



Application for an overall benefit permit under clause 17(2)(c) of the Endangered Species Act

For Internal Use Only

Tracking Number | Lead District

Note: It is anticipated that the completion of this form will take multiple extended sessions. It is recommended that proponents download and save the form and the associated guide book to their local hard drive in order to more easily facilitate this task.

Personal information in this form is collected under the authority of Section 53 of the Endangered Species Act, 2007. The information provided will be used for the purposes of administering the Act and its Regulations.

Fields marked with an asterisk (*) are mandatory.

1. Contact Information

Proponent Contact Information [] check this box if the proponent is a private individual

Legal Last Name* | Legal First Name* | Legal Middle Initial(s)

Home Mailing Address

Unit No. | Street No.* | Street Name* | P.O. Box

Rural Route | Postal Station | Lot No. | Concession

City/Town* | Province* | Postal Code*

Telephone No.* ext. | Fax No. | Email (if available)

Primary Contact for Proponent

Is the proponent the primary contact for this form?*

[x] Yes [] No

Last Name* | First Name* | Middle Initial(s)

Position/Title

Legal Name of Organization/Company

Full Business Mailing Address

Unit No. | Street No.* | Street Name* | P.O. Box

Rural Route | Postal Station | Lot No. | Concession

City/Town* | Province* | Postal Code*

Business Telephone No.* ext. | Business Fax No. | Business Email (if available)

[x] I hereby certify that the information provided is true and correct to the best of my knowledge.

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2. Legislated requirements for an overall benefit permit under clause 17(2)(c) of the ESA

Table 1. Consideration of alternatives for the proposed activity

* as per MNR's assessment

Alternative description	Species or habitat(s) affected*	Potential adverse effects*
<p>Blanding's Turtle - Alternative 1 - Proceed With Development and Maximize Development Land (Full Impact)</p> <p>Alternative 1 is to proceed with the development and maximize the usage of development land. This is essentially the plan that was originally proposed prior to redesigning much of the subdivision to retain various habitat features and provide mitigation. Alternative 1 would have seen the removal of all habitat except the Kizell Cell and associated NEA lands. This essentially represents the original development plan prior to redesign to meet ESA requirements.</p>	<p>Approximately 98 - 115 adult and juvenile Blanding's Turtle were confirmed within Dillon's study area (the South March Highlands) after three years of monitoring data. When captures and observations made by Dillon are combined and averaged over the three year monitoring period, turtle captures in KNL 7 & 8 represent approximately 17% of all captures while those in the Kizell Wetland represent approximately 11% of all captures. Combined, the activities associated with KNL 7 & 8 and the SMP thereby have the potential to directly impact (approximately) 25-30% of the Blanding Turtles' population within Dillon's study area. Broadly speaking, if it is assumed that the proportion of captures occurring on KNL lands are accurate and representative of the entire population, Dillon's population estimate can be extrapolated to estimate that a total of approximately 24 to 35 adult and juvenile turtles utilize the habitats that exist in KNL 7 & 8 and the Kizell Cell. It should be noted however that this extrapolation is a broad estimate based on the above noted capture proportions. While this number is an extrapolation and hence cannot be interpreted to be a definitive population count, it nonetheless provides a general idea of how many turtles utilize the habitats within the KNL lands. Evidence of all major life processes were noted within the site including nesting, overwintering, foraging, movement, etc. As such, it is presumed that all life stages are found within the KNL 7 & 8 lands. Juvenile Blanding's Turtle are very difficult to detect in the wild but can be presumed to be present based on observed nesting behavior. The KNL developments have Category 1, 2 and 3 habitat for Blanding's Turtles. Figure 3a shows these habitat features prior to development. The size of these areas is quantified in Table B, Appendix B. In</p>	<p>Alternative 1 would not avoid all impacts to the species. It is highly likely that Alternative 1 would result in Blanding's Turtle being unable to reach key hibernacula and nesting areas (which would have been removed) and no viable alternatives would have existed in the vicinity. This could lead to direct mortality during overwintering and lack of breeding success. The absence of mitigation measures would likely result in road related mortality, potential construction stage mortality, potential mortality due to being unable to reach hibernacula, foraging, and other habitat areas, etc. Alternative 1 would not avoid all impacts to the habitat. Most of the habitat within KNL 7 & 8 would be removed or isolated from outside areas, and the major retained areas in and around the Kizell Cell would be effectively isolated except from the Carp River to the west. Alternative 1 would have seen the removal of all habitat except the Kizell Cell and associated NEA lands.</p>

Alternative description	Species or habitat(s) affected*	Potential adverse effects*
	<p>summary, Blanding's Turtle have been shown to be present within the KNL 7 & 8 lands as well as many surrounding natural areas. As shown in Figure 3a, the Kizell Cell is identified as a Category 1 habitat feature, providing key habitat functions including an overwintering site and core wetland habitat. A large nesting area is known to exist in the central portion of KNL 8, which is also a Category 1 feature that supports breeding. The string of vernal pools at the northeast side of KNL 8 are also shown as Category 1 features, primarily due to suspected overwintering at these locations. The remaining wetland habitats within and adjacent to KNL 7 & 8 are shown as Category 2 wetland features, providing movement functions, core wetland habitat, sites for thermo-regulation, foraging, etc. The majority of Category 2 habitat exists in the vicinity of Shirley's Brook, in the string of vernal pools in KNL 8, and in the Kizell Cell. Small isolated Category 2 patches are also shown. As shown in Figure 3a, nearly the entirety of the remainder of KNL 7 & 8 are shown as Category 3 movement habitat.</p>	
<p>Blanding's Turtle - Alternative 2 - Avoid Significant Impacts and retain hibernacula. Alternative 2 would be to avoid the majority of impacts by avoiding removal of all Category 1 and 2 habitat and all functional Category 3 habitat areas. This scenario was not pursued in detail as it was deemed economically and technically unfeasible to avoid all Category 1 and 2 habitat. Notably, earlier iterations of the subdivision design would have permanently protected the hibernacula in KNL 8.</p>	<p>See number of individuals and habitats described above in Row 1.</p>	<p>Avoiding all significant habitat removal would avoid most impacts to the individuals and the remaining potential impacts (such as human disturbance and road mortality) could be addressed relatively easily for the limited areas that would remain usable for development. However, this scenario would prevent the majority of the development area from being utilized. In this scenario, most of the Category 1 and Category 2 habitat areas would be avoided and only peripheral Category 3 areas would be developed. This would result in limited habitat removal confined to the least ecologically valuable areas (peripheral Category 3 areas). This alternative is not considered feasible to meet the main purpose of the activity. This would render the majority of the area un-developable. While this may ultimately preserve the majority of habitat, it would not meet zoning, growth, or economic development objectives for the area and may ultimately make the development unfeasible economically. This would</p>

