



MEMORANDUM

DATE: March 30th, 2022 E-Mail

TO: **Development Review East – City of Ottawa**

SUBJECT: **Analysis of Servicing Requirements for
Cardinal Creek Village Phase 7 Residential Lands**

OUR FILE: 21-1263

ATTACHMENTS:

- A. Cardinal Creek Village – South SWM Pond Conceptual Analysis (JFSA, February 24, 2022)
- B. Cardinal Creek Village Phase 7 Preliminary Engineering Drawings (DSEL, February 2022)
- C. Hydroworks Sizing Summary – Cardinal Creek Village – Ultimate Conditions (Hydroworks, Feb 14, 2022)
- D. CCV PH7 OGS Markup (DSEL, March 3, 2022)
- E. Greenspace Boundaries – Cardinal Creek Phase 7 (Urban Strategies Inc., November 10, 2021)
- F. Geotechnical Investigation – Proposed Cardinal Creek Village (Paterson Group, September 19, 2014)
- G. Geotechnical Review – Preliminary SWMP Design (Paterson Group, March 18, 2022)
- H. Excerpts from the Functional Servicing and Stormwater Management Report for Cardinal Creek Village (DSEL, September 2013)
- I. Excerpts from the Design Brief for Cardinal Creek Village Phase 5 & 6 (DSEL, August 2019) and the Stormwater Management Report for Phases 5 and 6 of Cardinal Creek Village (JFSA, January 2020)

This servicing memo is being submitted in support of Tamarack's zoning by-law amendment application for Cardinal Creek Village (CCV) Phase 7.

Phases 1 through 6 of CCV have been constructed. Phase 7 represents the remaining residential-zoned lands located north of Old Montreal Road and south of the existing stormwater management (SWM) pond, as depicted in **Figure 1**.

Background

The overall servicing strategy for CCV Phase 7 was approved by the City via the *Functional Servicing and Stormwater Management Report for Cardinal Creek Village* (FSR) (DSEL, September 2013). Most recently, servicing allowances for CCV Phase 7 development were incorporated into the *Design Brief for Cardinal Creek Village Phase 5 & 6* (DSEL, August 2019) and the *Stormwater Management Report for Phases 5 and 6 of Cardinal Creek Village* (JFSA, January 2020).

Tamarack's application specifically seeks approval for minor adjustments to the boundaries of the CCV Phase 7 residential lands. The rationale for the proposed adjustments is discussed in detail in separate documents; but generally, since the time of approval of the original Phase 7 residential boundaries and the associated servicing strategy, the City of Ottawa has updated the Official Plan (City of Ottawa, 2021) and is now considering additional Urban Expansion land immediately east of CCV Phase 7. Given the change in context, Tamarack has asked DSEL to review the CCV Phase 7 servicing strategy and explore any opportunities for minor refinements that may better suit the current conditions outlined in the zoning by-law amendment application.

