

**NATURAL ENVIRONMENT
TECHNICAL REPORT: LEVEL I and II
ELGINBURG QUARRY**

City of Kingston

Aggregate Extraction Application: Quarry Expansion

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SUMMARY

This technical report has been produced on behalf of Cruickshank Construction Ltd. who are making an application to expand their existing Unity Rd. quarry in two phases (see Figure 1).

The initial part of this report follows the guidelines provided in the *Aggregate Resources Policy Manual* for a Level 1 Technical Report, which investigates whether or not significant natural heritage features are on or within 120 meters of a proposed project. Possible significant wildlife habitat and significant woodlands are present on site and these will be discussed as a Level II report, as required, in the latter part of this report.

The proposed expansion lands are bordered on the north by Unity Rd. and a solar farm, on the east by existing quarry, on the west by woodland and active and abandoned farmland, and on the south by the K&P rail trail, woodland, and farmland. The shallow soils and farming history of the expansion lands have influenced the current mix of ecological communities, which include meadow, thicket, and woodlands. Current cultural constraints include a gas pipeline, a hydro corridor, adjacent landowner dwellings, farmland, adjacent quarry, adjacent solar farm, and an adjacent landowner to store cast-off vehicles and other material.

Site visits by representatives of the Cataraqui Region Conservation Authority (CRCA) and the Ministry of Natural Resources and Forestry (OMNRF) have helped shape this report. For example, OMNRF requested a reassessment of the ELC mapping, a wetland evaluation, further fish and turtle habitat assessment, and a western boundary butternut survey. As a result, this work was completed and is reflected in this updated EIS.

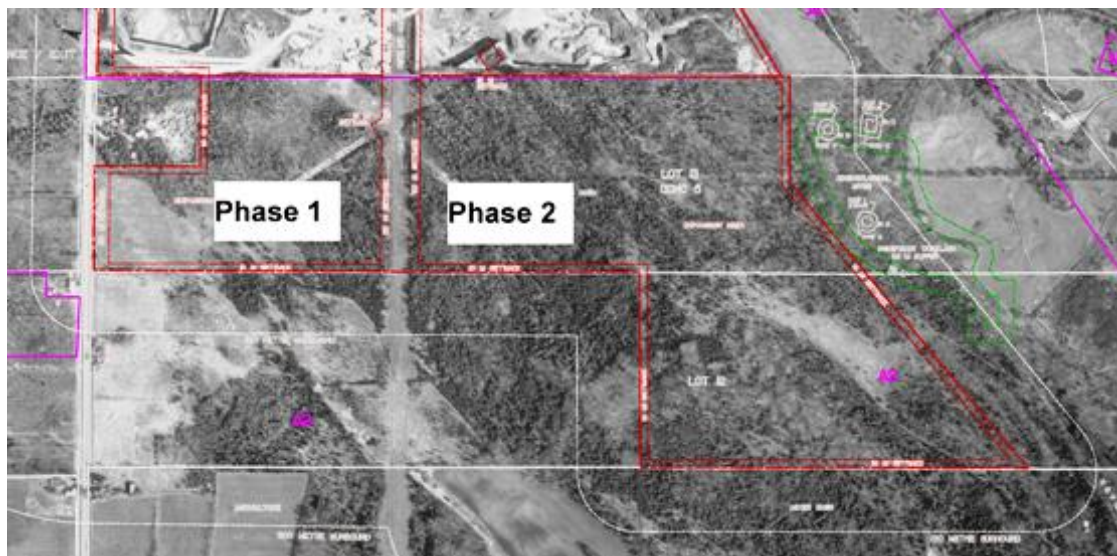


Figure 1. Proposed expansion area (red line) with 120 m adjacent lands (white line).

POLICY

Aggregate Resources Policy (from Manual for the *Aggregate Resources Act*)

Policy 2.01.07 Policy License Applications: Natural Environment Report Standards

“A Natural Environment Level 1 report determines whether one or more of the following features exist on-site or within 120 metres of the site:

- a) significant wetlands (including significant coastal wetlands);*
- b) significant habitat of endangered and threatened species;*
- c) significant Areas of Natural and Scientific Interest (ANSIs);*
- d) significant woodlands (south and east of the Canadian Shield);*
- e) significant valleylands (south and east of the Canadian Shield);*
- f) significant wildlife habitat; and*
- g) fish habitat.*

..... this policy deals in a summarized fashion with the contents of the Provincial Policy Statement 2014 and should not be relied on as a substitute for the PPS.

The Level 1 report must clearly conclude whether each of the features (a-g, above) exists on or within 120m of the site.

If any of these features are identified, then an impact assessment (i.e. Natural Environment Level 2 report) is required to determine any negative impacts on the natural features or ecological functions, and any proposed preventative, mitigative or remedial measures.

Provincial Planning Policy

Issued under Section 3 of the *Planning Act*, Section 2.1 of the Provincial Policy Statement (PPS) requires that municipalities consider natural heritage features in assessing development proposals. Guidance on the extent of adjacent lands is provided in a Natural Heritage Reference Manual (OMNR 2010). The adjacent land width for significant natural heritage features is 120 m. From the Policy:

2.1.3 *Development and site alteration shall not be permitted in:*

- a) significant habitat of endangered species and threatened species;*
- b) significant wetlands in Ecoregions 5E, 6E and 7E; and*

2.1.4 *Development and site alteration shall not be permitted in:*

- b) significant woodlands south and east of the Canadian Shield;*
- c) significant valleylands south and east of the Canadian Shield;*
- d) significant wildlife habitat; and*
- e) significant areas of natural and scientific interest*

2.1.5: *Development and site alteration shall not be permitted in fish habitat except in accordance with provincial and federal requirements.*

2.1.6: *Development and site alteration shall not be permitted on adjacent lands to the natural heritage features and areas ... unless the ecological function of the adjacent lands has been evaluated and it has been demonstrated that there will be no negative impacts on the natural features or on their ecological functions.*

Adjacent lands are defined in the PPS:

“...those lands contiguous to a specific natural heritage feature or area where it is likely that development or site alteration would have a negative impact on the feature or area...”

Guidance on the extent of adjacent lands is provided in a Natural Heritage Reference Manual (OMNR 2010), which lists an adjacent land width of 120 m for all significant heritage features.

METHODOLOGY

The determination of significant natural heritage features and functions was determined by site visits between August 2010 and October 2015. Field inventories were carried out by Rob Snetsinger, Chris Grooms, Mary Alice Snetsinger, and Dale Kristensen (see Table 1). An environmental assessment for a previous expansion of this quarry property was undertaken in 2006 (see Snetsinger 2006).

Information on potential rarities was provided by the NHIC Element Occurrence web page. Information on potential significant woodlands and valleylands was provided by Schedule 8A in the City of Kingston Official Plan. ANSI and wetland records for the region were also consulted.

The site investigation focused on documenting the presence and/or absence of significant natural features, species of conservation concern, wildlife habitat, and plant and animal species. Habitat communities are described following the methodology outlined in the ELC for Southern Ontario (Lee *et al.*, 1998) and if applicable, the *Ontario Wetland Evaluation System Southern Manual* (MNR 2002).

