3480 Arawana Forest Service Road – Environmental Assessment

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On

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1.0 Introduction

The following environmental document was prepared for proposed development of 3480 Arawana Road, Naramata, Regional District of Okanagan-Similkameen (RDOS). Makonis Consulting Ltd was retained to complete an environmental assessment for the project area and provide strategies to guide development and construction in a responsible environmental manner.

Located along the eastern slopes of the community of Naramata, the project site can be accessed from Arawana Road. Legal description of the subject parcel is Lot 3, Plan EPP60812, District Lot 3474, Land District Similkameen Div.of Yale, PID 029-929-857, 3480 Arawana Forestry Road.

Based on the review of the project, the scope of the proposed development and the requirements per the RDOS, the objectives of this assessment are to:

- Review the physical, biological, and terrestrial aspects of the project area.
- Identify environmental impacts as a result of development.
- Provide recommendations for impact mitigation, management and monitoring during development.

This report references the report developed for subdivision application titled “Riparian Areas Regulation Assessment Report for a Proposed Subdivision Development Adjacent to Arawana Creek, Naramata, BC.”, written June 2014, by Aarde Environmental, Ltd., as well as “Ecological Assessment of Proposed Housing Development of Naramata Benchlands (DL3474 and part of SL14 of DL2711)”, written by Les W. Gyug, Okanagan Wildlife Consulting, July 2005.

This report does not address adjacent site PID 029-929-849 and further assessment will be needed before recommendations for development can be made regarding said location. The following report is based on a purposed concept plan from WSP, Arawana Benchlands Properties – Phase 3 (November 1, 2017).

1.1 Project Description and Setting

The subject project is located at 3480 Arawana Road. This is a 14.7hectare lot, situated along the eastern slopes of Naramata, BC (Figure 1).

The property is bounded by Arawana Creek on the south, Arawana Road on the west, Provincial Crown Land to the north, and private previously logged land to the east. The property is zoned SH5s, small holdings site specific.

Okanagan Wildlife Consulting in 2005 identified the larger property as being previously cleared and disturbed for a potential Golf Course. Since 2005 the larger parcel was subdivided into
several parcels. A 14 hectare section of the 2005 parcel was designated as Conservation Lands to the south-west of this subject property.

The proposed plan is to subdivide the parcel into 68 lots, with the maintenance of green-space throughout. See Figure 2 WSP Arawana Benchland Properties – Phase 3 for schematic.

The subject property falls under the jurisdiction of the RDOS and consequently must conform to the Official Community Plan (the OCP) and provide requirements as per the development permit application process. This environmental assessment embodies the elements necessary for a Environmentally Sensitive Development Permit (ESDP). The Watercourse Development Permit (WDP) area was previously assessed by Aarde Environmental in 2014, and elements of that report provide details and recommendations for the watercourse within the property boundary.

Other regulatory frameworks which also guide the assessments and strategies within this report include, but not limited to:

1. Species at Risk Act (SARA) - Federal
3. Wildlife Act – Provincial

2.0 Background

The following section summarizes the environmental conditions of the area, including a desktop review with respect to terrestrial and aquatic habitat and species and ecosystems at risk. Sources reviewed includes the following, but not limited to:

- Biogeoclimatic maps and orthographic photos of the subject property.
- BC Conservation Data Centre (CDC).
- Habitat Wizard
- BC Soil Information Finder Tool
- Water Licences database, Provincial database.
2.1 Climate

The subject area lies within the Okanagan Valley which is in the rain shadow of the Coast and Cascade Mountains, and contains some of the warmest and driest areas of the province and Canada. The Okanagan is characterized as a continental climate of long warm dry growing seasons, and cool winters with moderate snowfall¹.

Air moving into the area generally loses most moisture on the west facing slopes of the coastal mountains, prior to reaching the Okanagan. There are occasional eruptions of hot dry air from the Great Basin extending from Mexico to Canada to the south, which in the summer, bring clear skies and very warm temperatures. In winter and early spring, there are frequent outbreaks of cold, dense, arctic air.

