

Appendix F  
Detailed Options Evaluation



| Category & Criterion | Description  | Measure/Indicator  | Rating Scale for Measuring Impacts |   | Alternative 1: Do Nothing  |       | Alternative 2: Free Flowing River  |       | Alternative 3: Reinststate the Dam   |       |
|----------------------|--|--|------------------------------------|---|--|-------|--|-------|--|-------|
| Natural Environment  |  |  |                                    |   | Comparative Evaluation   | Score | Comparative Evaluation   | Score | Comparative Evaluation   | Score |
| Water Quality        | The potential of the option to maintain or improve water quality.  | Potential change in water quality compared to the existing conditons for total suspended solids and total phosphorus.                            | 5                                  | Improvement to water quality from existing conditions (postive effect)  | No change anticipated in TSS or TP if no further work is done on the dam or other infrastructure works are not completed. Improvement may be recognized through other initiatives  | 3     | Improvements in water quality anticipated in TSS and TP reductions based on statistical analysis of historical water quality data before and after dam failure. River management implementation may also support improvements in DO and temperature over and above the existing condition.   | 5     | Statistical analysis of historical water quality data before and after dam failure indicates that water quality would be degraed from existing condition if the dam was reinstated. This may also be exacerbated through climate change.   | 1     |
|                      |  |  | 3                                  | No change in water quality from existing conditions (neutral effect)  |  |       |  |       |  |       |
|                      |  |  | 1                                  | Decrease/degradation in water quality from existing conditions (negative effect)  |  |       |  |       |  |       |
| Geomorphology        | The potential of the option to result in a stable river system (i.e. stable streambanks and stream bottom conditions) to optimize sediment transport to support a healthy aquatic environment. | Potential change in the extent and risk of streambank erosion and stream bottom scour compared to the existing conditions.                       | 5                                  | Improvement in the stability of the river system from existing conditions (positive effect)   | Existing condition does not have extensive areas of erosion. If no further work is carried out on the dam or river it would be anticipated that no substantial changes in stability would occur. There may be a change in stability through climate change impacts on flood flows and stream velocities during extreme weather events. | 3     | Existing condition does not have extensive areas of erosion. If further work is carried out on the river to improve existing conditions through flood management and improvements to the riparian zone it would be anticipated that some improvements could be made and that these changes might mitigate instability that may result from climate change impacts on flood flows and stream velocities during extreme weather events.                | 4     | Existing condition does not have extensive areas of erosion.Operation of a reinstated dam would resuklt in loss of streambank vegetation which, in turn would result in bare soils exposed when reservoir is emptied during November to April which could be anticipated to cause additional erosion and instability. Widely fluctuating water levels during changes in operation would result in increased erosion and instability. | 1     |
|                      |  |  | 3                                  | No change in the stability of the river system from existing conditions (neutral effect)  |  |       |  |       |  |       |
|                      |  |  | 1                                  | Decrease in the stability of the river system from existing conditions (negative effect)  |  |       |  |       |  |       |
| Species at Risk      | The potential of the option to protect and enhance the habitat of sensitive species and species at risk (both aquatic and terrestrial).  | Potential change in the extent and quality of significant habitats for sensitive species and species as risk compared to the existing conditons. | 5                                  | Improvement in the extent and quality of significant habitats for sensitive species and species at risk from existing conditons (positive effect) | Leaving the existing condition with no further work carried out would allow the river to continue naturalizing in ecological diversity.  | 3     | Leaving the existing condition with additional design elements for aquatic habitat within the river management strategy would be anticipated to provide additional support for ecological diversity in the river over and above the existing condition.  | 5     | Reinstating the dam would be anticipated to have a deliterious effect on the ecological diversity in the river from existing conditions because of the elimination of a stable natural riverine habitat.   | 1     |
|                      |  |  | 3                                  | No change iin the extent and quality of significant habitats for sensitive species and species at risk from existing conditons (neutral effect)   |  |       |  |       |  |       |
|                      |  |  | 1                                  | Decrease in the extent and quality of significant habitats for sensitive species and species at risk from existing conditions (negative effect)   |  |       |  |       |  |       |
