RE SMITHS FALLS 6 SOLAR PROJECT

Water Body Site Investigations Report

February 23, 2011

RECURRENT ENERGY

RE Smiths Falls 6 ULC

Water Body Site Investigations Report

RE Smiths Falls 6 Solar Project

H334680-0000-07-124-0064
Rev. 1
February 23, 2011

Project Report

February 23, 2010

RE Smiths Falls 6 ULC
RE Smiths Falls 6 Solar Project

DRAFT Water Body Site Investigations Report

Table of Contents

1. Introduction 3

1.1 Project Description 3
1.2 Legislative Requirements 3

2. Summary of Results of Records Review 4

3. Site Investigation Methodology 5

3.1 Date, Time, and Duration of Site Investigation 5
3.2 Weather Conditions During Site Investigation 5
3.3 Name and Qualifications of Person Conducting Site Investigation 5
3.4 Survey Methods 6

4. Results of Site Investigation 6

4.1 Permanent or Intermittent Streams 6
4.1.1 Unnamed Tributary of Otter Creek 6
4.1.2 Otter Creek 12
4.1.3 Other Watercourses 12
4.2 Seepage Areas 12

5. Conclusions 13

6. References 13

Appendix A Site Investigation Field Notes

List of Tables

Table 2.1 Summary of Records Review Determinations 4

List of Figures

Figure 4.1 Water Body and Project Boundaries 7
Figure 4.2 Unnamed Tributary Crossing Project Site – View Upstream from Beaver Dam on the Project Site 9
Figure 4.3 View Downstream from the Eastern Project Site Boundary 10
Figure 4.4 Inundation at the Existing Farmer's Water Crossing of the Unnamed Tributary at the Eastern Project Boundary Due to Beaver Dam 10
Figure 4.5 Upstream View into Beaver Pond Adjacent to Eastern Project Site Boundary 11
Figure 4.6 Photograph of Groundwater Seepage Area near Eastern Project Boundary 13

1. Introduction

1.1 Project Description

RE Smiths Falls 6 ULC is proposing to develop and operate a 10-megawatt (MW) solar photovoltaic (Solar PV) facility, on an approximately 33-hectare (ha) parcel of land, located approximately 5 km southeast of Smiths Falls in the Township of Rideau Lakes in the United Counties of Leeds and Grenville; herein referred to as "RE Smiths Falls 6" or the "Project".

1.2 Legislative Requirements

Ontario Regulation (O. Reg.) 359/09 – *Renewable Energy Approvals Under Part V.0.1 of the Act*, (herein referred to as the REA Regulation) made under the *Environmental Protection Act* identifies the Renewable Energy Approval (REA) requirements for renewable energy projects in Ontario. As per Section 4 of the REA Regulation, ground mounted solar facilities with a name plate capacity greater than 10 kilowatts (kW) are classified as Class 3 solar facilities and do require an REA.

Section 31 of the REA Regulation requires proponents of Class 3 solar projects to undertake a water site investigation for the purpose of determining

a) whether the results of the analysis summarized in the (Water Body Records Review) report prepared under subsection 30 (2) are correct or require correction, and identifying any required corrections;

b) whether any additional waterbodies exist, other than those that were identified in the (Water Body Records Review) report prepared under subsection 30 (2);

c) the boundaries, located within 120 m of the project location, of any water body that was identified in the records review or the site investigation; and

d) the distance from the project location to the boundaries determined under clause (c).

The REA Regulation has specific requirements if designated lake trout lakes are present within 300 m of the Project site. No such lakes were found during the Water Body Records Review (Hatch Ltd., 2010), so these requirements are deemed not applicable.

Waterbodies are defined in Section 1(1) of the REA Regulation to include a lake, a permanent stream, an intermittent stream and a seepage area, but does not include

a) grassed waterways

b) temporary channels for surface drainage, such as furrows, or shallow channels that can be tilled or driven through

c) rock chutes and spillways

d) roadside ditches that do not contain a permanent or intermittent stream

e) temporarily ponded areas that are normally farmed

f) dugout ponds, or

g) artificial bodies of water intended for the storage, treatment or recirculation of runoff from farm animal yards, manure storage facilities and sites and outdoor confinement areas.

