



March 4, 2018

Ecoasis Development LLP
2050 Country Club Way
Victoria, B.C. V9B 6R3

Attention: Eric Gerlach, P.Eng.

Dear Mr. Gerlach:

**Subject: BEAR MOUNTAIN HIGHLANDS DEVELOPMENT – PROPOSED
AMENDMENTS TO MASTER DEVELOPMENT AGREEMENT**

BACKGROUND

A Master Development Agreement (MDA), dated August 31, 2005, was created between District of Highlands and LGB9 Development Corporation. WSP Environmental Consulting was requested to review the components of the MDA that pertain to water quality monitoring and organic goals for fertilizer/pesticide practices, and provide recommendations with respects to possible amendments.

Water Quality Monitoring

Schedule A Golf Course and Groundwater Monitoring, Part 3(d) makes reference to the requirement of an operation plan which includes *“a groundwater quality and quantity for lands adjacent to the Land which will require quarterly monitoring in perpetuity.”* Part of the rationale for the monitoring program was in concern for grey water waste treatment, hence the added MDA language *“the monitoring program shall specifically test for residual pharmaceuticals in groundwater ... if it is found that groundwater contamination is occurring as a result of the golf course irrigation system”*

It is recommended that this water quality monitoring protocol be revisited, as no additional data can be accumulated from these adjacent properties that is useful to the assessment of Bear Mountain activities. Briefly stated, grey-water effluent is not being introduced into the groundwater, and the groundwater flows down-gradient from North to South. As such, the best early warning monitoring for fertilizer/golf related uses occurs on-site and with sampling surface waters.

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Background and Rationale for New Onsite Monitoring Protocols:

As per the MDA requirements, Thurber Engineering (and recently Western Water) has been sampling several drinking water wells located off site on a quarterly basis for drinking water criteria. This protocol is unorthodox given its ongoing requirement to test an unchanging condition in perpetuity. Well testing has taken place now for more than 10 years and none of the data indicates irregularities or any occurrences that do not comply with drinking water regulations.

Over 40 samples have been taken at each offsite residence between 2005 and 2017. With these well tests producing water samples upgradient from the Bear Mountain groundwater table, they are effectively “up river” from the Valley Course – which is ineffective in testing for impacts from golf use. Continual quality testing of off-site groundwater resources will not provide any new or additional data as it would pertain to Bear Mountain golf activities. It is estimated at since offsite testing commenced, approximately \$30K per test site was spent, only to determine on several occasions total coliform levels have been elevated in the vicinity of the test well – which is indicative of changes in the function of the septic treatment systems on these private residences. A complete summary of the off-site testing program is contained in Appendix E of the WSP Environmental Best Practice Report for Bear Mountain dated February 2018.

Based on the flow patterns observed on the golf course the sampling of surface waters would be more effective in determining if there are water quality concerns because of fertilizer and pesticide use. Ecoasis has retained WSP to develop a monitoring protocol on the property which includes both surface water and groundwater sampling, both on site and off site. Surface waters are sampled for nutrients (originating from fertilizers) as well as a site-specific array of chemicals that represent pesticide/herbicide use. Sampling takes place upstream of the site (baseline) as well as two downstream sites. Sampling currently takes place twice a year. The recommended groundwater sampling program is summarized in Section 3 of the WSP Environmental Best Practice Report for Bear Mountain dated February 2018.

The sampling protocol has been developed to demonstrate surface water quality conditions in the vicinity of the golf course under standard operating conditions. In the event of a spill event a water quality sampling program specific to the occurrence will be implemented immediately. In addition, the Bear Mountain golf course is monitoring a number of environmental features in order to ensure that operations are not impacting aquatic and terrestrial resources as part of an Environmental Effects Monitoring (EEM) program.

It is recommended that off-site well testing be discontinued, and a new water quality monitoring program will introduced that focuses on on-site surface and groundwater sampling; taken at more realistic intervals (for long term trend analysis).