Assessment of significant natural features followed the criteria outlined in the Natural Heritage Reference Manual (MNR 2010), Draft Significant Wildlife Habitat Ecoregion Criteria Schedules (MNR 2012) and Significant Wildlife Habitat Technical Guide (MNR 2000). Breeding bird surveys followed methods described in the Ontario Breeding Bird Atlas Guide for Participants (Cadman and Kopysh, 2001) and the Canadian Wildlife Service Forest Bird Monitoring Program. Bobolink and Eastern Meadowlark surveys followed Bobolink Survey Methodology (OMNR 2011), and Whip-poor-will using OMNR (2012) Whip-poor-will Survey Methodology. Amphibians were assessed by examining areas of appropriate habitat and monitoring evening calls in the spring.

The presence of reptiles was assessed by examining areas of appropriate habitat such as rock piles, exposed escarpment, and potential basking sites (logs, exposed bedrock). For snakes this

includes looking for congregations on sunny, warm days in both the spring (April-May) or in fall (Sept-Oct).

Other wildlife species of interest (e.g., butterflies, mammals) would be noted as encountered from direct observation, or from other signs of their presence (tracks, scat, den sites, etc.).

Vascular plant species were used to characterize ELC community types.

Table 1. Field survey effort (Note: herps can mean reptiles and amphibians.)				
Date of Survey	Starting Time	Weather Conditions	Surveyor	Main Purpose of Visit
Aug. 30, 2010	8:30	22 C, clear	Rob Snetsinger Chris Grooms	Multiple species. Site overview.
Sept. 11, 2010	8:00 1200	20 C, clear	Rob Snetsinger Chris Grooms	Bird, Vegetation, Herps
Sept. 25, 2010	830	17 C, clear	Rob Snetsinger	Bird, Vegetation, Herps
Feb. 12, 2011	1200	-7 C, clear	Rob Snetsinger	Winter use survey
May 4, 2011	730	7 C, clear	Rob Snetsinger	Bird, Herps, and Vegetation
May 21, 2011	700	15 C, clear	Rob Snetsinger	Bird, Herps, and Vegetation
June 5, 2011	600	16 C, clear	Rob Snetsinger	Bird, Herps, and Vegetation
June 16 2011	700	20 C, clear	Chris Grooms,	Bird and Herps
May 7, 2012	2200	7 C, clear	Rob Snetsinger	Evening birds, bat, and herps
May 10, 2012	2230	7 C, clear	Rob Snetsinger	Evening birds, bat, and herps
May 15, 2012	710	16 C, clear	Rob Snetsinger	Herps, and vegetation
May 28, 2012	2200	19 C, clear	Rob Snetsinger	Bat and herps
June 4, 2012	2200	14 C, clear	Rob Snetsinger	Evening birds, bat, and herps
Oct 17, 2012	845	14 C, clear	Rob Snetsinger Tom Beaubiah (CRCA)	Vegetation assessment
Feb 17, 2013	1100	-15 C, clear	Rob Snetsinger	Winter use survey
May 31, 2013	2300	14 C Clear	Rob Snetsinger	Evening birds
June 20, 2013	100	18 C, clear	Rob Snetsinger	Birds
July 16, 2013	2300	20 C, clear	Rob Snetsinger	Evening Birds
Feb. 16 2014	1300	-5 C, clear	Rob Snetsinger	Winter use survey
May 28, 2015	2400	Clear night sky	Rob Snetsinger	Evening birds
June 8, 2015	2400	Partially overcast	Rob Snetsinger	Evening Birds
July 2, 2015	900	23, clear	Rob Snetsinger	ELC mapping
Aug. 1, 2015	1000	25, clear	Rob and Mary Alice Snetsinger	Fish habitat assessment, wetland mapping
Aug. 2, 2015	1000	25, clear	Rob and Mary Alice Snetsinger	Fish habitat assessment, wetland mapping
Oct. 1, 2015	11:30	15, clear	Rob Snetsinger Dale Kristensen	Herp and butternut survey
Oct. 8, 2015	13:30	17, clear	Rob Snetsinger	Herp survey

SITE DESCRIPTION - ECOLOGICAL LAND CLASSIFICATION (ELC)

The minimum area for an ELC site is 0.5 hectares. In instances where vegetative patches would diffusely exist within a larger and different ELC type, only the dominant ELC designation was noted.

The proposed expansion area has historically been used as pasture and hayfields as can be seen in older aerial photographs (see Fig 2). Presumably the soils were not appropriate for cash crops. Between the mid 1960's and 1978 it is apparent in the photographic record that soil removal was undertaken in parts of the property. This may have been to support the construction of nearby Hwy. 401 or to help with the construction of the gas pipeline. It is known that soil removal was undertaken at other nearby sites for use in the Hwy. 401 construction, and evidence of past soil scraping is still present. Soil removal would have affected the future ecological character of the site and the transition to the observed ecology that is often dominated by red cedar. We have observed a similar red cedar succession at several other sites in the region where soil was removed or heavily pastured.

The original ELC mapping that we presented in the 2014 Technical Report EIS was based on site visits in 2011. At that time there were areas dominated by young trees, as well as red cedar, which is classified as a tree. In those areas where red cedar (and other trees) were less than 2 m, we labeled the site a thicket because its ecological function would be similar to a thicket community. After an initial review of our Level 1 report and a site visit by Todd Norris and Monique Charette of the Kingston OMNRF we revisited the site in 2015 to reassess the mapping and determined that in several areas trees had grown tall enough to change the status of some sites from thicket to woodland. As a result, and in consultation with Todd Norris of the OMNRF, we have redrawn the mapping that is presented in Figure 3 (Phase 1, north of the gas pipeline) and Figure 4 (Phase 2, south of the gas pipeline). These figures also include approximate habitat area coverage in hectares.

Descriptions of ELC map codes seen in Figure 3 and Figure 4 are as follows:

Agricultural (Ag): Areas still used for agricultural purposes, and referring to the fields at the northwest corner of the property the Phase 1 expansion lands.

Cultural (Cu): Applied to areas greatly altered by human disturbance such parking lots, building lots, and the quarry.

Cultural Meadow (CUM): This term applies to fields that have resulted from cultural disturbances, such as with abandoned farmland. To be designated a meadow, trees or shrubs may be present, but must be less than 25% coverage. The lack of trees or shrubs can be seen in Figure 5, the cultural meadow in the southern half of the expansion lands. We could find no evidence of soil removal in this particular cultural meadow and it does have deeper soils in comparison to adjacent sites on the property. That these fields have not succeeded into forest may be due to a more recent agricultural abandonment. Species present are typical of Kingston area meadows including a mix of common grass species such as *Bromus inermis* and *Poa pratensis*. Common perennial forbs are also present such as goldenrods, asters, clovers, and wild

carrot. Alfalfa is also a common ground cover and the invasive non-native dog strangling vine is spreading in from the edges.

Cultural Thicket (CUT): This term applies to woody areas that have greater than 25% shrub coverage, but less than 25% tree coverage. The thicket communities assessed are mostly dominated by a mix of prickly ash, red cedar, and two non-native invasive shrubs European buckthorn and Tartarian honeysuckle. The ground cover in these thicket/woodlands was usually sparse due to the shallow soils and dense cedar growth, but did include a mix of characteristic species such as wild carrot, asters, strawberry, goldenrods, and grasses. Alvar indicators including balsam ragwort, hairy beard tongue, and *Solidago ptarmicoides* were sometimes observed, but these sites were not considered alvar due to a lack of quality alvar indicators including consistent growth of indicator species, succession to thicket, and the artificial reasons for the shallow soils. Dog strangling vine is found throughout, but is particularly prevalent in the thicket areas (Figure 6).