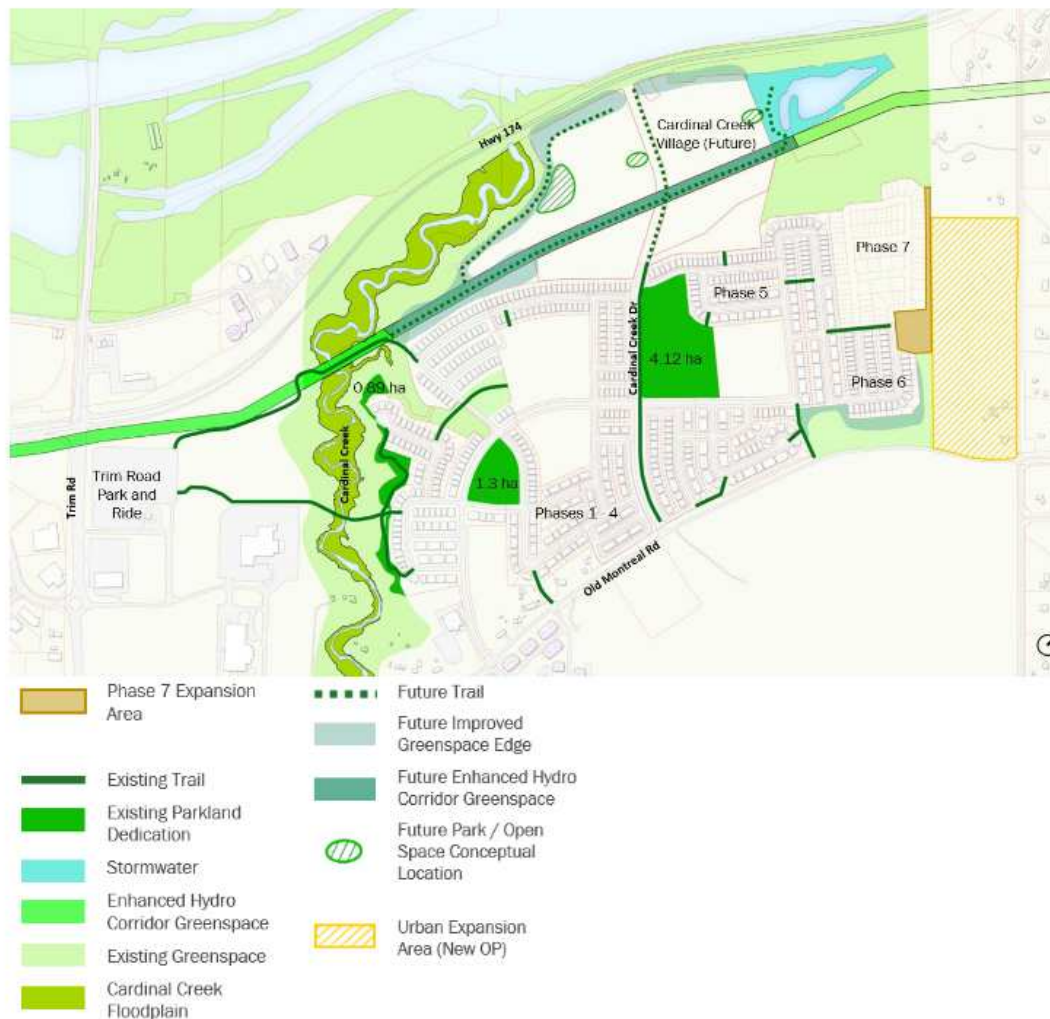


Figure 1: Phase 7 Location Map (Urban Strategies, November 2021)

Water & Wastewater Strategy

For the purpose of servicing requirements, it is expected that the adjusted CCV Phase 7 boundaries will add roughly 0.33 ha of gross residential area. In previous studies, the anticipated CCV Phase 7 gross residential area was roughly 7 ha and there was found to be residual capacity in all downstream sanitary sewers of 10 L/s or greater.

Given the minor change in gross residential area, the residual capacity in the downstream sanitary sewers and the minor nature of the proposed CCV Phase 7 boundary adjustments, the planned water supply strategy and wastewater servicing strategy will remain consistent with the overall strategies detailed in the FSR and in the subsequent detailed design approvals for CCV Phases 1 through 6. Water supply is to be provided to Phase 7 via connections to the existing watermain network in the previous phases of CCV. Wastewater from CCV Phase 7 is to be directed to the Trim Road Collector Sewer via existing sewers in previous phases of CCV.

As part of detailed design, water and sanitary sewer stubs can be sized and extended from CCV Phase 7 to the eastern property limit, so as to not create any new capacity constraints related to future servicing of the new Urban Expansion lands.

Stormwater Management Strategy – Ultimate Development Conditions

The *Functional Servicing and Stormwater Management Report for Cardinal Creek Village* (FSR) (DSEL, September 2013) - and most recently the *Stormwater Management Report for Phases 5 and 6 of Cardinal Creek Village* (JFSA, January 2020) - considered that CCV Phase 7 would drain to a proposed new south forebay of the existing CCV SWM Pond before discharge to the Ottawa River via the existing pond outlet and culvert under Highway 174. Approximately 31 ha of external existing drainage to the east of CCV Phase 7 was considered to be captured and conveyed around the existing CCV SWM Pond towards the Ottawa River via a proposed diversion storm sewer and ditch. See **Attachment I** for details.

As previously noted, beyond the minor adjustments proposed for the CCV Phase 7 residential boundaries, approximately 10 ha of the external drainage area to the east of CCV Phase 7 is now being considered for future development as part of the Urban Expansion area in the City of Ottawa's new Official Plan released in November 2021. Through discussions with the City, we understand that there is a general desire to consolidate any new stormwater management facilities required to service these lands, to avoid multiple end-of-pipe treatment solutions that would require maintenance. When considering the changes in land use, the new size of the planned urban drainage area, and the City's general preference to consolidate stormwater management facilities for maintenance purposes, the original stormwater management strategy detailed in the *Stormwater Management Report for Phases 5 and 6 of Cardinal Creek Village* (JFSA, January 2020) would not meet the previously established MECP and RVCA quality and quantity control requirements.

