

**MEMORANDUM**

SUBJECT: Stormwater Review of Skillings Connolly's letter to Bruce Titus, titled: Drainage Evaluation for Bruce Titus, Chrysler Jeep Wellington Heights Project
CPD# 18-1315

TO: Jeff Fant, Engineering Plans Examiner
Paula Smith, Associate Planner
Community Planning & Development

FROM: Steve Thompson, P.E., Water Resources Engineer – Storm & Surface Water
Public Works – Water Resources

DATE: January 24, 2018

We have reviewed the letter titled, Drainage Evaluation for Bruce Titus, Chrysler Jeep, prepared by Thomas E. Skillings, P.E., of Skillings Connolly, Inc. (Skillings), dated January 10, 2019, regarding drainage concerns associated with the Wellington Heights project and potential impacts to downstream properties.

Skillings demonstrated a sound understanding of the proposed project and its changes to the local hydrology and runoff regime. He offered some comments and recommendations that we will address below:

North-South Ditch

Skillings wrote the north-south ditch on Bruce Titus's property needs to be redesigned and reconstructed to convey not only the flow-through water from Wellington West but also any additional emergency overflow from the Wellington Heights project in the event of a failure of the proposed drainage/infiltration system. The north-south ditch should be designed to protect the dealership property from scour, and protect all downstream property owners from flood damage.

Response: The City agrees.

The north-south ditch currently does not have capacity to convey the existing flows without adversely impacting Bruce Titus's property. The Wellington Heights project

proposes to infiltrate 100% of the site runoff but it must also provide a downstream conveyance system for an emergency overflow in case their system fails.

The City's 2016 *Drainage Design and Erosion Control Manual* (DDECM), Volume III, requires the emergency overflow to be sized for the 100-year peak flow, and must be designed to provide a controlled discharge directly into the downstream conveyance system or another acceptable discharge point. In this case, that is the north-south ditch on Bruce Titus's property.

In addition, the DDECM, Core Requirement #4 says that "...if a significant adverse impact to down gradient properties or drainage systems is likely, then a conveyance system must be provided to convey the concentrated runoff across the downstream properties to an acceptable discharge point" where runoff can be discharged without significant adverse impact. Again, in this case, that is the north-south ditch.

As a condition of the Wellington Heights project, the north-south ditch must be modified to increase the capacity to handle the 100-year emergency overflows from both Wellington West and Wellington Heights. The intent is to prevent property damage to the new homes at Wellington Heights and prevent property damage to the Bruce Titus dealership.

(Properties downstream of the Bruce Titus dealership are discussed below.)

Chris Merritt, of Olympic Engineering, also responded to this issue by email to Paula Smith (January 11, 2019). Per Merritt, the north-south ditch reconstruction will include a layer of filter fabric and will be lined with quarry spall sized rock to dissipate energy and prevent scour from undercutting the parking area or dumpster pad on the Bruce Titus property.

East-West Ditch

Skillings noted that the east-west ditch needs to be restored to provide positive drainage. When the north-south ditch is improved and deepened, the east-west ditch will also be regraded to provide a positive slope to the north-south ditch.

Response:

We agree that the east-west ditch does not have positive flow; the City believes this is due to a buildup of sediment near the northwest corner. Construction of the north-south ditch will include this minor regrading of the east-west ditch in the area of the dumpster pad and

hydrant, at the northwest corner of the Bruce Titus property, to reestablish a positive flow. This work will be done in conjunction with the SEPA mitigating condition 3, bullet item 2.

Downstream Analysis

Skillings recommended that a complete downstream analysis be performed from the project site all the way to Percival Creek to ensure that no downstream properties will be adversely impacted in the event of an emergency or system failure.

City's Response:

The conveyance pipes go from a 48" diameter culvert under Bruce Titus's west approach (along the north-south ditch) to a single 15" diameter culvert under Carriage Drive that goes to a City stormwater conveyance system.

The City directed Olympic Engineering to stop their downstream analysis at the 48" culvert.

The City acknowledges that the conveyance system downstream of Bruce Titus's property does not have enough capacity to handle the 100-year storm event, but then, it was never intended to handle storms of that size. Designing storm drain conveyance systems for the 100-year event is generally considered not cost effective.

The design standards for stormwater conveyance systems include the following (from the DDECM, Volume 1, Appendix F):

- Pipes shall be designed to pass the 25-year storm event.
- Streets shall provide at least a 12-foot dry travel lane during a 25-year storm.
- Streets shall pond no deeper than 6" (height of a 6" curb) during a 25-year storm.
- Stormwater facilities shall be designed to survive a 100-year flood event.

To retrofit the downstream storm system to handle the unlikely event of a 100-year storm would require the replacement of approximately 1,200 linear feet of storm pipe, and that is beyond the expectations of what the City would require of a developer.

If we truly have a 100-year flood (emergency) event then it is reasonable to expect some property damage, but our goal is to survive the storm with minimal damage.

Summary of the Downstream Analysis

The downstream analysis for a storm event that exceeds the capacity of the 15" storm pipe is as follows: Stormwater would flow from Bruce Titus's property west along the surface of Carriage Drive for approximately 80-feet to a low spot in the road; then flow south across Carriage Drive, over a road approach and into the Olympia Mazda dealership's parking lot, and continue south through their parking lot to their south frontage with Cooper Point Drive. From the Mazda dealership floodwater would flow over a short bank and down to Cooper Point Drive, then flow east along the curb of Cooper Point Drive to the top of Percival Creek Canyon, and then down the canyon to Percival Creek.

Mounding Analysis

Skillings contended that a single boring hole with only one recorded reading of the water level, taken on June 21, 2018, is inadequate for the mounding analysis. If groundwater rises more than 8-feet above the recorded level then the infiltration facility would be out of compliance and if it rose 10-feet the facility might begin to fail. Skillings recommended that the water level be continuously monitored for at least one year to have a better idea of the groundwater fluctuations.

Response:

Based on the guidelines and requirements in the DDECM; continuous groundwater level monitoring is not required.

In response to the Skilling's report, the applicant has provided the City two additional borings and analysis by a licensed P.E. (email from Luke McCann to Alex Vo, dated January 11, 2019). The two additional borings were performed by others in the vicinity of the project and identified the same sand layer that the Wellington Heights project will use. These borings and the analysis indicate a fairly consistent groundwater level that does not have big swings in fluctuation. These two borings were also taken in the month of March, which would be close to the annual high groundwater mark.

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