Figure 2. 1952 aerial photograph



Figure 3. ELC mapping with approximate area coverage (ha.) for Phase 1 lands. Photo base is from 2014.

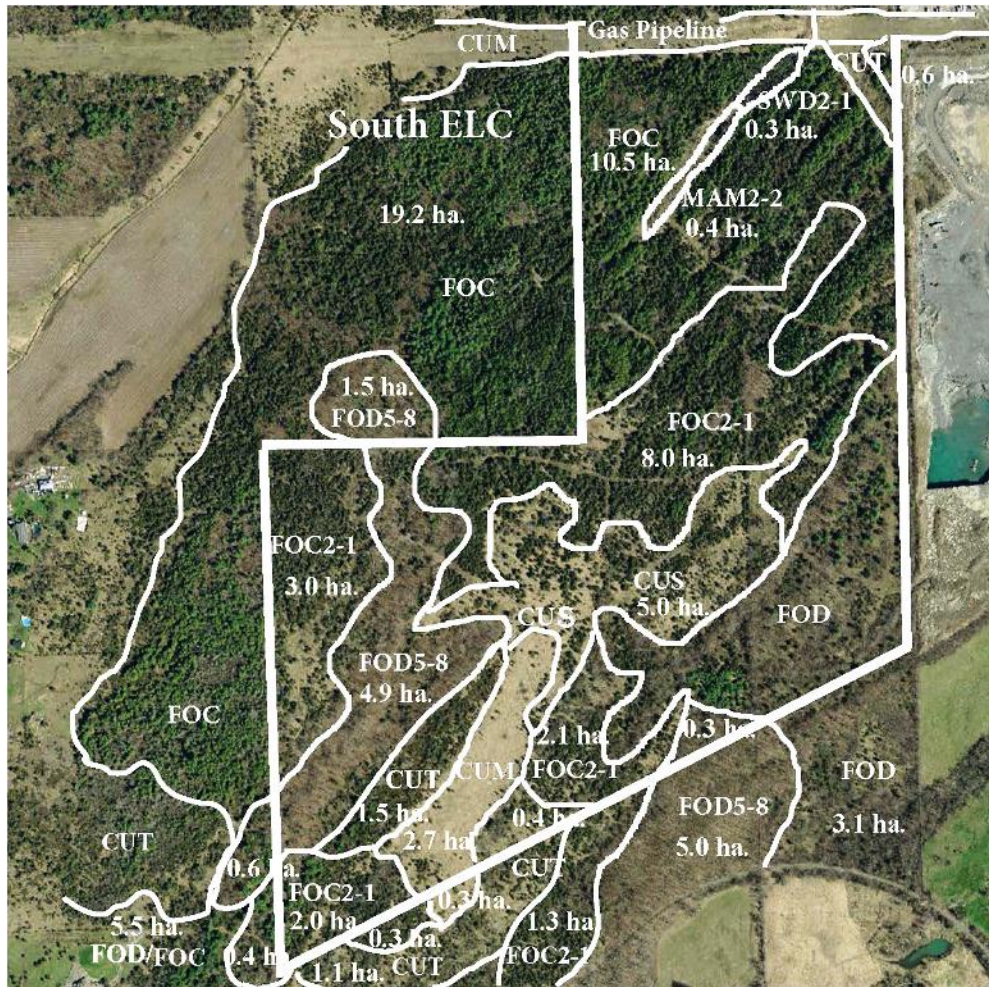


Figure 4. ELC mapping with approximate area coverage (ha.) for Phase 2 lands. Photo base is from 2014.



Figure 5. Cultural Meadow viewing to the southwest.



Figure 6. European buckthorn thicket with dog strangling vine understory.

Cultural Savannah (CUS). There was some discussion with OMNRF on the proper ELC term to apply to areas that had meadow characteristics (i.e. ground cover dominated by grasses and forbs), but also had a dispersed mix of red cedar (Figure 7). In the end, it was agreed that the most appropriate term would be Cultural Savannah, which is described in the ELC manual as having between 25% and 35% wood cover and being maintained by, or originating from cultural influences. Cultural Savannah is not true Savannah, which is mostly non-existent in Eastern Ontario due to a lack of the necessary graminoid indicator species.



Figure 7. Cultural Savannah

Dry-Fresh Sugar Maple – White Ash Deciduous Forest Type (FOD5-8). This is one of the most common forest types in the region, commonly found in association with disturbed or managed sites, and is one of the main forest types succeeding on abandoned farmland. As the name implies, sugar maple is the dominant tree in the overstory, with lesser amounts of white ash. Other trees were also observed, albeit in lower numbers such as oaks, hickories, and ironwood. Vertical diversity (i.e., shrub and sapling growth) in the understory was mostly sparse. Ground cover was also relatively sparse, but the plants observed were typical spring ephemerals such as dog tooth violet, white trillium, and hepatica.

The average age of the top canopy trees appeared to be in the 80-year range, and this ELC type is the oldest in the expansion lands. There are two FOD5-8 woodlots within the expansion area. The woodlot on the southern border is about 5.3 ha. in size. About 5 ha. will be left untouched for the expansion plans, and this portion slopes down to the K&P trail, and the slopes have snake

hibernacula features. The woodlot on the west border is more fragmented, disturbed, and younger. It is about 7 ha. in size, of which about 4.9 ha will be removed.

Deciduous Woodland (FOD). Previously identified as Cultural Thicket, continuing tree growth since 2011 has become robust enough to change the classification to woodland, albeit young woodland (mostly < 30 years old) that is comprised of a diffuse mix of species, with no clear canopy dominance. White ash, American elm, sugar maple, ironwood, white pine, and red cedar are common. The shrub layer was quite dense in places (i.e., impassable) and includes tree saplings, prickly ash, European buckthorn, and red cedar.

Dry-Fresh Red Cedar Coniferous Forest Ecosite. FOC2-1. This woodland type can be found in the Phase 2 lands in association with fields and deciduous thickets. These red cedar stands have low understory diversity because the dense canopy reduces the amount of available sunlight for ground cover species. Figure 8 shows a trail through a denser portion of this ecosite. OMNR (2000) suggests that red cedar stands are more prevalent today because they are a pioneering species that cover abandoned farmland that had poor quality soils. At this location, it will take longer for succession to deciduous woodland to occur due to the shallow soils and the inhibiting effects of the red cedar. These cedar stands are considered to have low ecological value due to their lack of diversity, although they are sometimes considered to have value as Loggerhead Shrike habitat. Knowing that, we specifically surveyed for Shrikes during the field work and none were found, likely because the cedar stands were too dense.



Figure 8. Trail through Red Cedar habitat.

Coniferous Forest (FOC). This woodlot has more than 75% coverage by coniferous species. The canopy is dominated by a diffuse and patchy mix of different conifers such as white spruce,

white pine, red cedar, and white cedar. Ground cover and shrub layers are mostly sparse or lacking as is typical in conifer woodlots (Figure 9).



