



Office of the Auditor General / Bureau du vérificateur général

FOLLOW-UP TO THE 2007 AUDIT OF THE CARP RIVER

WATERSHED STUDY AND RELATED PROJECTS

2010

SUIVI DE LA VÉRIFICATION DE L'ÉTUDE

SUR LE BASSIN HYDROGRAPHIQUE DE LA RIVIÈRE CARP

ET DES PROJETS CONNEXES DE 2007

Table of Contents

EXECUTIVE SUMMARY	i
RÉSUMÉ.....	iii
1 INTRODUCTION	1
2 KEY FINDINGS OF THE ORIGINAL 2007 AUDIT OF THE CARP RIVER WATERSHED AND RELATED STUDIES.....	1
3 STATUS OF IMPLEMENTATION OF 2007 AUDIT RECOMMENDATIONS	5
4 SUMMARY OF THE LEVEL OF COMPLETION	21
5 CONCLUSION.....	22
6 ACKNOWLEDGEMENT.....	22

EXECUTIVE SUMMARY

Introduction

The Follow-up to the 2007 Audit of the Carp River Watershed and Related Studies was included in the Auditor General's Audit Plan.

The key findings of the original 2007 audit included:

- Parts of the study and related projects were incomplete or erroneous.
- A possible conflict of interest may exist even if the requirement of the code of ethics of the Professional Engineers of Ontario was met. The Auditor General had concerns that an engineering firm worked concurrently for both the project developer's landowners group and the City. The implications of this were exacerbated by the fact that the City of Ottawa formed part of the developer's landowners group while at the same time reviewing and approving the studies and reports.
- Studies and reports completed as part of the Kanata West development did not satisfy some provincial and City policies.
- Technical design components of the studies and reports were based on erroneous drainage areas and did not properly calculate the volumes of runoff. For instance, peak water levels in some parts of the Carp River could be more than a metre higher than indicated in the design modelling.
- The City should require developers to correct, at no cost to the taxpayers, the design errors prior to proceeding further with the development.
- The City should ensure such potential conflicts do not occur in the future as they put the professional engineering firm in the position of having two masters.
- Based on legal advice, the results of audit work concerning the Glen Cairn development were not included in the report.

Summary of the Level of Completion

1. The table below outlines our assessment of the level of completion of each recommendation as of Fall 2009 and Fall 2010.

CATEGORY	% COMPLETE	RECOMMENDATIONS	NUMBER OF RECOMMENDATIONS	PERCENTAGE OF TOTAL RECOMMENDATIONS
LITTLE OR NO ACTION	0 – 24	-	-	-
ACTION INITIATED	25 – 49	-	-	-
PARTIALLY COMPLETE	50 – 74	-	-	-
SUBSTANTIALLY COMPLETE	75 – 99	2, 6, 8	3	23%
COMPLETE	100	1, 3, 4, 5, 7, 9,10, 11, 12, 13	10	77%
TOTAL			13	100%

2. The table below outlines management’s assessment of the level of completion of each recommendation as of Fall 2010 in response to the OAG’s assessment. These assessments have not been audited.

CATEGORY	% COMPLETE	RECOMMENDATIONS	NUMBER OF RECOMMENDATIONS	PERCENTAGE OF TOTAL RECOMMENDATIONS
LITTLE OR NO ACTION	0 – 24	-	-	-
ACTION INITIATED	25 – 49	-	-	-
PARTIALLY COMPLETE	50 – 74	-	-	-
SUBSTANTIALLY COMPLETE	75 – 99	2	1	8%
COMPLETE	100	1, 3, 4, 5, 6, 7, 8, 9,10, 11, 12, 13	12	92%
TOTAL			13	100%

Conclusion

For the recommendations where management agreed or agreed in principle, management has been dutiful in implementing them, as evidenced by the large number of completed recommendations in the Summary of the Level of Completion.

There were three recommendations where management originally indicated disagreement in the management responses. The update/status comment indicates that some action has been taken, which we consider a positive response to the findings of the audit.

Acknowledgement

We wish to express our appreciation for the cooperation and assistance afforded the audit team by management.

RÉSUMÉ

Introduction

Le Suivi de la vérification de l'étude sur le bassin hydrographique de la rivière Carp et des projets connexes de 2007 était prévu dans le Plan de vérification du vérificateur général.

Les principales constatations de la vérification de 2007 sont les suivantes :

- Des parties de l'étude et des projets connexes sont incomplètes ou erronées.
- Il existe un conflit d'intérêts potentiel bien que la relation en cause soit conforme aux exigences du Code de déontologie de l'Ordre des ingénieurs de l'Ontario. Le vérificateur général s'inquiète également du fait qu'un bureau d'ingénieurs a travaillé au projet à la fois pour le compte du groupe de propriétaires fonciers en cause et pour la Ville. Les implications de cette situation sont exacerbées par le fait que la Ville d'Ottawa participait au groupe de propriétaires fonciers promoteur alors qu'elle avait au même moment l'obligation d'examiner et d'approuver les études et les rapports.
- Les études et les rapports produits dans le cadre du projet d'aménagement de Kanata-Ouest ne satisfont pas à certaines politiques provinciales et municipales.
- Les composantes de conception technique des études et des rapports se fondaient sur les mauvaises zones de drainage et présentaient des calculs inadéquats du volume d'eau de ruissellement, ce qui signifie, par exemple, que les niveaux d'eau de pointe pourraient, à certains endroits de la rivière Carp, dépasser de plus d'un mètre le niveau prévu dans la modélisation de l'aménagement.
- La Ville devrait exiger que les promoteurs corrigent les erreurs de conception avant de poursuivre l'aménagement, et ce, sans qu'il en coûte quoi que ce soit aux contribuables.
- La Ville devrait veiller à ce qu'un tel risque de conflit d'intérêts ne se reproduise pas, de manière à éviter que le bureau d'ingénieurs serve deux maîtres à la fois.
- Tel qu'il a été recommandé à la Ville dans un avis juridique, les résultats des travaux de vérification concernant Glen Cairn ont été exclus du rapport.

