

**Mattamy Homes Richmond Official Plan Application**  
**Response to City of Ottawa June 8, 2009 Technical Circulation & Additional Comments**  
**March 10, 2010**

#	Comment	From	Date	Mattamy Response	Action Taken
<b>STORMWATER MANAGEMENT AND DRAINAGE PLAN</b>					
1.	There is not enough justification in the Stormwater Management Drainage Report (DSEL, March 2009) that the construction of the stormwater pond and the communal well in the floodplain is feasible from both a planning policy (PPS, MOE policies, Official Plan policies) and a technical perspective. Natural Systems supports the Rideau Conservation Authority's position of strongly discouraging placing the stormwater pond in the floodplain.	City – Natural Systems Unit	July 10, 2009	The communal well is not situated in the floodplain. Figure 17 – Concept Plan shows the communal well location which south of the floodplain limit.  Please see response to stormwater question #13 below	No action required as communal well not situated in the floodplain. For pond in the floodplain, see response to Question #13 below
2.	The Official Plan policy 4.8.1 quoted on Page 56 of the Stormwater Management Drainage Report (DSEL, March 2009) is now out of date. The City's new Official Plan policies approved by Council on June 10, 2009 state the City will not permit site alteration, or the construction of buildings and structure in the flood plain except for facilities that must locate in the floodplain such as bridges, erosion control structures, minor additions, passive non-structural uses, uses permitted in accordance with two-zone flood plain policy areas".	City – Natural Systems Unit	July 10, 2009	Mattamy's Official Plan Amendment was deemed complete on May 26, 2009. As such, the 2003 Official Plan policies apply to this application. Section 4.8.1 of the City of Ottawa Official Plan provides policies related for floodplains. Policy 3 states that the City will not permit any buildings, structures or septic systems in the floodplain regardless of the underlying designation with 3 exceptions. Policy 7 states: <i>All new development and infrastructure in the flood plain will be subject to the approval of the appropriate Conservation Authority, in accordance with the applicable provincial legislation.</i>	No action required
3.	The concept plan shows housing in the floodplain south of Ottawa Street. Natural Systems supports the position of the Rideau Valley Conservation Authority that development should not be shown on the concept plan in this area as discussions on the feasibility of building in this area proceed.	City – Natural Systems Unit	July 10, 2009	The RVCA has provided the following response on the floodplain delineation south of Ottawa Street (Letter dated August 25, 2009 from RVCA on Natural Environment & Impact Assessment Report). <i>The second paragraph of Section 3.2 on page 32 is not entirely accurate with respect to the floodplain south of Ottawa Street. The works authorized by the Conservation Authority's letter of permission issued on March 3, 2009 will not re-establish the 1:100 yr</i>	No Action Required

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				<p><i>floodplain limit to the originally approved berm locations. The berm as originally approved will be removed and new berms will be constructed to the east and southwest of the high point of land, thereby eliminating the spill areas that occur on either side of this high point. Figure 10 correctly shows the approximate extent of the revised floodplain if the berm work is implemented as approved by the Conservation Authority. However, it is to be noted that these modifications are completely depended on the design and implementation of an alternative drainage scheme for the lands north of the berm.</i></p> <p>The floodplain delineation is correct but permit requirements and the stormwater management and drainage scheme for these lands must be approved by the RVCA prior to the floodplain regulated limit being revised.</p>	
4.	Natural Systems supports the comments of Infrastructure Planning and the RVCA to Mattamy that the floodplain mapping north of Perth Street should be incorporated into the Natural Environment & Impact Assessment Study and the Stormwater Management and Drainage Plan analyses.	City – Natural Systems Unit	July 10, 2009	We agree and as such could not prepare the revised report until the floodplain mapping exercise was completed. The revised report applies the floodplain mapping model (JFSA, 2009) to the relevant analysis for existing and post development.	The final floodplain mapping for the Van Gaal/Arbuckle Drain (JFSA 2009) has been incorporated into the revised report.
5.	There is a discrepancy in the report (Natural Environment & Impact Assessment Study) on the loss of reaches of the Moore Branch that Natural Systems would like clarified. On Page 81 it is stated “The Moore Branch would be left in place, potentially with enhancements in upper sections.” On Page 95, it is stated “The loss of section 8 of the Moore Branch is also considered to be minor...” - The report does not include much information on enhancements. Here are some of the enhancements Natural Systems would like	City – Natural Systems Unit	July 10, 2009	Please refer to Appendix H – Fish Habitat Risk Assessment Report (Kilgour & Associates, March 2010) which provides the status of tributaries and enhancements for the preferred stormwater management solution. This includes enhancements consist with the Natural Environment & Impact Assessment report (Kilgour, February 2010).	Comment addressed Appendix H of the revised SWM report and the revised Natural Environment & Impact Assessment Report (Feb. 2010).

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	<p>to see:</p> <ul style="list-style-type: none"> <li>a. Evaluate potential for better spawning for pike.</li> <li>b. Bio-engineering enhancements where erosion is occurring.</li> <li>c. Improve riparian belt shading on remaining watercourses.</li> <li>d. Evaluate opportunities for natural channel design.</li> </ul>								
6.	<p>Page 28 (DSEL) states that in the Moore Branch there is 100% canopy and low stability due to poor water quality associated with tile drains. This is inconsistent with healthy fish habitat found.</p>	City – Natural Systems Unit	July 10, 2009	<p>The comment on “poor water quality” is related to the presence of tile drainage in Section 5 of the Moore Branch, a conclusion reached by a Fluvial Geomorphologist conducting a site inspection. Measurement of metals and nutrients in surface water at that location (see Kilgour report, page 51) indicated that the water is of relatively high quality. The sentence has been removed in the revised SWM (DSEL) and Environment (Kilgour) reports.</p>	<p>Comment addressed in Existing Conditions section of the revised SWM report and the revised Natural Environment &amp; Impact Assessment Report (Feb. 2010).</p>				
7.	<p>See attached “Comments on Natural Environment Criteria”</p> <p><b>Comments on DSEL application on the Natural Environment Criteria</b></p> <p>The way the natural environment criteria were applied in the evaluation of the stormwater management options is too narrow in scope from the perspective of Natural Systems.</p> <table border="1" data-bbox="121 1304 730 1511"> <thead> <tr> <th data-bbox="121 1304 552 1336">Criteria</th> <th data-bbox="552 1304 730 1336">Evaluation</th> </tr> </thead> <tbody> <tr> <td data-bbox="121 1336 552 1511">N1 impact on significant natural features: Loss, displacement, disruption fragmentation of natural areas (wetlands, woodlands, terrestrial ecology, ANSIs and associated corridors)</td> <td data-bbox="552 1336 730 1511">The evaluation of Jock River Corridor</td> </tr> </tbody> </table>	Criteria	Evaluation	N1 impact on significant natural features: Loss, displacement, disruption fragmentation of natural areas (wetlands, woodlands, terrestrial ecology, ANSIs and associated corridors)	The evaluation of Jock River Corridor	City – Natural Systems Unit	July 10, 2009	<p>The evaluation criteria are consistent with the criteria applied in the Master Servicing Study. These criteria were circulated to the TAC and public for comment. The criteria were revised based on input received and are considered final.</p> <p>N1 is defined as <u>Impact on Significant Natural Features</u>. NESS Area 422 and the Jock River Corridor were the only significant features identified by Kilgour &amp; Associates. As such, this criterion addresses these features only.</p> <p>N2 criterion addresses impacts on Ecological Processes which considers the broader natural system including other natural areas such as the isolated woodlots, hedgerows and watercourse setbacks.</p>	<p>No action on criteria. Section 7.3.2 provides further elaboration on the evaluation results in the revised Stormwater Management and Drainage Report.</p>
Criteria	Evaluation								
N1 impact on significant natural features: Loss, displacement, disruption fragmentation of natural areas (wetlands, woodlands, terrestrial ecology, ANSIs and associated corridors)	The evaluation of Jock River Corridor								