		seriously impact the proponent financially and would adversely affect the growth and economy of the community.
Blanding's Turtle - Alternative 3 - Proceed with development, avoid impacts to critical areas, undertake habitat enhancement/mitigation, and provide compensation (preferred alternative). This alternative is essentially what has been described throughout this submission. The goal of this alternative is to allow the development to go forward while sacrificing selected areas of development land to protect key features. Compensation for habitat impacts will be undertaken and a sophisticated habitat management, mitigation, and compensation plan has been developed.	See number of individuals and habitats described above in Row 1.	Not all impacts to individuals and habitat can be avoided. Potential impacts to individuals include potential construction stage injury and mortality, potential increased risk of turtle road mortality within the development, and potential interference with turtles by residents and pets. Potential habitat impacts include loss of Category 1, 2 and 3 habitat and the associated impact on turtle life processes. These impacts are mitigated as noted in Table 2 of this form.
Butternut - Alternative 1 - Remove All Butternut Trees The original development plan would involve removal of all Butternut Trees to afford maximum flexibility during tree removal and grading. This is essentially the original subdivision plan scenario that was presented to OMNRF prior to redesign for Blanding's Turtles.	KNL 7 and 8 were found to have a total of 84 Category 2 Trees and 36 Category 3 Trees. This includes 16 Category 2 Trees and 12 Category 3 Trees in KNL 7, and 68 Category 2 Trees and 24 Category 3 Trees in KNL 8. For specific information regarding exact locations of the Butternut trees, please refer to Figure 9a and 9b and the attached Butternut Health Assessments (Appendix D). Multiple trees were found to be producing seed and the BHA documented numerous seedlings, indicating reproduction at the site.	This would result in all trees being removed from the Site. Butternuts would only be retained within designated open space areas far from the development edge. Not all adverse effects on the habitat would be avoided (see previous column). This approach would ensure there are no further permitting or site plan restrictions or mitigation related to Butternut, and would maximize flexibility for development. The main drawback with this approach is that it may result in more Butternut Trees being removed than are actually required to complete development. This approach may increase the impact on Butternut beyond what is needed to fulfill development requirements and may also have a consequent impact on the cost of compensation. It is therefore more desirable to retain Butternuts in locations where it is feasible to do so.
Butternut - Alternative 2 - Do Not Proceed with Development of areas with Butternut Trees.	See Row 4 above for total number of Butternut Trees.	This alternative would protect all areas that Butternut are growing and hence all habitat. This option would prevent development of large areas of the property. The Butternuts are distributed fairly evenly across the property and the area occupied by Butternut Trees is too large to avoid while allowing for the planned development. Site servicing and road access would not be feasible if all Butternuts were avoided. It is not feasible either technically or economically to

		<p>retain Butternut within the development area. Avoiding impacts to the areas occupied by Butternut would prevent development of large portions of the Site. The financial impact on the owner would be extremely high given the high value of the land and money invested in the project. The overall economic impact for the community as a whole would be detrimental, given the loss of construction and maintenance jobs. This would also impact the City of Ottawa growth plans as the Site is designated and zoned as a growth area. It is generally not technically feasible to retain trees within the development area, unless they are within larger open space blocks. This is because grading changes, blasting, tree clearing, construction, etc. make it very unlikely that trees retained within development areas will survive the development process. It is therefore only feasible to retain Butternut within designated open space blocks.</p>
<p>Butternut - Alternative 3 (Preferred Alternative) - Remove Butternut Trees as required, to meet needs of the Site Plan. Retain Butternut Trees in selected areas, where feasible.</p>	<p>See Row 4 above for total number of Butternut Trees.</p>	<p>Tables E & F (Appendix B) and Figure 9a and 9b provide information on where Butternut Trees will be removed. The total impact level will include the removal (killing) of 33 Category 3 Trees and 77 Category 2 Trees, as well as impacting (harming) of 1 Category 3 Tree and 3 Category 2 Trees. This impact breaks down as 63 Category 2 Trees and 24 Category 3 Trees to be removed from KNL 8, 3 Category 2 Trees to be impacted in KNL 8, 14 Category 2 Trees and 9 Category 3 Trees to be removed from KNL 7, and 1 Category 3 Tree to be impacted in KNL 7. A total of 4 Category 2 Trees and 2 Category 3 Trees will not be harmed. Tables E and F (Appendix B) summarize the impacts to these trees and the tree sizes. Not all impacts to Butternut habitat will be avoided. As noted, many of the areas that currently have Butternut Trees will ultimately be developed.</p>
<p>Least Bittern (Stormwater Management Plan) - Alternative 1 - Original Stormwater Management Plan The original stormwater management plan as originally designed would have primarily relied on the Kizell Cell for stormwater quality and quantity management from KNL 7, 8 & 9. This would have required the construction of three berms within the Kizell Cell to</p>	<p>Three (3) Least Bittern individuals were observed within the Kizell Cell; one lone male, and one mated pair (male and female). The mated pair displayed behavior that is indicative of nesting, and it was determined to be highly likely that this Least Bittern pair were nesting on the east side of the Kizell Cell, close to Goulbourn Forced Road (DST 2013f).</p>	<p>Not all effects on the species would be avoided by Alternative 1. Several drawbacks to the original stormwater management plan were identified. Notably, the plan would require in-water work to install the three berms. This would have carried a risk of injuring both Least Bittern and Blanding's Turtle and also would remove a</p>