Sommaire du degré d'achèvement

1. Le tableau ci-dessous présente notre évaluation du degré d'achèvement de chaque recommandation à l'automne 2009 et à l'automne 2010 :

CATÉGORIE	POURCENTAGE COMPLÉTÉ	RECOMMANDATIONS	NOMBRE DE RECOMMANDATIONS	POURCENTAGE DU TOTAL DES RECOMMANDATIONS
PEU OU PAS DE MESURES PRISES	0 – 24	-	-	-
ACTION AMORCÉE	25 – 49	-	-	-
COMPLÉTÉE EN PARTIE	50 – 74	-	-	-
PRATIQUEMENT COMPLÉTÉE	75 – 99	2, 6, 8	3	23 %
COMPLÉTÉE	100	1, 3, 4, 5, 7, 9, 10, 11, 12, 13	10	77 %
TOTAL			13	100 %

2. Le tableau ci-dessous présente l'évaluation de la direction concernant le degré de réalisation de chaque recommandation à l'automne 2010 en réponse à l'évaluation du Bureau du vérificateur général. Ces évaluations n'ont pas fait l'objet d'une vérification.

CATÉGORIE	POURCENTAGE COMPLÉTÉ	RECOMMANDATIONS	NOMBRE DE RECOMMANDATIONS	POURCENTAGE DU TOTAL DES RECOMMANDATIONS
PEU OU PAS DE MESURES PRISES	0 – 24	-	-	-
ACTION AMORCÉE	25 – 49	-	-	-
COMPLÉTÉE EN PARTIE	50 – 74	-	-	-
PRATIQUEMENT COMPLÉTÉE	75 – 99	2	1	8 %
COMPLÉTÉE	100	1, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13	12	92 %
TOTAL			13	100 %

Conclusion

En ce qui a trait aux recommandations avec lesquelles la direction était d'accord ou était d'accord sur le principe, celle-ci a diligemment veillé à leur mise en œuvre, comme le témoigne le grand nombre de recommandations déjà implantées, inscrites dans le Sommaire du degré d'achèvement.

Cependant, il y a trois recommandations sur lesquelles la direction avait à l'origine exprimé son désaccord dans les réponses de la direction. Selon le commentaire de mise à jour/sur l'état de la situation, une certaine mesure a été prise, ce que nous considérons une réponse positive aux constatations de la vérification.

Remerciements

Nous tenons à remercier la direction pour la coopération et l'assistance accordées à l'équipe de vérification.

1 INTRODUCTION

The Follow-up to the 2007 Audit of the Carp River Watershed and Related Studies was included in the Auditor General's Audit Plan.

The key findings of the original 2007 audit included:

- Parts of the study and related projects were incomplete or erroneous.
- A possible conflict of interest may exist even if the requirement of the code of ethics of the Professional Engineers of Ontario was met. The Auditor General had concerns that an engineering firm worked concurrently for both the project developer's landowners group and the City. The implications of this were exacerbated by the fact that the City of Ottawa formed part of the developer's landowners group while at the same time reviewing and approving the studies and reports.
- Studies and reports completed as part of the Kanata West development did not satisfy some provincial and City policies.
- Technical design components of the studies and reports were based on erroneous drainage areas and did not properly calculate the volumes of runoff. For instance, peak water levels in some parts of the Carp River could be more than a metre higher than indicated in the design modelling.
- The City should require developers to correct, at no cost to the taxpayers, the design errors prior to proceeding further with the development; The City should ensure such potential conflicts do not occur in the future as they put the professional engineering firm in the position of having two masters.
- Based on legal advice, the results of audit work concerning the Glen Cairn development were not included in the report.

2 KEY FINDINGS OF THE ORIGINAL 2007 AUDIT OF THE CARP RIVER WATERSHED AND RELATED STUDIES

Based on the reviews undertaken to date, it is concluded that:

1. The Mississippi Valley Conservation Authority (MVCA) representative was the first one to suggest as a viable option for consideration by the City that the Two-Zone Concept could be applied to the Study Area.
2. The City and the MVCA applied the Two-Zone Concept to an area that is undeveloped, which is not normally accepted by other conservation authorities in Ontario, including the Rideau Valley Conservation Authority.

3. It is noted that the Provincial Policy Statement does not contain a specific limitation to the application of the Two-Zone Concept to undeveloped areas. However, the practice by other municipalities and conservation authorities is to discourage such applications. Examination of the Provincial Policy together with the Technical Guides reveals that the intent of the Provincial Policy Statement was not followed in the case of the Carp River.
4. The application of the Two-Zone Concept followed Provincial Policy in principle, but did not take into account the Technical Guides.
5. The Provincial Policy Statement requires that all the hazards be evaluated to determine if the Two-Zone Concept can be applied to a stream reach. The hazards include hydrologic and hydraulic, as well as erosion and geotechnical aspects, such as deep peats and sensitive clays, organic soils, and unstable bedrock such as karst formation areas. The considerations taken into account during the application of the Two-Zone Concept were restricted to the hydrologic and hydraulics aspects, but did not take into account the suitability of the concept to an area of deep peats and sensitive clays.
6. The consideration of the Two-Zone Concept did not take into account the “design with nature” policies of the Official Plan. In our opinion, the application of the Two-Zone Concept in this case seems to have been carried out in isolation, without explicitly taking into account the requirements of the Official Plan with respect to the “design with nature” policies. For example, the decision to apply the Two-Zone Concept took into consideration only hydrologic and hydraulic effects, leaving out other risks such as sensitive clays and organic soils; another example is that the potential effects of the Carp River restoration on sedimentation in downstream reaches has not been addressed.
7. The Servicing Report indicates that to service the low-lying areas along the Carp River it will be necessary to use special housing built forms and/or conventional building design with sump pumps. In addition, the Servicing Report indicates that the submerged inlet condition of the future stormwater management ponds will cause sedimentation with the storm sewers, which could result in a lowering of the level of service from the 100-year storm to the 25-year storm. On this basis, it was found that the application of the Two-Zone Concept results in sub-standard servicing for parts of the developments, as a result of potential sewer backups and basement floor heaving.
8. For the hydrologic and hydraulic analysis of the potential impacts of the application of the Two-Zone Concept, neither the MVCA nor the City provided a clear target maximum increase in water levels and flows.
9. The hydrologic and hydraulic analyses were completed on the basis of the wrong drainage area.