Fertilizer and Pesticide Management Practices, and Organic Maintenance Methods

Under Environmental and Storm Water Management Plans, Part 9 (e) states that “*the environmental management plan should include a fertilizer and pesticide management plan with a goal toward immediate and on going organic maintenance methods.*”

WSP, in consultation with Landscapes Unlimited has reviewed the concept of organic golf maintenance, and feels that an ‘organic’ program is currently not achievable. Landscapes Unlimited is an internationally leading golf management consulting firm to hundreds of golf courses world-wide, and has no knowledge of any mainstream golf course operating in North America that uses an organic fertilizers or pesticide program – and the golf industry does not



have any standard or protocol that define a suitable or practical program. Having said above, there is a wealth of environmentally sensitive options integrated in golf course management. **As such the language for the MDA should be revised to state “... with a goal towards environmentally sustainable maintenance practices”, rather than “organic maintenance practices”.**

Background for Fertilizer and Pesticide Management Plans:

Landscapes Unlimited has emphasized the importance of an integrated pest management plan (IPM) which was included in the Environmental Management Plan. By employing an integrated pest management (IPM) program the use of pesticides can be reduced. The major components of an IPM program include:

- establishing tolerance levels for pests (disease, weeds, insects);
- monitoring the pests, and treating only when the pre-determined tolerance level is exceeded;
- developing thresholds;
- using effective alternatives to pesticides when they are available;
- when pesticides are required, using the 'least toxic' alternative (a pesticide characterized by low water solubility, low leachability, and low acute toxicity to fish and wildlife);
- using pesticides at the minimum effective application rate;
- maintaining accurate records of pests identified, actions taken and the effectiveness of treatment.
- for golf courses, an essential component of IPM is an emphasis on maintaining healthy turf, which minimizes the need for chemical control of weeds, insects, and diseases. Measures to maintain a healthy turf include:
 - selecting, where available, turf species and cultivars that are resistant to the locally endemic diseases: *Fusarium* patch (pink snow mold), pythium root rot, take all patch, brown spot, dollar spot and melting out or “*Helminthosporium*” and leaf spot (*Drechslera*);
 - using high-quality seed stock that includes an analysis of the types and numbers of weed seeds contained in the product;
 - pruning trees to reduce shading;
 - reducing the time that dew spends on grass leaves (by dragging a hose or pole across the turf early in the morning);
 - watering early in the morning rather than in the evening to allow leaves time to dry and reduce the potential for promoting diseases;
 - providing adequate irrigation;
 - fertilizing, aerating, and overseeding adequately to develop a dense, healthy turf;
 - promptly repairing worn and damaged areas;
 - using correct mowing practices, including keeping the mowing height as high as possible for the turf grass species and use of the site, and keeping the mower blades sharp;
 - keeping thatch at an optimum thickness;
 - scheduling maintenance procedures to avoid working in weather and turf conditions that favour the spread of diseases;
 - maintaining a vibrant soil microbe population through aeration and provision of adequate organic material;
 - maintaining a somewhat acidic soil pH (5.8 to 6.5) to control diseases such as *Fusarium* patch and take all patch;



- paying particular attention to fall cultivation: aerating, top dressing with compost, and avoiding fertilization in late fall when active growth may lead to damage from cold and/or disease.

Upon the completion of the Valley Golf course in 2005 ENKON Environmental Ltd. met with the greenskeeper to review the specific chemicals that were being used on the golf course. A full list of the chemicals being used were submitted to Maxxam Analytics laboratory to develop a site specific comprehensive water quality sampling program. Water samples were taken twice annually at several locations. All analyzed samples showed these chemicals were below detection. Surface water quality samples associated with the golf course have shown good water quality downstream of the discharge points. This demonstrates that management practices on the golf course are environmentally sustainable.

I hope this information is helpful to you in your review of the proposed works. If you have any questions please contact me at 250-881-4368.

Yours sincerely,

A handwritten signature in black ink that reads "Susan Blundell". The signature is written in a cursive, flowing style.

Susan Blundell, M.Sc., R.P.Bio.
Senior Biologist