<p>increase storage capacity, it would have resulted in longer periods of elevated water level, all flows including first flush flows would have been directed to the Kizell Cell, and the total volume of water received would be larger. This is the original SMP that was presented to OMNRF.</p>	<p>The Least Bittern uses the Kizell Cell for nesting, reproducing, rearing and foraging. A likely nest location was observed southwest of the open water patch near Goulbourn Forced Road. As noted in the first row (see above), approximately 11% of Blanding's Turtle captures during Dillon's monitoring study were within the Kizell Cell. The Kizell Cell is shown as a Category 1 habitat feature due to documented overwintering. It also serves as the largest Category 2 wetland feature within the KNL 7 & 8 area. Neither species has been documented or found to occur within the Beaver Cell.</p>	<p>corresponding area of vegetated habitat. The original plan also would have utilized the Kizell Cell for quality treatment in addition to quantity treatment. This would have included the first flush flows which contain the majority of suspended particles, turbidity, contaminants, siltation and temperature impacts. While these impacts were proposed to be mitigated through the use of an energy dissipater, it was nonetheless anticipated this would negatively impact individual turtles that may be hibernating in the Kizell Cell (during winter), while also ultimately leading to vegetative community change through siltation, nutrient enrichment, and turbidity. Foraging efficiency would also likely be reduced for both species and both would be exposed to greater contaminant loads. Not all effects on the habitat would be avoided by Alternative 1. Several potential habitat impacts are discussed in the previous column. Considered cumulatively, these impacts may have resulted in significant ecological change throughout the Kizell Cell and reduced habitat functionality for Least Bittern and Blanding's Turtle.</p>
<p>Least Bittern (Stormwater Management Plan) - Alternative 2 - Updated Stormwater Management Plan - Preferred Stormwater Solution The SMP has been significantly redesigned so that all flow from KNL 9 will go to the Beaver Cell (an existing licensed stormwater facility) and also so that the first flush flows (up to the first 25 mm) from KNL 7 & 8 will also be diverted to the Beaver Cell. This will reduce the overall water flow to the Kizell Cell significantly and will ensure that only clean water during infrequent major storm events will go to the Kizell Cell. This arrangement will be achieved by expanding the existing capacity in the Beaver Cell. The expansion will ensure that the Kizell Cell is only needed for stormwater management to accept flows beyond the first flush flow relatively infrequently during major storms. The redesigned stormwater management plan will no longer require installation of berms in the Kizell Cell and new construction within the Kizell Cell will be limited to the installation of a</p>	<p>See number of individuals and habitats described in Row 7 above.</p>	<p>The revised SMP was redesigned specifically to reduce the potential impact on the Kizell Cell and the associated Blanding's Turtle and Least Bittern habitat. The revised SMP significantly mitigates the potential impact of stormwater inflow on water quality, substrate, contaminants, and vegetative cover. The only significant residual impact on the individuals of the species that has been noted is the potential for infrequent water level fluctuation during major storm events to impact the nests of Least Bittern.</p>

<p>single outlet/energy dissipater to accommodate flow beyond the first flush during major storm events. Refer to the Activity Description of the IGF for additional detail.</p>		
<p>Least Bittern (Stormwater Management Plan) - Alternative 3 - Back-up Stormwater Management Solution - New Ponds</p> <p>The back-up stormwater options that are currently being considered, if implemented, are predicted to largely or entirely avoid usage of the Kizell Cell through construction of a new stormwater pond adjacent to the Beaver Cell (KNL 9) or in KNL 8 and the Trillium Woods. Either scenario ultimately would divert most stormwater flow away from the Kizell Cell and hence would have a lower impact on the Kizell Cell than described in the previous row. However, the new ponds would require the sacrifice of significant areas of development land and would also remove large areas currently designated to be preserved as natural habitats. If a major departure from the currently preferred SMP is ultimately needed (see previous row), this will be discussed in greater detail with OMNRF, once the SMP is finalized.</p>	<p>See number of individuals and habitats described in Row 7 above.</p>	<p>The two back-up stormwater management options would both see a new pond constructed, and both proposed pond locations are outside of core Blanding's Turtle and Least Bittern habitat areas. Both new pond options would result in the Kizell Cell receiving far less stormwater inflow, and so either option would essentially avoid impacting the Kizell Cell. Thereby, impacts to individual Blanding's Turtle and Least Bittern would also largely be avoided.</p> <p>The main drawback of building a new stormwater management pond is that it would require the sacrifice of large amounts of development land and also usage of large areas that have otherwise been designated as retained natural features (either the Trillium Woods or NEA lands south of KNL 9). If a new stormwater management pond is needed, KNL will seek compensation development lands from areas that are currently designated for habitat retention, in order to fulfill the requirements of the 40% agreement. Thereby - it is anticipated that the overall availability of development land and retained natural habitat within KNL would both be reduced by construction of a new pond.</p>

2. Legislated requirements for an overall benefit permit under clause 17(2)(c) of the ESA

Proponents may choose to identify which alternative is the best alternative from their perspective and provide a supporting rationale for MNR's consideration. This rationale should highlight the advantages and disadvantages of the alternative in relation to its effects on the protected species or habitat, as well as its effectiveness in meeting the main purpose of the activity. MNR will consider the rationale provided and determine if the alternative chosen by the proponent is likely to meet the legislated requirement as the best alternative for an overall benefit permit.

Best Alternative

Rationale: (If this information is available in an existing report, proponents can copy and paste the relevant information into the space provided below and reference the title, author and date of the report(s) from which the copy and paste sections originate).

The best alternative for each species was selected and described in the previous section of this form. These included:

Blanding's Turtle - Alternative 3 (Preferred Alternative) - Proceed with development, avoid impacts to critical areas, undertake habitat enhancement/mitigation, and provide compensation

Butternut - Alternative 3 (Preferred Alternative) - Remove Butternut Trees as required, to meet needs of the Site Plan. Retain Butternut Trees in selected areas, where feasible.

Least Bittern (Stormwater Management Plan) - Alternative 2 - Updated Stormwater Management Plan - Preferred Stormwater Solution

For each species it was noted that the preferred alternative is to proceed with development while avoiding impacts to critical areas, undertake enhancement/mitigation, and provide compensation. A complex habitat enhancement/management, mitigation, and compensation plan has been developed to mitigate the potential impacts described above. Further details on the mitigation, habitat enhancement, and compensation outlined in the report have been included in Tables 2 and 3 of this form.