Subsection 3 of Section 31 of the REA Regulation requires the proponent to prepare a report setting out the following:

1. A summary of any corrections to the (Water Body Records Review) report prepared under subsection 30 (2) and the determinations made as a result of conducting the site investigations under subsection (1).
2. Information relating to each water body identified in the records review and in the site investigations, including the type of water body, plant and animal composition and the ecosystem of the land and water investigated.
3. A map showing
    i. the boundaries mentioned in clause (1) (c)
    ii. the location and type of each water body identified in relation to the project location, and
    iii. the distance mentioned in clause (1) (d).
4. The dates and times of the beginning and completion of the site investigation.
5. The duration of the site investigation.
6. The weather conditions during the site investigation.
7. A summary of methods used to make observations for the purposes of the site investigation.
8. The name and qualifications of any person conducting the site investigation.
9. Field notes kept by the person conducting the site investigation.

This Water Body Site Investigations Report has been prepared to meet these requirements.

2. Summary of Results of Records Review

Table 2.1 summarizes the results of the Water Body Records Review (Hatch Ltd., 2010).

Table 2.1 Summary of Records Review Determinations

Determination to be Made	Yes/No	Description
Is the Project in a water body?	No	No part of the project will be constructed within a waterbody
Is the Project within 120 m of the average annual high water mark of a lake, other than a lake trout lake that is at or above development capacity?	No	No lakes are located within 120 m of the Project site.
Is the Project within 300 m of the average annual high water mark of a lake trout lake that is at or above development capacity?	No	No lake trout lakes are present within 300 m of the Project site.

Determination to be Made	Yes/No	Description
Is the Project within 120 m of the average annual high water mark of a permanent or intermittent stream?	Yes	One small watercourse crosses the Project site.
Is the Project within 120 m of a seepage area?	No	No groundwater seepage areas were identified during the Records Review.

Therefore, depending on the layout of the proposed solar facility, some components of the Project could potentially be located within 120 m of the average annual high water mark of one permanent or intermittent stream. The Project could also be located within the 1:100-yr flood line of Otter Creek.

3. Site Investigation Methodology

3.1 Date, Time, and Duration of Site Investigation

- Date: April 30, 2010
- Start Time: 14:00 hours
- Duration: approximately 1 hour

3.2 Weather Conditions During Site Investigation

- Temperature: 22°C
- Beaufort Wind: 2 (7 to 11 km/h)
- Cloud Cover: 20%

3.3 Name and Qualifications of Person Conducting Site Investigation

The site investigation was completed by Sean K. Male.

Sean K. Male, M.Sc. is a Terrestrial Ecologist specializing in assessments of terrestrial habitat, flora and fauna. Sean received his Bachelors of Science (Honours) in Biology from Queen's University, where he completed his Honour's thesis under Dr. Raleigh J. Robertson, studying the impacts of nestbox density in Tree Swallows (*Tachycineta bicolor*) on nest-building behaviour. He then completed a Master's of Science degree in the Watershed Ecosystem Graduate Program at Trent University under Dr. Erica Nol. Sean's thesis focussed on examining the impacts of a Canadian diamond mine on a population of breeding passerines.

Sean joined Hatch as a Terrestrial Ecologist in 2006. Since joining Hatch, Sean has participated in several environmental assessments for hydro and wind power developments. He has developed and implemented baseline monitoring and impact assessment programs for both terrestrial wildlife and plant communities, including detailed bird and bat studies for several wind power developments, including the proposed 100-MW Coldwell Wind Power Development near Marathon, Ontario, a proposed 20-MW facility near Port Dover, Ontario, and a proposed 110-MW wind facility in southwestern Ontario. Sean has also conducted terrestrial and wetland vegetation for several

hydropower projects in southern and northern Ontario and has participated in fisheries surveys for several of these projects.

3.4 Survey Methods

The entire site was searched by the observer on foot in order to document waterbodies. Photographs of the site were taken. Any observations of waterbodies, including the type of water body, average annual high water mark, instream habitat types, surrounding riparian areas and wildlife use were noted.

A copy of the field notes kept by the observer is provided in Appendix A.

4. Results of Site Investigation

This section documents the results of the Site Investigation and discusses specific water features observed on and adjacent to the Project site. Features noted in the following sections are shown in Figure 4.1, which includes the proposed solar panel development footprint area (denoted as the "Project Boundary").