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	N2 Fragmentation of natural areas, interruption of natural linkages	The evaluation gives a higher score to option 3 but the enhancement could be included in any of the 3 options. The evaluation should consider interruption of hedgerows, removal of good quality trees and infrastructure within watercourse setbacks.			N3 deals with aquatic systems including other creek corridors such as Van Gaal and Malbourough Creek.  The revised Stormwater Management and Drainage Report provides further explanation in Section 7.3.2 on the scores assigned based on the updated analysis.	
	N3 Number of stream crossings, impact on significant fish habitat	The evaluation should explain why option 2 and 3 would not be the same for fish habitat. More specifically, clarify why option 2 would not produce habitat.				
	N6 Interference with linear green way systems.	The evaluation should clarify why option 3 would produce more opportunities for green space. All options could provide for green space.				
8.	A hydraulic grade line analysis for the storm sewer has not been provided. This is a fundamental requirement given the low relief and low-lying nature of the proposed development lands. A major/minor system and HGL analysis is also an explicit requirement of Section 8.3 of the Sewer Design Guidelines, quoted below. Further review of the SWM and Drainage Plan cannot proceed until the required HGL and major/minor system analyses are completed, revisions made as may be required and the report resubmitted.	City	Preliminary Comments – June 30, 2009	A hydraulic grade line analysis is provided in Section 9.2 and Appendix I of the revised report.	A hydraulic grade line analysis is provided in Section 9.2 and Appendix I of the revised report.	
9.	Due to the complexity of storm drainage systems when analyzed at this level (i.e. varying outlet conditions, inlet control hydrographs, etc), it is recommended that the HGL analysis be undertaken with the use of a dynamic computer model (see Sections 3.5 and 8.3.5). The designer must ensure that the inlet control rate used in the model corresponds to the 5-year capture rate. In other words, the pipe should be full during a 5-year simulation.	City	Preliminary Comments – June 30, 2009	A computer hydraulic model has been created to determine the 100-year hydraulic grade line in the storm sewer based on the preferred solution.	A hydraulic grade line analysis is provided in Section 9.2 and Appendix I of the revised report.	
10.	When designing a sewer system, most designers use spreadsheet models based on the Rational Method and Manning's equation to determine peak flows and pipe capacity. If the pipe system becomes surcharged	City	Preliminary Comments – June 30, 2009	A computer hydraulic model has been created to determine the 100-year hydraulic grade line in the storm sewer based on the preferred solution.	A hydraulic grade line analysis is provided in Section 9.2 and Appendix I of the revised report.	

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	<p>due to a submerged outlet, the designer will often use a spreadsheet-based steady state hydraulic grade line analysis using the Darcy-Weisbach equation. For the most part these methods are acceptable, but there are instances where a dynamic computer model must be used. This section identifies when computer model should be used with respect to SWM.</p> <p>Section 3 of the City's Sewer Design Guidelines states that when Stormwater Management is used in designing a storm sewer system, a dynamic computer model that simulates inflow hydrographs and the effect of storage attenuation should be used. A dynamic computer model will provide more realistic results since it can account for effects of limited CB capture, depression storage, spatial and temporal variations, times of concentrations, diurnal flow patterns, etc.</p> <p>Dynamic computer models should therefore be used in the following SWM instances:</p> <ul style="list-style-type: none"> <li>• When assessing the hydraulic grade line in the trunk storm sewer at the Master Servicing Study (or Master Drainage Plan) stage.</li> <li>• When determining major system storage requirements at the Master Servicing Study (or Master Drainage Plan) stage.</li> <li>• When assessing the major system conveyance at the Master Servicing Study (or Master Drainage Plan) stage.</li> <li>• When assessing the capacity of an existing receiving storm sewer system.</li> <li>• When sizing SWM facilities (dry ponds, wet ponds, wetlands etc).</li> </ul>				

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11.	Preliminary plan and profile drawings of storm and sanitary sewers (main trunks) continuing to their outlets should be provided. This was explicitly requested in previous discussions. The drawings should be of sufficient detail that all areas of potential conflicts in storm and sanitary sewers can be identified, and the approach to overcoming the conflicts can be determined before the plan is approved.	City	Preliminary Comments – June 30, 2009	Preliminary plan and profile drawings of the trunk storm sewers are provided in Appendix I of the revised report.	Preliminary plan and profile drawings of the trunk storm sewers are provided in Appendix I of the revised report.
12.	While it is appreciated that the 100- year floodline north of Perth St. remains to be approved/finalized by RVCA, please note that the review cannot be completed until the impacts of the floodline have been incorporated into the plan.	City	Preliminary Comments – June 30, 2009	The floodplain mapping for the Van Gaal Drain was approved on January 28, 2010. The final floodplain mapping for the Van Gaal/Arbuckle Drain (JFSA 2009) has been incorporated into the revised report.	The final floodplain mapping for the Van Gaal/Arbuckle Drain (JFSA 2009) has been incorporated into the revised report.
13.	<p>Provincial Policy Statement</p> <p>Section 3.1 (Natural Hazards) of the PPS states: Development shall generally be directed to areas outside of:</p> <p>b) hazardous lands adjacent to river, stream and small inland lake systems which are impacted by flooding hazards and/or erosion hazards;</p> <p><b>The lands in question are hazardous lands adjacent to a stream system.</b></p> <p>3.1.2 Development and site alteration shall not be permitted within:</p> <p>d) a floodway regardless of whether the area of inundation contains high points of land not subject to flooding.</p> <p><b>The lands in question are "flood way" since, in areas of one zone floodplain administration (such as is the</b></p>	RVCA	September 4, 2009 Letter	<p>Comments #1, #13, #14, 15, #16, #24, #25 pertain to the policy interpretation of situating a stormwater management facility in the floodplain.</p> <p>Section 10 of the revised report provides the policy context that does not prohibit swm ponds in the floodplain. The RVCA comments expressed in Comments #13, #14 and #15 concur with DSEL's policy interpretation as it relates to the PPS not prohibiting sitting of swm ponds in floodplain.</p>	Please refer to Section 10 of the revised report.

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	<p><b>case here), the entire floodplain is defined as the floodway.</b></p> <p>3.1.3 Despite policy 3.1.2, development and site alteration may be permitted in certain areas identified in policy 3.1.2:</p> <p>a) where the development is limited to uses which by their nature must locate within the floodway, including flood and/or erosion control works or minor additions or passive non-structural uses which do not affect flood flows;</p> <p><b>The "nature" of a stormwater management facility does not dictate that it must be located in the floodplain.</b></p>				
14.	<p><b>Development</b> is specifically defined in the PPS as "the creation of a new lot, a change in land use, or the construction of buildings and structures, requiring approval under the Planning Act" but excludes a) "activities that create or maintain infrastructure authorized under an environmental assessment process ... ",</p> <p><b>Infrastructure</b> (PPS) means "physical structures (facilities and corridors) that form the foundation for development. Infrastructure includes: sewage and water systems, septage treatment systems, waste management systems, electric power generation and transmission, communications/telecommunications, transit and transportation corridors and facilities, oil and gas pipelines and associated facilities. "</p> <p>We believe that these definitions are sufficiently broad to include infrastructure such as stormwater facilities. However, it is important to note that prohibition of "development" in the floodway (Section 3.1.2 d of the PPS) does not apply to "activities that create or</p>	RVCA	September 4, 2009 Letter	<p>Comments #1, #13, #14, 15, #16, #24, #25 pertain to the policy interpretation of situating a stormwater management facility in the floodplain.</p> <p>Section 10 of the revised report provides the policy context that does not prohibit swm ponds in the floodplain. The RVCA comments expressed in Comments #13, #14 and #15 concur with DSEL's policy interpretation as it relates to the PPS not prohibiting sitting of swm ponds in floodplain.</p>	Please refer to Section 10 of the revised report.