As such, as detailed in the *Cardinal Creek Village – South SWM Pond Conceptual Analysis* (JFSA, February 24, 2022), proposed refinements to the stormwater management strategy would see the flows from the existing external drainage area to the east (including an allowance for the 10 ha future development considered as Urban Expansion lands in the new Official Plan) be captured by an oversized CCV Phase 7 storm sewer network and directed to a proposed South

SWM Pond. From there, the treated flows would be directed to the Ottawa River via a new ditch around the existing CCV SWM Pond and the existing culvert under Highway 174. Under the proposed concept, 2-year capture and 100-year on-site storage have been assumed for the 10 ha Urban Expansion future development, and 100-year capture has been assumed for the balance of the existing external drainage area. As part of detailed design, the future development lands' major flow conveyance and storage strategies could be confirmed. There may be potential to route portions of the major flow through the existing CCV major flow network or to increase the capture rate into the proposed CCV Phase 7 storm sewer network.

The proposed South SWM Pond would be built in the general location of the previously considered south forebay. See **Drawings 1 & 2** for preliminary design details of the proposed South SWM Pond, including access routes from the existing stormwater management pond located north of the Hydro Corridor. Paterson Group has completed a preliminary geotechnical review of the proposed pond (**Attachment G**) and has provided their general agreement. Paterson Group would be expected to complete a thorough geotechnical review as part of detailed design, to provide detailed construction recommendations.

The proposed pond outlet ditch around the existing CCV SWM Pond would be located in the same location as the previously considered diversion ditch. As part of detailed design, erosion control measures would be implemented in the proposed inlet and outlet ditches. Based on preliminary discussions with GeoMorphix Limited, it is expected that a combination of granular lining, vegetation, cascade features, riffle pool sequences, and wetland pools would be considered as part of the detailed design of the ditches.

The size of the proposed South SWM Pond is constrained by the adjacent Hydro Corridor to the north and the surrounding significant woodlot and escarpment to the south. Oil and Grit Separator (OGS) units are therefore proposed upstream of the South SWM Pond to provide partial water quality treatment, to allow for the constrained pond footprint to meet MECP Enhanced Protection quality control requirements. As shown in **Drawing 1**, the OGS units are proposed in the northwest corner of CCV Phase 7, but their locations could be further coordinated with the City as part of detailed design. As detailed in the *Cardinal Creek Village – South SWM Pond Conceptual Analysis* (JFSA, February 24, 2022), the proposed South SWM Pond has been sized to provide 60% Total Suspended Solids (TSS) removal, and the OGS units would provide at minimum 50% TSS removal beforehand. The OGS units are to direct treated flows to the South SWM Pond via an inlet channel designed into the existing escarpment. It is expected that a combination of granular lining, vegetation, cascade features, riffle pool sequences, and wetland pools would be considered as part of the detailed design of the inlet channel.

Local OGS unit manufacturers have confirmed that 50% TSS removal of the ETV Particle Size Distribution (PSD) can be achieved for a total drainage area that includes Cardinal Creek Phase 7, the Urban Expansion lands detailed in the Official Plan (City of Ottawa, 2021), and the remaining existing external drainage areas. For example, HydroWorks has proposed the use of two offline HD10 units in parallel providing 56% average annual removal of the ETV PSD, as detailed in the *Hydroworks Sizing Summary – Cardinal Creek Village – Ultimate Conditions* (Hydroworks, Feb 14, 2022). The Hydroworks sizing report has been provided to demonstrate that 50% TSS removal is achievable for the proposed tributary area. Alternative products from local OGS manufacturers will also be considered during the detailed design process.

The proposed stormwater management strategy would allow for additional woodland retention to the north of CCV Phase 7. When comparing the general footprint of the proposed stormwater management strategy with the *Environmental Impact Statement and Tree Conservation Report - Cardinal Creek Village* (Muncaster Environmental Planning, March 25, 2014) it was found that roughly 0.25 ha of additional woodlands can be retained, specifically by consolidating the previous channels that were proposed over the escarpment, and relocating westward under the new stormwater management concept. The woodland areas no longer requiring removal are shown in magenta in **Figure 2**. Additional tree removal associated with the proposed concept is shown in blue. Based on the limits of the significant woodland detailed in the *Environmental Impact Statement for the Proposed Expansion of Cardinal Creek Village Phase 7* (Kilgour, September 24, 2021), the proposed concept represents a 0.3 ha decrease in tree removal required within significant woodlands.

