

January 11, 2022

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Dilworth Development Inc.
92 Bentley Avenue
Ottawa, Ontario
K2E 6T9

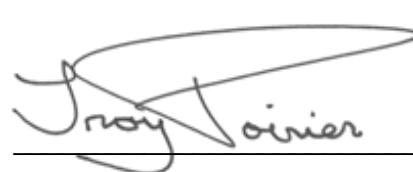
Attention: Mr. Walter Griesseier,

**Re: Regulatory Floodplain Review - Cut Fill Balance Analysis
2095 Dilworth Road, Ottawa, Ontario**

Please find enclosed a letter report intended to supplement the previous Floodplain Review completed by GEMTEC Consulting Engineers and Scientists Limited (GEMTEC) for the property located at 2095 Dilworth Road, City of Ottawa. The floodplain review is intended to assist in an application for severance of the parcel on the east side of the property but also addresses potential development of the retained lands. The cut-fill balance described in the following pages has been updated based on suggestions provided by RVCA staff following the initial informal floodplain review.

We trust this report provides sufficient information for your present purposes. If you have any questions concerning this report, please do not hesitate to contact our office.

Sincerely,



Troy Poirier, P.Eng.
Senior Hydrologist

1.0 BACKGROUND

GEMTEC Consulting Engineers and Scientists Limited (GEMTEC) was retained by Dilworth Development Inc. to complete a Regulatory Floodplain Review of the property at 2095 Dilworth Road, Ottawa, Ontario. A preliminary Regulatory Floodplain Review report was prepared on November 26, 2021 to address the overall potential for development of the retained lands and proposed severance. This letter report and attached figures are intended to supplement that document by proposing a cut-fill plan to allow development in “non-hazardous” floodplain areas.

Cut and fill modelling was performed using the City of Ottawa 2020 high-resolution digital terrain model (DTM) to define the existing topography. The regulatory floodline produced using this DTM was compared to that published on the RVCA GeoPortal to ensure the surfaces used for each were in agreement. Although the City of Ottawa 2020 DTM presents elevations in the CGVD 2013 datum, a simple offset was performed to convert to CGVD 28, which is the geodetic datum used for local flood mapping and reporting.

The following sections detail the results of the cut-fill analysis, with results also presented on the attached drawings.

2.0 REGULATORY REQUIREMENTS

The Rideau Valley Conservation Authority (RVCA) regulates development adjacent to and within floodplains under the guidelines outlined in *Policies Regarding Development Including the Construction / Reconstruction of Buildings and Structures, Placing Fill and Alteration to Waterways Under Section 28 of the Conservation Authorities Act of Ontario, 02.18.2010, RVCA approved amendments Feb 22, 2018*. The following points highlight the sections applicable to the cut and fill for development of the Dilworth Road property.

Minor removal or placement of fill / minor site grading in the floodplain

2.1 Exceptions may be considered for the minor removal or placement of fill / minor site grading/ minor site alteration in the floodway where flood depths in the floodway are shallow, flow velocities are minimal and the proposed development or site alteration is considered to be minor in nature with no impact in terms of its effect on the control of flooding, pollution, erosion and the conservation of land such that:

(i) The site alteration (cut and fill operation) is confined to lands toward the edge of the flood plain with ground elevations that are at present no more than 0.3 metres lower than the estimated 1:100 year water surface elevation of the river or stream (public safety risks associated with lands that are flooded to depths of 0.3 metres or less may be considered as “minor”)

(ii) The loss of flood plain storage volume within the 1:100 year flood plain which will result from the placement of fill shall be fully compensated for by a balanced cut (or excavation) to be carried out in close proximity to and concurrent with the placement of the fill in accordance with the following tolerances:

- the volume of available flood plain storage capacity within the affected river or stream reach shall not be reduced; and
- the minimum proposed ground elevation in the compensating excavation area shall not be lower than the minimum existing ground elevation in the proposed fill area (cutting below the normal high water mark will not be considered for calculation purposes and filling below the normal high water mark will not be permitted);
- the proposed site grading (cut and fill) must be designed to result in no increase in upstream water surface elevations and no increase in flow velocities in the affected river cross sections under a full range of potential flood discharge conditions (1:2 year to 1:100 year return periods); compliance with this requirement shall be demonstrated by means of hydraulic computations completed to the satisfaction of the RVCA.

(iii) adequate overland flow routes in local drainage networks must be maintained;

In accordance with the cut / fill regulations noted above, proposed development will be located at the edges of the floodplain (in the flood fringe) where flood depths are less than 0.3 m. Flood storage volumes will be balanced such that there is increased storage volume within the Cranberry Creek floodplain.

3.0 PROPOSED FLOODPLAIN MODIFICATIONS

Dilworth Development Inc. is proposing a land severance along the east side of the property. The primary objective is to provide a cut-fill balance to satisfy the regulatory requirements of the severance (Fill Area 1). The secondary objectives are to increase/optimize the developable lands in the central portion of the retained lands (Fill Areas 2 and 3) and to provide access to the wooded lands in the southwest corner of the property through the central lands.