| Terrestrial Habitat  | The potential for the option to maintain or enhance terrestrial and riparian habitat for both plants and animals.  | Potential change in the terrestrial habitat function and production capacity compared to existing conditions                                     | 5                                  | Improvement in the terrestrial habitat function and production capacity from existing conditions (positive effect)                                | Leaving the existing condition with no further work carried out would allow the river to continue naturalizing iits riparian zone with more variety and dense vegation.  | 3     | Leaving the existing condition with additional intervention to strategically plant desired species of vegetation and eliminate invasive species within the river management strategy would be anticipated to provide additional support for riparian habitat diversity in the river over and above the existing condition.   | 5     | The reinstatement of the Springbank dam would eliminate the vegetation in the riparian areas upstream of the dam that exist under the existing condition by flooding these areas during months of dam operation and leave these riverbank areas devoid of vegetation for much of the year when the dam was not operational.  | 1     |
|                      |  |  | 3                                  | No change in the terrestrial habitat function and production capacity from existing conditions (neutral effect)                                   |  |       |  |       |  |       |
|                      |  |  | 1                                  | Decrease in the terrestrial habitat function and production capacity from existing conditions (negative effect)                                   |  |       |  |       |  |       |
| Aquatic Habitat      | The potential for the option to maintain or enhance habitat for aquatic dependent species.   | Potential change in the aquatic habitat function and production capacity compared to existing conditions.  | 5                                  | Improvement in the aquatic habitat function and production capacity from existing conditions (positive effect)                                    | Under existing conditions, the river has been flowing freely as a natural flowing system and that annual stability has resulted in the positive expansion of river and floodplain habitats that are important to many species.   | 3     | Under existing conditions, the river has been flowing freely as a natural flowing system and that annual stability has resulted in the positive expansion of river and floodplain habitats that are important to many species. If habitat improvements are made in the river through implementation of the river management strategy it would be anticipated that additional habitat improvements would occur over and above the existing condition. | 5     | It could be anticipated that reinstatement of the dam would result in the loss of diverse riverine habitat areas compared to the existing condition due to flooding of river habitata during dam operation.  | 1     |
|                      |  |  | 3                                  | No change in the aquatic habitat function and production capacity from existing conditions (neutral effect)                                       |  |       |  |       |  |       |
|                      |  |  | 1                                  | Decrease in the aquatic habitat function and production capacity from existing conditions (negative effect)                                       |  |       |  |       |  |       |

| Category & Criterion                       | Description  | Measure/Indicator  | Rating Scale for Measuring Impacts |   | Alternative 1: Do Nothing  | Alternative 2: Free Flowing River | Alternative 3: Reinstatement of the Dam  |     |  |     |
|--|--|--|------------------------------------|---|--|-----------------------------------|--|-----|--|-----|
| Groundwater and Surface Water Interactions | The potential of the option to protect or improve groundwater and surface water interactions in order to maintain or improve water quality and quantity. | Potential changes in the groundwater and surface water interactions compared to existing conditions.               | 5                                  | Improvement in groundwater and surface water interactions from existing conditions resulting in improvements to water quality and quantity (positive)                     | It could be anticipated that groundwater/surface water interactions would not change.  | 3                                 | It could be anticipated that groundwater/surface water interactions would not change over and above the existing condition.  | 3   | It could be anticipated that with reinstatement of the dam, the increased water surface elevation would result in more surface water being discharged to groundwater over and above the existing condition.  |     |
|  |  |  | 3                                  | No change in groundwater and surface water interactions from existing conditions resulting in no changes to water quality and quantity (neutral effect)                   |  |                                   |  |     |  |     |
|  |  |  | 1                                  | Decrease in groundwater and surface water interactions from existing conditions resulting in degradation to water quality or decrease in water quantity (negative effect) |  |                                   |  |     |  |     |
|  |  |  |                                    |   | Subtotal   | 18                                | Subtotal   | 27  | Subtotal   | 8   |
|  |  |  |                                    |   | Normalized to out of 5   | 3.0                               | Normalized to out of 5   | 4.5 | Normalized to out of 5   | 1.3 |
| <b>Social/Cultural</b>                     |  |  |                                    |   |  |                                   |  |     |  |     |