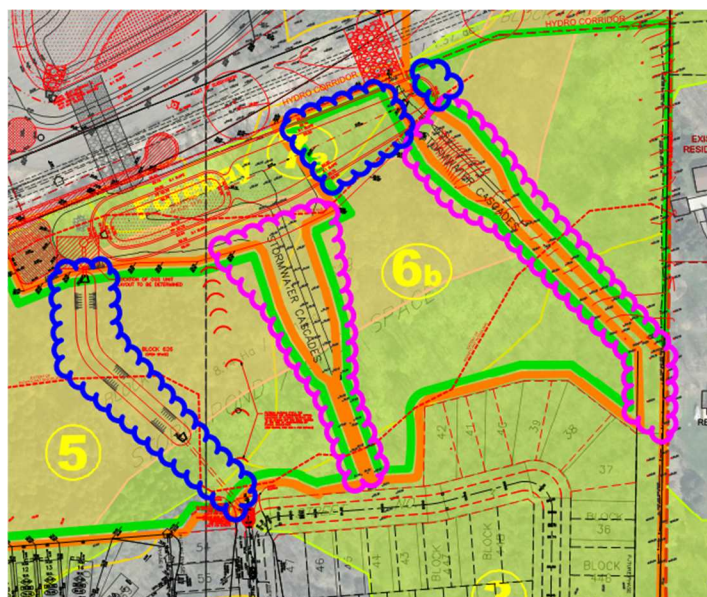


Figure 2: Tree Removal Comparison (DSEL, March 2022)

As shown in **Drawing 3**, the grading of CCV Phase 7 is planned to direct the major flow from the northern portion of the site towards the proposed South SWM Pond. The southern portion of the site is intended to be directed towards the existing CCV SWM Pond via the overland flow network in the previous phases of CCV. As detailed in the *Cardinal Creek Village – South SWM Pond Conceptual Analysis* (JFSA, February 24, 2022), onsite storage up to the 100-year event has been assumed to be required for the future development to the east. Emergency overland flow for these external lands will be routed to the overland flow network of CCV Phase 7, directing flow to the existing CCV SWM Pond. The existing CCV SWM Pond model can be updated during detailed design to reflect these new conditions. Details of the proposed modeling techniques are provided in the *Cardinal Creek Village – South SWM Pond Conceptual Analysis* (JFSA, February 24, 2022); specifically, JFSA is proposing to create a new standalone PCSWMM model for CCV PH7, external drainage areas, and the new South SWM Pond. JFSA would update the existing XPSWMM model for the existing pond to remove the upstream CCV Phase 7 drainage area where required and to incorporate updated overland flow contributions where required.

Under the proposed stormwater management strategy, the peak 100-year flows directed to the existing culvert under Highway 174 from the existing CCV SWM Pond and the proposed South

SWM Pond are below the maximum capacity of the culvert and represent a reduction in peak flow when compared to the peak 100-year flows considered in the *Stormwater Management Report for Phases 5 and 6 of Cardinal Creek Village* (JFSA, January 2020). Please refer to the *Cardinal Creek Village – South SWM Pond Conceptual Analysis* (JFSA, February 24, 2022) for additional details.

Stormwater Management Strategy – Interim Development Conditions

Please note that the proposed stormwater management strategy would also function under interim conditions, prior to construction of the 10 ha Urban Expansion lands future development. Specifically, 100-year capture into the CCV Phase 7 storm sewers would be provided for the full 31 ha. existing external drainage, via a ditch inlet catchbasin and storm sewer stub extended towards the eastern property line at the location of the existing North Tributary watercourse that has seasonal flow. Refer to **Figure 3** for an example configuration and the *Cardinal Creek Village – South SWM Pond Conceptual Analysis* (JFSA, February 24, 2022) for additional details regarding the proposed stormwater network’s operating characteristics under interim conditions.