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	<p>maintain infrastructure authorized under an environmental assessment process." If the project does not trigger an EA by which the impacts of the proposal on the floodplain would be identified and mitigated, then the project is not permitted. Note that the above definition refers to an "environmental assessment process ". This would include full EA's under the Environmental Assessment Act, Municipal Class Environmental Assessments and a Master Plan approach that comes into effect or approval under the Planning Act (i.e. exempt from further examination under the Municipal Class EA). The consultant has noted in Section 6.3.3 of the report that the stormwater management drainage plan has been prepared in accordance with Phases 1 and 2 of the Class Environmental Assessment Process, and as such, the project is permissible because in their opinion, there will be no adverse impact on the floodplain and the natural environment.</p>				
15.	<p>Although we do not disagree with the consultant's interpretation of the PPS policies in this regard, there is some question concerning the intent of the PPS with respect to the definition of site alteration:</p> <p><b>Site alteration</b> (PPS) means "means activities, such as grading, excavation and the placement of fill that would change the landform and natural vegetative characteristics of a site."</p> <p>This definition does not include the same exemption for infrastructure that is authorized under an EA process as does the definition of development. Since the PPS specifically excludes infrastructure that has been subject to an EA process from the more general prohibition of development on hazard lands, in our opinion it is implicit that the policy providing for the exemption would also apply to activities or works</p>	RVCA	September 4, 2009 Letter	<p>Comments #1, #13, #14, 15, #16, #24, #25 pertain to the policy interpretation of situating a stormwater management facility in the floodplain.</p> <p>Section 10 of the revised report provides the policy context that does not prohibit swm ponds in the floodplain. The RVCA comments expressed in Comments #13, #14 and #15 concur with DSEL's policy interpretation as it relates to the PPS not prohibiting sitting of swm ponds in floodplain.</p>	Please refer to Section 10 of the revised report.



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	<p>resulting in site alterations. We have difficulty foreseeing a scenario whereby the PPS would allow for infrastructure authorized under an EA process on one hand, and then on the other hand prohibit such infrastructure because it results in a site alteration. We understand that others may have a different interpretation.</p>				
16	<p>Official Plan Policies</p> <p>We understand that Mattamy's position with respect to the Official Plan is that the policies in the 2003 OP are applicable because their application for the OPA predates Council's adoption of the new OP. The City ultimately will decide which OP is applicable. However, our comments are based on the 2003 OP.</p> <p>The consultant has relied on Section 4.8.1 Floodplains of the 2003 OP and has concluded that the polices do not preclude a stormwater management pond in the floodplain.</p> <p>Policy 3 states:</p> <p>3. The City will not permit any building, structure or septic system in a floodplain, regardless of the underlying designation, except:</p> <p>a) In accordance with policies 4, 5 and 6 of this subsection;</p> <p>b) Works and facilities related to flood and erosion control authorized under the Environmental Assessment Act;</p> <p>c) Repairs and minor additions to buildings and accessory buildings may be permitted subject to approval of the appropriate Conservation Authority.</p> <p>With respect to a) above only section 5 is applicable since the area in question is regulated under Section</p>	RVCA	September 4, 2009 Letter –	<p>Comments #13, #14, 15, #16, #24, #25 pertain to the policy interpretation of situating a stormwater management facility in the floodplain.</p> <p>Comment #16 speaks to the City of Ottawa's Official Plan policies. The RVCA concur with DSEL's policy interpretation as it relates to Section 4.8.1. However, other policies such as Section 3.1, General Uses related to public utilities needs to be addressed.</p> <p>Section 10 has now addressed OP Policies 3.1 and 4.7.3 of the Official Plan. Again these policies do not prohibit SWM ponds being situated in a floodplain that are subject to the Environmental Assessment Act. The SWM Report is following Phases 1 &amp; 2 of the Class EA process but lthough the projects are pre-approved or exempt.</p> <p>As stated in the comment, the MOE Stormwater Management and Design Manual goes on to state that SWMPs may be allowed in the floodplain if there is "sufficient technical or economic justification and if they meet certain requirements" with respect to floodplain storage, valley land values/functions, fluvial processes and outlet invert elevations relative to certain return frequencies. The technical environmental, social and economic justification in Section 10 of the revised report has been expanded and further details have been</p>	Comment addressed in revised SWM report – Section 10.

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	<p>28 of the Conservation Authorities Act. This section is limited in scope in so far as it only addresses repairs, minor additions and new construction. With respect to b) and c) above, the proposed pond is not a flood or erosion control works and it is not a repair, minor addition or accessory building.</p> <p>Policy 7 states:            7. All new development and infrastructure in the floodplain will be subject to the approval of the appropriate Conservation Authority, in accordance with applicable provincial legislation.</p> <p>Infrastructure is defined in the OP as:</p> <p>Physical structures that form the foundation for development. Infrastructure includes wastewater and water works, electric power, communications and transportation facilities, and oil and gas pipelines and associated facilities.</p> <p>In effect, this section of the OP defers the decision as to what development can occur in the floodplain to the Conservation Authority, subject to zoning provisions and EA requirements when applicable.</p> <p>Although we do not disagree with the consultant's opinion that Section 4.8.1 of the OP does not explicitly preclude stormwater management ponds in the floodplain, it is important to note that all of the applicable policies in the OP must be considered. Section 3.1 Generally Uses, 10 under the Public Utilities heading states:</p> <p>10. Other public utilities municipal services and facilities are permitted land-use designations on Schedules and B, except in ... Floodplains ... shown on</p>			<p>provided to address the comments such that:</p> <ul style="list-style-type: none"> <li>• Engineering criteria demonstrated based on new flows</li> <li>• Additional floodplain storage provided to the system</li> <li>• Ability to design a Hybrid Wetland/Wet Pond</li> <li>• Pike Spawning Habitat Creation/Enhancement</li> <li>• Net Gain in Fish Habitat</li> <li>• Community Amenity Space connecting Martin Street Pedestrian Crossing with pond pathway system</li> <li>• Landscaping Enhancement Plan along Arbuckle Drain to improve riparian/aquatic habitat</li> </ul> <p>Additional details regarding the pond configuration and outfall invert has been provided in the report to demonstrate the performance of the stormwater management facility during a 100-year spring melt event and its effect on floodplain storage.</p>	

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	<p>Schedule K</p> <p>Since a stormwater management pond is a municipal service and facility, the policy explicitly prohibits such facilities in the floodplain.</p> <p>Although the MOE Stormwater Management Planning and Design Manual (2003) is not a policy document, it does address the matter of stormwater ponds in the floodplain and it is the Province's expectation that the guidance provided in this document will be considered in these matters. Section 4.2 Siting of Stormwater Management Facilities states:</p> <p>"End-of-pipe SWMPs should normally be located outside of the floodplain (above the 1: 1 00 year elevation). If the facility is multi-purpose in nature (e.g. providing quantity control in addition to quality and erosion control) it must be located above the highest design flood level. "</p> <p>However, the manual goes on to state that SWMPs may be allowed in the floodplain if there is "sufficient technical or economic justification and if they meet certain requirements" with respect to floodplain storage, valley land values/functions, fluvial processes and outlet invert elevations relative to certain return frequencies. The stormwater report does not describe any exceptional circumstances or any compelling technical or economic justification for siting the stormwater management pond in the floodplain. Again, such facilities are "normally" located outside the flood risk area and this direction is consistent with OP.</p>				
17.	1. "The 1:100 year summer rainfall flood plain"	RVCA	September 4, 2009	The FINAL JFSA report on Floodline Mapping of the Van Gaal Drain now suggests that the Regulatory	Please refer to Section 10 of the revised SWM report.

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	<p>At page 27 the DSEL, AECOM, Kilgour report says "the 100 year flood levels in response to summer rainfall events are significantly less (by 1 metre) than those occurring as a result of the Spring melt", attributing this finding to the 2004 Jock River Flood Risk Mapping Study - Hydraulics Report by PSR Group.</p> <p>This is indeed the conclusion drawn in the PSR Group for the reach of the Van Drain (VGD) from its confluence with the Jock River to the downstream side Fortune Street culvert, but the PSR Group report does not provide water surface elevations associated with a 1: 100 year summer event upstream of (The water surface shown in Appendix E to that report terminates at Street).</p> <p>The more recent flood plain mapping work by JF Sabourin and Associates (JFSA) now indicates that a 1: 1 00 year summer rainstorm flood event on the VGD is expected to produce higher water levels in the area between Fortune Street and Perth Street, than will a 1 :100 year spring flood event on the Jock River. A contributing factor in the water surface elevations upstream of Fortune Street is the capacity of the Fortune Street culvert in relation to the estimated flow associated with the 1: 100 year rainstorm on the VGD watershed. The JFSA modeling suggests that water levels upstream of the culvert will be approximately 0.5 metre higher than the tailwater elevation. Under present day conditions, based on the JFSA analysis, Pond 1 as shown in Option 3 of the SWM plan will be located within an area that is flood prone during both a 1: 1 00 year summer flood on the Drain and the 1: 1 00 year spring flood on the river.</p> <p>Culvert enlargement would be necessary to reduce the upstream water level during a 1: 1 00 year summer</p>		Letter –	flood level between Perth Street and Fortune Street is the 1:100 Year Jock River flood level at the VGD confluence. This implies that the 1:100 Year summer flood level on the VGD, in this reach, is less than the Regulatory Flood Level. With that in mind, it is proposed that Pond 1 be situated between the Regulatory flood level and the 1:100 Year VGD flood level. We have assumed that a SWM Pond in this location would not be subject to typical concerns regarding ponds in floodplains, such as re-suspension, since this pond would be flooded only by backwater from the Jock River.	