10. The impact of the error in drainage area on the calculated water levels in the Poole Creek is high (about 20 cm) and in the Carp River is low (about 3 cm).
11. The largest effect is on the floodlines of the Poole Creek, where the peak discharge for the 100-year flood is 16% lower than calculated and the water levels differences of 7 cm to more than 20 cm were noted. In the Carp River itself, the effect of the change in flows in the Poole Creek (reduced by approximately 16% at the outlet to the Carp River) are minor for existing conditions, ranging from 0 cm to 3 cm.
12. The effect of the error in the drainage area is compounded by failure to recognize that the hydrologic models underestimated the volumes of runoff produced by the watershed.
13. The hydrologic model underestimates significantly the volume of runoff produced by the watershed. The calibration efforts did not address this discrepancy. The effect of the lack of calibration of the runoff volume is to underestimate the water levels in the Carp River by more than 1.0 m in some locations of the study reach.
14. The hydraulic routing model of the Carp River was calibrated on the basis of hydrographs with too low runoff volumes. Consequently, the calibration must be corrected.
15. The proposed restoration of the Carp River through the Kanata West lands could result in additional sedimentation in downstream reaches. The impact of the additional sediment loads should be quantified. Nevertheless, the low sediment transport capacity of the overall Carp River to its mouth should be carefully considered before improvements are carried out in an upstream reach.
16. Although the City staff on the project tried to review the information produced on behalf of the Kanata West Owners Group (KWOG) as at arm's length as possible, it is evident in the correspondence and reports that the fact that the City was a co-proponent in the Class EA projects and was a member of the KWOG affected the reviews by the City staff. Examples of correspondence and reports that lead us to our conclusions that staff's review was affected by ownership are listed in the detailed report.
17. The Carp River Watershed/Subwatershed Study report lacks some information that would normally be required, for example, a table summarizing the drainage areas and flows at different parts of the watershed; the conclusion that the Two-Zone Concept can be applied to the Carp River is not fully explained.
18. The "Flow Characterization and Flood Level Analysis" report addresses the area to Richardson Road only, leaving out the remainder of the watershed. Although a basic problem, the report was completed without correcting this.

19. Regarding the same report, it was accepted although not all the comments by the City were fully addressed in the report.
20. The “Post-Development Flow Characterization and Flood Level Analysis” report does not fully address all the comments provided by the City, but it was accepted.
21. It is understood that the City participated in the KWOG as a non-voting member, and as mentioned above, the staff tried to review the information produced by the KWOG at arm’s length. However, there might be a conflict of interest on the part of the City by participating on the KWOG and being the approval entity on the same projects.
22. In general terms, the Class EA projects were completed in accordance with the Municipal Class Environmental Assessment.
23. Development in the flood fringe as proposed in the Servicing Report could lead to unanticipated liability to the City, as there are difficulties in meeting the City standards.
24. A consultant worked concurrently for the City of Ottawa in preparing the Carp River Watershed and Subwatershed Plan and for the developers as part of the Kanata West Concept Plan (KWCP). This may place the consultant in possible conflict of interest. This is a case in which disclosure of potential conflict of interest may not be sufficient. The interests of the City and the KWCP proponents should be separate. Notwithstanding that the City was aware that the consultant was working for both, the potential for conflict of interest remains. It is also noted that the City may not have agreed to the consultant being part of both teams if the City was not part of the KWOG. Both the City and the KWCP proponents, as well as other parties, were fully aware of this fact and both agreed that the arrangement addressed the Professional Engineers of Ontario (PEO) Code of Ethics.
25. The Class EA processes were conducted in accordance with the appropriate Class EA Schedule, except for the Carp River et al. restoration project which, given the potential environmental effects, should have been conducted as a Schedule C project.

3 STATUS OF IMPLEMENTATION OF 2007 AUDIT RECOMMENDATIONS

2007 Recommendation 1

That the City develop a policy to preserve flood plains as a flood damage reduction measure.

2007 Management Response

Management agrees with this recommendation in principle.

Management would like to address the fact that there are examples in other Conservation Authority watersheds, of implementing a concept where the regulatory flood plain is redefined and riparian storage is maintained in a developing area (i.e., Toronto and Region Conservation Authority- TRCA). The TRCA Valley and Stream Corridor Management Program (October 1994) has policies for “unusually wide flood plain with shallow depths of infrequent flooding”. In section 3.2.2 (2) on page 21 of the policy, it states that alterations to stream corridor boundaries within shallow flood plains may be permitted. The TRCA Valley and Stream Corridor Management Program also notes on page 22 that:

“Within passive or inactive storage areas, re-grading may be permitted that retains existing stage/storage characteristics provided it does not conflict with the policies outlined above.”

Therefore, the TRCA allows redefinition of the regulatory flood plain line to allow new development if flood plain storage is maintained. This is the same concept that is being applied, in the case of the reach of the Carp River, in the Kanata West area. Therefore, if the Carp River was within the TRCA’s watershed, their present policies would allow the development into the flood plain without identifying the area as a Two Zone.

There are also examples of the Ontario Municipal Board (OMB) decisions implementing the Two Zone concept in new development areas (i.e., Amberlakes in Stittsville). Furthermore, the Ministry of Natural Resources (MNR) technical guidelines do not specify or restrict which type of lands the Two Zone concept can be applied to or whether it applies to existing or proposed development.

Notwithstanding the above, a draft Official Plan Amendment (OPA) for new Flood Plain Management policies is currently underway. This document has been circulated to various public agencies and will be presented to Council by Q4 2008.

