trespass has established a well-worn trail along the eastern bank to access Myra-Bellevue Provincial Park adjacent to ASP to the east. City of Kelowna in 2007 undertook a conservation analysis and plan with the Sensitive Ecosystem Inventory that has highlighted the Bellevue Creek as a Core Conservation Corridor. The ASP team has answered this earlier work by preserving the lower Bellevue Creek, floodplain and lower slopes in the design processes. Development nodes were proposed for either side with a minimum distance between of 200 meters in width, or greater, as a creek corridor. No services or road crossings are proposed for Bellevue Creek.

The Riparian setback for Bellevue Creek is 15meters from top-of-bank.

Rembler Creek has the greatest influences on the Thomson Flats ASP. This feature's catchment and drainage will touch most of the proposed development. As part of the additional surveys in 2018 stream flows were monitored from freshet to freeze to assist the ASP team in determining natural flows and storm water needs. This data was analyzed with ground water stations installed previously in the Rembler Creek basin for the ASP.

Results show lower Rembler Creek surface flows at the Lower Rembler Station stay low until the groundwater throughout the Thomson Flats peaks. Until this point the Upper Rembler Station inflows are significantly higher than discharge at the Lower Station. There is a fair amount of groundwater discharge that leaves the site in a northeast direction (to and past Jack Smith Lake) and therefore does not report to Lower Station. It appears Lower Rembler Creek is predominantly fed by groundwater discharge from the aquifer that forms in the main Rembler Valley; This aquifer is more stable and longer lasting than the snowmelt runoff that drives the upper station.

The rise in ground water and increase flows also coincide with the rehydration of the wetlands that form behind the 2003 debris berm. Subsequently allowing amphibians to utilize for breeding at that time.

What we have observed over the years was non-authorized use of the area, in particular off-road vehicles (4x4's), ATV's and motor bikes, that uses Rembler Creek and wetlands for mud-bogging. This alone has created significant impacts in habitat and species destruction, as well altering of the creek, wetlands and natural drainage.

Both Canadian Horizons and Melcor agreed this impact to Rembler Creek needs to be restored during the development process that can add to a stable habitat and hydrology system for the ASP and surrounding areas. Any plans and/or work here will have to be further planned and coordinated with the Province, City of Kelowna and stakeholders.

Riparian setbacks for Rembler Creek are 15meters top-of-bank. The associated wetlands of Rembler Creek will also be 15meters from edge of wetland.

Several ephemeral streams on the south slope drain north into Rembler Creek. The Riparian setbacks on these escarpment - ravine streams will be 10meters from top-of-bank.

Jack Smith Lake touches the northern edge of the ASP and is defined by moderately steep slopes. AS Jack Smith Lake is not defined by the City of Kelowna's "minimum riparian management areas" it defaults to the provincial requirements and would be 30meters.

#### **WILDLIFE**

A significant part of the environmental assessment was focused to wildlife species found within the ASP. Key habitat and species inventories included, bat survey, nocturnal owl survey, pond breeding amphibian and painted turtle inventory and breeding bird survey. An intensive Great Basin Spadefoot tracking program was undertaken in 2017 to help guide the planning and future development of Thomson Flats ASP.

Great Basin Spadefoot (GBS) were found to breed in the wetlands along Rembler Creek and detected in the Fraser Lake basin, as well north into the Ponds Development areas and further north across Bellevue Creek. The GBS were found to use sites on all aspects and in all conditions. Soils did vary from the documented friable to very hard-pan and ranged up to 600meters from the breeding ponds. During the planning discussions with Canadian Wildlife Service and Provincial Wildlife Branch assisted in concepts to meet regulatory requirements as well maintain the population within the Thomson Flats ASP. Key points discussed as the ASP team were to maintain population and breeding connections from ASP north in Fraser Lake and Ponds areas; and terrestrial habitat throughout the ASP. Road crossings and network were heavily considered during these planning sessions.

## 2.0 Concept Plans

WSP produced several ASP maps (1-8) that were reviewed as part of the Phase II and reflected the discussions and inventories from Phase I.

### 2.1 Development Nodes

Development nodes as indicated on WSP Figure 1.0 show development nodes A through W.

Of noting Development Nodes B and C will require a wildlife corridor between them to be established prior to development moving forward. This wildlife corridor is to ensure passage for the Great Basin Spadefoot are maintain from Rembler Creek wetlands in the south to Frazer Lake and breeding in the north. As well the corridor is to have soils augmented to allow terrestrial usage for the GBS throughout the year. A small, less than 2.5 meter, walking pathway for public use is allowable here within the corridor.

Development Nodes B, C F, H, I and R will require GBS fencing and exclusion prior to ground disturbance. Development plans for these will require further planning for GBS.

Development node W will depend on development from the north to allow for services and access to avoid crossing of Bellevue Creek.

Development Nodes H and R, the eastern portion of F will need to allow for Rembler Creek aquatic setbacks, public pathways and a connecting roadway to pass through. No development or pathways/road should be within the Rembler Creek and/or wetland setbacks.