4.1 Permanent or Intermittent Streams

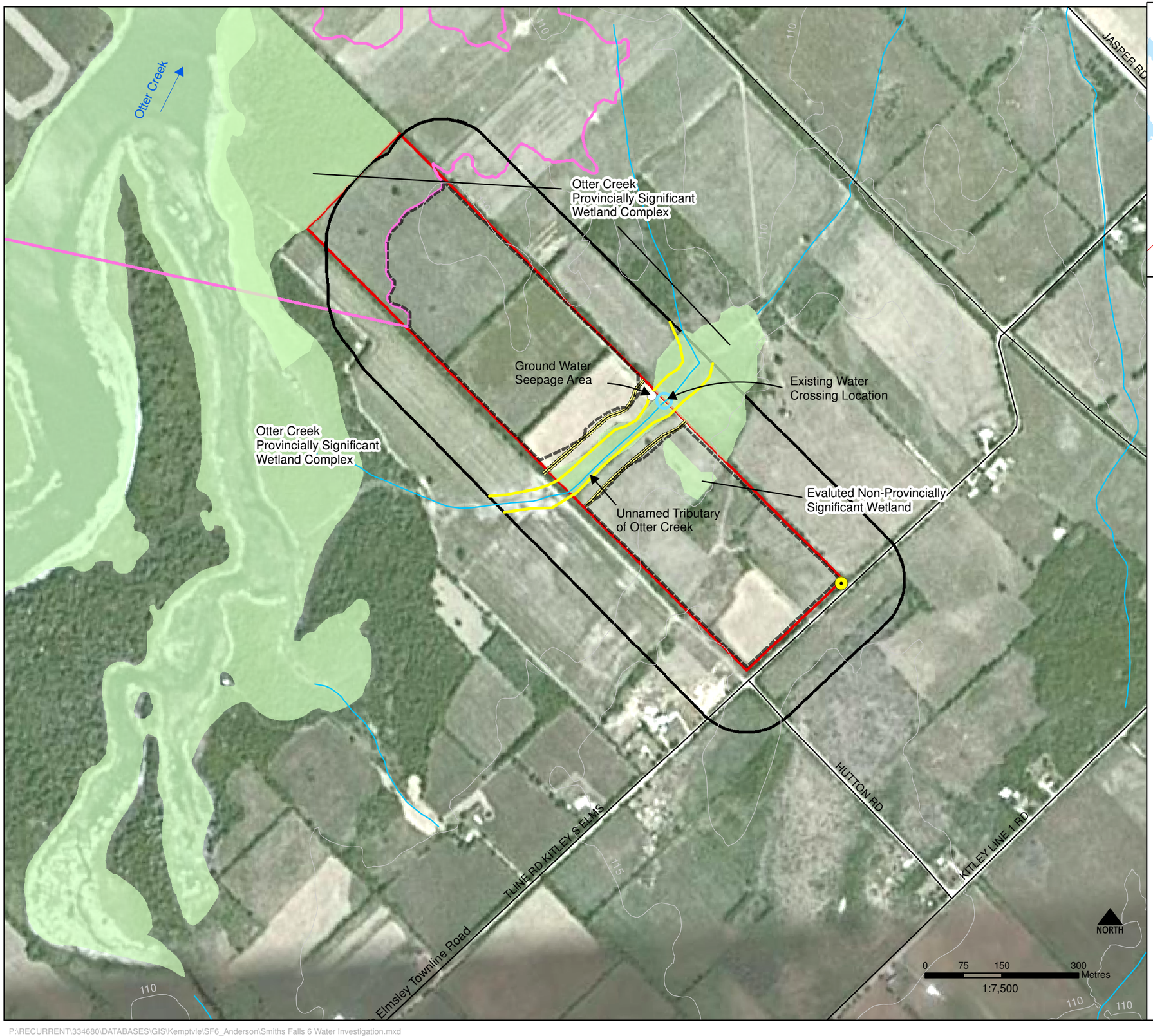
4.1.1 Unnamed Tributary of Otter Creek

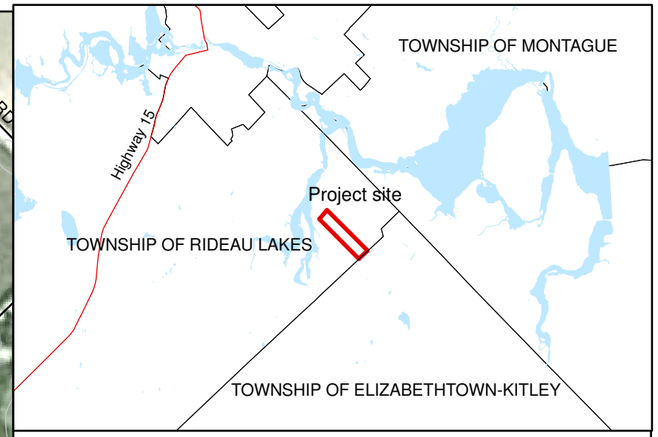
As noted in the Water Body Records Review Report (Hatch Ltd., 2010), there is an unnamed tributary of Otter Creek crossing the Project site (as shown in Figure 4.1). The watercourse originates in an agricultural field, approximately 0.5 km east of the Project site and runs in a southwesterly direction toward the Project boundary. It flows through the Project site in a northeast-southwest direction in a linear corridor. After leaving the Project site, the watercourse turns in a northwestern direction and flows into Otter Creek, which is a tributary of the Rideau River.

The waterbody corridor includes the watercourse channel itself and surrounding, naturally vegetated low lands/wetlands, adjacent to active agricultural fields. The watercourse is generally low gradient, consisting of slow-moving, run-type morphology. There is one small beaver dam across the channel, approximately half way across the Project site. The watercourse is approximately 4 to 5 m wide due to the impoundment created by the small dam, which extends to the western Project boundary. During the site investigation, water from the impoundment had inundated the existing water crossing that the farmer uses to access the northern portion of the property. The wetted channel downstream from the beaver dam was approximately 3 to 4 m wide.

Substrate in the channel is predominantly muck and other fine sediment. Water depth was approximately 0.60 m in the small beaver pond and 0.40 m downstream from the pond. The watercourse is relatively linear and was likely been channelized at some point in the past to facilitate agricultural activities.

The riparian corridor is approximately 30 m wide and consists of primarily shrubs (red-osier dogwood, willow species, prickly ash) with some trees (primarily ash species). Ground cover in the riparian area consists primarily of grasses and sedges.





Legend

- Road
- Rail
- Topographic Contour (5m Interval)
- Watercourse
- Average Annual High Water Mark
- 30 m Setback from Water Body
- Project Site
- Study Area
- Parcels
- Evaluated Wetland

Project Components

- Connection Point With Existing Distribution Line