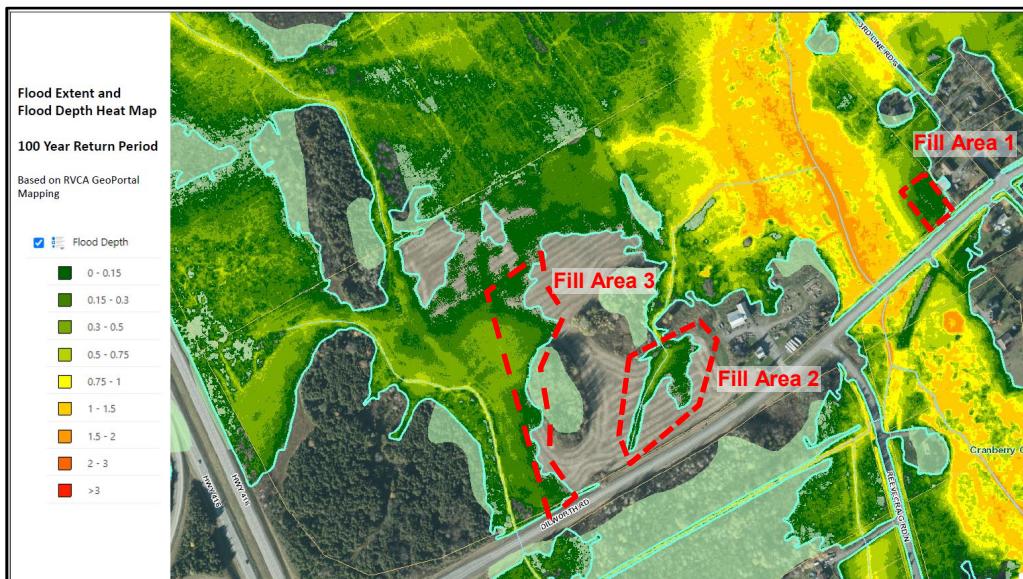


Figure 1. Proposed fill areas within the Regulatory Floodplain.

3.1 Proposed Fill in Severance Lands (Fill Area 1)

A 33.3 m by 60.8 m parcel of the proposed severance with frontage on Dilworth Road is planned for residential development pending regulatory approval (see Figure 1 and Cut-Fill Drawing, Fill Area 1). This small parcel is within (along the edge of) the Regulatory floodplain with flood depths less than 0.3 m (non-hazardous flood zone). Residential development would fill this portion of the floodplain resulting in flood storage volume reduction of 435 m³.

This development would maintain a 50 m setback from the adjacent provincially significant wetland (PSW), while raising the grade above the Regulatory flood elevation (87.29 m). In order to minimize potential impacts on the PSW, additional fill to shift the Regulatory floodline further from the property and toward the PSW is not being proposed.

3.2 Proposed Fill in Central Section of the Retained Lands (Fill Area 2)

The central portion of the property with frontage to Dilworth Road is largely outside of the Regulatory floodplain except for the headwater feature that projects through the center and towards the road. A headwater drainage feature assessment (HDFA) for the property was completed by GEMTEC in August 2020 noted the feature to be a drainage swale with limited habitat potential and requiring no management.

Filling this drainage swale to allow development would result in a flood storage volume reduction of 557 m³.

A headwater drainage feature assessment (HDFA) for the property was completed by GEMTEC (August 2020) in support of an Environmental Impact Statement (EIS). Four HDFs were identified on-site, with locations and details presented on Figure 2 and in Table 1. The assessment concluded no management is required for HDF1, HDF3 and HDF4. Protection was only recommended for HDF2 (in the northwest corner of the property) based on wetland conditions and the important riparian and terrestrial habitat it provides. The proposed cut fill works follow these recommendations and would result in the infilling of HDF1 (1-1, 1-2 and 1-3) and compensatory cut at HDF3 which are swales in the active agricultural field.



Figure 2. Mapped watercourses and drainage feature classification.

Table 1 Summary of HDF Classification and Management recommendations

HDF	Step 1		Step 2	Step 3	Step 4	Management Recommendation
	Hydrology	Modifiers	Riparian	Fish Habitat	Terrestrial Habitat	
HDF1	Limited: Dry or standing water	HDF originates in active agricultural field	Limited - Cropped	Contributing	Limited – swale	No Management Required
HDF2	Valued: intermittent water	HDF originates in wetland	Important – Wetland	Contributing	Important – breeding amphibians	Protection
HDF3	Limited: Dry or standing water	HDF originates in active agricultural field	Limited – Cropped	Contributing	Limited – swale	No Management Required
HDF4	Limited: Dry or standing water	HDF originates in active agricultural field	Limited – Cropped	Contributing	Limited – no defined feature	No Management Required

3.3 Proposed Fill in Central Section of the Retained Lands (Fill Area 3)

Fill Area 3 is intended to maximize the developable width of retained lands while maintaining a buffer greater than 30 m from the adjacent watercourse. Filling this portion of the floodplain to allow development would result in a flood storage volume reduction of 1,448 m³.

