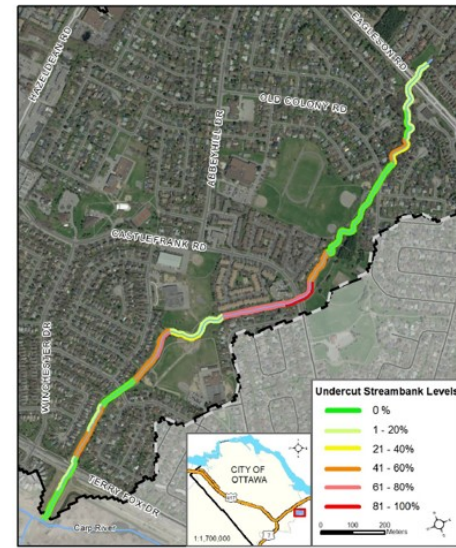
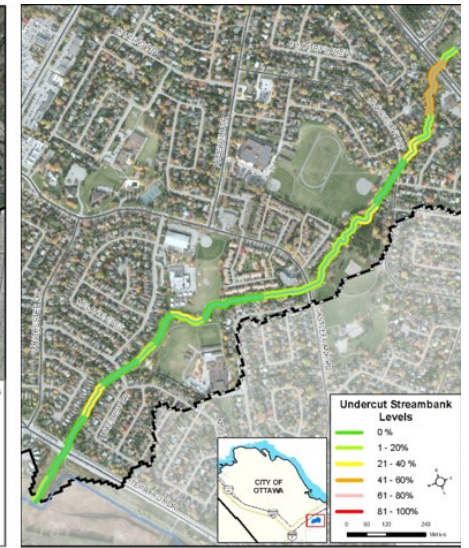


CRRP Tender 15 May 2015 L Series Drawings – L1 to L3 Extracts



Carp Creek 2017 Catchment Report Pg 8
Fig 13 Undercut Banks along Carp Creek



Carp Creek 2023 Catchment Report Pg 8
Fig 13 Undercut Banks along Carp Creek

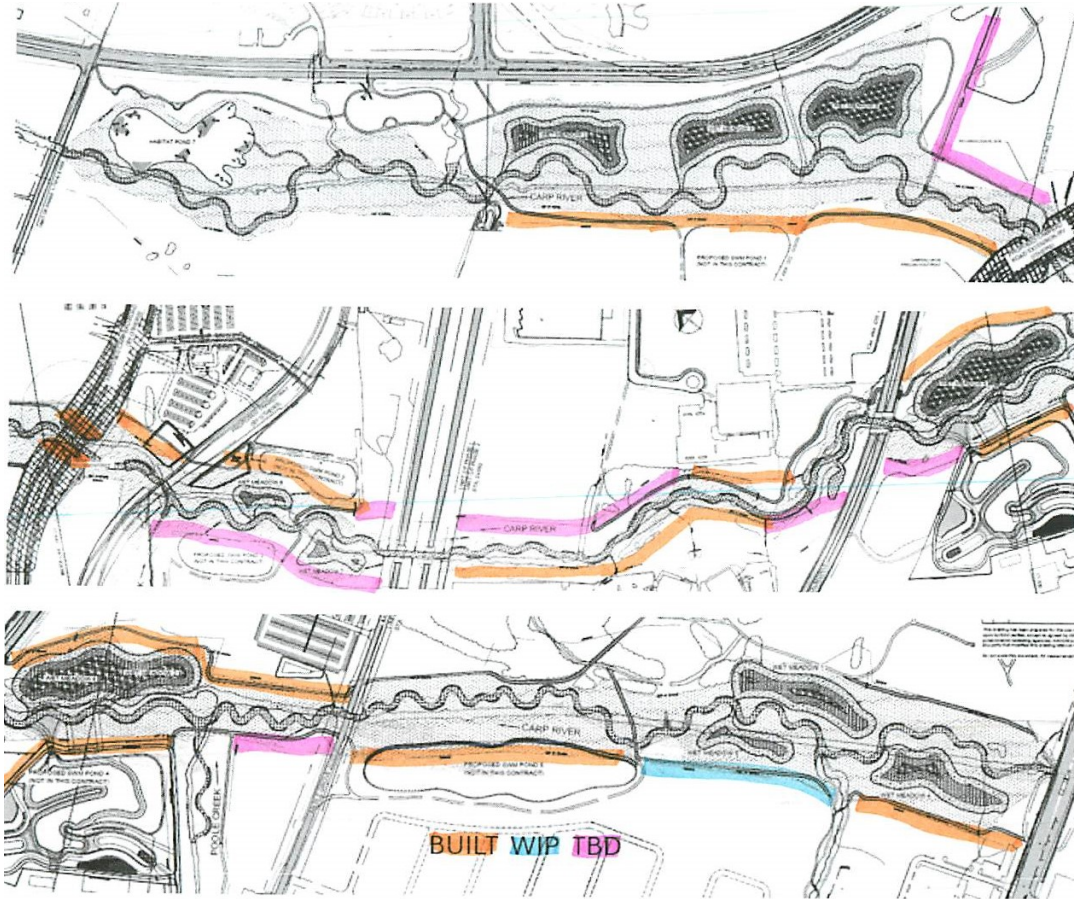
Carp River and Carp Creek 2024 Floodplain Mapping Presentation to the MVCA Board