As shown in Figure 4, KNL has sacrificed an additional 2.12 ha of development land north of the rail line under the arc of Terry Fox in order to protect wetlands in this vicinity (Block 18 in Figure 2). This includes the loss of approximately 10 housing lots as well as reduction in lot sizes. The value of the development land sacrificed by KNL to avoid impacts to these key habitat features is approximately \$1,570,000.00, based on an estimated (pre-development) land value of \$300,000.00 per acre. It should be noted that the post development (retail value) of houses to be built on sacrificed lots considerably exceeds this number and amounts to several million dollars in lost retail value.

2. Legislated requirements for an overall benefit permit under clause 17(2)(c) of the ESA - Cont'd

2.2 Steps to minimize adverse effects for the best alternative (i.e., mitigation measures)

For the best alternative selected and detailed in section 2.1, describe the potential adverse effects of each component of the activity on the protected species or habitat, and the steps that will be taken to minimize those adverse effects (e.g., mitigation measures) in Table 2. Where applicable, provide monitoring and supplementary actions for mitigation measures.

Table 2. Summary of Mitigation Plan

Component of the Activity	Adverse Effects on the Protected Species or Habitat	Proposed Steps to Minimize Adverse Effects (i.e., Mitigation Measures)	Residual Adverse Effects on the Protected Species or Habitat	Impact Monitoring for Residual Adverse Effects	Effectiveness Monitoring and Supplementary Actions for Mitigation Measures
NOTE - The Quantification of Blanding's Turtle Habitat Impacts is Provided in Table B in Appendix B.	NOTE - The Quantification of Least Bittern Habitat Impacts is Provided in Tables C & D in Appendix B.	NOTE - The Quantification of Butternut Impacts is Provided in Tables E & F in Appendix B.	NOTE - A Gantt Chart with a detailed project schedule is included in Table A, Appendix B.		
Tree and Vegetation Clearing (Impacts to Individuals)	Refer to Row 5 to 8 for a discussion of the habitat loss associated with tree removal – this row refers to potential impacts to individuals during tree clearing. During tree clearing there is the potential to accidentally kill or injure Blanding's Turtle.	Once the turtle's active season has ended and turtles have entered overwintering sites (e.g. October to November 2015) tree and vegetation clearing will commence for KNL 7 & 8. Clearing during the overwintering season will eliminate the possibility that turtles will be directly impacted by tree removal and will minimize the risk of turtle injury. No confirmed overwintering sites will be directly impacted by tree removal during the 2015-2016 overwintering season, as the existing alignment of Shirley's Brook will not be removed until the 2016-2017 overwintering season, and the hibernacula will not be	No residual adverse effects on the individuals are anticipated. Refer to Row 4 for a discussion of fencing within the development, and Rows 5 to 8 for a discussion of habitat impacts.	Regular monitoring will be undertaken during the tree clearing and construction stage (see next row). At a minimum, this will include inspections once per week during the active season, confirmation of the limits of tree removal, and monitoring of the construction of new habitat enhancement and mitigation features. Details on the construction stage monitoring are provided in the next row.	Supplementary actions will include the fencing discussed in Row 4 (below). Refer to Row 5 for a discussion of the long term post construction monitoring program.

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		removed until the 2016 active season (see below). Construction stage monitoring (see Column 5) will further mitigate the risk of impacting Blanding's Turtle during tree clearing.			
Construction of KNL 7 & 8 and Habitat Features (Impacts to Individuals)	Refer to Row 5 to 8 for a discussion of the habitat loss associated with construction of KNL 7 & 8 – this row refers to potential impacts to individuals during construction. During construction there is the potential to accidentally kill or injure Blanding's Turtle.	During the 2015-2016 overwintering season, the new alignment of Shirley's Brook will be constructed. However, water flow will be maintained within the existing alignment of Shirley's Brook for an additional year in order to provide opportunity for the new alignment to grow in. The old alignment of Shirley's Brook will not be removed until the 2016-2017 overwintering season. This will allow time for the new alignment to grow in and mature, and will also allow turtles time to find the new habitat features prior to removing the old ones. During the 2016-2017 active season both the new and old habitat features will exist on the landscape. The new deep wetland and the three (3) new nesting areas will	No residual adverse effects on the individuals are anticipated. Refer to Row 4 for a discussion of fencing within the development, and Rows 5 to 8 for a discussion of habitat impacts.	Construction stage monitoring will begin with the commencement of construction activities and will be complete by summer 2016, by which time all new habitat features and mitigation features will be built, and the KNL 7 & 8 work area will be isolated by permanent turtle exclusion fencing (see next row). Additional construction stage monitoring will be undertaken during the overwintering season of 2016-2017 during the removal of the old alignment of Shirley's Brook and during the 2016 active season when the hibernacula will be removed (see Row 6 below). Construction stage monitoring will include the following: • Impact monitoring will begin with the commencement of	Supplementary actions will include the fencing discussed in Row 4 (below). Refer to Row 5 for a discussion of the long term post construction monitoring program.

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		<p>be built in the overwintering season of 2016-2017 (see below). Refer to Row 5 to 8 for a discussion of the installation of these features. Clearing during the overwintering season will eliminate the possibility that turtles will be directly impacted by tree removal and will minimize the risk of turtle injury. No confirmed overwintering sites will be directly impacted by tree removal during the 2015-2016 overwintering season, as the existing alignment of Shirley's Brook will not be removed until the 2016-2017 overwintering season, and the hibernacula will not be removed until the 2016 active season (see Row 6 below). Construction stage monitoring (see Column 5 of this row) will further mitigate the risk to turtles during the construction phase.</p>		<p>construction in November 2015 and will conclude following completion of fencing/vegetation clearing (by April 2016);</p> <ul style="list-style-type: none"> • An additional period of construction stage monitoring will be undertaken during the backfilling of the lost hibernacula pools during the 2016 active season (see Row 6 below) and the backfilling of the old Shirley's Brook alignment in the 2016-2017 overwintering season; • Construction stage monitoring will consist of, at a minimum, weekly inspections by a qualified biologist during any site clearing, site preparation, fencing, construction of habitat enhancement features, new habitat features, or dewatering works; • Critical work phases may require inspections of greater frequency; • Prior to vegetation clearing, significant habitat features will be marked by a qualified biologist, trees to be retained will be marked, and contractor's will be 	