- Project Location

Rideau Valley Conservation Authority Data

- 100 yr Flood Hazard Area

Notes:
1. Spatial Referencing: UTM NAD 83
2. OBM and NRVIS data downloaded from LIO-MNR with permission.
3. RVCA data provided by NVCA, March 2010.
4. Natural Resource Solutions Inc. provided additional evaluted wetland boundaries, Sept, 2010.

Figure 4.1
Recurrent Energy
RE Smiths Falls 6 Water Body and Project Boundaries

HATCH™

P:\RECURRENT\334680\DATABASES\GIS\Kemptvle\SF6_Anderson\Smiths Falls 6 Water Investigation.mxd

back of figure

Several photos of the watercourse and riparian vegetation, a well as the inundated conditions at the existing water crossing, are shown in the following figures. Based on the results of the site investigation, it appears as though this stream is a permanent watercourse.

Figure 4.2 Unnamed Tributary Crossing Project Site – View Upstream from Beaver Dam on the Project Site

Figure 4.3 View Downstream from the Eastern Project Site Boundary

Figure 4.4 Inundation at the Existing Farmer's Water Crossing of the Unnamed Tributary at the Eastern Project Boundary Due to Beaver Dam

Immediately upstream from the Project site boundary, there is a beaver dam that creates a larger impoundment with flooded vegetation. A photograph of the beaver pond is shown in Figure 4.5.

Figure 4.5 Upstream View into Beaver Pond Adjacent to Eastern Project Site Boundary

Therefore, the site investigation has confirmed that unnamed tributary of Otter Creek is a permanent stream and would be classified as a water body, based on the definition in the REA Regulation. The boundaries of the water body, as defined in the REA Regulation, would be the average annual high water mark of the watercourse (i.e., the normal water's edge during the annual flood). To establish this boundary, riparian vegetation was assessed during the site investigation to determine the boundary of vegetation species tolerant of annual flooding. Based on these observations, it was determined that the average annual high water mark would go to the edge of the naturally vegetated riparian corridor, since vegetation species in this zone consisted of those that are tolerant of wet conditions and some annual flooding. The average annual high water mark boundary is shown in Figure 4.1.