Figure 9. FOC eco-site.

Cattail Mineral Shallow Marsh Type (MAS2-1). This small marsh (about 0.8 ha.) abuts the existing quarry, and is bordered on the south by the gas pipeline. It is connected by two other wetland types by a cut ditch running across the gas pipeline. Combined, all three wetland types are less than the 2 ha. minimum required for evaluation in the wetland evaluation manual. Nevertheless, we undertook a wetland evaluation in August 2015 and determined the score to be well below significance. The wetland evaluation was reviewed to the satisfaction of Todd Norris, Kingston area biologist for the OMNRF.

During past field work and for the wetland evaluation, we undertook transects across the wetland and found it be dominated by a dense growth of both cattail species (*Typha angustifolia* and *Typha latifolia*) (see Figure 10). While the more central portion of this wetland has some spots with water of about 30 cm in depth, the density of the cattail stems precludes any ponding. Consequently, it does not provide turtle or fish habitat. Peripheral wetland species observed include boneset, joe-pye-weed, purple loosestrife, and canary reed grass.

This MAS2-1 wetland is separated from the two wetland types described below by the Hydro and pipeline easements, but is hydrologically connected by a ditch dug across the pipeline easement. The ditch usually only conveys water in spring. Combined, all three wetland types would be considered an isolated wetland, as they have no outflow connection to another water body or wetland.



Figure 10. Cattail wetland within expansion lands.

Red Maple Mineral Deciduous Swamp Type (SWD3-1). We wouldn't normally include an ecosite below 0.5 ha., which is the minimum mapping size in the ELC manual. However, it is included here because it was considered part of the wetland we evaluated in August 2015. As the name implies, the dominant canopy species is red maple, and the ground cover contains a mix of species such as *Leersia oryzoides*, sensitive fern, and water hemlock. There is some ephemeral ponding in spring, but during the August visit there was no standing water. Amphibian use in spring surveys was determined to be negligible. The SWD3-1 grades into the MAM2-2 described below.

Reed Canary Grass Mineral Meadow Marsh Type (MAM2-2). As the name implies reed canary grass is the most common species, but there are numerous other meadow marsh species present such as *Leersia oryzoides*, purple loosestrife, joe-pye-weed, and boneset. A small circular pond (apparently dug) of about 8 m x 8 m in size is present and is surrounded by *Typha latifolia*, *Scirpus cyperinus*, and *Carex comosa*. The surface of the pond was heavily covered with greater duckweed, and *Wolffia*. Dense mats of decomposing plant matter were found underwater, but due to its degraded condition we were unable to identify the species. We determined that the pond does not contain fish habitat, and it is too small and isolated to provide turtle habitat, and no turtles have been observed on site.

SIGNIFICANT FEATURES ASSESSMENT

Habitat of Endangered and Threatened Species

There were two species at risk (butternut and Whip-poor-will) found in association with the proposed expansion lands.

Butternuts (Endangered) are not uncommon in the region in similar habitat and during our surveys of the expansion lands we encountered dead (i.e., no foliage or branches) butternut trees. This death is a common outcome in the region due to infection by butternut canker (*Sirococcus clavigignenti-juglandacearum*).

At the request of the OMNRF we also undertook a butternut survey in 2015 along the western edge of the property to determine if there were any butternut on the adjacent lands to the west, but within 15 m of the property boundary where we had landowner access permission. No living butternut trees were observed and therefore a Level II discussion is not required.

With our work associated with the solar farms immediately north of the proposed quarry expansion area we are aware that there are a number of Whip-poor-will (Threatened) in the land extending north from Unity Rd. to Railton Rd. As such, we undertook evening bird surveys in 2015, primarily focusing on Whip-poor-will. We did hear several calling to the northwest and west of the proposed Phase 1 lands, but determined these locations to be more than 120 m away.

There is an NHIC record for a Northern Bobwhite (*Colinus virginianus*)(SARA Schedule 1 Engangered, SARO Endangered) in the several 1 km squares associated with the quarry expansion. The last record for this species in the area is from 1856, and they are currently not found in this region.

Significant Wetlands

In Schedule 8-B of the OP the general area of these wetlands is highlighted as unevaluated wetland. An Ontario Wetland Evaluation was applied to the only wetland on the property, and it was determined that there was no significance. The wetland evaluation was submitted and approved by the OMNRF. The wetland mapping is provided in Figure 11.

Regulation 148/06 of the CRCA does not allow development within wetlands that are greater than 0.5 ha (see CRCA 2012), however we contacted Tom Beaubiah of the CRCA who said the Regulation would not apply in this case because there is no surface connection from the evaluated wetland to another. The Regulation 148/06 will also not apply if the quarry license expansion is approved by OMNRF.

In Schedule 7-B of the OP the wetlands appear to be designated as riparian habitat. Riparian habitat is the zone between true upland and a river or stream and often refers to the streambank. As well, in documentation associated with the waterways regulation, CRCA refers to a riparian

buffer as a *vegetated strip of land extending along a shoreline (or along both sides of a stream)*. Since there is no stream present, these small wetlands cannot be considered riparian habitat.

In Schedule 3-B of the OP the wetlands appear to be designated as an Environmental Protection Area. We are assuming this is a mapping artifact resulting from remote sensing, similar to what happens when some of the woodlands shown in the OP are determined to be shrubland as a result of field work. It may also be due to the riparian and wetland designations in Schedule 7-B and 8-B. Since these wetlands are not significant, not riparian habitat, nor significant wildlife habitat, and because the waterways regulation likely does not apply, we are of the opinion that the EPA designation is not appropriate.



Figure 11. Wetland mapping including both ELC codes (MAS2-1, SWD3-1, MAM 2-2) and wetland mapping codes (reM2, hS1, reM1).

Significant Areas of Natural and Scientific Interest (ANSI).

There are no ANSI's listed by Lindsay (1983) within 120 m of the proposed quarry expansion area.

Significant Woodlands

Woodland has been identified in Schedule 8A of the City of Kingston OP as significant, which is based on woodland mapping provided by the CRCA. The CRCA notes that their significance ranking is tentative, because woodland boundaries have been determined from remote viewing. As such, fieldwork is required to confirm significance. This is also noted in Section 6.1.6 of the City of Kingston OP, where it states that:

“boundaries of the natural heritage system features are approximate and more specific delineation of the boundaries and the significance of the area must be determined through an environmental impact assessment”

Some of the lands designated as significant woodland (see dark green in Figure 12) or contributory woodland (light green in Figure 12) by the city are shrub thickets, which from aerial imagery, might appear as woodland. Tom Beaubiah of the CRCA walked part of the site in 2012 with Rob Snetsinger of Ecological Services to see some of these shrub thickets. To assess woodland significance we have provided the woodland ranking criteria provided in OMNR (2010).