| Cultural Heritage                          | The potential of the option to protect cultural/heritage resources.  | Potential of the construction and related changes to the river regime to impact cultural heritage resources.       | 5                                  | Potential to improve cultural/heritage resources due to construction and related changes to the river regime  | Without active river management as part of the solution, there is more risk of shoreline erosion which may result in degradation of cultural heritage resources within the Thames River corridor.    | 2                                 | By implementing River Management projects (to be identified in Stage 2 of the EA), there is opportunity to further protect cultural/heritage resources.  | 4   | By implementing River Management projects (to be identified in Stage 2 of the EA), there is opportunity to further protect cultural/heritage resources.  |     |
|  |  |  | 3                                  | No potential to degrade cultural/heritage resources due to construction and related changes to the river regime   |  |                                   |  |     |  |     |
|  |  |  | 1                                  | Potential to degrade cultural/heritage resources due to construction and related changes to the river regime  |  |                                   |  |     |  |     |
| Public Health & Safety                     | The potential of the option to minimize risk or liability to community health and safety.  | Potential change in risk or liability to community health and safety from existing conditions.                     | 5                                  | Potential to improve potential risk or liability to community health and safety   | With no management of the existing dam structures and no strategy to manage the River, risks to human health and safety increases.   | 1                                 | Under this option the River will continue to be managed to protect human health and safety. Flood protection will be considered as a factor in selection of River management projects in Stage 2 to reduce the risk of flooding from the existing conditions.            | 4   | Under this option the dam and River will continue to be managed to protect human health and safety. The dam would be operated to reduce the risks of flooding, and flood protection will be considered as a factor in selection of River management projects in Stage 2 to further reduce the risk of flooding from the existing conditions. |     |
|  |  |  | 3                                  | No change in potential risk or liability to community health and safety   |  |                                   |  |     |  |     |
|  |  |  | 1                                  | Potential to degrade potential risk or liability to community health and safety   |  |                                   |  |     |  |     |
| Boating Recreation                         | The potential of the option to provide or enhance boating recreational activities.   | Potential change in boating (canoeing, kayaking, etc.) recreational activities and areas from existing conditions. | 5                                  | Improvement in boating recreational activities and areas from existing conditions (positive effect)   | If no River Management strategies are implemented the river will to naturalize with no controls, and boating opportunities will decrease.  | 2                                 | River management strategies (identified in Stage 2 of the EA) will consider channel improvements to improve opportunities for boaters.   | 4   | Reinstating the dam will provide deeper waters to improve boating recreational activities.   |     |
|  |  |  | 3                                  | No change in boating recreational activities and areas from existing conditions (neutral effect)  |  |                                   |  |     |  |     |
|  |  |  | 1                                  | Decrease in boating recreational activities and areas from existing conditions (negative effect)  |  |                                   |  |     |  |     |
| Fishing Recreation                         | The potential of the option to provide or enhance fishing recreational activities.   | Potential change in fishing recreational activities and areas from existing conditions.                            | 5                                  | Improvement in fishing recreational activities and areas from existing conditions (positive effect)   | Fishing is expected to remain the same as present if no improvements to the River are implemented.   | 3                                 | A free flowing river, with continued River Management will result in more fish species; the invasive fish species will be reduced. Fishing will improve as a result.   | 5   | Reinstating the dam will result in more invasive fish species, and a general reduction in the types of fish. There will be a decrease in the fishing recreational activities as a result.  |     |
|  |  |  | 3                                  | No change in fishing recreational activities and areas from existing conditions (neutral effect)  |  |                                   |  |     |  |     |
|  |  |  | 1                                  | Decrease in fishing recreational activities and areas from existing conditions (negative effect)  |  |                                   |  |     |  |     |
| Land- Based Recreation                     | The potential of the option to provide or enhance land-based recreational activities such as walking, biking and bird watching.                          | Potential change in land-based recreational activities and areas from existing conditions.                         | 5                                  | Improvement in land-based recreational activities and areas from existing conditions (positive effect)  | If no River Management strategies are implemented the river will continue to naturalize with no controls; land-based recreational activities will be negatively impacted as a result.                | 2                                 | River Management strategies will help improve, protect and enhance land-based recreational activities.   | 4   | River Management strategies (with controlled water levels associate with reinstating the dam) will provide the greatest opportunities to improve, protect and enhance land-based recreational activities.  |     |