### 2.2 Generalized Land Use

If housing trends shift it would be preferable to increase the density of B, C F, G, H and R and reduce the area along Rembler Creek Frontage to allow for more bottomland restoration to occur.

### 2.3 Parks and Open Space

With 55% of the ASP as green space across an array of ecosystem and habitat types, biodiversity can be maintained. It will be important for City of Kelowna Parks management to coordinate with the Provincial and Regional District Parks on the surrounding lands to the east and south to maintain the biodiversity and conservation of these and surrounding green spaces.

## **2.4 Mobility and Transportation**

The greatest challenge I heard in the Phase I open house was the South Perimeter Road (SPR). One of our first efforts as the Thomson Flats team was to review this and part of that was to reduce the environmental impacts.

The first thing to the SPR was to realign the initial proposal out of Rembler Creek and reduce crossing from six to one.

The crossing of SPR at Rembler Creek will need to be passable for wildlife. This crossing will also require provincial approvals.

The wildlife corridor from Rembler Creek to Frazer Lake, between Development Node B and C, will require amphibian crossing and protection to reduce road mortality.

Rembler Creek will require two additional minor collector crossings with this proposed concept plans. The 2003 debris berm will be replaced with a road crossing as well a crossing in the east as Rembler Creek makes it way to the valley floor.

Roads crossing the south slope need to allow for wildlife passage between development nodes. Fill and cut slopes, if required, should be at walkable grades of 2.5(run) to 1(rise); or if along a minor stream crossing, they should be spanned. No infill and culverts.

## **2.5 Water Service Plan**

The proposed concepts for water service are to be installed within the road networks.

Any future crossing of Rembler Creek will need to be reviewed carefully and should be directional drilled.

## **2.6 Sanitary Service Plan**

The proposed concepts for sanitary service are to be installed within the road networks.

Any future crossing of Rembler Creek will need to be reviewed carefully and should be directional drilled.

## 2.7 Storm Service Plan

Catchment basins outlined in figure 7.0 will require a storm pond. These should be located near roadways to allow for servicing and clean out when required.

## 3.0 Recommendations

All future proposed develop plans to be reviewed by a QEP. These future plans will take into account the ASP documents, and current provincial and federal regulatory requirements.

All comments and points made in this Phase Two document made shall be taken as a recommendation.

1. Wildfire Mitigation
  - a. Hand-falling in ESA 1 areas where safe to do so and skidding along designated routes, utilizing existing trails and roads. Winching and/or long lining on steeper ground (>50%) will be necessary;
  - b. Machine exclusions from within 20m of creeks, and designated wetlands;
  - c. Hand removal of CWD – fuel;
  - d. Focus towards historical conditions, ie Ponderosa pine dominating in PP and lower elevation - warmer aspects of IDF;
  - e. Focus towards forest health issues (beetle, etc...);
  - f. Retain variable structure and composition in over story. Assessment of dominant trees for wind firmness to avoid future blow down will be necessary;
  - g. Retain wildlife trees;
  - h. Create wildlife trees;
  - i. Rehabilitate skid areas with approved grass mixture and plantings;
  - j. Timing of mitigation works should respect:
  - k. Ground conditions (compaction etc...)
  - l. Nesting and denning potential within the area;
  - m. Works to be coordinated in monitoring with appropriate QEP's.
2. Designate no disturb areas prior to construction with flagging or temporary fencing;
3. Minimize cut and fill slopes where possible utilize natural topography in the development design;
4. Ensure construction activities are conducted during appropriate times of the year to avoid potential impacts to nesting and breeding wildlife;

5. Hydro-seed disturb sites shortly after construction, during appropriate times of the year, to limit the potential of erosion and introduction of invasive weeds;
6. Trails and recreational amenities should be designed and constructed to avoid ESA and sensitive features where possible;
7. Habitat corridors should be incorporated into the development to provide access between significant Environmental Sensitive Areas and avoid fragmentation and alienation of habitat and species. These features also provides higher aesthetic values within the development;
8. Retain Habitat Trees where possible as part of the overall development design;
9. Road crossings occurring on natural drainage or seepage sites will integrate measures to ensure the hydrological patterns are not altered to avoid impacts on riparian and wetland communities down slope;
10. Aquatic Mitigation
  - a. At the DP level, complete assessment of condition and functioning of wetlands so that neither are impaired significantly by proposed development.
  - b. Restoration of Rembler Creek will require Provincial Authorization and City of Kelowna Approvals requiring further detail design and planning to occur.
  - c. Construction activities will require to be coordinated for Great Basin Spadefoot breeding – rearing timing as not to impact species and the lifecycles.

## 4.0 Closure

This report incorporates and is subject to best management practices, City of Kelowna Terms-of-References, Environmental Guidelines and Bylaws. If you have any questions or comments, please contact the undersigned at your convenience.

Respectfully Submitted,

John Grods, R.P. Bio  
**Makonis Consulting Ltd.**