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	flood event to such a degree that flooding would be contained within the line identified in Figure 2 of the DSEL/AECOM/Kilgour report as the "100 year summer flood line". Note however, that culvert enlargement will not change the fact that the area of proposed Pond 1 in Option 3 is flood prone during a 1: 100 year spring flood on the Jock River.				
18	<p>2. Rationale for swm ponds in flood plains</p> <p>At page 58 the DSEL/AECOM/Kilgour report suggests that the MOE Storm Water Management Planning and Design Manual (SWMPDM) provides direction to the effect that the swm facilities are "designed to function during summer storm events only". We believe this is a misinterpretation of the wording in Section 3.5 of the SWMPDM, which alludes to the fact that the impact of urbanization on the hydrology of an area is more pronounced during the summer and fall months, than during the winter and spring months. This is due to several factors, including:</p> <ul style="list-style-type: none"> <li>• a percentage of precipitation during the latter falling as snow instead of rain</li> <li>• the differing nature of winter/spring rainfall/snowmelt events (lower intensity, longer duration, cyclonic, covering large areas) compared to summer/fall rainfall events (higher intensity, shorter duration, convective, localized)</li> <li>• frozen ground conditions winter/spring yielding higher runoff rates under predevelopment conditions - hence less difference between predevelopment and post development hydrologic response</li> </ul> <p>Accordingly, design of swm facilities is generally done with a view to managing developing area's hydrologic response to summer and fall events. But does not mean swm facilities needn't function during winter and spring rainfall events particularly multi-purpose</p>	RVCA	September 4, 2009 Letter –	<p>Appendix I contains details demonstrating the performance of the stormwater management facility during a 100-year spring melt event and its effect on floodplain storage based on the final model.</p> <p>The reference to stormwater management facilities functioning during summer months only was stated in regards the anticipation that the surface of the pond will be frozen. During this condition it is expected that re-suspension of sediment trapped in the forebay would be minimal. Furthermore, with the 100-year Spring Melt event limit established as a result of back water effects of the Jock River, expected velocities in the forebay are anticipated to be lower than 0.15m/s in this event, being the upset limit for re-suspension sediment trapped in the forebay. Modeling will be prepared at the detailed design stage to confirm the above assumptions. Therefore, the facility will continue to mitigate the effects of urbanization on the downstream receiving watercourses during winter months.</p> <p>The analysis has addressed the following requirements that must be met for siting swm ponds in flood plains (as per the MOE SWMPDM) :</p> <ul style="list-style-type: none"> <li>• the geometry of the proposed ponds and associated site grading and hydraulic structures needs to be more thoroughly described in order to</li> </ul>	Please refer to Sections 9 and 10 and Appendix I in the revised SWM report

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	<p>facilities which are intended to mitigate potential impacts on water quality and stability, as well as controlling peak discharges during runoff events.</p> <p>In any case, aside from the fundamental policy issues raised earlier, it needs to be more thoroughly demonstrated that the performance of the swm pond would not be compromised by its periodically being inundated by flood waters (spring or summer), in order to pass the "proof of concept" test that is required at this stage in the development approval process.</p> <p>More specifically, and with regard to the certain requirements that must be met for siting swm ponds in flood plains (as per the MOE SWMPDM) :</p> <ul style="list-style-type: none"> <li>• the geometry of the proposed ponds and associated site grading and hydraulic structures needs to be more thoroughly described in order to demonstrate that cumulative effects will not result from changes in flood plain storage and balancing cut and fill do not adversely impact existing or future development. The ponds are only shown in plan view within the conceptual drawings in the present report</li> <li>• it has not been demonstrated that the SWMP's outlet elevation can be set higher than the 2-year flood line and the overflow elevation set above the 25 year flood line without generating unacceptable hydraulic grade lines or unacceptable grade raises in the development area.</li> </ul>			<p>demonstrate that cumulative effects will not result from changes in flood plain storage and balancing cut and fill do not adversely impact existing or future development. The ponds are only shown in plan view within the conceptual drawings in the present report</p> <ul style="list-style-type: none"> <li>• it has not been demonstrated that the SWMP's outlet elevation can be set higher than the 2-year flood line and the overflow elevation set above the 25 year flood line without generating unacceptable hydraulic grade lines or unacceptable grade raises in the development area.</li> </ul>	
19.	<p>3. Cumulative Effects - Managing Flood Discharges on the Jock River in the long term</p> <p>This comment pertains in particular to the discharge (quantity) criteria that should be applied in the design of any swm facilities that outlet directly to the Jock River at the end of Ottawa Street, since discharges to</p>	RVCA	September 4, 2009 Letter –	<p>Mattamy and DSEL meet with RVCA on November 25, 2009 to discuss the approach to be applied to address cumulative effects. It was agreed that a full watershed hydrological and hydraulic analysis could not be assigned to one planning application. However, the RVCA requires a technical analysis to demonstrate that quantity control on the Jock River</p>	<p>Please refer to Section 7.1.2 and Appendix G of the revised report</p>

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	<p>the Van Gaal Drain have been determined to require peak flow control for both flood control and geomorphic stability reasons.</p> <p>The submitted rationale for not requiring control of post development peak flows released directly to the Jock River is provided in Section 6.1.2 (page 45) and supported in Appendix G. The quantitative analysis deals only with the potential impact of the lands being considered for urbanization in the present proposal. It demonstrates that peak flows from the urbanizing area will precede the peak flows in the Jock River, and the projected increase in peak flow from developing area will not affect the magnitude of on not be exposed to higher 1: 100 year flood levels.</p> <p>The submission goes on to make the intuitive or qualitative argument that the same conclusion hold true if analysis were to into account of developing the remaining developable lands in Richmond - relying on their area in relation to the Mattamy lands. This only goes part way towards addressing RVCA's request for a cumulative effects analysis. To more completely take into account cumulative effects on a holistic watershed basis, we need to contemplate the long term potential for further urbanization throughout the entire Jock River watershed - especially when the development could take a relatively high density suburban/village form, as opposed to a low impact, low density rural residential form.</p> <p>If, in the future, there is likely to be any further expansion of Village and Urban Envelope limits beyond those set out in the current Official Plan and the present Official Plan Amendment proposal, it is incumbent upon us to consider the cumulative effect of all such future developments in the watershed as</p>			<p>is not required. The approach recommended by the RVCA was to use the Jock River Flood Plain Mapping Study model and input future development within the catchment area upstream of Eagleson Road.</p> <p>AECOM undertook the cumulative effects analysis based on the approach recommended by the RVCA. This analysis is contained in Appendix G of the revised report which concluded that there is no impact from anticipated future development in the watershed on Jock River flows.</p>	

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	<p>we formulate storm water management policy for this development. In other words, it is necessary to determine how much additional development following a similar policy could be accommodated in the Jock River watershed without generating higher peak spring discharges in the river, or changing the hydrologic regime so much so that the dominant flood event on the river switches from being a spring snowmelt event to a summer rainstorm event. This is a challenging concept to deal with in long range flood plain and watershed management, and it brings to the fore the need for us as a society or community to think seriously about long term limits to urban growth within watersheds. The alternative is to adopt storm water management policies which require the hydrologic response of each and every developing area to emulate as closely as possible that of the area in its pre-development or pre-settlement state. That calls for the control of peak flows for all storm and flood frequencies as well as much greater attention to the control of runoff volumes leaving the site.</p> <p>In the absence of a more comprehensive analysis of the cumulative effects on a watershed basis, RVCA will not support a swm plan that contemplates any increase in peak flows being directly discharged to the Jock River.</p>				
20.	<p>SWM practices at the Lot Level and in Conveyance Systems</p> <p>The MOE's SWMPDM recommends "an integrated treatment train approach to water management that is premised on providing control at the lot level and in conveyance (to the extent feasible) followed by end-of-pipe controls. This combination of controls is only means of meeting multiple criteria for water balance, water quality, erosion control and water quantity."</p>	RVCA	September 4, 2009 Letter –	<p>A new section on lot level control has been added to the report (Section 7.2.2).  Section 5.0 Water Budget has been revised and the methodology has been revised whereby the effects of development on existing infiltration rates, the pre and post development hydrologic models were converted to continuous simulations. The results are summarized in Section 5 with the output files contained in Appendix I of the revised report.</p>	<p>Please refer to Section 7.2.2 for evaluation of Lot Level Controls.</p> <p>Please refer to Section 5 and Appendix I for the revised water budget analysis conducted by JFSA.</p>



