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January 16, 2025

ESA Habitat Compensation Valuation for 4975, 4961, & 4951 200 Street and 19991 49 Avenue, City of Langley.

Hello Roy;

As requested, I have put together a generic formula to determine the cost of compensation for works within an Environmentally Sensitive Area (ESA). For the properties in question (4975, 4961, & 4951 200 Street and 19991 49 Avenue), the total area of impacted ESA is 7,705 sqm. The classified ESA polygons within the subject properties are comprised of moderately low value (4973 sqm) and low value (2732 sqm).

To determine the appropriate replacement value of the designated EAS polygons within the Subject Properties, several guidelines were referenced, and include the following:

- Province of British Columbia: Riparian Restoration Guidelines (March 2008)
https://www.env.gov.bc.ca/lower-mainland/electronic_documents/RiparianRestorationGuidelines.doc
- Province of British Columbia (2012). Appendix 4: Revegetation Guidelines for Brownfield Sites. RAR Implementation Guidebook.
- Species at Risk Voluntary Stewardship Practices or: Guidance for Restoration Activities in Riparian Areas. (December 2013). Prepared by Mike Pearson, PhD. RPBio: and DG Blair M.SC.
http://stewardshipcentrebc.ca/PDF_docs/sar/GuidanceforRestorationActivitiesinRiparianAreasPilot12-2013.pdf
- B.C. Ministry of Forests. 2000. Establishment to free growing guidebook. Vancouver Forest Region. Rev. ed., Version 2.2. For. Prac. Br., B.C. Min. For., Victoria, B.C. Forest Practices Code of British Columbia Guidebook.
<http://www2.gov.bc.ca/assets/gov/farming-natural-resources-and-industry/forestry/silviculture/stock-standards/efgg/efg-van-print.pdf>

Planting Densities

To determine the density of planting and the total number of plants required for restoration, the class of plants were designated into two strata, canopy species (trees) and understory species (shrubs and herbaceous groundcover).

For the moderate-low value forested habitat, the BC Ministry of Forests Stocking Standards for a zonal site within the CWHxm1 biogeoclimatic ecosystem classification zone was used to determine the appropriate density of trees. For the understory vegetation occurring within the moderate-low value forested habitat and the low value oldfield habitat, no established standards or guidelines are published in BC, therefore, relevant guidelines from other jurisdiction were utilised to determine the appropriate spacing. Based on this review, the average on-centre spacing was established at 3.0 m for shrubs and 1.0 m for herbaceous groundcover. This spacing density allows for balancing resource competition, plant development, and maintenance.

To determine the required number of plants, the following equation was used:

$$\frac{PAS (TAH \times PTA)}{AoCS}$$

Where:

PA = Proportional Area of Stratum

TA = Total Area of Habitat

PTA = Proportion of Total Area of Habitat

AoCS = Average on-Centre Spacing

Moderate-Low Value Habitat

As the forested habitat occurs within a heavily modified urban-residential area, a minimum of 400 stems/hectare is the recommended replacement value, this equates to an average on-centre spacing of 25 m. The total area of moderate-low habitat occurring within the subject properties is 4973 sqm (0.497 ha). Therefore, the stocking density at a 1:1 replacement ratio is 199 trees. Applying the City's required 2:1 replacement ratio, this results in a total of 398 replacement trees.

Assumed that the proportion of shrubs and herbaceous groundcover within the understory stratum is equally distributed, with 50% shrub and 50% herbaceous groundcover.

At a 1:1 replacement ratio, the number of replacement plants are set at 829 shrubs and 2487 herbaceous plants. Applying the City's required 2:1 replacement ratio, the number of required replacement plants are 1688 shrubs and 4974 herbaceous plants.

Table 1. Calculation of the number of required plants at a 1:1 replacement ratio within the moderate-low value habitat.

Habitat	Stratum	Total Area (ha)	Prop. of Total Area	Planting Area (ha)	Prop. of Stratum	Average On-Centre Spacing	Number of Plants
Moderate-Low	Canopy: Trees	0.497	1.0	0.497	1.0	25	199
Moderate-Low	Understory: Shrubs	0.497	1.0	0.497	0.5	3	829
Moderate-Low	Understory: Ground Cover	0.497	1.0	0.497	0.5	1	2487

Table 2. Calculation of the number of required plants at a 2:1 replacement ratio within the moderate-low value habitat.