Management Representation of the Status of Implementation of Recommendation 1 as of June 2009

A new Flood Plain Management Policy has been developed and included in the City’s updated Official Plan that Council approved on 10 June 2009.

Management: % complete *100%*

OAG's Follow-up Audit Findings regarding Recommendation 1 as of November 2009

The Official Plan Amendment No. 76, now approved, contains new policies for development restrictions in the flood plains. Development is prohibited in the flood plain, except for minor additions.

OAG: % complete *100%*

2007 Recommendation 2

That the City develop a policy for Council approval to apply the Two-Zone Concept only to areas of the City with existing development and not to areas that heretofore are undeveloped.

2007 Management Response

Management agrees with this recommendation in principle.

Development of the lands adjacent to the Carp River was initially characterized as a Two Zone approach. One of the main benefits of the application of the Two Zone concept was the restoration of this reach of the Carp River. Historically, the channel of the Carp River has been straightened and lowered. This restoration will return it to a more natural state.

The Carp River Restoration project proposes re-grading and balanced cut and fill, with the effect that some lands are removed entirely from the flood plain. Since these lands are entirely removed from the floodplain, the Carp River Restoration is better described as a modified one-zone approach. This is the advice provided to the City, by the Ministry of Natural Resources, along with the opinion that the restoration as proposed satisfied the intent of the Provincial Policy Statement's (PPS) Natural Hazards policy. In a letter dated April 26, 2007 David Ramsay, the Minister of Natural Resources, stated "the Ministry believes the objectives of the provincial natural hazards policy have been met in the Carp River Restoration Plan. Furthermore, the flexibility provided by the policy has been appropriately used by the MVCA given the wide shallow floodplain in this urbanizing area."

As mentioned in the previous recommendation, a draft OPA for new Flood Plain Management policies is currently underway and will be presented to Council by Q4 2008.

Management Representation of the Status of Implementation of Recommendation 2 as of June 2009

A new Flood Plain Management Policy has been developed and included in the City's updated Official Plan that Council approved on 10 June 2009.

Management: % complete *100%*

OAG's Follow-up Audit Findings regarding Recommendation 2 as of November 2009

The Official Plan Amendment No. 76, now approved, contains policies for the application of the Two-Zone Concept to areas with existing development. The policies permit new development in the flood fringe area, but do not permit creation of new lots.

OPA 76 indicates that Schedule K shows four areas where the Two-Zone Concept could be applied, but the latest copy of Schedule K does not show them.

OAG: % complete 90%

Management Representation of Status of Implementation of Recommendation 2 as of Fall 2010

Management agrees with the OAG's follow up finding.

OPA 76 includes two amendments to Schedule K that will apply the Two-Zone Concept at two locations in the Urban area and another in the Village of Constance Bay.

OPA 76 was adopted by Council in 2009 and notice of approval was given by the Ministry of Municipal Affairs and Housing in January 2010. The whole of OPA 76 was subsequently appealed and is now before the Ontario Municipal Board for determination. The City is working with the appellants to scope the appeals, including the appeal of these changes to Schedule K. Once the appeals of the schedules are resolved, the City will update Schedule K of the Official Plan.

Management: % complete 90%

2007 Recommendation 3

That the City ensure that the evaluation of the flood fringe for development includes examination of all potential hazards, including slope stability and risk incurred by the City as a consequence of reduced design standards.

2007 Management Response

Management agrees with this recommendation, as this is the City's current practice.

As stipulated in the City's Official Plan, each development application is required to submit studies that examine and assess all potential hazards. Included in this submission is a geotechnical study which incorporates a slope stability assessment.

Management disagrees, however, with the comments in the audit that a reduced design standard for development of lands was applied to Kanata West. There is no municipal or provincial standard that requires basements. The applicable standard is the requirement for footing elevations to be designed to maintain at least a 0.3m clearance above the 100-year Hydraulic Grade Line (HGL). This will continue to be a requirement for any development in Kanata West.

Management will be seeking, within the terms of reference for the third party engineering firm, advice on the appropriate timing within the process for examination of geotechnical hazards. See the response to recommendation 11 for a more complete discussion of the background and scope of the third party review of the Carp River Restoration Environmental Assessment (EA).

Management Representation of the Status of Implementation of Recommendation 3 as of June 2009

The examination of hazards confirmed the application of setbacks to be employed and outlined the timing when additional soils investigations would be required. The issue pertaining to hydraulic gradelines and risk with reduced City standards identified the direction of analysis to be completed during detailed design and reviewed the potential of additional maintenance with City staff. The Third Party Review (TPR) gave additional recommendations to be applied during the phasing of construction to ensure safe conveyance of flows and protection of downstream areas. Additional geotechnical investigation is not required for the EAs

Management: % complete *100%*

OAG's Follow-up Audit Findings regarding Recommendation 3 as of November 2009

The Official Plan contains policies that require examination of all the potential hazards for any development. The Third Party Review Report was produced in April 2009, which addressed the issues identified in the audit report.

OAG: % complete *100%*

2007 Recommendation 4

That the City develop a policy for Council approval to not participate in landowners groups, including selling the subject lands or putting them in a blind trust.

2007 Management Response

Management disagrees with this recommendation.

The City requires the same flexibility as any other landowner in managing real estate. The forced sale or placement in a blind trust, of real property would limit or restrict the City's ability to fulfill programming needs.

The City has endorsed a corporate landlord model within the Real Property Asset Management Branch (RPAM) that operates independently from the approval authorities within the Planning Transit and Environment department.

RPAM participated in the Kanata West Owners Group's (KWOG) meetings as an observer. The City has participated financially but has not signed the KWOG agreement. As a result, City staff has not voted on any direction or matters considered by the KWOG including the Carp River Restoration plan. In this circumstance, management chose to exercise flexibility and was not a direct participant in order to avoid conflict of interest.