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	<p>The DSEL/AECOM/Kilgour report has its primary focus on end-of-pipe controls, and contains very little if any discussion of the feasibility of lot and conveyance systems.</p> <p>While there is a suggestion in the water balance section of the report (Section 4.4) that imported sand fill and reduced lots grading could be used to achieve higher infiltration rates on the developed site, the idea is not carried through to Section 6 (Proposed Storm Water Management System) or Section 7 (Post Development Conditions). Furthermore, it not clear whether the higher infiltration rate of 291 mm/year suggested in Table 5 (page 41) - which is more than twice the stated infiltration for pre-development sandy silt and silty sand areas - can be achieved without requiring infiltration devices at the lot level. It not clear from the report if the post-development hydrologic simulations have been based on the higher infiltration rates for sandy surficial soils, or a random clean fill with a relatively high clay content that would more likely be used for lot grading purposes unless otherwise specified.</p> <p>In general, RVCA finds the report deficient with respect to its consideration of alternative storm water management practices at the lot level and in the conveyance system. Greater effort should be made to at least examine the feasibility of their being used at this site.</p>				
21.	<p>5. Details</p> <p>Comments 1 through 4 above are the more substantive concerns that we have that should influence the overall direction to be taken with the</p>	RVCA	September 4, 2009 Letter –	<p>a. Parish Geomorphic provided the 100-year erosion limit for the Van Gaal Drain which is inside the meanderbelt width. This is discussed in Sections 3.3.</p> <p>b. Text has been revised in Section 3.2, Regulatory</p>	Comments have been addressed in revised Stormwater Management and Drainage Report.

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	<p>storm water management concept for the development proposal. The following comments are more in the nature of questions seeking clarification of detailed technical matters or wording in the report:</p> <p>a. 100 year erosion limits - on page 35 it says they were established but where are they actually stated in the report; we are unable to see where they are reported</p> <p>b. Revisions to RVCA regulations limits mapping page 26 says there is an annual review. This is misleading - RVCA's practice is to make revisions on an as required basis when new and/or more accurate, defensible information becomes available</p> <p>c. Page 29 More accurate wording for the first sentence under heading Jockvale Estate Storm Easement 1) would be reach was constructed for the purposes of providing an adequate outlet for runoff from the Jockvale Estates subdivision- a estate subdivision to the west.</p> <p>d. Page 29 The second sentence same heading says ditch has low (geomorphic) stability due to poor habitat features. Is it not more likely that poor instream habitat is a consequence of disturbed or poor geomorphic stability? Throughout section, wording a relationship between stream stability and the RSA T scores, but in the text at page 40 of Appendix D, RSAT scores are described as being indicators of stream health from more of an ecological point of view. Clarification is required.</p> <p>e. Page 36 - second bullet under Hydrology - change to read "the flood plain limit south of Ottawa Street has been changed as shown in the drawings contained in this report, on the assumption that the work contemplated in the RVCA letter of permission (of March 3, 2009) will be completed". The RVCA's regulatory limits and underlying flood hazard mapping</p>			<p>Floodplain.</p> <p>c. Text has been revised in Section 3.3., Geomorphology.</p> <p>d. The comment on "poor water quality" is related to the presence of tile drainage in Section 5 of the Moore Branch, a conclusion reached by a Fluvial Geomorphologist conducting a site inspection. Measurement of metals and nutrients in surface water at that location (see Kilgour report, page 51) indicated that the water is of relatively high quality. The sentence will be removed from revised SWM (DSEL) and Environment (Kilgour) reports. Please refer to Section 3.3.</p> <p>e. Suggested wording has been incorporated in Section 3.2.</p> <p>f. JFSA Floodplain Model now used so Time to peak/Time of Concentrations are consistent with this analysis.</p> <p>g. Stormwater management outlet boundary have been established in accordance with the most relevant floodplain mapping.</p>	

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	<p>will not be revised until such time as the finished grade plan has been submitted and confirmed as being in compliance with the letter of permission, and an alternative route for flows conveyed by the Jockvale Estates Storm Easement has been implemented.</p> <p>f. Page 38 - Time to Peak - Time of Concentration we were unable to find the detailed time of concentration calculations in Appendix D; on a related note, the report refers to the Chicago and SCS rainstorm distributions in its description of precipitation events that have been simulated, but does not explain the time step that has been used in the rainfall hyetograph or the computational time step within the modeling. Nor are the rainfall hyetographs explicitly shown in the SWMHYMO input data printout. This makes it difficult to properly review the hydrologic calculations.</p> <p>g. Page 62 the wording refers to the water surface profiles determined in the 2004 PSR Group study as being a boundary condition for the computation of hydraulic grade lines throughout the storm water system and back to the connections with individual residences. It needs to be recognized that the PSR Group report's findings with respect to water surface profiles on the Van Gaal Drain will be superceded by the findings of the more recent JF Sabourin Associates report, pending its being reviewed internally by RVCA personnel, exposed for review and comment by the community over the next few weeks, and formally adopted for use by the RVCA Board of Directors.</p>				
22.	The lands on which proposed Pond 1 is situated are within an area subject to regulation by the Conservation Authority under the "Development, Interference with Wetlands and Alterations to Shorelines Watercourses Regulation" (Ontario Regulation 174/06 under Section 28 the Conservation.	RVCA	September 4, 2009 Letter –	The revised SWM report has provided additional detail in order to demonstrate that the proposal would not have an adverse impact to existing floodplain volumes, pollution, and conservation of the land.	Comment addressed in the revised Stormwater Management and Drainage Report, Sections 9 and 10.

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	<p>The applicant will require the written approval of the Conservation Authority to any site preparation, regrading, filling, construction etc. Any applications which may ultimately be received in this regard would be assessed within the context of approved policies for administration of the regulation, including those for the protection of fish habitat. The stormwater management report and all other supporting documentation will have to clearly demonstrate that the proposal would not have an adverse impact with respect to flood control, erosion control, pollution and the conservation of land. As described in this letter, the Conservation Authority is not satisfied that these requirements have been addressed.</p>				
23.	<p>In conclusion, for the reasons outlined above, we are unable to support the findings and recommendations of the Storm Water Management report in its present form. The applicable PPS and OP policies require further explanation and clarification. Although there is reliance on both the PPS and the OP to support siting the stormwater pond in the floodplain, it is unclear as how the OP policies in particular have been interpreted as supporting this approach. Significant revision is needed to the fundamental receiving stream protection criteria as well as the criteria for siting proposed end-of-pipe facilities. The nearly exclusive reliance on end-of pipe facilities (with no apparent call for lot level or conveyance system measures) is not adequately explained or justified. Some important technical matters have not been sufficiently described or explained in the report.</p> <p>We recommend against the adoption of an official plan amendment or approval of a community design plan based on the report in its present form.</p> <p>Unfortunately we could not provide these comments</p>	RVCA	September 4, 2009 Letter –	<p>Comment noted and the revised Stormwater Management and Drainage Report will provide additional details and analysis addressing all comments which we hope will allow RVCA's endorsement of the revised preferred stormwater management and drainage scheme for the development lands.</p>	