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				<p>advised of the position of features to be retained;</p> <ul style="list-style-type: none"> • Where necessary, features/trees to be retained will be identified through the installation of snow fencing to mark their position; • The construction of new habitat features and habitat enhancement features will be supervised to ensure proper placement and adherence to drawings and specifications; • Specific tree removal decisions, particularly within habitat enhancement/creation areas, will be made on the ground in consultation with the City's forester. The City's forester will be consulted to identify specific trees for retention within areas where tree retention is possible; • Prior to vegetation clearing, sweeps for turtles will be undertaken in all vegetated areas by a qualified biologist; • If turtles are noted during pre-clearing vegetation sweeps, work in the immediate area will cease immediately and measures will be taken to 	

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				<p>allow the turtle to exit the work area without interference;</p> <ul style="list-style-type: none"> • The fencing and work area will be inspected by a qualified biologist prior to commencement of work to ensure that the arrangement will reduce the likelihood of a turtle entering the work area; and • Full time monitoring by a biologist during initial dewatering for in water works (if dewatering is required). This would include monitoring of dewatering set-up and full time monitoring of water draw down. Once water level draw down is achieved, any fish, turtles, or other wildlife would be relocated by a qualified biologist to a safe location in order to facilitate completion of the work. 	
Development Fencing	There are several potential impacts on individual turtles which are addressed by the proposed development fencing. These impacts include potential impacts during both the construction stage and during the operational phase. These include:	Permanent turtle exclusion fencing will be installed throughout the development and at offsite fencing locations in the early summer of 2016. This fencing will be installed once the construction of new habitat areas and tree	No residual adverse effects on the individuals are anticipated. Refer to Table 3 of this form for a discussion of offsite fencing as an overall benefit measure.	Residual adverse effects will be monitored through the post construction monitoring program. The post construction monitoring program will include monitoring of turtle movement, which will provide sufficient data to identify if any flaws	See the previous column for effectiveness monitoring. If the fencing system is shown to be ineffective by the monitoring program, additional fencing may be required as a supplemental action. This may include adding additional one-way fencing in some locations to

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	<ul style="list-style-type: none"> • Potential injury or mortality of adults in terrestrial habitats due to vehicle impacts, during excavations, or during land clearing; • Potential increased risk of road mortality due to increased road density and increased traffic both during and after construction; and • Potential increased human usage of remaining habitat areas, including increased recreational usage, human interference with turtles, and degradation of trails and back of lots. 	<p>clearing (described above) are substantially complete. This will ensure that the fencing can be installed at the development edge without risk of damage. Fencing can be installed with light equipment during the turtle active season without significant risk of injuring turtles. As shown in Figure 7a, 7b, 7c and 7d, fencing will be placed between the edge of retained/constructed habitat features and the development/roads. This will ensure that turtles are excluded from the development and roads both during construction, and following development. As shown in Figure 7a, 7b, 7c, and 7d, three types of fencing will be used within the development. This will include a) Chain link fence at the back of lots/ along roads that border retained habitat areas in areas where the risk of turtles entering the development area is considered lower; b) Chain link fence at the back of lots/along roads with plastic inserts where</p>		<p>exist in the fencing system and if any turtles have accessed the roads or development area. Blanding's Turtle post construction habitat and population monitoring will include monitoring in 2016 and 2017 to assess immediate post-construction impacts, while long term monitoring will be conducted in 2018 and 2019. Thereby, post-construction monitoring will include four (4) monitoring years. KNL will partner with an accredited post secondary institution to complete the Blanding's Turtle monitoring program as a research project (Refer to Appendix F). The research project will provide an overall benefit to Blanding's Turtle by providing a robust study of the effectiveness of the management program outlined in this permit application. The dissemination of the results of this research project will help to inform and refine future Blanding's Turtle</p>	<p>close gaps in the fencing system, in some areas it may be determined that chain link fencing was insufficient and one way fencing needs to be added, or the monitoring program may identify areas requiring repair.</p> <p>Once the four year monitoring program is complete, monitoring and maintenance of the fencing will be undertaken by City maintenance staff through an agreement with the City of Ottawa. The fencing will be maintained for a minimum of fifteen (15) years.</p>

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		<p>the risk of turtles entering the development area is considered moderate. In these areas durable plastic sheeting will be woven into the chain link fence to prevent new hatchlings from moving through the fence. The plastic inserts will consist of durable UV resistant material designed to last at minimum fifteen (15) years. The inserts will be a minimum of 60 cm tall (measured from the ground) and will be anchored to the ground through a bottom rail and/or buried into the substrate to prevent turtles from going under the fence; and c) Angled one-way wildlife exclusion fencing, specifically designed for Blanding's Turtle, will be used in critical areas where the risks to turtles are greater. The one way fencing is designed to prevent turtles from crossing the fence in one direction. This will allow turtles to exit the development during the construction phase, but will not allow them to return. The advantage of this fencing is that if any</p>		<p>management programs. KNL will partner with a post secondary institution to provide support to a PhD student for a four (4) year period to aid in the completion of a PhD thesis. The PhD thesis will create original research focusing on the Ontario population of Blanding's Turtle. At a minimum, the PhD researcher will conduct the four (4) years of monitoring in KNL 7 & 8, the Kizell Cell, and surrounding habitat areas on behalf of KNL. At a minimum, the PhD student will collect telemetry data showing turtle movement and will monitor the condition of enhanced/ newly constructed habitat features. This will include monitoring of the vegetative communities present and maintenance of a photographic record documenting the condition of the mitigation/habitat enhancement measures outlined in this permit application. The PhD student and their supervisor will also be expected to undertake original research within</p>	

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		<p>turtle accidentally enters the development, the turtle could potentially leave the development on their own, without being able to re-enter. This fencing is also impassable by turtles of any size and any age. The one way turtle fencing will be designed to last at minimum fifteen (15) years. The arrangement of these different types of fencing is shown in Figures 7a, 7b, 7c and 7d. Within the development and along the upgraded sections of Goulbourn Forced Road adjacent to the Kizell Cell (Figure 7d), the construction of this fencing is a mitigation measure designed to prevent turtles from entering the work area during the construction stage, and it will also prevent turtles from entering the development and roads following construction. This fencing will also benefit other wildlife including other turtle species, snakes, frogs, and small mammals by mitigating the risk of these species reaching the work area and roads. The</p>		<p>the study area and to publish at least one (1) peer reviewed paper using this data. KNL's consultant will be responsible for writing annual monitoring reports which will be produced in the late season or winter following each monitoring year. These annual reports will be written using the data gathered during the research program. Additional detail on the research program study design, the research lab to undertake the project, the research objectives/topics, and the proposed methodology are included in Appendix F. Monitoring for Least Bittern will be completed separately by KNL's biological consultant. Three (3) years (2016, 2017, 2018) of post-construction monitoring of the Least Bittern population will be undertaken in the Kizell Cell, the Beaver Cell, and the newly created wetland at the west side of the rail line where it meets Terry Fox Drive. An additional three (3) years of Least</p>	