Management Representation of the Status of Implementation of Recommendation 4 as of June 2009

Council approved the staff recommendations on January 28, 2009 which was in accordance with the findings of Best Practices Studies regarding disposal and development of municipal properties. Council also approved the governance structure whereby the City continues to clearly separate the responsibilities of the City's real estate functions from the City's planning, regulatory and program functions. The Real Estate function is now part of the City Manager's Office under the Real Estate Development & Partnership Office.

Management: % complete *100%*

OAG's Follow-up Audit Findings regarding Recommendation 4 as of November 2009

Review of the work carried out by the City to address this issue indicates that they did a thorough due diligence. The resulting recommendations from specific studies completed for the City by two consultants provide guidance in this regard.

OAG: % complete *100%*

2007 Recommendation 5

- a) That the City ensure that the benefit of additional tax revenues should be measured against the costs of preparing the lands for development, including the cost of the land, and the potential liability exposure by permitting development in lands that do not meet the existing municipal standards.
- b) That a cost-benefit analysis be carried out with respect to the additional lands gained by applying the Two-Zone Concept.

2007 Management Response

Management disagrees with this recommendation.

A cost-benefit analysis cannot be carried out to any reasonable degree of accuracy at this point in time as the key variable inputs cannot be measured, or are simply unknown.

There are three key variables that would need to be determined to validate the recommendation. First, the type and level of development within the impacted area has not been determined. The general uses can range from office/industrial/commercial development, to low/medium density residential development, or even to land dedicated for parkland.

Secondly, given that the specific type of development is unknown, any attempt to measure the exposure liability by permitting development on the additional lands gained by applying the Two Zone concept, would be difficult at best to assess.

Finally, given the unknown nature of development, an offset tax revenue cannot be reasonably estimated. Until these key variables are more clearly defined, the recommended cost-benefit analysis would be highly theoretical and speculative, and would be of minimal value to management.

Management Representation of the Status of Implementation of Recommendation 5 as of June 2009

This recommendation requires resolution. Given we disagree and based on comments that this is not achievable, further discussion is required.

Management: % complete *0%*

OAG's Follow-up Audit Findings regarding Recommendation 5 as of November 2009 and Fall 2010

We concur with management's representation below.

OAG: % complete *100%*

Management Representation of Status of Implementation of Recommendation 5 as of Fall 2010

Based on the Minister of Environment's Order of July 21, 2008 the Two-Zone concept has not been approved for the Carp River in Kanata West. Part II Order requests have been received by the Minister of the Environment on the Carp River Restoration EA (August 2010) and there is no development possible on the basis of a Two-Zone concept at this time. The extent of any modifications to the existing floodplain are unknown and are dependent on the review of the Carp River Restoration EA and acceptance of the Carp River Widening report which would reduce the amount of potential lands removed from the existing floodplain. The viability of a Two-Zone concept is also subject to Model Validation and confirmation of stormwater management targets. Given the lack of an approved two zone and the many unknown variables, and the fact that no development is taking place in this area; a cost benefit analysis would not be feasible, or warranted and is not being undertaken.

Management considers implementation of this recommendation to be complete.

Management: % complete

100%

2007 Recommendation 6

That the City require consultants to discuss in detail the potential impacts of discharging sanitary sewer overflow to the proposed stormwater management pond, including confirming that this procedure is acceptable to the Ministry of the Environment.

2007 Management Response

Management disagrees with this recommendation.

The discharging of the sanitary sewer overflow in a storm water management pond as an emergency measure practice when a sanitary pump station experiences a catastrophic failure, has been a standard practice for a number of years. This option is further supported in the City of Ottawa's Sewer Design Guidelines (section 7.2.1.6 - System Reliability and Contingency Planning), when it is feasible to do so. This emergency measure is also noted in the City's draft Storm Water Management Design guidelines and is an accepted measure by the Ministry of Environment by virtue of their issuance of Certificates of Approval, which call for an overflow into storm water ponds. All emergency conduit connections to storm sewers, storage facilities, natural watercourses or surface outfall points are subject to approval by the Ontario Ministry of the Environment.

Management Representation of the Status of Implementation of Recommendation 6 as of June 2009

Requires Resolution. The 3rd party report confirmed management's response on this matter and noted that the probability was quite low of this occurrence.

Although management disagrees with this recommendation, it is noted that acceptability of the procedure to MOE will be confirmed by MOE's decision on issuance of a Certificate of Approval. Also discussed in Third Party Review consultant's draft report, since issue was raised by Part II Order requesters.

For further discussion.

Management: % complete

0%

OAG's Follow-up Audit Findings regarding Recommendation 6 as of November 2009

We agree that the MOE confirmation of acceptance of this procedure is confirmed by MOE's approvals and the issuance of a Certificate of Approval. However, the issue raised in the recommendation went beyond this and suggested that the potential impacts of discharging sanitary overflow to proposed stormwater management ponds be more fully discussed and considered. This aspect of the recommendation has not been completed.

*OAG: % complete**75%*

Management Representation of Status of Implementation of Recommendation 6 as of Fall 2010

The emergency overflow is only intended for a catastrophic situation. As noted in the 2007 response, the option for emergency discharge to a stormwater management pond is a valid one as specified in the Council Approved Sewer Design Guidelines (See Section 7.1.6.8 - Emergency Provision for Flood Protection). The Sewer Design Guidelines state “Emergency conduit connections to storm sewers with downstream stormwater treatment facilities are preferred over direct connections to water courses.” The Guidelines go on to state “emergency conduit connections to storm sewers, storage facilities, natural watercourses or surface outfall points will be subject to the approval of the Ministry of Environment (MOE). The emergency conduits should also be identified as part of the Municipal Class Environmental Assessment Process.”

In this case, the proposed overflow from the pumping station during a catastrophic event is to direct sanitary flows to Pond 5. The proposed conduit has been appropriately identified through the Class Environmental Assessment process and is subject to future approvals by the MOE. The details and effects of providing this conduit connection will be reviewed and approved through detailed design and approval by the City and MOE. As this approach is consistent with City guidelines and represents a solution authorized by the MOE in the past, there is no further action or response required.