Faith Blacquiere
B.H.Sc. BLS
Glen Cairn, Kanata
8 July 2024

Phased implementation of Fill Will Result in Higher Water Levels in Future

- In the 19 June PPAC meeting, the engineer said that the “phased implementation” had resulted in some of the planned Corridor limits not being filled
- The Carp River Restoration Plan **objective was to lower water levels in the Corridor** so that 28ha could be filled and developed
- The **Corridor was designed for future conditions** with full build-out based on the 13 July 2011 Greenland Calibration Validation Report, the KWOOG Design Brief (25 June 2013) and Addendum (9 Mar 2014) approved by MOE 23 Oct 2014
- The future Corridor will be narrower and have higher water levels
 - KWOOG 2013 **14 of 14 water levels are higher by 0.05m to 0.35m**
 - KWOOG 2013 **94.45 d/s of Glen Cairn Detention Basin - the 2024 water level of 95.55m is 1.10m higher**
- The existing conditions **2024 mapping is already out of date** due to in-process or built development, infrastructure and corridor fill projects undertaken during the study period e. g. 2 projects were completed using different models in Sep 2021
 - The Campeau Drive Bridge 2024 floodlines do not reflect the bridge and 100 yr levels are lower
 - The Carp Creek Embankment Restoration modelling resulted in higher 100yr levels
- In July 2012 Ottawa City Council approved the Corridor with a condition that the MVCA 1983 flood levels to be used if they were higher
 - **The 2024 water levels from the Glen Cairn Detention Basin to Carp Road are higher by 0.02m to 0.20m for 11 of the 20 MVCA 1983 water levels**

Corridor Fill Status



CRRP Tender 15 May 2015 L Series Drawings – L1 to L3 Extracts



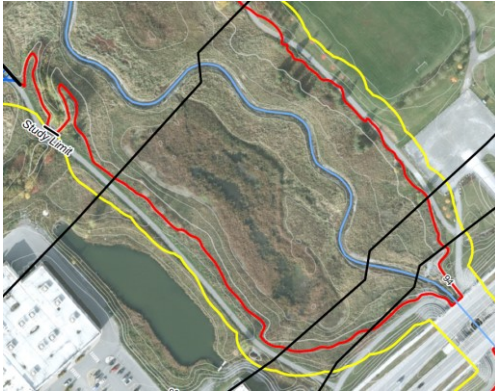
Map 42



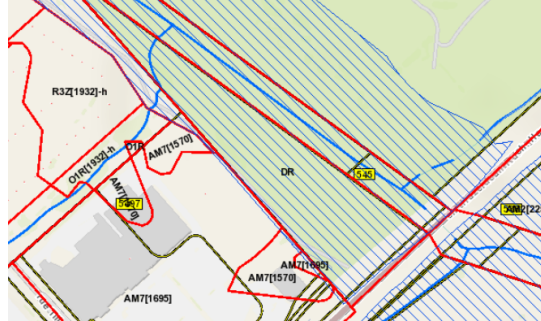
Map 45

- 2 parcels have Spill Areas
 - Richcraft 1620 Hazeldean (blue In Process)
 - 395 Didsbury (pink To Be Determined)
- Removal of spill areas results in loss of storage and higher water levels
- The number of To Be Determined (pink) parcels is a major concern as these may or may not (e. g. City lands) be filled
- The Maple Grove Road widening and Transitway may impact water levels and floodplain capacity in future