2.2 Topography and Landscape

The area of focus is approximately 14.7 hectares consisting of a moderately sloped landscape, with small benches throughout. Aspect of slopes is generally westerly facing towards Okanagan Lake. The subject area highest elevation is approximately 718 meters above sea level, located along the eastern property boundary. The property slopes down towards Okanagan Lake to an approximate elevation of 620 meters above sea level at the western property boundary.

The region has been influenced heavily by numerous glaciations over time with the most recent being the Fraser Glacier. The result of this glaciation yields surface materials consisting of morainal material (till) deposited by the glacial ice: a mixture of boulders, sand, silt, and clay². Soils mapped at 1:50,000 for the subject area indicate well-drained, sandy loams with 26% course fragmentation³.

2.3 Site History

Historic photos from 1939 display the subject property as relatively open, with a few scattered patches of trees and shrubs. No settlements are apparent, however trails can be seen throughout the property boundary. Arawana Creek can be seen beyond the subject southern boundary, in addition to a creek feature along the northern section of the property. Overall, the landscape of the subject area historically may be considered a grassland environment (Figure 3).

More recently, the property has experienced change in ownership, and changes to proposed land use. Past proposed land use for a portion of the property was development of a golf course

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As such, the eastern area of the property has experienced some tree clearing in anticipation of golf course development.

### 2.4 Ecosystems

Climate, topography and surface geology influence the site hydrology, which in turn influences the biological resources on site. This ecological principle is fundamental in most Ecological Landscape Classifications. The vegetation assessment utilizes the Biogeoclimatic Ecosystem Classification (BEC) which is used extensively throughout British Columbia to report and describe terrestrial ecosystems. This ecological classification system enables biologists, foresters, resource managers, planners and the other stakeholders to use a common framework and currency for exchanging fundamental knowledge. In the BEC system, climate is the most significant determinant of ecosystems; influencing the soil characteristics, which in turn influence the climax (old growth) vegetation, its composition and structure.

The subject property is located in the North Okanagan Basin (NOB) Okanagan Very Dry Hot Ponderosa Pine (PPxh1) biogeoclimatic subzone variant which occurs at lower elevations, along very dry valley areas of the Interior Plateau of British Columbia. It is the driest forest zone in the province, with an almost absent shrub layer and dominated by Bluebunch wheatgrass (*Agropyron spicatum*), or in lesser amounts Arrow-leaved balsamroot (*Balsamorhiza sagittata*), Idaho fescue (*Festuca idahoensis*) and Timber milk-vetch (*Astragalus miser*).

Terrestrial and Sensitive Ecosystem Mapping (TEM, SEI) polygons mapped at 1:20,000 scale for the area were reviewed for surficial materials, ecosystems and sensitive designation for the subject property. The subject property extends over the conjunction of five delineated polygons with ECP Tags of 082E053_1372, 082E053_1417, 082E053_11150, 082E053_1433, 082E053_21417. No direct sampling of polygons associated with the subject property had been completed for the TEM project. Following ecosystems were mapped within the polygons:

- PPxh1 PT/02 Structural Stage 6 - Ponderosa pine – Red three-awn
- PPxh1 PW/01 Structural stage 6 - Ponderosa pine – Bluebunch – Idaho fescue
- PPxh1 SB/02 Structural Stage 2 - Selaginella – Bluebunch wheatgrass rock outcrop
- PPxh1 DM/08 Structural Stage 5 - Douglas-fir – Water birch – Douglas maple
- PPxh1 RW/00 - Rural
- PPxh1 RZ/00 – Road

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Sensitive Ecosystems listed for the subject area:

- PPxh1 Ri:gu – Riparian gully
- PPxh1 WD:co – Wooded coniferous
- PPxh1 SV:ro – Sparsely vegetated rock outcrop

2.5 Aquatic Review

There are no water features formally mapped by the province within the boundary of the subject property. Water features in the form of creeks have been mapped north and south of the subject property boundary.

