October 18, 2024

City of Waterloo
Development Approvals
100 Regina Street South
2nd Floor
Waterloo ON N2J 4A8

Attention: Michael Stewart, M.A.Sc., P.Eng.
Senior Project Engineer, Development

Dear Mr. Stewart,

Re: Response to SWM Comments
Conservation Drive
City of Waterloo

We offer the following comments based upon our meeting notes dated June 14, 2024.

1. Infiltration

2024/06/14 – The City requested that the water balance include the pre- and post-development calculations, which should be included in the main body of the SWM report. **[City of Waterloo] Completion of a water balance for the site is required for all developments proposing changes to the site's impervious cover or drainage conditions. A detailed water balance assessment would be expected to consider, at a minimum, estimated of water surplus and/or deficit. If the site is adjacent to sensitive natural features, the water balance should consider baseflow requirements of downstream receptors and ensure they are maintained in post development scenario.**

As per Section 10.3 of the NWSSS, the baseflow of Beaver Creek will be maintained by ensuring existing infiltration rates are achieved. The proposed infiltration measures will exceed the pre-development infiltration, as is consistent with the NWSSS. Details on the water balance assessment and the measures taken to ensure sufficient infiltration is provided in the post-development condition have been described in the "Water Balance" section of the SWM report.

1.1 School Block Infiltration

2024/04/03 – It was questioned if the school block infiltration requirement was necessary to meet the infiltration target; has the school board had been informed of this requirement and the associated costs? Meritech's opinion is that they have designed SWM systems for schools in the past, schoolboards are most likely aware that these are costs that they will have to get comfortable with as schools are built. Infiltrating the roof area was not

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expected to be a concern. The City indicated a preference that the school board not be responsible for infiltration on their own lands.

[City of Waterloo] As Meritech noted, they have experience with SWM (infiltration) systems for schools. The city requests that any requirements for the school block are transparent/ easy to interpret from the report.

The expected approach to the infiltration of runoff from the school block has been noted in the SWM report under "Water Balance – Lot Level Infiltration Facilities."

2024/06/14 – The City noted the infiltration at the school as a continuing concern. Meritech proposed having the preliminary design show infiltrating the school roof runoff through the CWC system, extending it as necessary in the right of way. The ultimate design could be coordinated with the school board, if necessary. The City preferred this option, so long as transparency is maintained by Meritech through this process. ***Issue is considered resolved (for the purposes of next submission).***

This is the currently proposed method of infiltrating runoff from the school block. Refer to the section "Lot Level Infiltration Facilities".

1.2 Over-Infiltrating in Catchment 3913

2024/04/03 – Meritech recalled being asked to over-infiltrate where possible, as there may be other areas within the subwatershed that are not as good. The City agreed that this was previously requested, however, the impacts to the current design require further investigation.

2024/06/14 – The surplus infiltration had been significantly reduced by other constraints on the water balance. ***Issue is considered resolved (for the purposes of next submission).***

No response required.

1.3 Clean Water Collector (CWC) System

2024/04/03 – The City stated that more CWC system was allowable.

2024/06/14 – The City asked for confirmation that the CWC would be reasonably sized to provide the necessary infiltration. Meritech identified the typical clearstone requirement across the length of the CWC as approximately 1m by 1m. The City noted that this was a reasonable size. ***Issue is considered resolved (for the purposes of next submission).***

The anticipated sizes of the CWC system has been provided in the SWM report as part of the Water Balance subheading "Clean Water Collection System."

1.4 Rear Yard Infiltration

2024/03/04 – The City noted that rear yard infiltration galleries were not preferred due to maintenance concerns.

2024/04/06 – Meritech explained that the rear yard infiltration was necessary only because some areas of the site cannot be directed to the CWC pipe; and since there is a pre-development surface water limit, small areas of the site (back yards) are proposed to infiltrate. The City, while not in favour of rear yard infiltration, agreed to allow it since it is a better option than raising grades with retaining walls.

Issue is considered resolved (for the purposes of next submission).

The design of the rear yard infiltration galleries is discussed in the SWM report as part of the Water Balance subheading "Lot Level Infiltration Facilities."