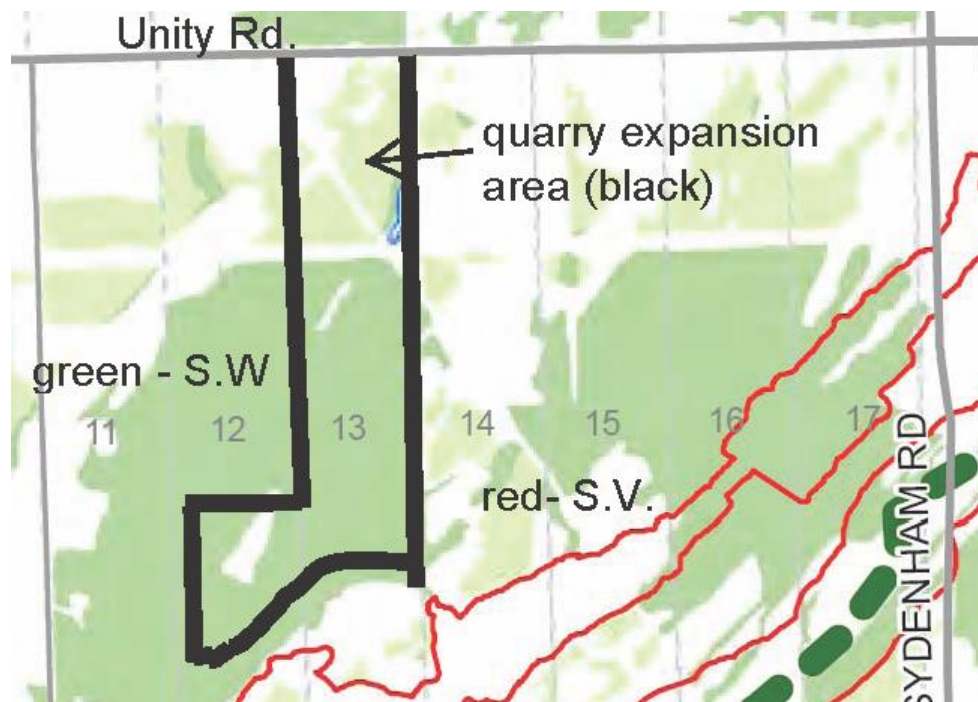


Figure 12. Delineation of significant woodland (dark green) within the approximate quarry expansion area, outlined in black.

1. **Size.** The size criterion has to be based on some sort of regional comparison, which can be difficult due to a lack of a universally agreed upon standard.

If we consider the political boundary of the City of Kingston, where the forest coverage is between 30–60% of the land cover, woodlands 50 ha in size or larger should be considered significant.

If we consider the Collins Creek watershed, where the forest coverage is between 30–60% of the land cover, woodlands 50 ha in size or larger should be considered significant.

If we consider the greater area of Frontenac County, which has more than 60% woodland cover, there is no size threshold.

If we consider the Madoc site district 6E-9 (OMNR 2010), which has more than 60% woodland cover, there is no size threshold.

Taking the more conservative approach, the size threshold of 50 ha. is not reached by the woodlands in the Phase 1 lands, but the combined size of the Phase 2 woodlands and offsite woodlands is about 77 ha. in size, which meets the size threshold of 50 ha. The Phase 2 expansion lands contain about 27 ha. of woodland, and if lost to the quarry, the remaining 50 ha. of adjacent woodland would still meet the size threshold.

In consultation with the CRCA, who the City of Kingston defers to on matters of woodland significance, it was noted that size significance needs to be qualified in regard to type of woodland, quality of woodland, woodland function, and regional representation. It is clearly understood that there is not 50 ha. of quality woodlands in and around the expansion lands, due to woodland type, fragmentation, age, and quality. The most valuable woodlands on the property are likely the two FOD5-8 woodlands, of which one will be preserved.

The young FOD woodlands on the southeast area of the Phase 2 lands (about 6.5 ha. within the expansion lands) have a dominant shrubby understory (including many non-native species), and these woodlands were recently classified as shrubland.

The Phase 2 FOC2-1 woodlands (about 15 ha., within the expansion lands) are dominated by red cedar and these woodlands are considered to have low ecological value due to their low biodiversity.

The remaining Phase 2 woodland is the FOC woodlands, of which about 10.5 ha. will be lost to the expansion. They are comprised of dense red cedar patches, as well as cedar/pine/spruce zones that have limited understory vegetation and thus limited biodiversity.

All the Phase 2 woodlands exist in a patchy environment, with little connectivity and no regional linkage, and therefore woodland size in this instance has limited impact. This

issue was discussed with Tom Beaubiah during a site visit with OMNRF officials during a 2015 meeting.

2. **Woodland Interior.** Otherwise known as core habitat, it is primarily intended for the protection of area sensitive songbirds, who do better in larger woodlands. It is generally agreed that large woodlands that are essentially wild (i.e., well removed from roads and human activity) are good for habitat specialists such as the Cerulean Warbler, Scarlet Tanager, and Red-Shouldered Hawk. However, it should be clear that core alone is not the only critical feature for these species. A large forest with poor quality indicators and lacking appropriate tree species would not provide these species suitable habitat.

If we consider the political boundary of the City of Kingston, the forest coverage is between 30–60% of the land cover, and in this context 8 ha of core interior habitat would be considered significant. Core interior habitat is unbroken blocks of woodland starting at 100 m from the woodland edge. Calculations of core area must work around gaps (i.e. non-woodland) greater than 20 m. Gaps can be non-woodland habitat types, such as marsh or field, or cultural gaps such as roads or hydro right of ways. In this context we could find no 8 ha. blocks of core habitat in the expansion lands.

3. **Proximity.** Woodlands are considered significant if they are located within 30 m of an important natural feature such as fish habitat. There is a watercourse that is located more than 120 m from the proposed expansion area, and more than 30 m from any woodland associated with the expansion area.

4. **Linkages.** The woodland does not provide a link between two other significant features.

5. **Uncommon characteristics** (e.g., rarities). No rarities were observed or are known.

6. **Water Protection:** Woodlands should be considered significant if they are located within a sensitive watershed or near the top of bank from a sensitive groundwater discharge, recharge, or headwater area. None of these are located in proximity to the expansion area woodlands. There is a stormwater drainage ditch within the woodland, which runs west to east alongside the K&P trail, but it is not considered sensitive for the purposes of woodland ranking.

7. **Woodland Diversity.** Woodlands should be considered significant if they have uncommon forest assemblages or have a high diversity of features. The woodlands found in associated with the expansion area are of a common type in the region, lack diversity, and also contain many non-native species.

8. **Uncommon Characteristics.** Woodlands should be considered significant if they have a unique species, or species with a high Coefficient of Conservatism, or vegetation communities with S1, S2, S3 rankings, or a certain percentage of larger older trees. The quarry woodlands are mostly young, disturbed, and do not meet threshold criteria for uncommon characteristics.

Conclusion: In our opinion, the woodlands associated with the expansion area are not significant, as based on OMNR (2010) criteria. In a January 19, 2015 correspondence, the CRCA were satisfied with our conclusions regarding woodland significance. It should also be noted that in correspondence with Jason Budd (Senior Planner) of the City of Kingston, the Tree By-Law does not apply to the expansion lands.

The FOD5-8 slope woodlot located to the south of the Phase 2 expansion area has some value in the form of slope protection, older age, containing possible snake hibernacula, and more woodland diversity compared with other wooded areas associated with the quarry. Although it is not deemed to be significant we are still recommending that steps be taken to protect this FOD5-8 woodland and are therefore moving it to a Level II assessment.