The 2024 water levels are Inconsistent with the 2015 CRRP Tender

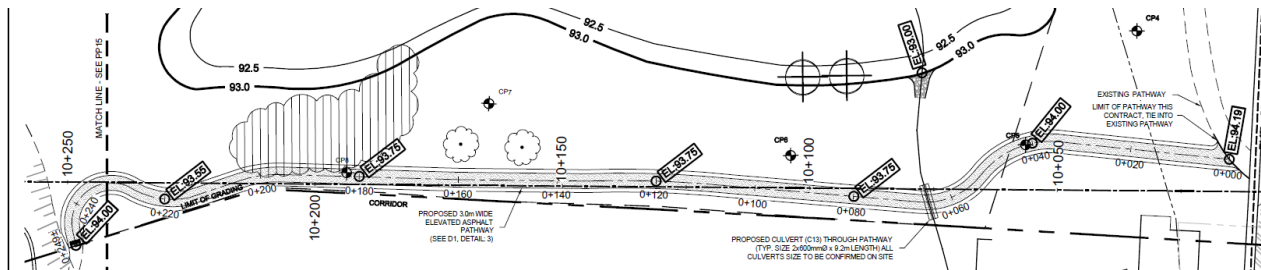
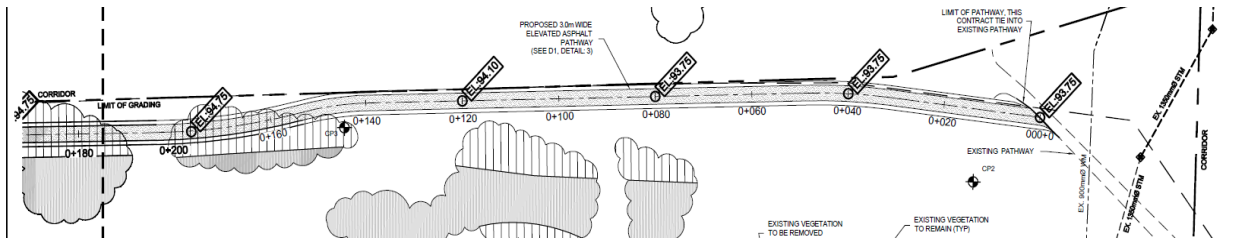


Map 45



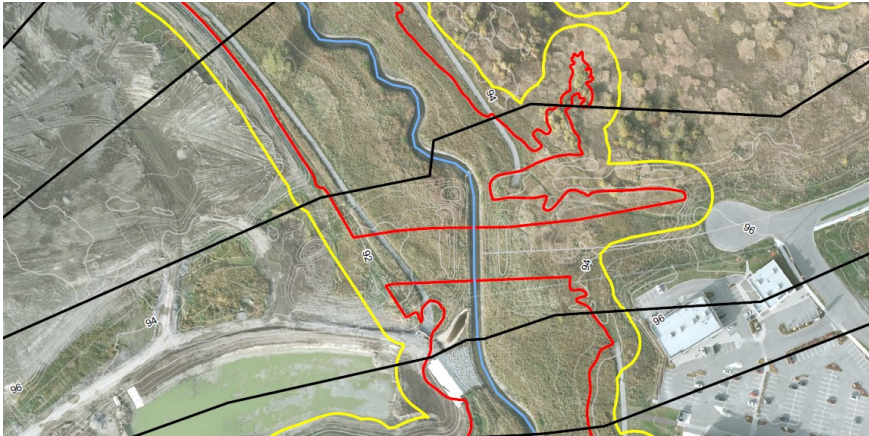
GeoOttawa viewed 20240623

- The West Pathway Map 45 is **94.41m** vs the 2015 Tender **93.75m** – the pathway should have been overtopped
- The East Pathway 2015 Tender has differences from Map 45 **94.41m** in 3 locations
 - 94.75 **-0.34** should not be in floodplain
 - 94.10 **+0.31** should be in floodplain
 - 93.75 (3) **+0.66** should be in floodplain
- Pathway elevations may have impacted the corridor width and affected flows



