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November 6, 2013
PGL File: 015-17.01

Musqueam Capital Corp.
6615 Salish Drive
Vancouver, BC
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Attention: Stephen Lee
Acting CEO

RE: ENVIRONMENTAL SETBACKS – MUSQUEAM BLOCK F

Further to our recent discussions with Gordon Easton (Colliers), Pottinger Gaherty Environmental Consultants Ltd. (PGL) has prepared the following summary of conceptual environmental setbacks for proposed stormwater-management infrastructure on the Musqueam Indian Band's Block F parcel located on the University Endowment Lands.

BACKGROUND

The proposed project has been reviewed by Fisheries and Oceans Canada and they determined that the "project is not likely to result in a contravention of the habitat protection provisions of the *Fisheries Act*." This review confirmed that the proposed stormwater-management measures, including the upgrade to the culvert under University Boulevard, do not pose a risk to downstream fish habitats.

The proposed upgrade to stormwater management of the site was also reviewed as a notification under Section 9 of the *Water Act* by the provincial Ministry of Forests, Lands and Natural Resource Operations, who determined that the project could proceed "subject to the proposed works being consistent with the objectives, standards and the planning, design and operational best practices outlined in our Standards and Best Practices for Instream Works."

We understand the proposed development of the Block F Parcel includes construction activity within the riparian area of proposed stormwater management infrastructure (a constructed wetland) that will be connected via surface flow to Salish Creek, a known fish-bearing watercourse. As such, environmental setbacks will be required to protect the fish habitat values of the constructed wetland. Please note that fish are not present at or near the site.

We also understand that the proposed development will take place in and adjacent to the existing drainage ditch at the east end of the Block F parcel. As the existing drainage ditch is not connected to fish habitat, there are no requirements for environmental setbacks.

PROPOSED RIPARIAN SETBACKS

Our proposed average riparian setback width of 10.4m (from the high-water mark) for the constructed wetland is presented in PWL Partnership Drawing LSK 20 (attached).

DISCUSSION

The riparian area, alongside natural and man-made aquatic areas, is intended to protect aquatic habitat. To test whether the proposed setback discussed above will adequately protect aquatic habitat, the functions of a leave strip as outlined in the "Land Development Guidelines" can be reviewed:

- Large organic debris source: mature trees in the riparian zone are required to provide an ongoing source of large organic debris that provides stability, cover from predators, and habitat for young fish. It is our opinion that a tree/shrub setback zone, averaging 10.4m in width, for the constructed wetland will provide adequate stability. Cover and habitat for juvenile fish are not relevant here, because there are no fish present at the site;
- Food source: the vegetation of the riparian corridor is habitat for terrestrial insects that, in turn, are a major food source for rearing juvenile fish. Leaves and other organic matter falling from proposed native riparian vegetation to be planted at the site (see below) are also an important food source for aquatic insects. The vegetation in the proposed setback (averaging 10.4m in width for the constructed wetland), adequately protects this source of food for fish populations downstream of the site;
- Regulation of water temperature: summer water temperatures cannot exceed approximately 20ºC without causing stress and eventually mortality in downstream salmonids. One of the most important functions of riparian vegetation is to provide shade to keep water temperatures as cool as possible. It is our opinion that the riparian shrubs/trees to be included in our proposed setback area will provide adequate shade; and
- Filtering of runoff: this final function of leave strips is perhaps one of the most important, yet one of the most difficult to quantify and assess. The riparian vegetation forms a physical barrier to surface runoff, slowing down flow and trapping sediment and pollutants carried by the flow. This prevents these materials from flowing into the watercourses and the fish habitat. There will be no direct runoff of dirty stormwater from future site development to the constructed wetland. The combination of our proposed average setback width discussed above, and plans for treatment of dirty stormwater appear to be sufficient to achieve this filtering objective.

It is our opinion that the fish habitat functions of the proposed constructed wetland are adequately protected with the proposed setback and implementation of native riparian restoration, as described below.

PROPOSED NATIVE RIPARIAN RESTORATION

Restoration concepts to be implemented in the riparian areas of the constructed wetland will be based on natural successional strategies and involve a two-phased approached. The first phase of planting will include a simple, high-density planting strategy dominated by young, fast-growing, native primary woody plant species, including:

- Red alder (*Alnus rubra*);
- Black cottonwood (*Populus balsamifera*);
- Red-osier dogwood (*Cornus stolonifera*);
- Willow (*Salix* sp.); and
- Bracken fern (*Pteridium aquilinum*).

The second phase of planting will occur after the primary woody plant community has successfully established (i.e., roughly three growing seasons). This phase will supplement the pioneering woody species with pioneering coniferous trees to assist the successional process, and begin to establish long-term conditions less favourable for some unwanted invasive species. Tree species to be included in the second phase of planting will include:

- Douglas-fir (*Pseudotsuga menziesii*);
- Western redcedar (*Thuja plicata*);
- Western hemlock (*Tsuga heterophylla*); and
- Sitka spruce (*Picea sitchensis*).