Significant Valleylands

The City of Kingston OP policies do not permit development and site alteration on adjacent lands to Natural Heritage “B” features shown on Schedules 7 and 8 of the Official Plan, unless it has been demonstrated that there will be no negative impacts on the valleyland **natural features** or on their ecological functions. An environmental impact assessment will be required (unless otherwise directed by the CRCA) for lands within 50 metres for significant valleylands.

The valleyland limit for the OP was determined by the CRCA. The ecological value of a valleyland is normally related to its water course and the associated riparian habitat. However, the valleyland boundary in the OP extends well beyond any riparian habitat. This is because it not ecologically based, but instead was added by the CRCA to reflect the 100-year floodplain limits for Ontario Regulation 148/06.

As illustrated in Figure 13, the proposed quarry extraction area is more than 120 meters (i.e. the more stringent PPS) away from the significant valleyland as identified on Schedule 8-B of the Official Plan. The significant valleylands at their closest point are 180 meters from the proposed extraction area.

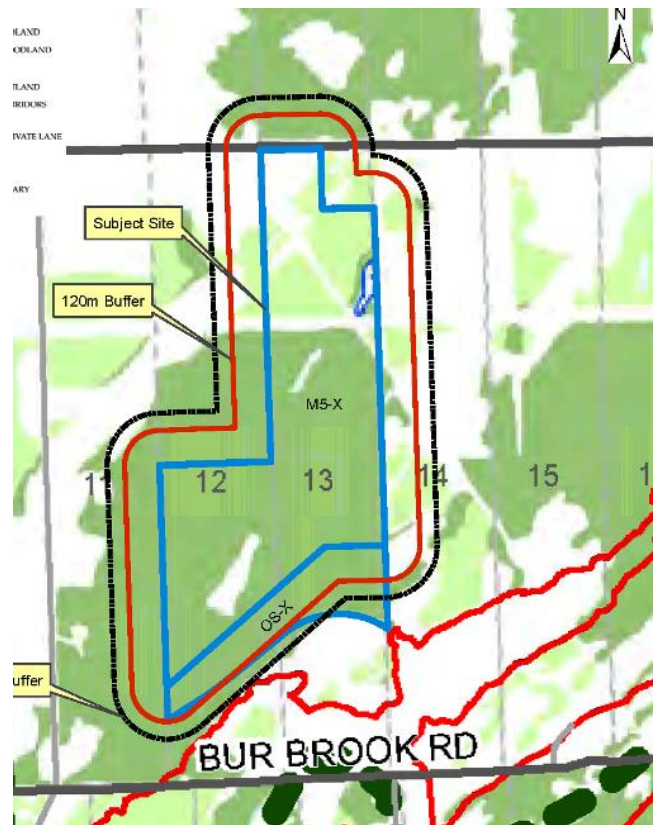


Figure 13. Extent of proposed quarry development and identified significant valleyland (wavy red line) in Schedule 8B of the OP.

Significant Wildlife Habitat

The *Significant Wildlife Habitat Criteria Schedules for Ecoregion 6E* (OMNRF 2015) outlines several categories that need to be addressed. These include habitat of seasonal concentrations of animals, rare vegetation communities, specialized habitats for wildlife, habitat of species of conservation concern, and animal movement corridors. All are discussed below.

Seasonal Concentration Areas of Animals

Habitats of seasonal concentrations of animals are areas where animals occur in relatively high densities for specific periods in their life cycles and/or in particular seasons. These areas are generally localized and relatively small in relation to the area of habitat used at other times of the year.

OMNRF (2015) lists 11 types of seasonal concentration habitats that were considered during the field work.

Waterfowl stopover and staging areas (terrestrial): Suitable stopover and staging habitat for migrating waterfowl include cultural meadow and thicket communities that are seasonally flooded. There are seasonally flooded cultural meadow or thicket communities within 120 m of the expansion area. There is one small pond associated with the wetlands on site. The larger pond is about 64 m². This is too small to have any value for waterfowl stopover and staging.

Waterfowl stopover and staging areas (aquatic): These areas include ponds, marshes, lakes, bays, coastal inlets, and watercourses that are used during migration. The small (64 m²) pond on site is too small to qualify as significant, when a site needs to have aggregations of 100 or more listed waterfowl species for 7 days, resulting in greater than 700 waterfowl use days.

Shorebird migratory stopover area: Shorebird migratory stopover would have shoreline areas that are usually muddy and un-vegetated, but can also include beach bars and seasonally flooded shoreline. There is no such habitat on site.

Raptor wintering area: This habitat type includes a combination of fields (CUM, CUT) and woodlands (FOD, FOM, FOC) that provide roosting, foraging and resting habitat for wintering raptors. To be significant, this habitat must contain specific numbers of indicator species usage.

During the winter site visits in 2010, 2011, and 2014, no raptor winter usage of listed species was observed. Other than areas on Amherst Island and Wolfe Island, the general area around Kingston is not known for significant raptor wintering concentrations.

Bat hibernacula: These are found in crevice and cave ecosites (CCR and CCA). There is no cavern or crevice ELC ecosite present within 120 m of the proposed expansion area.

Bat Maternity Colonies: These colonies are associated with mature FOD or FOM forested ecosites. The only potential habitat within the project lands are at the south end within the FOD5-8 woodland, which is too small, young, and lacking in snags.

Bat Migratory Stopover Area: According to Amy Cameron of the MNR, criteria have not yet been developed for identifying bat movement corridors and therefore they do not need to be considered at this time. The only place in the province currently identified as SWH for bat movement corridors is Long Point (Ecoregion 7E) for silver-haired bats

Turtle Wintering Areas: Wintering areas need water that is deep enough not to freeze to the bottom, and to have a soft mud substrate. The one small pond within the proposed expansion is too small to support overwintering turtles. As well, turtles would not be present on the property due to a lack of appropriate feeding habitat.

Reptile hibernaculum: OMNR (2012) notes that sites located below frost line in burrows, rock crevices, and other natural locations are needed. Broken and fissured rock can provide access to subterranean sites below the frost line. These areas should also have proper moisture levels to keep snakes from drying out during the winter, and south facing slopes are also preferable in providing more moderate winter conditions.

There is a FOD5-8 woodland south of the white line (see Figure 4), which represents the southern extent of the quarry expansion. The portion of the woodland south of the white boundary line has a south facing slope with fissuring, which represents potential snake hibernacula. It will be placed in a zoning category that prohibits development.

During their site visit, representatives of the OMNRF noted rock fissuring in the interior of the proposed quarry site and suggested the possibility of it being snake hibernacula. We were aware of this fissuring and its potential for hibernacula as early as 2010, and as a result were always on the lookout for snake congregations in spring and fall, which can be an indication of hibernacula. Focused hibernacula site visits occurred in the spring of 2011 and 2012 and the fall of 2015 under appropriate weather conditions, which also included areas that OMNRF representatives asked us to focus on.

Colonially -Nesting Bird Breeding Habitat (Bank and Cliff): Nesting sites for these species includes eroding banks/cliffs, sandy hills, pits, steep slopes, rock faces or piles. These attributes do not exist within the expansion area.

Colonially -Nesting Bird Breeding Habitat (Trees/Shrubs): Nesting occurs in swamp and fen habitats, which are not present.