Arawana Creek (310-657800) is south of the subject property boundary. The report written by Aarde Environmental in 2014 indicates: “Arawana Creek has no summary of fish species within the BC Fisheries Data Warehouse. This should not be considered a comprehensive list. The stream was surveyed in 1996 and although no fish were found from the mouth to Naramata road, there were no barriers to fish access from Okanagan Lake. Kokanee (Oncorhynchus nerka) and Rainbow Trout (Oncorhynchus mykiss) are typical stream species that may utilize this stream and may be present at some time of the year to carry out their life processes.”

Naramata Creek (310-660700) is located north of the subject property. Fish species observed in 1995 and 1996 according to Habitat Wizard\(^5\) included the Kokanee (Oncorhynchus nerka) and the Rainbow Trout (Oncorhynchus mykiss), with obstructions including a 3.5metre dam and 5.0metre falls.

The Aarde Environmental 2014 report outlined an unnamed tributary located along the north-east section of the subject, south and east of the reservoir. The assessment determined this tributary to be a non-classified drainage system.

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2.6 Wildlife Review

Okanagan Wildlife Consultants (2005) conducted a wildlife assessment for the subject and surrounding area in the spring of 2005. This review concluded the area received use by various ungulates, and would be suitable habitat for over ten bird species. Snake species were observed, however no suitable hibernacula or denning sites were observed during the inventory.

In addition, according to the Okanagan Habitat Atlas (Accessed November 2017), the habitat connectivity for the subject area is considered high, though biodiversity of the area is listed as low.

2.7 British Columbia Conservation Data Centre

Results of investigation indicate fifty-eight vertebrate species listed for the area, forty blue and eighteen red listed species\(^6\). Of these, ten were listed by the Committee on the Status of Endangered Species in Canada (COSEWIC) as endangered and nine listed as endangered by the Species at Risk Act (SARA). One of these species, the American Badger (\textit{Taxidea taxus}) was listed as potentially occurring in the subject region. A historical record of the White-headed Woodpecker (\textit{Picoides albolarvatus}) was also listed for subject region. Though the last observation of this species in the Naramata area was in 1976, this does not necessarily mean the area is no longer used as habitat.

Secure element occurrences were also listed for the subject area. After consultation with CDC, it was determined that the North American Racer (\textit{Coluber constrictor}) and the Western Rattlesnake (\textit{Crotalus oreganus}) are in the vicinity of the subject site, however not observed within the subject site. This does not preclude these species from potentially using the subject as habitat.

Twenty-seven vascular plant species were listed for the area, eleven blue and sixteen red under Provincial Conservation Status. None of these species were mapped as being within the project boundary.

Twenty-one ecological communities were listed for the area\(^7\), six blue and fifteen red listed under Provincial Conservation Status. No sensitive communities were mapped by the CDC within the project boundary; however, Douglas-fir / common snowberry - birch-leaved spirea was listed for the Penticton area as BC Blue List.

\(^6\) Search parameters-RDOS, Okanagan-Similkameen, PP, Red or Blue Status,
\(^7\) Area parameters included: PPxh1, OSRD, Penticton, BC Red and Blue List
2.7 Water Wells

According to BCiMap (accessed August 14, 2017), there is one unlicensed well located in the south-east corner of the subject property. This was drilled in 1981 for G. Blackwell.

3.0 Site Inventory


The subject property covers approximately 14.7 hectares, with existing access along the west side and north side, off of Arawana Road. The main access is via a driveway along the west-central area of the subject into a yard site in the central area of the subject. A secondary access is located north of the subject site, along a forestry road which meanders south along the eastern section of the subject and exists the subject along the south-east property boundary.

The subject property is sloped and benched towards Okanagan Lake. The area has been heavily influenced by anthropogenic disturbance as is evidenced through observation of trails, a farm yard-site, logged areas, a historic irrigation channel, and high density of weedy species.