|  |  |  | 3                                  | No change in land-based recreational activities or areas from existing conditions (neutral effect)  |  |                                   |  |     |  |     |
|  |  |  | 1                                  | Decrease in land-based recreational activities or areas from existing conditions (negative effect)  |  |                                   |  |     |  |     |
| Shoreline Accessibility                    | The potential of the option to enhance public accessibility to the river.  | Potential change in sites and areas for shoreline access from existing conditions.                                 | 5                                  | Improvement in sites and areas for shoreline access from existing conditions (positive effect)  | If not River management strategies are implemented the River will continue to naturalize with no controls; accessibility to the river will reduce as a result.                                       | 2                                 | A free flowing river, with continued River Management will result help improve sites and areas for shoreline access from existing conditions.  | 4   | Reinstating the dam, with continued River Management will provide the most opportunities to improve sites and areas for shoreline access from existing conditions as a result of the ability to control water levels.  |     |
|  |  |  | 3                                  | No change in sites and areas for shoreline access from existing conditions (neutral effect)   |  |                                   |  |     |  |     |
|  |  |  | 1                                  | Decrease in sites and areas for shoreline access from existing conditions (negative effect)   |  |                                   |  |     |  |     |
| Aesthetics                                 | The potential of the option to maintain or enhance the visual character of the river corridor.   | Potential change in the visual character of the river corridor from existing conditions.                           | 5                                  | Improvement in the visual character of the river corridor from existing conditions (positive effect)  | If no River Management strategies are implemented the river will continue to naturalize with no controls; the visual character of the area will be continue to degrade as a result of doing nothing. | 2                                 | A free flowing river, with continued River Management will provide more "natural" benefits associate with a moving river (e.g. sounds, more natural flora and fauna); It is preceived by some stakeholders to improvement to the visual character of the river corridor. | 5   | Controlling water levels in the river by reinstating the dam, with continued River Management will provide more "man-made" benefits associate with deeper water levels river (e.g. more accessibility to water, more boating activities). It is preceived by some stakeholders to improvement to the visual character of the river corridor. |     |
|  |  |  | 3                                  | No change in visual character of the river corridor from existing conditions (neutral effect)   |  |                                   |  |     |  |     |
|  |  |  | 1                                  | Decrease in the visual character of the river corridor from existing conditions (negative effect)   |  |                                   |  |     |  |     |

| Category & Criterion          | Description  | Measure/Indicator  | Rating Scale for Measuring Impacts |  | Alternative 1: Do Nothing   | Alternative 2: Free Flowing River | Alternative 3: Reinstatement the Dam  |     |   |     |
|-------------------------------|--|--|------------------------------------|--|---|-----------------------------------|---|-----|---|-----|
| First Nations Interest        | The potential of the option to address First Nations and Métis interests.  | Ability to address First Nations and Métis interests.  | 5                                  | Fully addresses First Nations and Métis interest   | The do nothing options partially addresses First Nations and Métis interests  | 3                                 | A free-flowing river, with proper River management strategies fully addresses First Nations and Métis interests, as indicated through consultation activities and input received.   | 5   | Reinstating the dam, is against the interests of the First Nations and Métis (including protection of the natural environment, such as fisheries and water quality)   | 1   |
|                               |  |  | 3                                  | Partially addresses First Nations and Métis interests  |   |                                   |   |     |   |     |
|                               |  |  | 1                                  | Does not address First Nations and Métis interests   |   |                                   |   |     |   |     |
| Urban Revitalization          | The potential of the option to encourage investing in London's downtown as the heart of the City to support urban regeneration and revitalization. | Potential to encourage investing in London's downtown.   | 5                                  | High potential for encouraging investing in London's downtown in support of urban regeneration and revitalization                                    | The do nothing options will result in some degradation of the dam and river corridor, potentially discouraging investing in London's downtown   | 2                                 | A free flowing, managed river has the potential to encourage more investment in London's downtown   | 4   | A controlled river, offers more recreational activities (e.g. rowing) which could potentially have the greatest potential of all options to encourage more tourism and investing in London's downtown.  | 5   |