Colonially -Nesting Bird Breeding Habitat (Ground): Nesting occurs on rocky islands or peninsula within a lake or large river. These features are not present.

Butterfly migratory route/stopover areas: A butterfly stopover area needs to be a minimum of 10 ha in size with a combination of field and forest habitat present, and will be located within 5 km of Lake Ontario. The expansion area is further than 5 km from Lake Ontario

Landbird migratory stopover areas: To qualify an area must have usage thresholds of greater than 200 migrant birds/day and with 35 spp with at least 10 bird spp. recorded on at least 5 different survey dates. These thresholds were not met during spring surveys.

Deer yarding areas: Deer use was recorded during winter surveys, but not to significant numbers to qualify for deer yarding. A review of available information on deer wintering areas confirmed there are no winter deer yards on or within 120 m of the expansion area.

Deer Winter Congregation areas: To qualify an area must include one of the following ELC codes (FOC, FOM, FOD, SWC, SWM, SWD) and should be greater than 100 ha. The expansion area does not meet this size criterion and during winter surveys, deer usage was found to be low.

Rare vegetation communities

Vascular plant species encountered during the site investigation were used in characterizing vegetation community types. Plants identified as a species of conservation concern would be GPS referenced and the habitat would be surveyed in order to determine the extent of the population. If specimens could not be readily identified they would be collected and assessed later using appropriate references (e.g., Gleason and Cronquist 1991; Queen's University Fowler Herbarium records).

Rare vegetation community types are those with SRANKS of S1 to S3 (i.e., extremely rare - rare - uncommon in Ontario). OMNRF (2015) lists the following rare types for site region 6E: Cliffs and Talus Slopes, Sand Barren, Savannah, Tallgrass Prairie, Alvar, and Old Growth Forest.

OMNR (2012) also lists Other Rare Vegetation Communities, which are plant communities that contain rare species which depend on the habitat for survival. Henson and Brodribb (2005) identify the following provincially rare vegetation communities within the Madoc Ecodistrict 6E-9. These include:

Common Juniper - Fragrant Sumac - Hairy Beardtongue Alvar Shrubland	S2
Dry Bur Oak - Shagbark Hickory Tallgrass Woodland Type	S1
Moist - Fresh Sugar Maple - Black Maple Deciduous Forest Type	S3
Philadelphia Panic Grass - False Pennyroyal Alvar Pavement Type	S1
Red Cedar - Early Buttercup Treed Alvar Grassland Type	S2
Tufted Hairgrass - Canada Bluegrass - Philadelphia Panic Grass Alvar Grassland Type	S2S3
White Cedar - Jack Pine - Shrubby Cinquefoil Treed Alvar Pavement	S1
White Cedar - White Spruce - Philadelphia Panic Grass Treed Alvar Grassland Type	S3
Winterberry Organic Thicket Swamp Type	S3S4

None of the vegetation communities listed above was found during the site investigations within 120 m of the proposed expansion area.

Specialized Habitat for Wildlife

The Ecoregion Criteria Schedules (OMNRF 2015) lists 8 categories of specialized habitat for wildlife for Site Region 6E. Each of these is discussed below in context with what was observed during the site investigations:

Waterfowl nesting area: This criterion includes wetland habitats adjacent to upland areas. There are two small areas containing wetland vegetation within the expansion area, but no waterfowl were observed to be using the ponds for nesting or feeding.

Bald Eagle and Osprey Nesting, Foraging and Perching Habitat: Sites with ELC designations FOD, FOM, SWD, SWM, and SWC that are adjacent to riparian areas are to be considered. There are no riparian areas associated with the expansion area and osprey and bald eagle were not observed during the site investigations.

Woodland Raptor Nesting Habitat: All ELC woodland types are considered possible, but they must be greater than 30 ha. in size and have more than 10 ha of interior habitat. There are no woodlands 10 ha. of interior habitat on or within 120 m of the expansion area, nor were any woodland raptors observed during the site investigations.

Turtle Nesting Areas: Turtle nesting areas include exposed sites typically with a southern exposure and with sand or gravel substrates that allow turtles to dig, and are within 100 m of certain wetland habitats. There are no appropriate wetland turtle habitat within 120 m of the expansion area, which is predominately composed of dry thicket and field.

Seeps and Springs: No seeps or springs were identified within 120 m of the proposed expansion area.

Amphibian breeding habitat (woodland): Woodland of ELC classes FOC, FOM, FOD, SWC, SWM, and SWD containing wetland, or be next to a wetland can be potential amphibian breeding habitat. We did not encounter significant numbers of woodland amphibians, and the woodlands are dry, have shallow soils, and do not contain any ephemeral ponds.

Amphibian breeding habitat (wetland): These areas would have ELC community classes SW, MA, FE, BO, OA and SA. There are two potential ELC communities that are applicable, a MAS2-1 and MAM2-2. To be significant the site must have a breeding population of 1 or more of the listed salamander species or 3 or more of the listed frog or toad species and with at least 20 breeding individuals.

No salamander species were observed during the field work, nor would they be expected due to the dry nature of the habitat. During the amphibian call breeding surveys none of the listed species above were present in sufficient numbers to be considered significant.

Area Sensitive Bird Breeding Habitat: Includes older forests (>60 years old) in forests greater than 30 ha., with interior forest habitat at least 200 m from the forest edge. The bulk of the forests associated with the expansion lands are less than 60 years old and are lacking in interior

habitat that is 200 m from the edge habitat. To be significant, the site must also contain at least 3 nesting pairs of the indicator species, and this threshold was not met.

Habitat for Species of Conservation Concern

The Ecoregion Criteria Schedules (OMNRF 2015) lists 5 categories of habitat for species of conservation concern for Site Region 6E. Each of these is discussed below in context with what was observed during the site investigations:

Marsh bird breeding habitat: All wetland habitats are to be considered as long as there is shallow water with emergent aquatic vegetation present.

Listed species include American Bittern, Virginia Rail, Sora, Common Moorhen, American Coot, Pied-billed Grebe, Marsh Wren, Sedge Wren, Common Loon, Sandhill Crane, Green Heron, Trumpeter Swan, and special concern species include Black Tern and Yellow Rail. To be significant a site must have 5 or more nesting pairs of Sedge Wren or Marsh Wren or 1 pair of Sandhill Cranes; or breeding by any combination of 5 or more of the listed species above. Any wetland with breeding of 1 or more Black Terns, Trumpeter Swan, Green Heron or Yellow Rail is significant.

None of these species were observed or heard calling during the surveys, nor would they be expected due to poor habitat quality.

Open country bird breeding habitat: Requires grassland habitat 30 ha or larger in size, that is not Class 1 or 2 agricultural lands, and not being actively used for farming. There is no grassland habitat of this size within 120 m of the proposed expansion area. Adjacent lands include roadways, thickets, smaller grassy areas, woodlands, agricultural land, and a quarry.

Listed birds to be considered for open country bird breeding habitat include Upland Sandpiper, Grasshopper Sparrow, Vesper Sparrow, Northern Harrier, and Savannah Sparrow, and special concern species the Short-eared Owl. To be significant the presence of nesting or breeding of 2 or more of the listed species is required. During the spring breeding surveys none of the listed species were encountered.