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	to you earlier in the process. The completion of our review of the report was dependent on the outcome of updated flood plain study for the Van Gaal Drain, which has only recently been received.				
24.	<p>i) <u>PPS</u>: A SWM facility falls under the definition of both "infrastructure" and "site alteration" per the PPS. For instance, while a SWM facility represents required <i>infrastructure that forms the foundation for development</i>, it also involves <i>activities, such as grading, excavation and the placement of fill that would change the landform and natural vegetative characteristics of a site</i> (i.e., <i>site alteration</i> as per the PPS). So, while the PPS definition of development specifically excludes <i>activities that create or maintain infrastructure authorized under an environmental assessment process</i>, SWM facilities (perhaps somewhat uniquely) also meet the definition of <i>site alteration</i>. The fact that an EA process may be undertaken for a SWM facility is not sufficient to permit their location within a floodplain (compared to, for instance, watermain and sanitary sewer crossings of floodplains, bridges, etc.).</p> <p>The relevant PPS policies are:  3.1.2: <i>Development and site alteration shall not be permitted within....a floodway regardless of whether the area of inundation contains high points of land not subject to flooding.</i></p> <p>3.1.3 <i>Despite policy 3.1.2, development and site alteration may be permitted in certain areas identified in policy 3.1.2:</i></p> <p style="padding-left: 40px;"><i>in those exceptional situations where a Special Policy Area has been approved. The designation of a Special Policy Area, and any</i></p>	City – Infrastructure Planning	September 4, 2009	<p>Comments #1, #13, #14, 15, #16, #24, #25 pertain to the policy interpretation of situating a stormwater management facility in the floodplain.</p> <p>DSEL, RVCA and Mattamy based on legal counsel disagree that the PPS preclude SWM ponds in floodplain as they are site alterations. The definition for site alteration does not include the same exemption for infrastructure that is authorized under an EA process as does the PPS definition of development. Since the PPS specifically excludes infrastructure that has been subject to an EA process from the more general prohibition of development on hazard lands, it is implicit that the policy providing for the exemption would also apply to activities or works resulting in site alteration. As the construction of infrastructure involves site alteration, it would not be consistent to permit infrastructure authorized under an EA process but prohibit such infrastructure because it results in a site alteration.</p>	Please refer to Section 10 of the revised SWM Report

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	<p><i>change or modification to the site-specific policies or boundaries applying to a Special Policy Area, must be approved by the Ministers of Municipal Affairs and Housing and Natural Resources prior to the approval authority approving such changes or modifications; or</i></p> <p><i>where the development is limited to uses which by their nature must locate within the floodway, including flood and/or erosion control works or minor additions or passive non-structural uses which do not affect flood flows.</i></p> <p>As per 3.1.2, SWM ponds are precluded from floodplains (as site alterations) and the exceptions in 3.1.3 do not apply: this is not a Special Policy Area and SWM facilities by their nature are not required to be located within floodplains.</p>				
25	<p>ii) <u>OP Policy:</u>            Given the submission was deemed complete on May 25th/09 (notwithstanding the lack of floodplain mapping north of Perth Street), it is grandfathered to the existing OP (i.e., not OPA 76). Existing OP policy 10 under section 3.1 Generally Permitted Uses states:</p> <p><i>10. Other public utilities and municipal services and facilities are permitted in all land-use designations on Schedules A and B, except in Natural Environment Areas, Significant Wetlands South and East of the Canadian Shield, Sand and Gravel and Limestone Resource Areas, or in Flood Plains and Unstable Slopes shown on Schedule K...</i></p> <p>A stormwater management facility is a municipal service and so is not permitted to be located within</p>	City – Infrastructure Planning	September 4, 2009	<p>Comments #13, #14, 15, #16, #24, #25 pertain to the policy interpretation of situating a stormwater management facility in the floodplain.</p> <p>The revised SWM report in Section 10.1 addresses OP Policies 3.1.9 and 3.1.10. Again “Public Utility” is defined in the City OP Glossary as “a public body or private corporation providing infrastructure services to the public, such as hydro, natural gas, telephone, cable, and sewer and water”. Clearly, the permitted “public utility facilities” in Policy 9 would include a stormwater management pond given the definition of “public utility”. Accordingly, where such facilities are subject to the <i>Environmental Assessment Act</i> process, they are permitted in all land use designations.</p>	Please refer to Section 10 of the revised SWM Report

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	<p>the floodplain according to the governing OP policy. (Note: OPA 76 remains consistent with existing policy 10.)</p> <p>Section 4.7.3 Eosion and Prevention of Surface Water:  <i>4. No site alteration or development is permitted within the minimum setback, except as otherwise provided for in this section. Site alteration is defined as activities, such as fill, grading and excavation would change the landform and natural vegetative characteristics of a site. Development is defined as the creation of a new lot or the construction of buildings and structures requiring approval under the Planning Act or the issuance of a Building Permit under the Building Code Act. Exceptions to this policy are:</i></p> <p><i>a. Activities that create or maintain infrastructure within the requirements of the environmental assessment process or works subject to the Drainage Act;</i></p> <p><i>b. Alterations necessary for recreation, environmental restoration, or slope stability works that are approved by the City and the Conservation Authority.</i></p> <p>As noted above, SWM facilities fall under the definition of both "site alteration" and "infrastructure," hence, following an EA process does not make them permissible within the floodplain.</p>			<p>Policy 10 addresses "other public utilities and municipal services and facilities not subject to an <i>Environmental Assessment</i> process as outlined in Policy 9. Stormwater management facilities are subject to the MEA Class Environmental Assessment process.</p>	
26	<p>iii) <u>Stormwater Management Planning and Design Manual (MOE, March 2003):</u>            From p.4-5 (my emphasis):  <u><b>End-of-pipe SWMPs should normally be located outside of the floodplain (above the 100 year elevation). If the facility is multi-purpose in nature (e.g., providing quantity control in addition to quality and erosion control) it must be located above the highest design flood level. In some site-specific</b></u></p>	<p>City –            Infrastructure            Planning</p>	<p>September            4, 2009</p>	<p>Comments #13, #14, 15, #16, #24, #25 pertain to the policy interpretation of situating a stormwater management facility in the floodplain.</p> <p>As stated in the comment, the MOE Stormwater Management and Design Manual goes on to state that SWMPs may be allowed in the floodplain if there is "sufficient technical or economic justification and if they meet certain requirements"</p>	<p>Comment addressed in revised SWM report – Section 9 and 10.</p>

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	<p><i>instances, SWMPs may be allowed in the floodplain if there is sufficient technical or economic justification and if they meet certain requirements:</i></p> <ul style="list-style-type: none"> <li>○ <i>The cumulative effects resulting from changes in floodplain storage and balancing cut and fill do not adversely impact existing or future development;</i></li> <li>○ <i>Effects on corridor requirements and functional valleyland values must be assessed. SWMPs would not be allowed in the floodplain if detrimental impacts could occur to the valleyland values or corridor processes;</i></li> <li>○ <i>The SWMPs must not affect the fluvial processes in the floodplain; and</i></li> <li>○ <i>The outlet invert elevation of the SWMP should be higher than the 2 year floodline and the overflow elevation must be above the 25 year floodline.</i></li> </ul> <p>The DSEL report references the above excerpt. However, the MOE manual recognizes that SWM ponds are normally intended to be located outside floodplains and no compelling arguments are presented to justify an exception - particularly when such an approach is inconsistent with both the PPS and the OP as noted above.</p> <p>There has been insufficient detail provided to review the proposed pond grading, outlet elevations, etc. However, it appears that filling may be required to</p>			<p>with respect to floodplain storage, valley land values/functions, fluvial processes and outlet invert elevations relative to certain return frequencies. The technical environmental, social and economic justification in Section 10 of the revised report has been expanded and further details have been provided to address the comments such that:</p> <ul style="list-style-type: none"> <li>• Engineering criteria demonstrated based on new flows</li> <li>• Additional floodplain storage provided to the system</li> <li>• Ability to design a Hybrid Wetland/Wet Pond</li> <li>• Pike Spawning Habitat Creation/Enhancement</li> <li>• Net Gain in Fish Habitat</li> <li>• Community Amenity Space connecting Martin Street Pedestrian Crossing with pond pathway system</li> <li>• Landscaping Enhancement Plan along Arbuckle Drain to improve riparian/aquatic habitat</li> </ul> <p>Additional details regarding the pond configuration and outfall invert has been provided in the report to demonstrate the performance of the stormwater management facility during a 100-year spring melt event and its effect on floodplain storage.</p>	