1.5 Winter Months – End of Pipe

2024/06/14 – The City requested that the water balance calculations be updated to discount more winter months for the end-of-pipe system. Meritech agreed to do so, explaining the expected reduction to the provided infiltration based on Environment Canada climate normals data. Meritech requested that the City provide specific maintenance dates for the gallery to be closed to better evaluate the infiltration volume from the end-of-pipe system

[City of Waterloo] Stormwater Operations has confirmed that the valves to infiltration systems that may be impacted by salt are closed in November and re-opened in April, the specific date is weather dependant. Meritech can should run their modeling assuming a closure on Nov 15th and an opening on April 15th. It should be noted that this period represents about 37.5% of Waterloo's annual precipitation, but for monthly analysis, the applicant should refer to historical monthly averages, and not simply divide annual rainfall by 12.

The months of November to April have been discounted from the end-of-pipe facility infiltration entirely using the Canadian climate normals data from Environment Canada, considering 45% of the annual precipitation to occur in the winter condition and 55% of the annual precipitation as occurring in the summer condition.

1.6 Winter Months - CWC

2024/06/14 – The City requested that the snowfall on roofs be accounted for more accurately in the water balance calculation. Meritech explained that this information is not readily available. The City agreed to provide direction on how to account for snowfall on roofs in the water balance calculation.

[City of Waterloo] Meritech may proceed with assumptions based on professional judgement if justified and all precipitation is accounted for. Assuming snowfall on roofs acts the same as rainfall during winter months is acceptable to the city.

Noted. This assumption has been used in the design.

2. NWSSS Targets

2.1 Infiltration Targets

2024/04/03 – The City raised concerns that the infiltration targets may have an upper limit per Table 11.5 of the NWSSS. It was determined that the infiltration targets should be agreed upon between the City and Meritech before the next formal submission.

2024/06/04 – The City requested a future meeting to discuss the specifics of the NWSSS targets, providing the agenda for this meeting by email.

2024/06/14 – Meritech reviewed the subwatershed study, Appendix 3E, which discusses the process used in creating the study. The study has identified theoretical proposed infiltration and runoff rates based on the assumed land usage "for the purposes of discussion." These are not noted as being targets anywhere in the study. For infiltration in particular, the study stated that infiltration rates should be maintained or improved compared to existing conditions. It was noted by both the City and by Meritech that the NWSSS should be carefully reviewed for this submission.

Where infiltration targets have not be met, the City requested justification be provided in the report.

Issue is considered resolved (for the purposes of next submission).

Noted. The particulars of the NWSSS and the required targets for infiltration are included in the Water Balance section of the SWM report under the sub-heading "Total Post-Development Infiltration & Runoff."

2.2 Runoff Targets

2024/06/04 – The City requested a future meeting to discuss the specifics of the NWSSS targets, providing the agenda for this meeting by email.

2024/06/14 – The typical expectation for a development is that runoff should be restricted as much as possible. In this case, the NWSSS states that for catchment 3913, surface runoff should be maintained in order to "not starve the wetland." Meritech proposed using the pre-development runoff rate as a target to fulfill this condition of the NWSSS, using the theoretical post-development runoff rate presented by the subwatershed study as a maximum.

Issue is considered resolved (for the purposes of next submission).

Noted. Runoff targets are discussed as part of the Water Balance section of the SWM report.

2.3 Infiltration Values

2024/06/14 – The City requested that the infiltration rates for agricultural and lawn areas be evaluated in more detail and provided with supporting evidence.

[City of Waterloo] Meritech may use an infiltration method of their choosing, however the limitations of the method should be well understood and accounted for using a reasonable correction. The Thornthwaite-Mather is typically used with a correction factor for post-development compacted soils.

Infiltration rates for agricultural and lawn areas has been evaluated based on values included in Table 3.1 from the MOE 2003 SWM design manual. This has been described in the Water Balance section of the SWM report under the subheading "Passive Infiltration & Runoff."

3. Groundwater Elevation

2024/04/03 – Meritech indicated that the groundwater near the school block would not interfere with infiltration. Groundwater was also brought up as a concern in the SWM facility design. The City noted that a wet pond should have clearance to the groundwater table and would require a clay liner.

2024/06/14 – The City identified a groundwater highpoint of 354.9m from Meritech's previous report. Meritech identified this groundwater elevation at the north property line, not near the SWM block. The additional groundwater study completed for the development will be included in future submissions. The City requested that the required information be easy to find on one drawing, specifically that the groundwater information be provided on the grading plan.

Issue is considered resolved (for the purposes of next submission).

The design drawings have been updated to incorporate information about the groundwater contours.