|                               |  |  | 3                                  | Moderate potential for encouraging investing in London's downtown in support of urban regeneration and revitalization                                |   |                                   |   |     |   |     |
|                               |  |  | 1                                  | Low or negative potential for encouraging investing in London's downtown in support of urban regeneration and revitalization                         |   |                                   |   |     |   |     |
|                               |  |  |                                    |  | Subtotal  | 19                                | Subtotal  | 39  | Subtotal  | 37  |
|                               |  |  |                                    |  | Normalized to out of 5  | 2.1                               | Normalized to out of 5  | 4.3 | Normalized to out of 5  | 4.1 |
| <b>Technical and Economic</b> |  |  |                                    |  |   |                                   |   |     |   |     |
| Flood Hazard                  | The ability of the option to mitigate flood hazards.   | Potential change in risk of flood and erosion damage to public infrastructure and private property.  | 5                                  | Decrease in potential risk of flooding   | Do nothing will provide no change in potential risk of flooding   | 3                                 | River Management Strategies will cause reduction flooding; Flood protection will be considered as a factor in selection of River management projects in Stage 2 to reduce the risk of flooding from the existing conditions.  | 4   | If the dam is reinstating it will be continue to raise and lower based on season. Additionally, a re-instated dam would be operated in emergency situations to control potential flooding. The River Management Strategies will also help reduce the risk of flooding; Flood protection will be considered as a factor in selection of River management projects in Stage 2 to reduce the risk of flooding from the existing conditions.  | 5   |
|                               |  |  | 3                                  | No change in potential risk of flooding  |   |                                   |   |     |   |     |
|                               |  |  | 1                                  | Increase in potential risk of flooding   |   |                                   |   |     |   |     |
| Carbon Footprint              | The ability of the option to minimize carbon footprint.  | Potential change in carbon footprint from existing conditons, including the change in energy requirements during construction and operations.  | 5                                  | Potential to reduce carbon footprint or energy requirements compared to existing system  | There will be no change in carbon footprint or energy requirements.   | 3                                 | There will be no discernible change in carbon footprint or energy requirements. More vegetation may have some minor, but non-significant decreases in carbon footprint.   | 3   | There is potential to increase carbon footprint and energy use by constructing and operating the dam.   | 2   |
|                               |  |  | 3                                  | No change carbon footprint or energy requirements compared to existing system  |   |                                   |   |     |   |     |
|                               |  |  | 1                                  | Potential to increase carbon footprint or energy requirements compared to existing system  |   |                                   |   |     |   |     |
| Constructability              | The ease of the option to be constructed and implemented on a technical basis.   | Ease of constructing the option, considering land requirements for works and staging areas, construction equipment, timeframe for construction | 5                                  | Easy to implement; no or very little construction requirements   | No construction requirements; easy to implement on a technical basis  | 5                                 | From a technical basis the option is moderately easy to implement; it requires modifications to the dam, and the implementation of the River Management Strategies  | 3   | From a technical basis the options is slightly more difficult to implement than Option 2; as it requires re-construction of the existing dam.   | 2   |
|                               |  |  | 3                                  | Moderately easy to implement; some challenges with construction such as land and equipment requirements, and timeframe for construction              |   |                                   |   |     |   |     |
|                               |  |  | 1                                  | Very difficult to implement; major construction challenges such as land and equipment availability/requirements, and long timeframe for construction |   |                                   |   |     |   |     |