We trust that this meets your requirements. If you have any comments or questions, please contact Matt Hammond or Bruce Nidle at 604-895-7644 or 604 895-7609, respectively.

POTTINGER GAHERTY ENVIRONMENTAL CONSULTANTS LTD.

Per:

Bruce H. Nidle, B.Sc., R.P.Bio.
Senior Environmental Scientist

Matt Hammond, B.Sc., R.P.Bio.
Senior Environmental Assessment Specialist

BHN/MNH/mtl/slr
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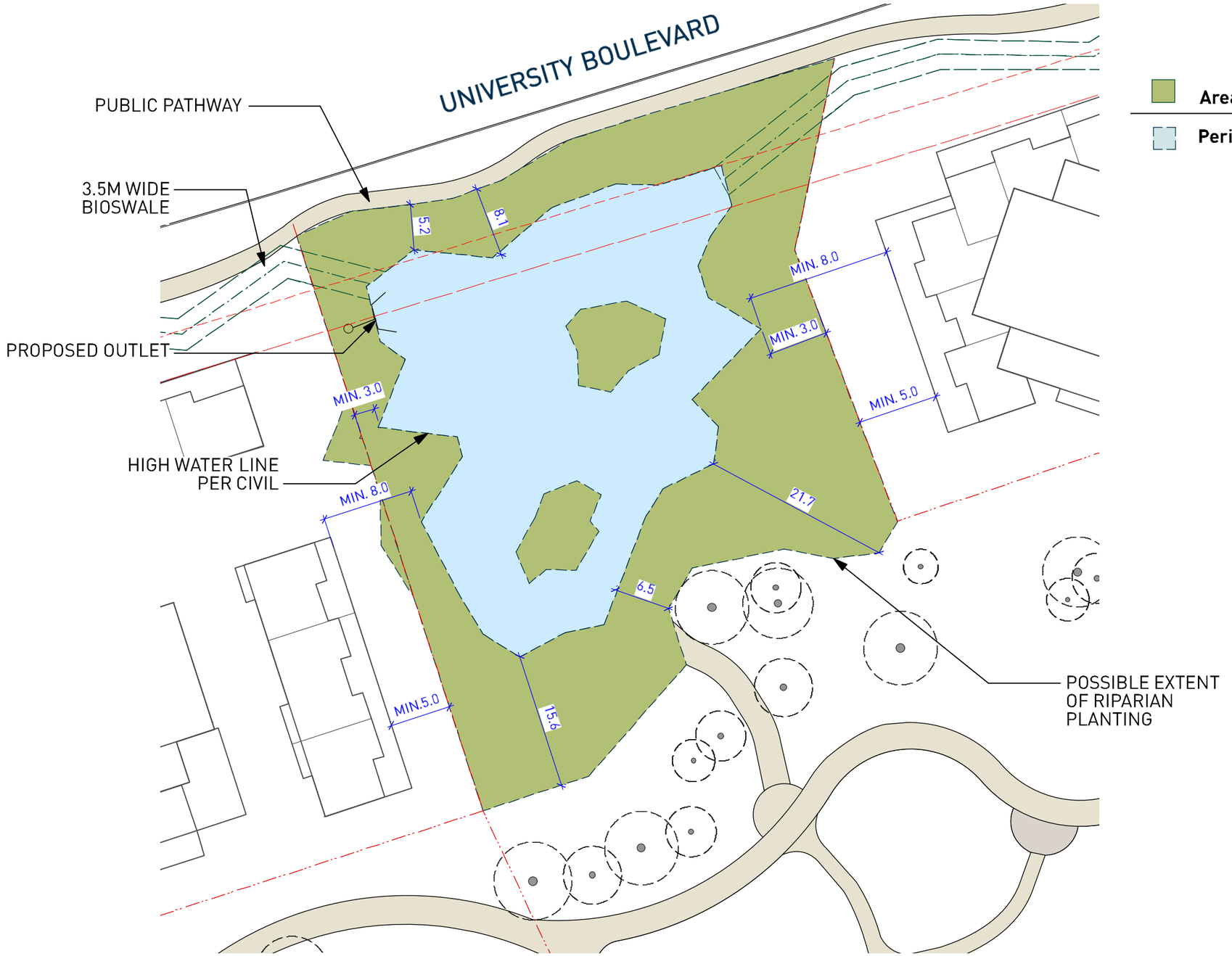
Attachments: PWL Partnership Drawing LSK 20



Area 1890 sq. m.

Perimeter 182 m

= Average Setback 10.4m

Revised: 2013/10/31

PWL partnership

www.pwlpartnership.com

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This LSK to be read in conjunction with the following drawings:

Project: 1266
UEL Block F

Drawing Title:
Rain Garden and Constructed Wetland

Scale: 1:500

North:

Date: 2013/10/22
File: 1266 PLAN.vwx
Drawn: JL **Reviewed:** JW
Drawing:

LSK 020