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	<p>achieve the proposed storage volumes: the top of the active level storage is noted as 94.10m (see Drawings 5, 6, 7) which is equivalent to the 100 yr flood elevation. However, the footprint of the proposed facility within the floodplain shows existing grades as low as 93.4m. As currently proposed, this would require a considerable amount of filling within the regulatory floodplain - which is not acceptable as it represents a loss of flood storage - most particularly given flood susceptible existing development downstream. There has also been no effort to indicate whether the outfall invert elevation is located above the 2 year flood elevation.</p>				
27.	<p>iv) <u>Policy 2 designation for Jock River:</u>            Finally, MOE has advised that the Jock River is a "Policy 2" receiver for phosphorous, i.e., " water quality that does not presently meet the Provincial Water Quality Objectives shall not be degraded further and all practical measures shall be taken to upgrade the water quality to the objectives." In this instance, locating a SWM facility in the floodplain would be expected to increase the potential for the resuspension of sediments to occur.</p>	<p>City –            Infrastructure            Planning</p>	<p>September            4, 2009</p>	<p>The FINAL JFSA report on Floodline Mapping of the Van Gaal Drain now suggests that the Regulatory flood level between Perth Street and Fortune Street is the 1:100 Year Jock River flood level at the VGD confluence. This implies that the 1:100 Year summer flood level on the VGD, in this reach, is less than the Regulatory Flood Level. With that in mind, the proposal is to develop a SWM Pond between the Regulatory flood level and the 1:100 Year VGD flood level. We have assumed that a SWM Pond in this location would not be subject to typical concerns regarding ponds in floodplains, such as re-suspension, since this pond would be flooded only by backwater from the Jock River.</p>	<p>Comment is addressed in the revised Stormwater Management and Drainage Report in Section 9 and 10.</p>
28.	<p>23: Section 3.2 Regulatory Floodplain will require updating as per the new floodplain mapping north of Perth St.</p>	<p>City –            Infrastructure            Planning</p>	<p>January 29,            2010</p>	<p>Section 3.2 has been revised to reflect the January 28, 2010 RVCA Board approval of the Staff Report and JFSA November 2009 Floodplain Mapping and Model</p> <p><i>The report entitled "Floodplain Mapping Report for the Van Gaal and Arbuckle Municipal Drain in the Village of Richmond (November 2009)" was prepared by J.F. Sabourin &amp; Associated. This report was supported by RVCA staff and was brought</i></p>	<p>Section 3.2 has been updated to reflect RVCA Board approval of new floodplain mapping and process for the Van Gaal Drain.</p>

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				<p><i>forward for approval to the January 28, 2010 RVCA Executive Board Meeting. At this meeting, the Board approved the report and mapping as the regulatory floodplain mapping. The Board also approved the RVCA staff recommendation to allow for channel modifications to be undertaken north of Perth Street that would allow for an amendment to the regulatory floodplain limit. The approach and process are documented in the January 14, 2010 minutes of meeting which are contained in Appendix C. In summary, additional channel modifications will be completed north of Perth Street to increase the channel's conveyance capacity that met the 1:100 year water surface profile in J.F. Sabourin &amp; Associates Floodplain Mapping Report for the Van Gaal and Arbuckle Municipal Drains Report (November 2009). On approval and completion of the channel modifications and grade raises, RVCA will amend its flood hazard and regulation limits mapping based on the completed works. The 2009 Floodplain Mapping for the Van Gaal and Arbuckle Drain is contained in Appendix C.</i></p>	
29.	<p>p. 26: Regarding the drainage easement for Jockvale Estates Drain, RVCA's permit requires that: <i>"The overall function of the drainage ditch/easement will be reviewed as part of an overall Master Drainage Plan (completed by others) to be undertaken as a component of the Community Design Plan process for expansion of the existing community through the Municipal Planning process."</i></p> <p>This requirement has not been addressed, for example, the drainage easement is not labeled as such on any plan, although Dwg 7 appears to indicate that this drainage is to be picked up by storm sewers? Is</p>	City – Infrastructure Planning	January 29, 2010	The drainage easement has been labeled on applicable drawings. It is shown on Drawing 1 as a site constraint. For Option 3, the easement will be filled in within the development area and remain open within the floodplain. The drainage from Jock River Estates will be directed to Section 8 of the Moore Tributary through a new culvert under Ottawa Street and be conveyed to the Arbuckle Drain via the redesign Moore Tributary.	Revised SWM Report clearly articulates the post development scenario for drainage associated with Jock River Estates.

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	this the case? If this flow is being diverted to storm sewers (away from the drain), are there any fisheries concerns? Please address this matter in the next submission.				
30.	Please provide a complete reference to the geotechnical report (author, title, date, etc.).	City – Infrastructure Planning	January 29, 2010	All reports that are relied upon are cited in a reference list in Section 2.2 (Page 18) that includes title, author, date, etc. Each reference is then given a “title” to use in subsequent sections.	No Action Required
31.	Given anticipated fill depths, it is unlikely that existing hedgerows can be maintained.	City – Infrastructure Planning	January 29, 2010	The revised SWM report is recommending Option 3C which anticipates maximum grade raises of 1.2m. Grades will be tapered down to match existing in areas where hedgerows are to be retained.	Please refer to Section 8.0 – Preliminary Grade Control Plan
32.	Existing condition modeling should be consistent with final approved modeling for floodplain mappning completed by JFSA (November 2009). Section 4.0 should be revised accordingly. The spring and summer design events used (for SWM design) should be consistent with the JFSA report as well.	City – Infrastructure Planning	January 29, 2010	Agree – the existing condition model (Section 4.0) has utilized the 2010 Van Gaal Floodplain model.	Please refer to Section 4 where the JFSA Floodplain Model is utilized for existing conditions model.
33.	p.40 - The statement that external areas can be conveyed via various pipe sizes is dependent on pipe gradient (given the flatness of the site, it is available gradient to the outlet that will ultimately govern either pipe size or channel width/depth) - please confirm feasibility.	City – Infrastructure Planning	January 29, 2010	SWM Options 1 and 2 propose to convey external drainage through storm sewers. Detailed analysis was not conducted as these options were not carried forwarded.	No Action Required
34.	p. 41 - Water Budget: Explicit targets to be met in the post-development condition need to be confirmed, including confirmation as to what measures are required to achieve the targets (i.e., confirmation of soil types, infiltration rates and measures are to be confirmed conceptually at this stage).	City – Infrastructure Planning	January 29, 2010	Water budget has been revised and is contained in Section 5.0. With roof leaders disconnected from the weeping tile, pre-development infiltration rates are close to post development conditions.	Please refer to Section 5.0 – Water Budget
35.	p. 43 - Provide the reference for the statement that SWM facilities in the Ottawa area have a phophorous removal efficiency of 70%.	City – Infrastructure Planning	January 29, 2010	The phosphorus removal efficiency of storm water management facilities in Ottawa has been found to be approximately 70% as stated in the <i>Jock River Reach One Subwatershed Study – Appendix H –</i>	Please refer to Section 6 and Appendix F which have been updated to list reference

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				<p><i>Phosphorus Loading Analysis</i> (Stantec 2007) prepared for the City of Ottawa. Section 6 and Appendix F have been updated to provide the reference.</p>	
36.	<p>p.46 - A (continuous) erosion analysis is required to assess the impact of increased runoff volumes and flow duration in the the post-development condition. This should be integrated with the proposed measures to meet water balance targets (i.e., reducing runoff volumes from frequent events will assist in meeting erosion targets). Please confirm approach with City staff prior to proceeding with the analysis.</p>	City – Infrastructure Planning	January 29, 2010	JFSA has undertaken a continuous erosion analysis which is contained in 9.5.5 of the revised report	Please refer to Section 9.5.5 and Appendix I of the revised SWM report
37.	<p><u>10. SWM Option 3:</u>            i) The drainage area to Pond 3 is too small to warrant a pond. An alternate solution should be provided.            ii) Beyond various policy restrictions, based upon the limited information provided in the report, it does not appear feasible to achieve the required SWM storage without completely berming off the floodplain area and eliminating the floodplain storage behind the pond berm (and replacing it with SWM storage). For example, drawing 8 indicates the maximum water level of 93.90m which is roughly equivalent to the existing grade (although there are locations with grades as low as 93.4 to 93.7m). A minimum of 0.3m of freeboard above the maximum (100 year) operating level is required which cannot be achieved without filling in the floodplain unless the maximum operating level is lowered accordingly. Also, the pond outlet (and permanent water level) should be at or above the 2 yr flood level (this has not been identified in the report?). This represents a very narrow range to provide the required 100 year storage which may also significantly constrain the storm servicing.             iii) Two outlet channels are noted for Pond 1 but no</p>	City – Infrastructure Planning	January 29, 2010	<ul style="list-style-type: none"> <li>i. Pond 3 has been changed to a dry pond for quantity control and a hydrodynamic separator to provide quality control</li> <li>ii. Please refer to Sections 9 and 10 and Appendix I regarding floodplain storage</li> <li>iii. Further details on the outlets from Pond 1 are provided in Section 7.2.3 and Appendix I of the revised report</li> <li>iv. Thermal measures are discussed in Section 9.5, SWMP Operating Characteristics</li> <li>v. This is confirm in Section 10.2</li> </ul>	Comments addressed in revised SWM report