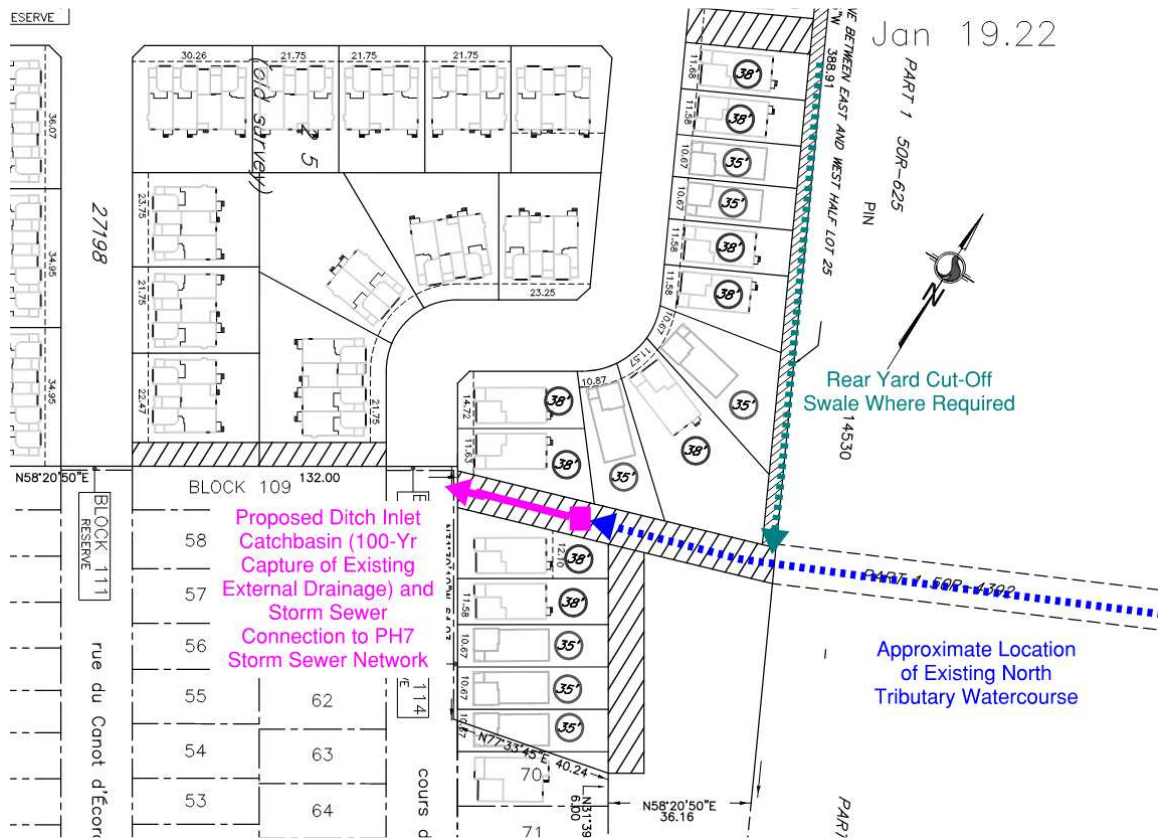


Figure 3: Proposed Capture of Existing External Drainage Under Interim Conditions (DSEL, March 2022)

Easements are to be proposed to ensure that City access for maintenance can be achieved via 5m-wide access routes to the ditch inlet catchbasin. The ditch inlet catchbasin would be oversized

to mitigate the impacts of any potential blockages (e.g. assume 50% blockage of inlet). Under interim conditions, the emergency flow route for the existing external lands would be through CCV PH6 in exceptional conditions beyond 100-year conditions – e.g., complete failure of infrastructure and significant ponding on external lands (but not affecting existing private buildings or public infrastructure).

The staging of the OGS units would also be investigated as part of the detailed design of CCV Phase 7. Based on preliminary discussions with the OGS manufacturers, the interim condition (e.g., prior to construction of the 10 ha Urban Expansion lands future development) may be serviced with fewer and smaller OGS units than what is required to service the ultimate condition. This would allow for Tamarack to construct the system based on the existing drainage conditions, and defer construction of additional OGS units until the Urban Expansion area is advanced at a later date.

Conclusion

In summary, given the change in the development context for CCV Phase 7, refinements to the previously-approved stormwater management strategy are being proposed that maintain all previous commitments for stormwater quality and quantity control. In addition, the proposed refinements allow for a reduction in tree removal within the significant woodland.

It is proposed that the water supply and wastewater servicing strategies for CCV Phase 7 remain consistent with previous studies.

It is requested that the City of Ottawa review the servicing information contained in this memo, and offer their comments or agreement in principle in order to inform the preparation of a detailed engineering design package for CCV Phase 7.

Please do not hesitate to contact our office should we be able to assist in your review.



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