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		<p>fencing mitigates the risk of turtles entering the development/work area and will substantially reduce the risk of road related mortality. Backyard fencing will ensure that residents and their pets can only access retained habitat areas at designated access points and trails. The fencing is a permanent mitigation feature which will be installed prior to the construction phase and maintained following completion of development.</p>		<p>Bittern monitoring will be undertaken in future when the stormwater management system for the KNL Developments is fully operational (date to be determined). Monitoring will include a presence/absence survey following the National Least Bittern Survey Protocol (Canada Wildlife Service 2011).</p>	
<p>Habitat Removal - Category I Nesting Areas</p>	<p>Table B (Appendix B) shows a quantification of the anticipated habitat loss. The estimated functional nesting habitat loss is 1.61 ha. All of this habitat will be removed by the development plan.</p>	<p>Table B (Appendix B) shows a quantification of the anticipated habitat creation to mitigate this habitat loss. Three (3) new nesting areas will be built as shown in Figure 6a and 6b. All of these new nesting areas will be closer to core wetlands than the nesting area that will be lost from KNL 8. The Beaudry et al. (2010) study suggests that turtles are willing and able to locate and utilize anthropogenic nesting areas, that such areas could be intentionally</p>	<p>Table B (Appendix B) shows the quantification of the residual habitat loss following the creation of compensation habitat. The estimated loss of functional nesting habitat will be -0.3 ha (-17%). It should be noted that the new nesting areas are likely to provide a benefit to the Blanding's Turtle population by reducing the need for overland movement due to their closer proximity to core wetlands. This benefit will include potentially reduced metabolic demand</p>	<p>The post construction monitoring program is described above in Row 4. As noted above, vegetation monitoring of the newly constructed habitat features will include maintenance of a photographic record showing the condition of the new habitat features. Telemetry tracking data will provide evidence of whether turtles are utilizing the new nesting areas.</p>	<p>Ongoing maintenance of the nesting area may be required. This would primarily be required to ensure that the area remains free of invasive vegetation, and also to ensure that it retains an optimal proportion of tree and shrub cover. The monitoring program will allow for adaptive management of the nesting area. If maintenance is required, this will be undertaken as a supplementary action. The nesting areas will be maintained throughout the four year post construction</p>

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		<p>created, and also that careful placement of artificial nesting locations may have benefits to the population in terms of reducing mortality to adult females from overland movement, while also potentially increasing nest and hatchling survivorship. Three (3) new nesting areas will be constructed throughout the KNL lands including west of the Kizell Cell in an upland area adjacent to the wetland, and in two locations at the west side of Shirley's Brook. These are shown in Figure 6a and 6b. The specifications of these nest areas will follow the Massachusetts Division of Fisheries and Wildlife (MDFW) (2009) Advisory Guidelines for Creating Turtle Nesting Habitat. These new nesting areas are all being placed close to existing wetland habitat and known movement corridors for Blanding's Turtle (Dillon 2013b). It is therefore reasonably likely that the turtles will be able to detect and utilize these nesting areas in a</p>	<p>for nesting activity (due to shorter overland movement distances), decreased likelihood of predation and road mortality for nesting females, and increased likelihood of hatchling survival by providing a shorter distance for hatchlings to travel to wetland environments following hatching. Reducing the overland distance between nesting areas and wetlands will likely reduce the risk of predation, human interference, and road mortality for hatchlings as they disperse to wetland environments (Pappas et al. 2009). This is noted as an overall benefit to the species in Table 3 of this form. The net decrease in the size of functional nesting habitat will be compensated for through the off-site fencing overall benefit measures outlined in Table 3 of this form.</p>		<p>monitoring.</p>

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		<p>relatively short time. The new nesting areas are therefore likely to provide a benefit to the Blanding's Turtle population by reducing the need for overland movement due to their closer proximity to core wetlands. This benefit will include potentially reduced metabolic demand for nesting activity (due to shorter overland movement distances), decreased likelihood of predation and road mortality for nesting females, and increased likelihood of hatchling survival by providing a shorter distance for hatchlings to travel to wetland environments following hatching. Reducing the overland distance between nesting areas and wetlands will likely reduce the risk of predation, human interference, and road mortality for hatchlings as they disperse to wetland environments (Pappas et al. 2009). The spatial extent of the new nesting areas is shown in Figures 6a and 6b. In total, 1.3 ha</p>			

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		of new functional nesting habitat will be created. In contrast, the lost nesting area had an estimated functional habitat of 1.61 ha (Refer to Figure 3b).			
Habitat Removal - Category 1 Hibernacula	Table B (Appendix B) shows the quantification of the anticipated habitat loss. The removal of the hibernacula from KNL 8 results in a loss of -2.9 ha of Category 1 overwintering habitat. All of this habitat will be removed by the planned development.	The hibernacula will be retained for the overwintering season of 2015-2016. Clearing and other work on the extension of Goulbourn Forced Road will be undertaken in the vicinity of the hibernacula in the 2015-2016 overwintering season, during which the hibernacula will be protected by temporary fencing and retention of trees around the hibernacula. Prior to the beginning of the active season in 2016, a corridor of fencing will be built around the hibernacula to direct turtles to leave the work area by moving towards the passage culvert to the northwest (towards Terry Fox Drive). This fencing will direct turtles coming out of the hibernacula to leave the work area. Turtles will be intensively monitored several times each week during the early active	Table B (Appendix B) shows a quantification of the residual habitat loss following the creation of compensation habitat. There will be a net decrease in the size of hibernacula habitat of -1.5 ha (-8.2%). This residual impact will be compensated for through the off-site fencing and research program overall benefit measures outlined in Table 3 of this form.	The post construction monitoring program is described above in Row 4. As noted above, vegetation monitoring of the newly constructed habitat features will include maintenance of a photographic record showing the condition of the new habitat features. Telemetry tracking data will provide evidence of whether turtles are utilizing the new hibernacula pool.	Ongoing maintenance of the new hibernacula pool may be required. This would primarily be required to ensure that the area remains free of invasive vegetation, that it is sufficiently deep, and also to ensure that it retains water. The monitoring program will allow for adaptive management of the new hibernacula pool. If maintenance is required, this will be undertaken as a supplementary action. The new hibernacula pool will be maintained throughout the four year post construction monitoring.