3.1 Terrestrial Ecosystem

The subject area is along the boundary of the PPxh1 and IDFxh1 ecosystem variants. As such, species from each of these units were observed during the inventory (Figure 4). The refined detailed TEM for the property found onsite were:

PPxh1 PF/05 Ponderosa Pine-Bluebunch wheatgrass-Rough fescue

Main ecosystem represented south of the unnamed tributary. Gentle to moderate slope with some flat areas. Dominant relatively open canopy cover of Ponderosa pine (Pinus ponderosa) and Douglas fir (Pseudotsuga menziesii). Evidence of human disturbance in areas, such as yard debris and woody debris piles. Some grasses observed included Western fescue (Festuca occidentalis), Hair bentgrass (Agrostis scabra), Bluebunch wheatgrass (Pseudoroegneria spicata), Timothy (Phleum pretense), Quackgrass (Elymus repens), Cheatgrass (Bromus tectorum), Kentucky bluegrass (Poa pratensis), Rough fescue (Festuca scabrella). Most observed shrubs included Snowberry (Symphoricapos albus), Woods rose (Rosa woodsii), and Oregon grape (Mahonia aquifolium). Other herbs noted were Common yarrow (Achillea millefolium), Sulpher Cinquefoil (Potentilla recta), Lemonweed (Lithospermum ruderale), Arrowleaf balsamroot (Balsamorhiza sagittata), St. John’s wort (Hypericum perforatum), and Diffuse knapweed (Centaurea diffusa). Soils are dry sandy loamy soils, with aspect south-westerly. – Disturbed - ESA 3
**PPxh1 RZ/00 Roadway**

These areas are found meandering throughout the property. Packed gravel trails devoid of vegetation and flanked by weedy species. – ESA 4

**PPxh1 DS/07 FdPy-Snowberry-Spirea**

The ecosystem is found along the unnamed tributary. Main species observed were Aspen (*Populus tremuloides*), Snowberry (*Symphoricapos albus*), Nootka rose (*Rosa nutkana*), Star flowered false Solomon’s seal (*Similacina stellata*), Oregon grape (*Mahonia aquifolium*), Willow (*Salix spp.*), and Red-osier dogwood (*Cornus sericea*). Also noted was Western mountain ash (*Sorbus scopulina*), Lindley’s aster (*Symphyotrichum ciliolatum*), some Pinegrass (*Calamagrostis rubescens*), Birch-leaved spirea (*Spiraea betulifolia*), honeysuckle (*Lonicera spp.*), and Douglas maple (*Acer glabrum*). Few weedy species were observed. The main trail from north to south bisects this ecosystem. ESA - 1

**PPxh1 PW/01 Ponderosa Pine - Bluebunch wheatgrass- Idaho fescue**

Area is defined by steeper slopes, with 258° aspect, very open forest. Some soil exposure as well as larger exposed rocks and course materials. Evidence of past logging and disturbance. Major species observed included Snowbrush (*Ceanothus sanguineus*), St. John’s wort (*Hypericum perforatum*), Oregon grape (*Mahonia aquifolium*), Cheatgrass (*Bromus tectorum*). Minor occurrences of Lemonweed (*Lithospermum ruderale*), Snowberry (*Symphoricapos albus*), Sulphur cinquefoil (*Potentilla recta*), Saskatoon (*Amelanchier alnifolia*), Ponderosa Pine (*Pinus ponderosa*) and Douglas Fir (*Pseudotsuga menziesii*). Disturbed. ESA - 3

**PPxh1 RW/00 Rural**

This area is representative of the yard-site, grazing areas, old corrals, manure piles, cattle shelters, and associated residence. Many weedy and non-native species occupy this area. ESA- 3

**PPxh1 SP/06 FdPy-Snowberry-Pinegrass**

This ecosystem is within the north-west section of subject, in a small toe north of the reservoir. Main species observed were Douglas fir (*Pseudotsuga menziesii*), Aspen (*Populus tremuloides*), Ponderosa pine (*Pinus ponderosa*), Snowberry (*Symphoricapos albus*), Nootka rose (*Rosa nutkana*), Star flowered false Solomon’s seal (*Similacina stellata*), and Northern bedstraw (*Falcul boreale*). There was a small overgrown channel through the middle of this section, however no apparent inlet or outlet. Weeds were scattered around the perimeter and the property fence-line surrounded the north and west sides of this ecosystem. ESA - 3