4. Pond Design

2024/04/03 – It was agreed that Meritech would submit the initial design of a potential SWM design outside of a formal planning process in order to allow coordination with the City prior to another draft plan submission.

2024/06/04 – Meritech presented the in-progress pond design and some of the layouts that were eliminated to reach this. The City stated that the new iteration of the SWM pond was preferred.

2024/06/14 – The City requested greater clarity in the tables of the future SWM report to show how the pond was designed.

Issue is considered resolved (for the purposes of next submission).

The tables on the pond design have been revised for increased clarity.

4.1 Wet Pond vs. Wetland

2024/04/03 – The current design was identified as a hybrid system. This was not considered acceptable by the City. The City also indicated that they had encountered issues in maintaining SWM wetland facilities.

2024/06/04 – Meritech indicated that they would be pursuing a wet pond design, which the City agrees is preferable.

Issue is considered resolved (for the purposes of next submission).

A wet pond design has been utilized in the design.

4.2 Winter Conditions

2024/04/03 – In the previous design, Meritech did not provide information showing that the proposed facility would operate in the winter condition with the infiltration gallery disconnected. Meritech agreed with the City to show how the winter conditions impact the function of the SWM facility.

[City of Waterloo] Meritech should show the proposed SWM facility meets criteria (excluding infiltration) in all months with the infiltration gallery disconnected. Meritech may also expand this section to also compare performance of the pond with the infiltration gallery connected.

2024/06/14 – It was confirmed by the City that Meritech should address the winter condition in the calculations of the pond function and describe the summer condition.

Issue is considered resolved (for the purposes of next submission).

The winter conditions have been utilized to evaluate the quantity and quality control of the SWM facility. The permanent pool volume in particular was evaluated under summer conditions, when the variable permanent pool would be at its lowest.

4.3 End of Pipe Infiltration

2024/04/03 – The City raised a question about the layout of the SWM facility and infiltration gallery as a concern for maintenance.

2024/06/04 – The gallery was shown downstream and disconnected from the SWM pond, which is preferred.

Issue is considered resolved (for the purposes of next submission).

The gallery is disconnected.

4.4 Flow Splitter

2024/04/03 – Meritech raised the option of a flow splitter. The City questioned the need for more infrastructure.

2024/06/04 – The City requested that if a flow splitter will be designed for the SWM facility, that it be designed for the 5-year storm to be treated by the forebay with supporting examples.

No flow splitter is proposed as part of the design.

4.5 Outlets

2024/04/03 – The City indicated that the number of outlet structures should be reduced as much as possible.

2024/06/04 – This issue was not yet present with the in-progress pond layout.

The outlet structures are required in order to maximize the utilization of the active storage in large events without further increasing the size of the SWM block. The grading and elevation of the groundwater limits the amount of active storage available in the SWM block. Reducing the number of outlet structures would necessitate further increase of the SWM block to overcontrol the design storms.

5. Miscellaneous Items

5.1 Runoff to South Coordination

2024/06/14 – The City asked if Stantec had been informed of the expected runoff from catchment 3107 to their SWM facility downstream of the development. Meritech indicated that they had communicated the expected runoff multiple times but had not received a response. The City requested that Meritech try to get a response from Stantec on the subject; failing that, the City would reach out to Stantec on this. Meritech was asked to provide records of their correspondence to Stantec on this.

[City of Waterloo] Further follow up on this item should be coordinated directly with Caroline Amyot at the City of Waterloo (Caroline.Amyot@waterloo.ca)

We will shortly be corresponding again with Stantec (via Caroline) to ask for updated drawings, as we shift from Draft Plan Approval to preparing for a Site Alteration Permit.

5.2 Rain Barrels

2024/06/14 – The City asked how rain barrels would be encouraged for future homeowners. Meritech noted this as a question for the client, with the possibility of adding a homeowner's brochure as a condition of the subdivision agreement.

Issue is considered resolved (for the purposes of next submission).

We will ensure that this is covered in detailed design. We note, however, that adding rain barrels may run counter to the goal of maintaining site-wide infiltration by directing all roof runoff to the third pipe system.

We are confident that we have addressed all your comments to advance the Draft Plan approval. Should you require anything further, please contact the undersigned.

Yours very truly,

MERITECH ENGINEERING



Chris Togeretz, P.Eng.
Manager, Design Services

CHT/mf
Enclosures (0)
cc