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		<p>season in 2016 to ensure they leave the hibernacula successfully. This fenced corridor will be maintained and monitored until July 2016, when the fencing will be closed off, preventing turtles from returning to the hibernacula. The hibernacula will then be dewatered and backfilled in the late summer of 2016. Dewatering at this time will minimize the likelihood that turtles will be found in the pools. Dewatering will be monitored on a full time basis to ensure no turtles are present. The area of the hibernacula and adjacent fencing will be monitored intensively (multiple times each week) at the end of the 2016 active season following backfilling to ensure no turtles are trying to access the removed hibernacula. A contingency plan to relocate any turtles found during dewatering will be developed. This will include a contingency plan to relocate any turtles found trying to access the</p>			

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		<p>location of the hibernacula at the end of the 2016 active season.</p> <p>Table B (Appendix B) shows a quantification of the anticipated habitat creation to mitigate this habitat loss. A new deep wetland will be constructed at the west side of Shirley's Brook (Figure 6a). This feature is designed to function as new hibernacula habitat and as core Category 2 habitat. The purpose of the pool is to mitigate the loss of the existing hibernacula pools from KNL 8. The new pool will be dug in an area which is already partially wet habitat (e.g. willow thicket) but which does not currently provide a core wetland foraging or overwintering site. The pool will be dug in the path of the main channel of Shirley's Brook, with the channel disappearing into the pool (inline pool). The pool will be dug with a depth gradient so that the deepest point is approximately 2 m deep and so that the overall average depth of the deep pool will be approximately</p>			

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		<p>1 m. A gradient in depth will ensure that different depths are available to turtles and that water levels within the pool vary in order to allow adaptation to weather conditions. The deep pool will be dug within a habitat enhancement area with a diameter of approximately 80 m, approximately 2/3rds of which will be taken up by the deeper pool (Figure 6a). The deep pool will be graded so that the remaining 1/3rd of the habitat enhancement area transitions to an approximate average depth of 30 cm, which will provide shallow hemi-marsh habitat suitable for basking. The deep pool and hemi-marsh habitat will also feature a mixture of woody debris, grubbed stumps, logs, rock piles, flat rocks, and other cover materials that will be interspersed along the banks and within the wetland to provide cover for nestlings and juveniles, and also basking locations (Standing et al. 1997). The construction of the</p>			

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		<p>wetland and deep pool will include organic substrate including salvaged substrate from excavation areas. Planting will include a wetland restoration seed mix and natural regrowth. Sedge mats will also be relocated from lost wetland areas (those along the former Shirley's Brook alignment) to the new wetland area. It is anticipated that this new habitat feature will provide a potential future overwintering site (Category 1 hibernacula habitat), core foraging wetland (Category 2 habitat), it will attract turtles to the Shirley's Brook corridor and encourage their utilization of it as Category 3 movement habitat, and it will also help to attract turtles to the new nesting sites discussed in the following sections. In total, approximately 1.4 ha of new hibernacula habitat will be created through the construction of this pool.</p>			
Habitat Removal – Category 2 Habitat	Table B (Appendix B) shows a quantification of the anticipated habitat	During the 2015-2016 overwintering season, the new alignment of	Table B (Appendix B) shows a quantification of the residual habitat loss	The post construction monitoring program is described above in Row 4.	Ongoing maintenance of the Shirley's Brook realignment may be required. This

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	<p>loss. The total loss of Category 2 habitat is 33 ha. However, it should be noted that the realignment of Shirley's Brook (approximately 4.2 ha) is shown as both a 'loss' (e.g. removal of old alignment) and a compensation feature (e.g. construction of new alignment). This accounts for the majority of Category 2 habitat loss.</p>	<p>Shirley's Brook will be constructed. However, water flow will be maintained within the existing alignment of Shirley's Brook for an additional year in order to provide opportunity for the new alignment to grow in. The old alignment of Shirley's Brook will not be removed until the 2016-2017 overwintering season. A major component of the proposed habitat creation and enhancement project within the KNL 7 & 8 lands will be the realignment and restoration of Shirley's Brook. The purpose of the realignment project will be to move a portion of Shirley's Brook northward so that it will run approximately parallel with the rail line. This will reduce the impact of the watercourse on the availability of development land and will also provide the opportunity to enhance the habitat of Shirley's Brook through KNL 7 & 8 and restore the aquatic environment. It is</p>	<p>following the creation of compensation habitat. There will be a net decrease in the size of Category 2 habitat of -28.8 ha (-42.6%). This residual impact will be compensated for through the off-site fencing and research program overall benefit measures outlined in Table 3 of this form.</p>	<p>As noted above, vegetation monitoring of the newly constructed habitat features will include maintenance of a photographic record showing the condition of the new habitat features. Telemetry tracking data will provide evidence of whether turtles are utilizing the new alignment of Shirley's Brook.</p>	<p>would primarily be required to ensure that the area remains free of invasive vegetation, and also to ensure that it has stable banks and optimal vegetation coverage. The monitoring program will allow for adaptive management of the new alignment of Shirley's Brook. If maintenance is required, it will be undertaken as a supplementary action. The new alignment of Shirley's Brook will be maintained throughout the four (4) year post construction monitoring program.</p>

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		<p>anticipated that a total of 4.2 ha of new Category 2 habitat will be created over the course of this project, the majority of which will come from the Shirley's Brook realignment. The Shirley's Brook realignment will also contribute an east-west movement corridor for turtles to move through the subdivision. Figure 4 shows the post-development path of Shirley's Brook following the proposed realignment and restoration project. Figure 6a shows a close-up of the western side of the realigned Shirley's Brook including several new habitat features (discussed in Row 5 and 6 above). As shown in Figure 4, the current alignment of Shirley's Brook will largely be maintained through KNL 8. Realignment and habitat enhancement work will begin within the section shown in Figure 6a (at the west side of the rail line) and areas of Shirley's Brook north of this section will largely be maintained within their current</p>			