3.4 Proposed Cut in Northern Section of the Retained Lands (Cut Sources A and B)

Proposed Cut Sources A and B are high grounds located in the northern portion of the retained lands and surrounded by Regulatory floodplain. These lands are not well located for development and could be used to offset flood storage volume losses in Fill Areas 1-3. The surfaces of these lands are completely above the floodplain and flood storage volumes of 2,490 m³ and 688 m³, respectively, can be created by excavating to 0.3 m depth below the Regulatory Flood elevation.

3.5 Proposed Cut-Fill Balance

The cut-fill balance proposed for the property aims to provide a greater cut (added storage) volume than what is required for fill (lost storage volume). The storage volume summary presented in Tables 2 and 3 indicate a net gain in flood storage volume, with 738 m³ (30%) added.

Table 2 – Proposed Cut-Fill Summary

Location	Fill Volume (storage reduction, m ³)	Cut Volume (storage increase, m ³)
Fill Area 1	435	-
Fill Area 2	557	-
Fill Area 3	1,448	-
Cut Area A	-	2,490
Cut Area B	-	688
Totals	2,440	3,178
		738 m³ net gain

Table 3 – Proposed Incremental Storage Volume Changes

Depth Below Regulatory Flood Level	Fill Volume (storage reduction, m ³)	Cut Volume (storage increase, m ³)	Net Change Storage Volume (m ³)
0-10 cm	1222	1512	+291
10-20 cm	832	699	+133
20-30 cm	834	376	+458
30-40 cm	144	0	-144

3.6 Proposed Change to the Regulatory Floodline

The proposed cut-fill works would alter current Regulatory floodlines. The attached drawings (Current Regulatory Floodplain, Proposed Revised Regulatory Floodplain) present floodplain inundation limits for current and proposed conditions.

It should be noted that published flood elevations are based on modelled flooding of the Rideau River. Minor changes to flood storage on the Dilworth property would not be reflected in the flooding of the Rideau River, nor the projected 87.29 m Regulatory flood elevation.

A basic PCSWMM hydraulic model was developed for the property to determine if there would be increased local flood risks associated with the cut-fill works. The small size of the drainage area discharging through the west portion of the property, the compensated flood storage volumes and the buffering effect of the wetlands on the east side of the property negate any potential increases to local flood risks (depths or flow velocities) associated with the proposed fill works.

3.7 Proposed Access Road from Central Lands to Southwest Wooded Lands

Future development is also proposed for the wooded lands located at the southwest edge of the property. This section of the property does not have access from Dilworth Road as the adjacent land is intended for an access ramp to Highway 416. The majority of the wooded land is located outside the floodplain, however, access would be required across the small watercourse.

Construction of a road and culvert across the watercourse could pose the risk of blocking Regulatory flood storage upstream (north) of the crossing. In order to minimize this risk, the future road would be built at existing grades to allow flood waters to overtop, with only the culvert crossing itself requiring fill. This minor infilling of flood storage will be more than compensated by the excess of the proposed cut/fill balance, and will be addressed during the crossing design.

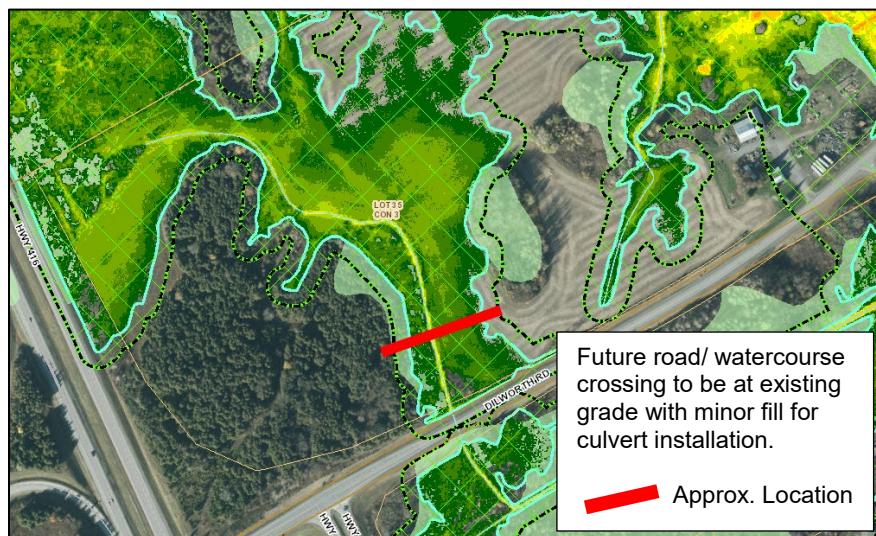


Figure 3. Approximate location of future watercourse crossing.

4.0 CLOSING

The proposed cut-fill balance for the property at 2095 Dilworth Road should satisfy the RVCA requirement to maintain floodplain storage during development within “non-hazardous” sections at the edge of the Regulatory floodplain. A net gain in flood storage is proposed for the property (retained and severance lands) and the connectivity of the proposed cut (storage) areas can be configured using drainage channels to ensure balance is maintained for each tributary branch of Cranberry Creek.