Habitat	Stratum	Total Area (ha)	Prop. of Total Area	Planting Area (ha)	Prop. of Stratum	Average On-Centre Spacing	Number of Plants
Moderate-Low	Canopy: Trees	0.497	1	0.497	1	25	398
Moderate-Low	Understory: Shrubs	0.497	1	0.497	0.5	3	1688
Moderate-Low	Understory: Ground Cover	0.497	1	0.497	0.5	1	4974

Low Value Habitat

Existing site conditions within the low value habitat indicate a dominance of graminoid species. To mimic the existing site conditions, 60% of the site will be retained as an open, graminoid-dominant habitat. Along the perimeter of the habitat, a mixture of shrubs and herbaceous plants would be established to create a transitional zone between the open habitat and the forested habitat. This area is expected to represent 40% of the total area, or 1093 sqm (0.109 ha). Consistent with the moderate-low value habitat, the proportion of shrubs and herbaceous groundcover within the understory stratum will equally distributed, with 50% shrub and 50% herbaceous groundcover.

Based on the above, at a replacement ratio of 1:1, the number of required replacement shrubs is 182 and the number of required replacement herbaceous plants is 547. Applying the City's required 2:1 replacement ratio, the number of required replacement plants are 364 shrubs and 1094 herbaceous plants.

Table 3. Calculation of the number of required plants at a 1:1 replacement ratio within the low value habitat.

Habitat	Stratum	Total Area (ha)	Prop. of Total Area	Planting Area (ha)	Prop. of Stratum	Average On-Centre Spacing	Number of Plants
Low	Understory: Shrubs	0.273	0.4	0.109	0.5	3	182
Low	Understory: Ground Cover	0.273	0.4	0.109	0.5	1	547

Table 4. Calculation of the number of required plants at a 2:1 replacement ratio within the low value habitat.

Habitat	Stratum	Total Area (ha)	Prop. of Total Area	Planting Area (ha)	Prop. of Stratum	Average On-Centre Spacing	Number of Plants
Low	Understory: Shrubs	0.273	0.4	0.109	0.5	3	364
Low	Understory: Ground Cover	0.273	0.4	0.109	0.5	1	1094

Combing the two potentially impacted Environmentally Sensitive Areas the suggested planting requirements are provided in the Table 5.

Table 5. Total Number of required plants by Stratum.

<i>Stratum</i>	Number of Plants
<i>Canopy: Trees</i>	398
<i>Understory: Shrubs</i>	2052
<i>Understory: Ground Cover</i>	6068
<i>Total</i>	8518

Valuation

Based on the above prescribed planting densities, and applying the required 2:1 replacement ratio, the total number of plants required for both the moderate-low and low value habitats is 8,518. In discussions with several suppliers of native plants, the average price for native trees (size 5) is \$28.00, shrubs (size 1) are \$12.00 while understory/groundcover is \$8.00 per plant. The total estimated cost for compensation plants is approximately \$84,400.00.

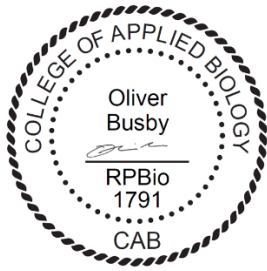
The cost of installation is required in addition to the fees for the planting stock. Installation includes the preparation of the site, importation of additional topsoil to help the plants establish, and labor fees. Based on discussions with several suppliers, a rate of \$12.00/plant can be used to estimate the total fees for installation. Assuming 8,518 plants, the installation fees will be approximately \$102,216.00.

An additional consideration is the assurance that the plants will have suitable survival. A survival rate of 80% is required by both the Provincial Water Sustainability Branch. To ensure these values are met, survivability surveys are completed in Years 1, 3, and 5. Typical surveys fees are \$1200 to \$1500 per year. Assuming an average of \$1500.00 (to account for inflation), an additional charge of \$4,500.00 is to be considered when determining the cost of compensation.

The total cost of compensation for the 7,705 square metres of ESA is approximately \$191,100.00 (excluding taxes). Not considered is the offsetting location which will also contribute to the valuation offsetting. For instance, if the works are being carried out along a existing watercourse and include the removal of invasive plants and habitat complexing then planting numbers can be adjusted to reflect the additional effort.

If you have any questions, please feel free to contact me at your convenience.

Regards;



Oliver Busby, MBA, RPBio
Principal
EBB Environmental Consulting, Inc.

I certify that the work described herein fulfills standards acceptable of a Professional Biologist.