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		<p>alignment. Moving south, Shirley's Brook would cross the rail line through the existing culvert and would enter KNL 7. From where Shirley's Brook enters KNL 7 eastward to Goulbourn Forced Road (GFR), the watercourse will be moved northward to run parallel with the rail line through a 30 m wide corridor. Ultimately Shirley's Brook will leave KNL 7 through the same culvert where it currently crosses GFR, and so the watercourse's alignment will remain unchanged both upstream and downstream of KNL 7 (although there would be some habitat enhancement work north of the rail line within KNL 8). Natural channel design principles will be utilized to restore Shirley's Brook during the realignment project (Doll et al. 2003). The channel itself will be realigned to create a moderately meandering stream. The stream will be realigned within a 30 m corridor with a wetted width of 1 to 4 m and the remainder of the corridor will serve as</p>			

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		<p>terrestrial vegetative buffer/riparian vegetation. Emergent materials for basking and cover materials will be added to the realigned channel. As noted above, the new habitat enhancement features, including the realigned Shirley's Brook, will be constructed during the 2015-2016 overwintering season. The old alignment of Shirley's Brook will be left in place for approximately one (1) year after this, and will be removed during the following overwintering season of 2016-2017. This approach is advantageous as it will reduce the risks to turtles during the transition from old to new habitats, and will provide one active season (2016) when both the new and old habitat features exist on the landscape. Once fencing of the area is complete, vegetation clearing and backfilling of the old course of Shirley's Brook will be undertaken in the winter of 2016-2017. Conducting this activity in the winter will reduce the likelihood</p>			

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		<p>of impacts to turtles, as turtles will not be on the landscape during this time and hence will not be impacted by construction equipment. It is not anticipated that turtle relocation will be necessary from the old alignment of Shirley's Brook, as monitoring data has not previously demonstrated that turtles have overwintered in Shirley's Brook. Nonetheless, a contingency plan will be developed to prepare for the possibility (even if unlikely) that turtles may need to be relocated in the winter of 2016-2017 during the backfilling of the old alignment of Shirley's Brook.</p> <p>It should also be noted that in order to reduce the total impact on Category 2 habitat, KNL has sacrificed an additional 2.12 ha of development land north of the rail line under the arc of Terry Fox in order to protect wetlands in this vicinity (Block 18, Figure 2). This includes the loss of approximately 10 housing</p>			

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		lots as well as reduction in lot sizes. The value of the development land sacrificed by KNL to avoid impacts to these key habitat features is approximately \$1,570,000.00, based on an estimated (pre-development) land value of \$300,000.00 per acre. It should be noted that the post development (retail value) of houses to be built on sacrificed lots considerably exceeds this number and amounts to several million dollars in lost retail value.			
ROW 8 BLANK DUE TO FORMATTING PROBLEMS					
Habitat Removal - Category 3 Habitat	The majority of Category 3 habitat will be removed by the proposed development. As shown in Appendix B, Table B, approximately -86.3 ha (-61.6%) of Category 3 habitat will be removed. The main functional impact of the loss of Category 3 habitat is that a north-south movement corridor through the KNL lands will no longer be available. Currently, turtles are known to move	The retention of the Category 2 habitat blocks north and south of the intersection of the rail line and Shirley's Brook help to mitigate the impacts of the removal of Category 3 habitat. As shown in Figure 4, the retained habitat blocks on the west side of Shirley's Brook maintain access to four (4) different Terry Fox Drive wildlife passage culverts, allowing a direct connection to the South	The residual impact on Category 3 habitat functionality will be the loss of a north-south movement corridor between the Kizell Cell and the South March Highlands Conservation Forest. This residual impact is compensated for by the offsite fencing (overall benefit measure) discussed in Table 3 of this form. The primary ecological risk associated with the loss of a north-	The post construction monitoring program is described above in Row 4. Telemetry tracking data will provide evidence of whether turtles are continuing to utilize the movement corridors outlined above.	Ongoing maintenance of the new habitat enhancement features that provide a turtle movement corridor may be required. The monitoring program will allow for adaptive management of the retained habitat areas. If maintenance is required, it will be undertaken as a supplementary action.

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	<p>between the Kizell Cell and the South March Highlands Conservation Forest through KNL 7 & 8 in a north-south direction (Dillon 2013b). Turtles also currently move from the Kizell Cell to the hibernacula and nesting areas in KNL 8. As noted above, the hibernacula and KNL 8 nesting area will no longer exist following development, and so a movement corridor to these features is not required following development. Movement corridors will continue to exist along Shirley's Brook, through the retained habitat blocks north and south of the rail line, and west beyond Terry Fox to the Carp River. The Kizell Cell will also continue to connect to the Carp River through NEA lands owned by Regional Group. Thereby, two (2) west-east movement corridors will continue to exist within the KNL lands.</p>	<p>March Highlands Conservation Forest and the Carp River from Shirley's Brook. This maintains a viable east-west movement corridor along Shirley's Brook, through the retained habitat blocks, and west beyond Terry Fox Drive to the Carp River. A second movement corridor allows westward movement out of the Kizell Cell into the NEA lands owned by Regional Group, and beyond this to the Carp River. Regional Group are currently proposing to enhance this movement corridor through construction of additional fencing and new wetlands east of Terry Fox Drive (presented as a separate Overall Benefit Permit for the Richardson Ridge Phase 4 development). Regional Group's proposed overall benefit project will help mitigate the loss of Category 3 habitat within Richardson Ridge Phase 4 and KNL 7 & 8 by enhancing the westward connection to the Carp River. Thereby, two (2) west-east</p>	<p>south movement corridor is isolation of the Kizell Cell subpopulation from the remainder of the Blanding's Turtle population in the South March Highlands Conservation Forest. In the field of population genetics, there is a generally accepted rule that in order for populations to remain genetically connected, a breeding migrant must move from one subpopulation to the other at least once per generation (Mills & Allendorf 1996; Wang 2004). While the amount of genetic exchange required between subpopulations may vary between different species and taxa, generally the one-migrant-per-generation rule is accepted as a standard benchmark. Following development, breeding migrants would not be able to move directly between the South March Highlands Conservation Forest and the Kizell Cell, but would instead need to meet in wetlands along the Carp River, or use the</p>		