| Approvability                 | The ease of the option to obtain required permits and approvals from regulating agencies (e.g. UTRCA, MNRF, MOECC, DFO).                           | Ease of obtaining approvals and permits, including timeframe for receiving   | 5                                  | No or very little approval requirements  | Do nothing will require some permits to keep the dam, including a Dam Construction Regulation Permit from the Ministry of Natural Resources, and approval under the a Species at Risk Act from Department of Fisheries and Oceans as a fish passage will still be required. | 4                                 | The free-flowing river option, requires approvals by Upper Thames Conservation Authority (Permit under section 28); Dam Construction Regulation Permit and an Overall Benefit Permit from the Ministry of Natural Resources; a permit under the Species at Risk Act by the Department of Fisheries and Oceans (need for fish passage); and a Navigable Waters Permit from Transport Canada. Because there are not many changes from current the process to receive these permits is deemed moderately easy. | 3   | Reinstating the dam requires the most permits, and will be the most difficult to receive given the potential loss to species at risk if implemented. Significant mitigation and compensation would be required to receive required permits: including approvals by Upper Thames Conservation Authority (Permit under section 28); Dam Construction Regulation Permit and an Overall Benefit Permit from the Ministry of Natural Resources; a permit under the Species at Risk Act by the Department of Fisheries and Oceans (need for fish passage); and a Navigable Waters Permit from Transport Canada; and Permit to take Water from the Ministry of Environment and Climate Change to re-construct the dam. | 1   |
|                               |  |  | 3                                  | Moderately easy to to obtain permits and approvals; some challenges relating to timelines and number of approvals necessary but conditions are minor |   |                                   |   |     |   |     |
|                               |  |  | 1                                  | Very difficult to receive permits and approvals; timeframe is long and conditions are major  |   |                                   |   |     |   |     |
| Operations & Maintenance      | The ease of the option to be operated and maintained.  | Degree of change in operations and maintenance requirements from existing conditions   | 5                                  | Lowest degree of change operations and maintenance requirements from existing conditions   | Operational and maintenance will not change from existing conditons.  | 5                                 | Will have to continue to maintain the River Management options  | 3   | Will have to continue to operate and maintain the dam; and also the River Management options. Has the most operational and maintenance requirements of all options,   | 1   |
|                               |  |  | 3                                  | Moderate degree of change in operation and maintenance requirements from existing conditions   |   |                                   |   |     |   |     |
|                               |  |  | 1                                  | Highest degree of change in operation and maintenance requirements from existing conditions  |   |                                   |   |     |   |     |

| Category & Criterion  | Description   | Measure/Indicator   | Rating Scale for Measuring Impacts |   | Alternative 1: Do Nothing  |            | Alternative 2: Free Flowing River  |            | Alternative 3: Reinststate the Dam   |     |
|---|---|---|------------------------------------|---|--|------------|--|------------|--|-----|
| Compatibility with existing and planned infrastructure projects | The compatibility of the option with existing and planned public infrastructure projects. | Ability of an option to be integrated with or complement existing and planned infrastructure projects | 5                                  | Very compatible with existing and planned infrastructure        | Do nothing will not be compatible with the existing and planned infrastructure (e.g. Thames River Corridor Plan, London Plan, and Back to the River Plan design) | 1          | The option can be integrate with and complement existing and planned infrastructure projects (e.g. Thames River Corridor Plan, London Plan, and Back to the River Plan) through the development of appropriate River management strategies in Stage 2 of the Master Plan EA. | 3          | The option can be integrate with and complement existing and planned infrastructure projects (e.g. Thames River Corridor Plan, London Plan, and Back to the River Plan) through the development of appropriate River management strategies in Stage 2 of the Master Plan EA. | 3   |
|   |   |   | 3                                  | Moderately compatible with existing and planned infrastructure  |  |            |  |            |  |     |
|   |   |   | 1                                  | Very low compatibility with existing and planned infrastructure |  |            |  |            |  |     |
| Capital Cost  | Relative capital costs.   | Capital costs of an option relative to other options  | 5                                  | Lowest capital costs  | Do nothing will have minimal capital costs   | 5          | Enhancing the dam structures to provide a free-flowing river, while managing the River corridor will be moderate costs compared to other options.  | 3          | Reinstating the dam while managing the River cooridor will be the most costly relative to the other options.   | 1   |
|   |   |   | 3                                  | Moderate capital costs  |  |            |  |            |  |     |
|   |   |   | 1                                  | High capital costs  |  |            |  |            |  |     |
|   |   |   |                                    |   | Subtotal   | 26         | Subtotal   | 22         | Subtotal   | 15  |
|   |   |   |                                    |   | Normalized to out of 5   | 3.7        | Normalized to out of 5   | 3.1        | Normalized to out of 5   | 2.1 |
|   |   |   |                                    |   | Natural Environment  | 3.0        | 4.5  | 1.3        |  |     |
|   |   |   |                                    |   | Social/Cultural  | 2.1        | 4.3  | 4.1        |  |     |
|   |   |   |                                    |   | Technical and Economic   | 3.7        | 3.1  | 2.1        |  |     |
|   |   |   |                                    |   | <b>Total</b>   | <b>8.8</b> | <b>12.0</b>  | <b>7.6</b> |  |     |