Tied to the inventory phase of this assessment is the stratification of environmentally sensitive areas (ESA). Environmentally Sensitive Areas (ESA) is an amalgamation of wildlife habitat and vegetation community ratings identified separately within the area. A basic presence model approach can be applied using the two previous ratings to derive the final overall cumulative
ratings; although considerations of adjacency and size of each setting rating was also considered on an individual basis and adjusted accordingly. In addition, because a site may receive an overall ESA rating of Low, does not mean it has no values, or even Low values, simply that, in the overall rating, the site does not rate as highly as others. Ratings are ranked from 1 to 4 in each of the groups. ESA rating of High (score 1), Moderate (score 2), Low (score 3) and Little or No Value (score 4).

4.0 Impact Assessment

Overall, the site has of historical anthropogenic disturbance and in some areas weedy and non-native species are the dominant groundcover. This is especially true along the eastern property boundary, the areas of rural habitation (yard site), grazing and corral areas, and the trails and roadways throughout the property.

Impacts addressed in past reports focussed on protection of Arawana Creek. The current proposal design for the subject considers the riparian setback according to Aarde Environmental (2014), and lot lines for the subject are beyond the setback for the creek. Therefore, development of the subject should not impact Arawana Creek.

In addition, overall wildlife habitat and movement was addressed as an impact concern by Okanagan Wildlife Consulting (2005). The proposed development had considered wildlife movement in the proposal, and has designated 0.225 hectares of park space and approximately 1.9 hectares of wildlife corridor space throughout the site to address this concern. Further mitigation to protect habitat is to be applied during evaluation of engineer design plans.

Under the current proposed lot development, some local site impacts are expected (Figure 5). The unnamed tributary and surrounding ecosystem (DS/07), running approximately east to west in the northern section of the property will experience impacts due to culverting of the tributary for roadway development. This will result in the loss of some plant species in the ESA 1 designated area. Approximately 362 m² of ESA 1 area within the property boundary will be impacted. Wildlife/cavity trees were noted during the 2017 site visit. Removal of such trees for lot development will result in direct loss of habitat for cavity nesters.
5.0 Recommendations

Considerations and recommendations are given to the entire subject property within context of the natural features in the surrounding areas as within the Best Management Practices. Recommendations listed below are a summation of those provide by Okanagan Wildlife Consulting (2005), Aarde Environmental (2014), and Makonis Consulting (2017, author).

1. Subdivision engineering design plans are to be reviewed and considered in context of this and previous environmental reporting – recommendations prior to construction approval.
   a. A further assessment should take place for adjacent site PID 029-929-849, to ensure the unnamed tributary in this location is protected accordingly. As well to address proposed crossings of drainage and ESA1 adjacent to Arawana FSR.
   b. Drainage crossing will require authorization from province and will need engineering design and Environmental Management Plans - Protection.
   c. Servicing between roads are unknown and proposed at this time. If the Servicing is to cross conceptual green space, these impacts need to be addressed.
   d. Disturbances will require evaluation for restoration and/or landscaping.

2. Prior to works commencing, the following should be addressed:
   a. The designated park and southern boundary of the property parallel to Arawana Creek will be delineated with temporary silt fencing, to demarcate construction limits and ensure no construction enters these areas. This will also assist to protect Arawana Creek from construction encroachment.
   b. The limits of construction disturbance for the subject will be staked. Work outside of delineated construction areas are prohibited, unless authorized and documented.
   c. ESA 1 will be delineated by silt fencing for the duration of the project. This is a “No Go” zone for construction, staging, and all other works. This area incorporates the recommended 2metre riparian buffer suggested by Aarde Environmental (2014).
   d. Danger trees in the ESA 1 are to be assessed prior to any development by the construction contractor to meet WorkSafe BC requirements (Aarde 2014).
   e. A windthrow hazard assessment should be completed to ensure trees in the ESA 1 designation are wind firm (Aarde 2014).
   f. A further assessment should take place for adjacent site PID 029-929-849, to ensure the unnamed tributary in this location is protected accordingly.
3. Site drainage and stormwater management should be addressed by a qualified professional. An outfall into drainages and/or Arawana Creek require provincial authorizations.