Management considers implementation of this recommendation to be complete.

*Management: % complete**100%*

2007 Recommendation 7

That the City re-evaluate the total suspended solids removal criteria and requests the developers’ engineers to address in qualitative terms the potential effects of the river restoration on sedimentation in downstream reaches.

2007 Management Response

Management agrees with this recommendation in principle.

In the Carp River Restoration project, the storm water management ponds will provide for quality control and will augment low flow during dry weather conditions. The Carp River Watershed/Subwatershed study determined criteria that would meet both environmental and functional objectives. Specifically, all development flows would need to be controlled to result in: 80% suspended solids removal in Poole and Feedmill Creeks, and 70% suspended solids removal in the Carp River. In fact, runoff from urban development will contain less sediment than

what is currently coming from farmers' fields, even before suspended solids removal.

Management will include, in the terms of reference for the third party engineering firm, a review of the criteria for suspended solids removal. See the response to recommendation 11 for a more complete discussion of the background and scope of the third party review of the Carp River Restoration EA.

Management Representation of the Status of Implementation of Recommendation 7 as of June 2009

The 3rd party report approved by Council suggested that the composition of material will change through the phasing of development and will ultimately be confined to the facilities with the exception of the normal in-stream processes.

Management: % complete 100%

OAG's Follow-up Audit Findings regarding Recommendation 7 as of November 2009

The issue raised in the audit report was the need for an assessment of the TSS criteria, beyond the requirements of the MOE Stormwater Management Design Guidelines. This has been discussed in the Third Party Review report.

OAG: % complete 100%

2007 Recommendation 8

That the City ensure that the Restoration Project design provides a quantitative estimate of the volume of sediment that will be transported to downstream reaches as a result of the restoration, including a quantitative evaluation of the sediment transport capacity of the downstream reaches.

2007 Management Response

Management agrees with this recommendation.

Accordingly, one of the objectives in the design of the Carp River Restoration project was to achieve a sediment balance in the Carp River within the natural erosion/deposition process. This means there will be no increase in sedimentation in downstream reaches.

In management's opinion, the following statement in the audit: "However, there is only cursory examination of the potential impacts of transferring the sediment that is currently being stored by the river in the restoration reach to the downstream reaches..." incorrectly assumes that the existing sediment in the restoration reach will be transported downstream. In fact, a criterion of the restoration project is to ensure that the design provides for remediation of existing erosion and encourages sediment balance. This includes the removal of existing sediment deposits in localized areas thereby reducing the movement of the sediment downstream. The

Carp River, Poole Creek and Feedmill Creek Restoration EA identified the need to monitor sediment movement to ensure impacts to downstream reaches are mitigated, per pages 73, 78, 90, 91 and page 93 (Monitoring Plan).

When preparing the terms of reference for the third party engineering firm, management will include the requirement for confirmation as to whether a sediment balance was achieved, and for advice on the need for quantitative estimates in regard to the volume of sediment and sediment transport capacity (including provision of quantitative estimates if required). See the response to recommendation 11 for a more complete discussion of the background and scope of the third party review of the Carp River Restoration EA.

Management Representation of the Status of Implementation of Recommendation 8 as of June 2009

The 3rd party report approved by Council recommended that the suspended sediment be monitored in-stream during the construction process. This monitoring data could be used, if desktop analyses were performed downstream with data collected from other tributaries.

Management: % complete **100%**

OAG's Follow-up Audit Findings regarding Recommendation 8 as of November 2009

This issued was discussed in the TPR report. However, the issue raised in the audit report regarding the effect of sediment transport in downstream reaches is not addressed at all. The TPR report indicates that "A more detailed assessment would be needed to generate actual quantities of sediment load generated and transported within the system". This is the analysis that the audit report states has not been provided.

Under present conditions, the restoration reach stores a given volume of sediment at a given rate. Once it is restored, that rate of storage will be less (as the reach will be designed not to silt up). Consequently, there could be more sediment discharged after the restoration than at present. This has not been addressed. The TPR report does not provide any quantitative estimates of sediment transport.

OAG: % complete **75%**

Management Representation of Status of Implementation of Recommendation 8 as of Fall 2010

Management disagrees with the OAG's follow up finding that implementation of this recommendation is only substantially complete.

As stated in the 2007 response, Recommendation 8 incorrectly assumes that the existing sediment in the restoration reach will be transported downstream. In fact, a criterion of the restoration project is to ensure that the design provides for

remediation of existing erosion and encourages sediment balance. This includes the removal of existing sediment deposits in localized areas thereby reducing the movement of the sediment downstream.

As part of the Kanata West Implementation Plan which satisfied the Ministry of Environment's requirements regarding the Minister's Order, the City of Ottawa has committed to a comprehensive monitoring program to ensure the Carp River, Poole Creek and Feedmill Creek restoration projects operate and perform to the specifications and standards described in the Class Environmental Assessment documents. This is building on the monitoring referred to above in the Carp River, Poole Creek and Feedmill Creek Restoration EA. The Ministry of Environment has indicated that an extensive monitoring program, including an annual report, will be imposed as part of any approvals as part of the Carp River Restoration Plan. An integrated monitoring program will be developed and implemented that will include but not be limited to:

- Semi-annual fisheries and terrestrial monitoring/reporting to Department of Fisheries and Oceans Canada (DFO)
- Stream Flow monitoring

Appropriate sections from the Kanata West Implementation Plan have been bolded below:

3.1.1.1.1 Semi-annual fisheries and terrestrial monitoring/reporting to DFO

This monitoring will include assessment of erosion and deposition through the system as well as any erosion/scour at major crossings including Highway 417. Observations will be documented with field measurements and photos depicting the stabilization process of the restoration features. In the event that specific areas demonstrate the need for remedial action, repair or restoration will be made accordingly. The reports would be circulated to other agencies as required. Two kinds of monitoring of the aquatic environment are particularly relevant:

- (1) Construction monitoring to ensure that the new channel and ponds are constructed as per specifications; and
- (2) Post-construction monitoring to determine whether the newly constructed channels and ponds have indeed improved aquatic habitats.