The REA Regulation requires solar panels, transformers and inverters to be set back at least 30 m from the water body boundary (i.e., the average annual high water mark). Therefore, for the purposes of the defining the distance from the water body boundary to the Project location, it has

been assumed that the distance installation of solar panels will occur 30 m from the water body boundary in order to maximize the area for panel installation, as shown in Figure 4.1.

The REA Regulation prohibits construction of the project within 120 m of the water body boundary, unless an Environmental Impact Study (EIS) is done to assess potential effects and mitigation requirements. Construction of Project components (e.g., solar panels) will occur within 120 m of the unnamed tributary of Otter Creek. Upgrades to the existing farmer's water crossing of the tributary will also likely be required and the electrical connections from the northern portion of the property will likely have to cross the tributary as well. Therefore, an EIS will be required to assess potential adverse effects on the water body due to the Project and identify mitigation requirements to prevent/minimize adverse effects.

4.1.2 Otter Creek

Otter Creek is located approximately 170 m northwest of the Project site. As noted in the Water Body Records Review (Hatch Ltd., 2010), the 1:100-yr water level of Otter Creek would encroach upon the Project site, as shown in Figure 4.1. However, based on the site investigation, the average annual high water mark of Otter Creek would not be located within 120 m of the Project site.

4.1.3 Other Watercourses

No other watercourses were observed on or within 120 m of the Project site. This is consistent with the information garnered from the Water Body Records Review (Hatch Ltd., 2010).

4.2 Seepage Areas

A potential groundwater seepage area was observed on the edge of the riparian corridor in an area of rutting from agricultural activities. At the edge of pooled water in the one of the ruts, there was an accumulation of orange-colored flocculent, which is typical of oxidation of iron when groundwater is aerated when it emerges at the land surface. The area is shown in Figure 4.1 and a photograph is provided in Figure 4.6. No other such areas were observed on or within 120 m adjacent to the Project site.

Figure 4.6 Photograph of Groundwater Seepage Area near Eastern Project Boundary

The REA Regulation prohibits development of solar panels, inverters and transformers within 30 m of the seepage area, as shown in the setback identified in Figure 4.1. The Project footprint boundary (e.g., the limit of development) will extend up to the 30-m setback, therefore, an EIS will be required to assess the potential effects of the Project on the seepage area and identify mitigation requirements.

5. Conclusions

Based on the results of the Site Investigation, the only correction to the Water Body Records Review Report (Hatch Ltd., 2010) would be to add the groundwater seepage area discussed in Section 4.2, since this was not noted in any of the records that were reviewed.

Based on the results of the site investigation and the distance (< 120 m) from the proposed Project to the water features noted in Section 4.1.1 (unnamed tributary of Otter Creek) and 4.2 (seepage area), an EIS will be required to assess potential adverse effects of the Project on these features.

6. References

Hatch Ltd. 2010. RE Smiths Falls 6 Solar Project – Water Body Records Review Report. Prepared for RE Smiths Falls 6 ULC.

Appendix A

Site Investigation Field Notes

Apr. 28/10
RECURRENT
SP 6

12:55 ~ 13°
-3:15 [illegible]
10% c.c.

Birds

TUVU	RBGU
GAME	COLO
AMRO	CACO
AMCR	SOSP
COGR	AMGO
RWBL	CHSP
~~[illegible]~~ vagrant	SOSP

Creek
-> runs through hedgerow
-> dammed [illegible] E of site
-> high water on [illegible] of hedgerow
-> fields on either side are wet.

-> Tadpoles in flooded part of path [illegible]
[illegible] hedgerow

-> deer tracks in [illegible]

-> Buckthorn /
common in hedgerows,
+ clumps of shrubs where
accumulations of [illegible]
-> [illegible] birch also present in hedgerows

-> abandoned house present on property

-> area overgrown E

-> overall no [illegible] habitat
-> bats in abandoned house?
-> should survey for them?

-> beaver ~~[illegible]~~ along creek