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	<p>details confirming feasibility - are these to drain directly to the Van Gaal/Arbuckle drain or to some storm sewer that is not shown? The area is very flat and it is not clear how outflows are to be controlled given the very low heads that may have to operate. A conceptual design of the outlet and channels should be provided to confirm feasibility. What is intended by: <i>"The channel will provide both surface and subsurface conveyance."</i>? Conceptual details (grading/channel capacity and/or pipe capacity and alignment/profile) are required to demonstrate feasibility of the outlets to ensure sufficient footprint is provided.</p> <p>iv) Additional detail is required regarding measures to mitigate temperature impacts.  v) The outlets for the SWM facilities are to be above the 2 yr flood elevation - please confirm.</p>				
38.	<p>p. 63 - 7.2 Conveyance of Major System Flows: Regardless of whether or not sump pumps are implemented, a major system analysis must be undertaken to confirm there is sufficient capacity within the rights-of-way to safely convey major system flows to outlet(s) and/or identify additional major system storage requirements. It is also not acceptable to suggest that if the major system flow exceeds the conveyance capacity of the right-of-way then the storm sewers will be upsized.</p>	City – Infrastructure Planning	January 29, 2010	Major Systems Flow is discussed in Section 9.3, Drawing 1 and Appendix I	Please refer to Section 9.3, Drawing 1 and Appendix I of the revised SWM report
39.	<p>Conceptual details (cross-sections, gradient, capacity calculations, etc.) should be provided for the proposed major system conveyance channel to ensure sufficient land has been set aside to convey the 100 year external flow. The worst case section must be</p>	City – Infrastructure Planning	January 29, 2010	Additional SWMP details to be provided.	Pond function is described in Section 9.0 and Cross-section have been provided.

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	confirmed from the western property limit to the Queen Charlotte Road allowance - are flows being concentrated or changed in any way that will affect existing properties?				
40.	p.64 - Why is the same per hectare volume applied to both Ponds 1 and 2 - when Pond 1 is indicated as a hybrid pond and Pond 2 is indicated as wet pond? Also clarify volume requirements for wet volume and extended detention volume.	City – Infrastructure Planning	January 29, 2010	Please refer to Section 9.5 SWMP Operating Characteristics for revised information	Please refer to Section 9.5 of the revised SWM report
41.	p.64 - There is no reference on p. 3-11 of the MOE manual that that the 2 year event is adopted as the design event for for active storage volume? Please clarify. Also, it is not clear how the culverts on the Van Gaal drain relate to discharge criteria? Post to pre controls are required.	City – Infrastructure Planning	January 29, 2010	DSEL to clarify reference location.	Revised reference to page 3-15, updated in Section 9.5.3.
42.	p.65 - For outflow directed to the Jock the release rate in the text is based on a pipe grade of 0.15%, while dwg. 9 indicates a grade of 0.10% - revise/confirm as required.	City – Infrastructure Planning	January 29, 2010	DSEL to clarify.	Revised to 0.10% in sewer modeling.
43.	Table 12 -Pre-development targets must be confirmed/consistent with the approved hydrology completed for the floodplain mapping.	City – Infrastructure Planning	January 29, 2010	Predevelopment targets have been developed applying the JFSA 2009 Floodplain mapping	Please refer to Section 7.1 of the revised report
44.	The pond footprints need to allow for all maintenance and operation requirements (e.g., sediment drying area, access roads, etc.). City Operations staff should be consulted on these matters.	City – Infrastructure Planning	January 29, 2010	O&M design requirements will be undertaken at the FSR stage.	O&M design requirements will be undertaken at the FSR stage
45.	If Pond 1 is to be a hybrid wetland/wet pond then conceptual grading must demonstrate the 40 to 50% of the permanent pool volume is provided by depths of 0.15 to 0.3m (max.). Otherwise, the permanent pool volume should be based upon the wet pond requirement.	City – Infrastructure Planning	January 29, 2010	Please refer to Section 9.5 SWMP Operating Characteristics for revised information	Please refer to Section 9.5 of the revised SWM report
46.	Are there any areas that can be serviced with conventional storm sewers without excessive filling - for example, in the southern portion of the site? Any such areas must be identified.	City – Infrastructure Planning	January 29, 2010	Mattamy / DSEL to confirm.	Based on standard unit types entire site area will be serviced with sump pumps.

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47.	As previously requested, a preliminary storm servicing plan including preliminary profiles must be provided to demonstrate feasibility, identify and address potential conflicts with existing and future servicing, submergence issues (that could further increase required fill levels), etc.	City – Infrastructure Planning	January 29, 2010	A preliminary storm servicing plan including preliminary profiles has been undertaken and is included in the revised report.	Please refer to Detailed Drawings for plan and profiles illustrating storm and sanitary sewers.
48.	A master/conceptual grading plan is required that clearly identifies existing and proposed grades, including at the limits of the site to ensure appropriate grading/transition adjacent to existing development/roads if/as required.	City – Infrastructure Planning	January 29, 2010	A master grading plan has been prepared. Please refer to Drawing 1 in the revised report.	Please refer to Drawing 1 in the revised report.
49.	<p><u>Drawings:</u>  Dwg 7: Label external drainage areas to be conveyed through site (hectares). How are major system flows to be conveyed across Perth St.? How are major system flows (that need to be controlled to pre-development levels) to be conveyed across the open channel to Pond 1? and across Ottawa St. to Pond 2?</p> <p>Dwg 8: What is the source of the normal water level in the Van Gaal drain (93.0m)? Please confirm.  Dwg 9: Are there any conflicts with existing sanitary laterals? If yes, how is this to be addressed?  Grading plans should indicate both existing and proposed grades and provide existing contours.</p>	City – Infrastructure Planning	January 29, 2010	<p>Drawing 7 – Relevant drawing have labeled the external drainage areas. The major flows across Perth Street will be conveyed through trunk storm sewers.</p> <p>Drawing 8 – Water elevations has been updated per AECOM Fortune Street Culvert Analysis.</p> <p>Drawing 9 – No service lateral conflicts exist based on available information. Detailed Drawing 1 contains existing and proposed grades.</p>	Report and Drawings updated accordingly.
50.	<p><u>23. Appendix H: Fish Habitat Risk Assessment:</u>  It is not clear how the outlet channels from Pond 1 will be "strategically placed to minimize heating and encourage cooling." Conceptual details are required, likewise for the proposed cooling trench (which is not mentioned in the main report?). Are the pond outlet channels intended to serve as mitigation and/or compensation for loss of fish habitat? The outlet channels' main function is to drain the facility and they</p>	City – Infrastructure Planning	January 29, 2010	<p>The Fish Risk Assessment report in Appendix H has been updated and provides details on the outlet channels, French drain, and riparian plantings. The outlet channels have created and enhanced fish habitat although not needed for compensation. The preliminary outlet design is similar to the Todd Channel.</p> <p>The revised SWM report discusses the French drain</p>	Please refer to Appendix H and Section 9.5 of the revised swm report

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	would be subject to regular maintenance so it may not be desirable to identify these as fish habitat - if that is the intent (to be confirmed with City operations staff). Please clarify.			in Section 9.5.	