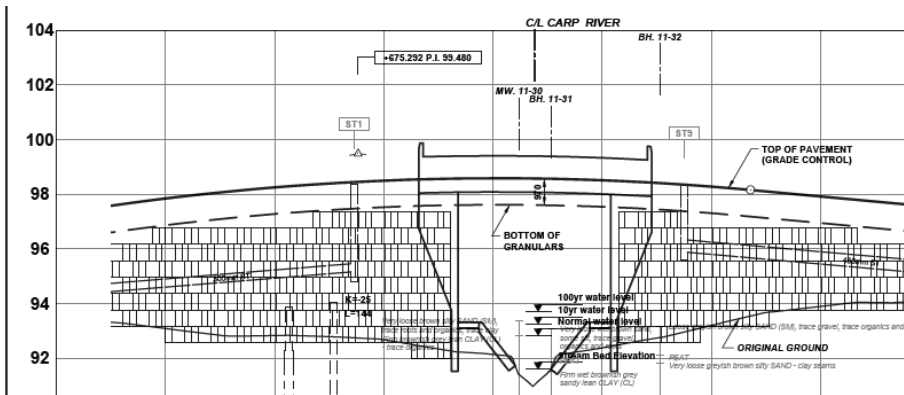
CRRP Tender Phase 3 PP16 15 May 2015 west and east pathways

Campeau Drive Bridge Water Levels are Higher than the MVCA Permit



Map 42

- Map 42 flood levels are higher than the MVCA Permit **100-yr 93.50m**
 - u/s 42807 **93.83m** minus 93.50m is **+0.33m higher**
 - d/s 42692 **93.57m** minus 93.50m is **+0.07m higher**
- The pathways were 0.2m under water now will be **up to 0.53m under water**
- A large amount of fill was placed fill in the floodplain resulting in less storage and constriction of flow – did the Restoration studies account for it?
- The project started 31 Jan 2020 and was completed 2 Sep 2021 – why weren't the new floodlines reflected in the 2024 study?



MVCA Permit W19-48 12 Aug 2019 Pg 8 extract

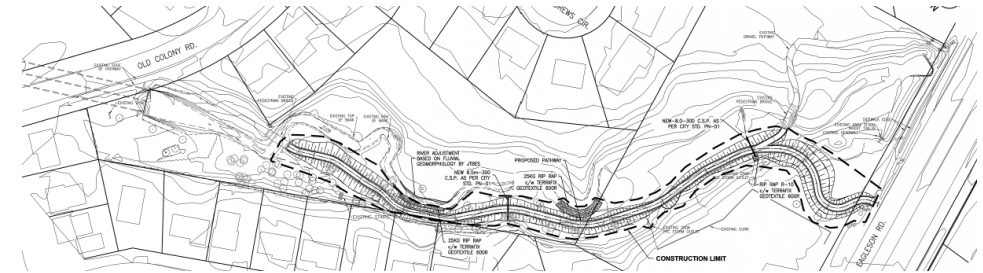
2024 Water Levels Conflict with Carp Creek 2003 Flood Mitigation and Recent Studies



Map 47 Old Colony to Castlefrank



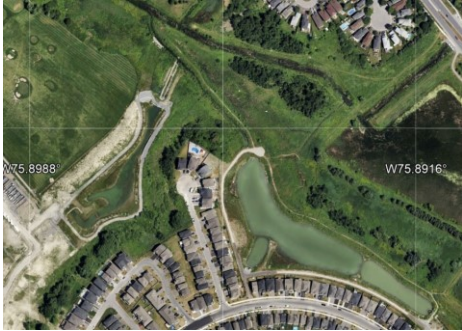
CC EMB Study Area Map 19 Jan 2018



Ravine Park Tender 23 Jan 2014 Dwg C03

- The CCL 2003 modelling modified the Carp Creek channel in response to the 1996 and 2002 flooding to lower the water levels
 - u/s Castlefrank **100.45 is 0.46m higher than Map 47 99.99m**
- The 2011 Bank Failure Assessment [ref CC EMB Pg 15] (d/s) **100yr 102.23m is 2.34m higher than Map 47 99.89m**
- The Carp Creek Restoration Addendum Mar 2021
 - u/s 101.14 (EC and FC) is **0.62m higher than Map 47 100.52m**
 - d/s 100.97(FC and EC) is **2.08m higher than Map 47 98.89m**
- 2024 water levels were **higher by 0.06m to 0.86m (3) u/s of Old Colony and lower from Old Colony to Terry Fox Drive by 0.08m to 1.2m (5)**
- Pedestrian bridges (2011, 2020), Ravine Park fill (2007) and Pathway (2014) and Carp Creek Restoration (2021) resulted in storage loss while the 2009 flood mitigation added more flow to the channel
- Due to these projects, sediment buildup, islands and storage loss the **2024 water levels should have been higher**