Construction monitoring of the fish habitat compensations will be carried out to demonstrate that proposed activities have been implemented.

- Biologists, environmental inspectors, or experienced contractors will inspect the compensation works during and after completion and will collect photographic evidence to show that the works were completed as agreed upon in the plan and for the purpose of an authorization under Section 35 of the *Fisheries Act*.

Sediment and erosion control measures will be inspected regularly and maintained in proper working order until all areas are fully stabilized.

The City of Ottawa currently monitors water quality, fish and benthic invertebrates in the Carp River system on a frequent basis, and it is anticipated that the City will continue to do so following construction.

- Monitoring will be conducted in years 1 and 2 after full construction, then at 2 year intervals until the system is demonstrated to be stabilized. The information gained from this monitoring will be useful for determining the success of the plan, and may provide insight for future restoration activities in the Carp River and elsewhere.
- Monitoring will include indicators of the physical and chemical environment, as well as of the biological responses (fish and benthos).

During years 1 and 2 (Post Construction), the stability of the banks, and streambed will be assessed and any features that are determined to not be functioning as intended will be corrected. Additional plantings and/or seeding will be applied where the establishment of vegetation is insufficient to meet soil stability.

Streamflow velocity, water quality (pH, dissolved oxygen, total suspended solids, conductivity, copper, hardness, and total and unionized ammonia, TKN, and phosphorus) will be recorded on a seasonal basis (spring, summer, and fall). Temperature loggers will be installed to collect continuous data through the summer months. Benthos sampling will be completed annually, in late summer, and measurements of abundance and diversity will be calculated for temporal comparisons. Electrofishing will be carried out following a standardized protocol (e.g., OSAP as per Stanfield et al., 2000) so that the data are comparable to preconstruction data.

In addition to the monitoring described herein, the Third Party Review recommends the collection of in-stream sediment samples during the construction phases of the Restoration Plan. To augment the data being collected and assess local impacts, additional samples could also be collected downstream of the Huntley Creek confluence. By including this downstream location, all sampling would help qualify the upper Carp River impacts downstream. This data could also be used to augment any future databases for the Carp River.

Monitoring reports content and frequency will be determined by DFO but may include:

- A photographic record showing the areas where compensation measures took place. The photographic record will include hard copies of digital photographs documenting the site before, during, and after construction, and once a year for the extent of the monitoring plan. The photographs will be taken from similar

vantage points for ease of comparison. Electronic copies of the digital photos will be made available to Fisheries and Oceans Canada if required;

- Summaries of the data collected in tabular form for ease of comparison over time; and
- Recommendations for changes and/or improvements to the monitoring plan or the monitoring methods.

Management considers implementation of this recommendation to be complete.

Management: % complete *100%*

2007 Recommendation 9

That the City require consultants to correct the errors in the hydrology, hydraulics and other parts of the work, resulting from the errors in the drainage area, at no cost to the City.

2007 Management Response

Management agrees with this recommendation.

The consultants are addressing the error in the drainage area and the impacts on hydrology, hydraulics and other aspects. These results, among others, will be used to address recommendation 13. This analysis will be included in the terms of reference for the third party engineering firm review. See the response to recommendation 13 for a more complete discussion of the background and scope of the third party review of the Carp River Restoration EA.

Management Representation of the Status of Implementation of Recommendation 9 as of June 2009

The drainage area for the upper Poole Creek was corrected. The approved 3rd party report reviewed and confirmed that the model was changed.

Management: % complete *100%*

OAG's Follow-up Audit Findings regarding Recommendation 9 as of November 2009

The consultants corrected the error in the drainage area and provided information on the impacts on hydrology, hydraulics and other related aspects.

OAG: % complete *100%*

2007 Recommendation 10

That the City require consultants to properly calibrate the runoff model and the hydraulic routing model to represent properly the response of the watershed to the rainfall input, at no cost to the City.

2007 Management Response

Management defers its response to a third party review on the issue of calibration.

Staff did undertake to calibrate the model using what data was available. As detailed on page 138 of the Carp River Watershed/Subwatershed study, various Soil Conservation Service (SCS) storm durations (1 hr, 3 hr, 6 hr, 12 and 24 hr) were reviewed. It was determined that the 12 hour storm best represented the peak flow conditions in the subwatershed area. The type of storm distribution (Chicago vs. SCS) related to the size of the area being modelled, not just the future land use.

As stated in the Flow Characterization and Flood Level analysis, temporary water level gauges were established at Richardson Side Road, Palladium Drive and the Glen Cairn Pond. During the time these monitoring stations were in place, only one large storm was recorded (September 9 2004, -the tail-end of Hurricane Francis). Therefore, only one event was available for calibration/verification.

Management will seek guidance from the third party reviewer on the issue of calibration and whether the steps undertaken, including sensitivity analysis, were reasonable. See the response to recommendation 13 for a more complete discussion of the background and scope of the third party review of the Carp River Restoration EA.

Management Representation of the Status of Implementation of Recommendation 10 as of June 2009

The 3rd party report approved by Council identified changes to the models of record that were completed by the original consultants. Until there is monitored data to confirm the models of record, the report also identified the maximum range of variability of flow conditions and an interim volume to be applied with development proceeding to account for any potential uncertainty in these models.

Management: % complete 100%

OAG's Follow-up Audit Findings regarding Recommendation 10 as of November 2009

The issue was addressed in the TPR report.

OAG: % complete 100%

2007 Recommendation 11

That the City require consultants to re-evaluate the results of the subsequent analyses and designs, and to modify them as required, at no cost to the City.

2007 Management Response

Management agrees with this recommendation.