4. Wildlife corridors, as per Figure 5, will be left in a natural state (undisturbed), to maintain natural connectivity and habitats for area wildlife. Corridors will be designated “do not disturb” and delineated with temporary fencing.

5. Removal of trees will be restricted between March 31 and July 31 for Bird Nesting. Clearing of trees within this window will require review and approval by the environmental monitor; including Hazard - Danager Trees.

6. If crossing upgrades are needed for the tributary area:
   a. Provincial authorization and local government requirements will be followed
   b. Minimize the crossing footprints
   c. Crossings will be engineered designed
   d. Restore disturbed crossing areas to native vegetation

7. Spill - containment kits will be on site and on each equipment – machine.

8. Work site will be maintained in a clean state. Oil containers, cans, grease tubes, rags, etc. and any other material or packaging will be removed from the work area to an approved disposal location immediately on completion of the servicing job.

9. Access and equipment movement should be conservative to minimize disturbance.

10. Equipment will be fueled at least 30metres from the delineated ESA 1 area. No storage of fuels or materials should occur within 30m of this area.

11. Equipment moving onto site is expected to:
   a. be free of weeds and cleaned (pressure washed)
   b. be leak-free and in good working condition
   c. have a spill – containment kit present.

12. Common area landscaping should contain plant and grass species native to the area. Residential landscaping should encourage the use of native species where appropriate. Native species will encourage wildlife usage of the area. Cut and fill slopes should be restored with native species. A site restoration plan is recommended.

13. Any exposed soils for prolong periods or for overwintering, shall be covered. Covering may include tarping, or hydromulch (without seed mixture) and must be maintained.

14. Environmental monitoring will be required. The environmental monitor will carry the authorization to stop works. Work will be suspended if there is a perceived threat or harm to natural environmental features. A Qualified Environmental Professional (QEP) will be retained as project environmental monitor by the proponent for any construction activities. The focus of monitoring will be on the protection of the ESA 1 area and ensuring the following are considered within this and subsequent reporting.
6.0 Figures

Figure 1: Location of 3480 Arawana Road, Naramata B.C.
Figure 2: Site plan for 3480 Arawana Road.
Figure 3: Historic 1938 aerial image of subject property and surrounding landscape (superimposed with current cadaster).
Figure 4: Ecosystem and sensitivity delineation for subject site.
Figure 5: 3480 Arawana Road impact overview to subdivision design.
7.0 Photos

Photo 1: Looking south from the trail entrance. Some garbage in the area. Many grasses. PF/05 ESA – 3.

Photo 2: Looking east along southern property fence-line. PF/05 ESA – 3.
Photo 3: Looking south west from the south-central area of the subject. East of the trail.

Photo 5: Open field area along eastern property boundary. Aspen ingrowth noted among weedy groundcover. Area of past disturbance.

Photo 6: Looking into the unnamed tributary area. DS/07 ESA -1.
Photo 7: Looking uphill from the main trail into the most north-westerly area of the subject property. Area previously disturbed. PW/01 ESA – 3.

Photo 8: Looking at the south side of the unnamed tributary.
Photo 9: South of yard-site, small boulders and shady Douglas fir canopy, lack of understory species.

Photo 90: Potential old irrigation channel, south of the yard site. RW/00 ESA – 3.
8.0 Conclusion

This report incorporates and is subject to best management practices. If you have any questions or comments, please contact the undersigned at your convenience.

Respectfully Submitted,

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