Glen Cairn Detention Basin and Fernbank Changes Impact the Modelling



Google Earth 15 July 2022



Map 45 extract



Map 46 extract



Water level differences ½ cup

- The Restoration studies excluded Fernbank land and the impact of Fernbank development changes was not studied
- Fernbank Pond 2 (2021), Fernbank Pond 3 (W16-147 19 Jan 2017) and Carp River West Tributary (CRWT W19-01 22 Jan 2019), with upstream area of about 297ha, added fill in the floodplain, created a new outlet to the Carp River and added flows
- MVCA **1983 water level 95.20m** was used for Pond 2, Pond 3, the CRWT channel, the Golf Course Pond and Grant Crossing Pond – the **2024 water level of 95.55m is 0.35m higher**
- Map 46 has **95.55m** on the downstream side of the Glen Cairn Detention Basin outlet culvert then **94.56m, a decrease of 0.99m** – is this physically possible?
- Map 46 has **95.57m** and **96.56m** in the Basin downstream of Terry Fox Drive – can water levels differ in a basin?
- Past Restoration studies have confused the water levels upstream in the Glen Cairn Detention Basin with those downstream at the culvert outlet

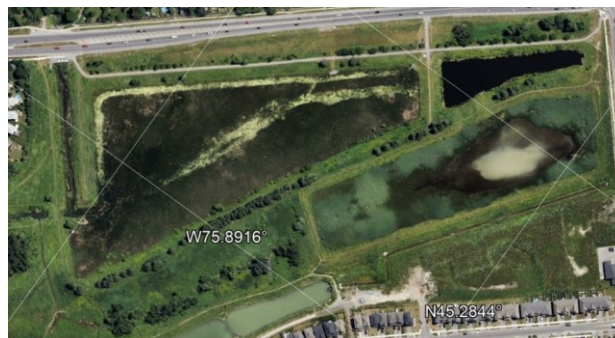
Glen Cairn Detention Basin Has Capacity and Design Problems



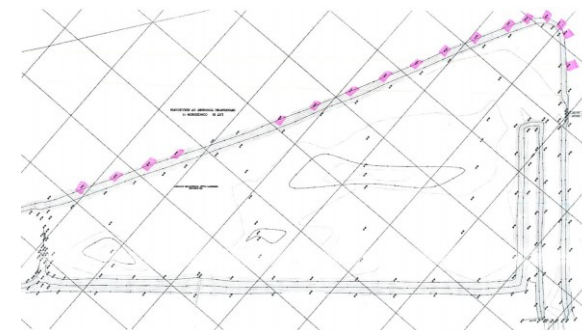
Map 46 extract



MVCA ownership



Google Earth 15 July 2022



Nov 2009 Survey

- The Glen Cairn Detention Basin capacity is uncertain
 - The **bottom is 0.3m higher than design** (City staff Nov 2009)
 - The outlet culvert sizes **1500mm** (2009 Survey, measured 20240615) vs **1200mm** (PCSWMM 2015)
 - The berm between the wet pond and north dry pond was expanded with no compensation
 - The “dry pond” west of the wet pond built on floodplain and incoming tributaries is rarely dry so has less capacity
- The outlet culverts invert differ from CH2MHILL Oct 2005
 - west **92.59m vs 92.87m is an increase of 0.28m**
 - east **92.64m vs 92.94 an increase of 0.3m**
- **The Nov 2009 survey has 17 points north of the wet pond that are less than 95.55m so the Detention Basin will overflow**
- The 2009 flood mitigation Stormwater Pumping Station was designed to maintain the water level at 93.50m upstream of the berm with no analysis of impact

Recommendations

- MVCA staff should explain why the 2024 water levels differ from the previous studies
- In cooperation with the City, before approving this agenda item, and before the City implements the mapping, the Board should, by Motion, establish conditions for implementation and transition of the mapping, including the following:
 - A. Establish a “highest flood level” policy
 - B. Approve the 350yr maps and flood levels to be used by the City to identify and evaluate flood vulnerable areas
 - C. Review all infrastructure and development projects in the pipeline which have not yet been built and establish policy for individual projects
 - D. Review existing infrastructure, developments, and tributary floodplain mapping for impact of the changes
 - E. Review the ultimate water levels and storage capacity and identify storage alternatives if more is needed
 - F. Review policies for conflicts and coordination with the City’s PCSWMM Ultimate Conditions Model
 - G. Review the original watershed boundary for Carp Creek as land removed south and east of the Creek conflicts with the CCL 2003 catchment area
- MVCA should sell the Glen Cairn Detention Basin and Corridor to the City as responsibility for maintenance is currently split