In January 2008, City staff discovered that modeling developed by an external engineering firm on behalf of the City and the Kanata West Owners Group for the Carp River, Poole Creek and Feedmill Creek Restoration EA contained an error. The engineering firm has confirmed to City staff that an error has, in fact, been made.

The Restoration EA is currently before the Ontario Ministry of the Environment (MOE) as several parties made Part II order requests. In light of this error, the City immediately advised the MOE to refrain from taking any decisions related to this assessment until the impact of the error has been fully assessed.

Currently, the City is in the process of engaging a third party engineering firm to independently review the analysis. The review is expected to take a few months to complete. The terms of reference will include a complete review of all aspects of the technical analysis for the Restoration EA as it relates to flood elevations and water flows and the impacts of any changes on the design. The review will also include the issues referenced in management's earlier responses. Once the results of the review are known, management will advise City Council and MOE of the outcome. Issues related to cost and next steps will be determined at that time.

Management Representation of the Status of Implementation of Recommendation 11 as of June 2009

The modifications have been reviewed by the 3rd party consultant and were supported.

Management: % complete 100%

OAG's Follow-up Audit Findings regarding Recommendation 11 as of November 2009

The City required the consultants to correct the error in modeling, and to re-evaluate the subsequent analyses and designs. The TPR consultant reviewed the results.

OAG: % complete 100%

2007 Recommendation 12

That the City ensure that consultants not be allowed to work on the same project for the City and for the developers, even if the City is fully aware of the fact. This recommendation applies even if the initial assignment is complete

2007 Management Response

Management agrees with this recommendation in principle.

The Professional Engineers Code of Ethics permits a professional engineer to work for two different employers on the same subject matter where such has been disclosed to both employers. While this does put such professional engineer in a position of having two masters, it is noted that the Code of Ethics provides that the professional engineer's duty to the public transcends his/her other obligations, that the professional engineer's duty to the public welfare is "paramount".

To implement this recommendation would reduce the available number of firms for an assignment, as some may have worked for developers on the same subject matter in the past or may not be willing to be precluded from working for developers in the future. It may also increase the cost of assignments, as the City, not being able to hire a firm that had worked for a developer in the past on an assignment, would always have to hire a firm that is starting fresh. This may also mean that the City is not able to benefit from the expertise of "the best" in the business.

Nevertheless, management concurs having a consultant that has not and will not work for a different employer on the same subject matter is, in most cases, a desirable outcome. Therefore, management supports an amendment to the City's Purchasing By-law to implement this recommendation, subject to exceptions being permitted when authorized by a Deputy City Manager, or by the City Manager for branches that report directly to him. If however, these exceptions become the norm and the number of consultants available to work on City projects is significantly reduced by the implementation of this recommendation, such that truly competitive bids are no longer possible, staff will seek instruction from Committee and Council to resolve this issue.

Management Representation of the Status of Implementation of Recommendation 12 as of June 2009

Implementation of this recommendation is 100% complete. Council approved a motion from CSEDC that the City's Purchasing By-law be amended to implement this recommendation, with exceptions authorized by the DCM or City Manager being reported to CSEDC as an information item. On September 10, 2008 Council approved the Conflict of Interest amendment to the Purchasing By-law. They did not, however, approve the "exceptions" recommendation per management's response.

Management: % complete *100%*

OAG's Follow-up Audit Findings regarding Recommendation 12 as of November 2009

As indicated by management, this recommendation was implemented by City Council.

OAG: % complete *100%*

2007 Recommendation 13

That the City ensure that a full evaluation of the risk of proceeding with detailed design on a project that is under review by the MOE based on a Part II Order request be submitted to Council for prior approval.

2007 Management Response

Management agrees with this recommendation.

In the future, Council will be notified in advance whenever management proposes to proceed with design while the Ministry of the Environment is reviewing a Part II order request.

Management Representation of the Status of Implementation of Recommendation 13 as of June 2009

Implementation of this recommendation is 100% complete.

Management: % complete **100%**

OAG’s Follow-up Audit Findings regarding Recommendation 13 as of November 2009

Council endorsed the recommendation on May 14, 2008.

OAG: % complete **100%**

4 SUMMARY OF THE LEVEL OF COMPLETION

1. The table below outlines our assessment of the level of completion of each recommendation as of Fall 2009 and Fall 2010.

CATEGORY	% COMPLETE	RECOMMENDATIONS	NUMBER OF RECOMMENDATIONS	PERCENTAGE OF TOTAL RECOMMENDATIONS
LITTLE OR NO ACTION	0 – 24	-	-	-
ACTION INITIATED	25 – 49	-	-	-
PARTIALLY COMPLETE	50 – 74	-	-	-
SUBSTANTIALLY COMPLETE	75 – 99	2, 6, 8	3	23%
COMPLETE	100	1, 3, 4, 5, 7, 9,10, 11, 12, 13	10	77%
TOTAL			13	100%

2. The table below outlines management’s assessment of the level of completion of each recommendation as of Fall 2010 in response to the OAG’s assessment. These assessments have not been audited.

CATEGORY	% COMPLETE	RECOMMENDATIONS	NUMBER OF RECOMMENDATIONS	PERCENTAGE OF TOTAL RECOMMENDATIONS
LITTLE OR NO ACTION	0 – 24	-	-	-
ACTION INITIATED	25 – 49	-	-	-
PARTIALLY COMPLETE	50 – 74	-	-	-
SUBSTANTIALLY COMPLETE	75 – 99	2	1	8%
COMPLETE	100	1, 3, 4, 5, 6, 7, 8, 9,10, 11, 12, 13	12	92%
TOTAL			13	100%

5 CONCLUSION

For the recommendations where management agreed or agreed in principle, management has been dutiful in implementing them, as evidenced by the large number of completed recommendations in the Summary of the Level of Completion.

There were three recommendations where management originally indicated disagreement in the management responses. The update/status comment indicates that some action has been taken, which we consider a positive response to the findings of the audit.

6 ACKNOWLEDGEMENT

We wish to express our appreciation for the cooperation and assistance afforded the audit team by management.