Shrub/early successional bird breeding habitat: OMNRF (2015) sets out various criteria for significance. For example, OMNRF (2015) note that the site must meet a minimal size of 10 ha., and also note that the ELC types to be considered can include CUT, CUS, and CUW. Finally, the site must also have a particular mix of indicator/common species. In our field work, we found the field and thicket areas in the southwest portion of the Phase 2 expansion to contain one indicator species (Brown Thrasher) and two common species (Field Sparrow and Eastern Towhee).

This mix of species meets the significant threshold, but the size threshold was not met if we consider the CUT and CUS types on site. However, in a review of our draft Level 1 assessment in 2015, the OMNRF was of the opinion that the CUM habitat should also be considered in the

size calculation, which would increase the overall habitat area to 11 hectares and meet the size threshold. We do not feel that this is appropriate because it runs counter to the OMNRF (2015) guidelines and because it would be unusual for Field Sparrows and Thrashers to nest in grasslands (Stauffer and Best 1980). Nevertheless, we will defer to the OMNRF and consider the possibility of significant shrub/early successional bird breeding habitat present and will discuss this further in the Level II assessment.

Terrestrial Crayfish: These only occur in SW Ontario.

Special concern and Rare Wildlife Species: All special concern and provincially rare (S1 to S3) plant and animal species. The proposed quarry expansion occurs in the NHIC 1 km grids 18UQ70 0 46 to 48 and 56 to 58. There are no special concern or S1 to S3 records for these grids.

During the field work one Wood Thrush (Special Concern) was heard calling in the FOD5-8 woodlands within 120 m to the Phase 2 expansion lands and this will be discussed in the Level II report.

Animal movement corridors

The Ecoregion Criteria Schedules (OMNRF 2015) lists 2 categories of animal movement corridors for Site Region 6E. Each of these is discussed below in context with what was observed during the site investigations:

Amphibian movement corridors: Amphibian movement corridors provide a link between wetland and woodland breeding habitat and summer and fall terrestrial habitat. There are no records of amphibian movement corridors for this site and no habitat or landscape features supportive of significant movements (e.g., riparian corridors) within 120 m of the proposed quarry expansion. The small wetland on site supports low numbers of breeding amphibians, with the next nearest amphibian habitat of any quality to be more than 500 m to the east, with the intervening land being the active quarry.

Deer movement corridors: Deer movement corridors are associated with deer wintering habitat (MNR 2012). There are also no confirmed winter deer yards or deer movement corridors reported within 120 m of the proposed quarry expansion, and winter field work found no only sparse usage of the subject lands by deer.

Fish Habitat

There is no fish habitat within 120 m of the proposed quarry expansion. In 2015 the OMNRF visited the site and noted the existence of the small pond on the property and asked us to investigate it for fish habitat. In previous site visits we encountered two pond areas, with the aforementioned one referred to by the OMNRF being mostly devoid of water, and the other smaller pond to be associated with the MAS2-1 wetland. In 2015, we observed the smaller pond

to be no longer present as it was now covered by dense cattail growth. The larger pond noted by OMNRF had sufficient water to possibly contain fish and so a fish assessment was undertaken.

The pond appears to be man-made as its appearance within the surrounding landscape is anomalous, and we could not see it in the historic aerial photographs. It is circular and is about 8m x 8m in size (see Figure 11). There is a large flat stone slab along one edge of the pond that appears to have been placed there; as such slabs are not found elsewhere in similar habitat.

For this fish habitat assessment, we drew on the expertise of our fisheries expert, Mary Alice Snetsinger. She has a Master's Degree in fisheries biology, and has worked with the Department of Fisheries and Oceans as a fish habitat biologist. She has also taken the Royal Ontario Museum fish identification course, and is a certified Ministry of Transportation Fisheries Specialist.



Figure 14. Fish assessment of small pond by Ms. Snetsinger. Note stone slab marked by plastic jug next to pond.

The pond was too heavily laden with decaying plant material (likely a water moss) to be able to effectively run a seine net, dip net, or to assess with an electrofisher. We tried dip netting without success and therefore placed a baited fish trap overnight, but did not catch any fish. In Ms. Snetsinger's opinion this pond is not fish habitat because:

1. It is totally isolated with no inflows or outflows, and has been known to dry up.
2. The nearest known fish habitat is several hundred meters away, and at a lower elevation.
3. The pond is small and contains poor habitat features.
4. No fish were caught in the fish trap.
5. No benthic invertebrates (i.e., fish food) were observed or caught.

In correspondence with the OMNRF, they stated that they were satisfied with our conclusions regarding a lack of fish habitat.

Conclusions & Recommendations Phase I

This report has followed the guidelines provided in the *Aggregate Resources Policy Manual* for a Level I Technical Report, which investigates whether or not significant natural heritage features are present.

Level I Technical Reports; report on the presence of significant natural heritage features and are not intended as an assessment of impacts. If significant natural heritage features are found, then a Level II report is initiated, requiring an assessment of impacts and recommendations.

Of the significant natural heritage features covered in the report, there is a possibility that snake hibernacula occur in the woodland to the south of the expansion area, which also has some forest value attributes. A special concern species (i.e., Wood Thrush) was also observed during the field work. As such, we have moved both of these to a Level II discussion.

It is the opinion of the OMNRF that significant wildlife habitat may exist in the southern half of the expansion lands (i.e., Phase 2) in the form of shrub/early successional bird breeding habitat. This will be moved to a Level II discussion.

The quarry expansion area does contain migratory bird breeding habitat (albeit not significant). We recommend that land clearing take place either before or after the bird breeding season (late April to late July) in order to prevent destruction of nests and be in contravention of the *Migratory Birds Convention Act*. It is possible to work within the breeding season, as long as the land is cleared prior to late April.

Natural Environment Level II: Impact Assessment

Value Feature Identified – Woodland

The Sugar Maple (FOD5-8) dominated woodland along the southern edge of the proposed Phase 2 expansion area (see Figure 4) ends at the top of slope along its northern edge where the adjacent habitat within the quarry property is dominated by woody shrubs such as prickly ash, Tartarian honeysuckle, gray dogwood, and red cedar. Dog strangling vine is also becoming more prevalent in this shrub area, and will also likely infest the woodland.

The woodland value comes from erosion protection for the lower elevations including the K&P trail, and a drainage watercourse. It also has potential to contain snake hibernacula due to some fracturing, southward exposure, and field habitat further south. No hibernacula or snakes were discovered within the woodlot however milk snakes have been observed in association with the fields further to the south.

Mitigation Recommendation 1: Since there are no plans to develop within this FOD5-8 slope woodland or to remove any trees, its value in providing possible hibernacula should continue. As well, there will be a berm wall built between the quarry and the woodland that will further help maintain woodland function. However, it is conceivable that during berm wall construction, inadvertent intrusions by heavy equipment could indirectly impact possible snake hibernacula. As such, it is recommended that the woodland edge should be clearly demarcated with some sort of marking system to prevent this intrusions.

Significant Wildlife Habitat - Habitat for Species of Conservation Concern

The Wood Thrush was listed as a Special Concern species in Ontario in 2014. It is not protected under the Endangered Species Act, but it is given consideration under the PPS as potential Significant Wildlife Habitat category. One Wood Thrush was heard calling in association with the FOD5-8 woodland south of the expansion lands during the 2011 surveys, however it was not noted during subsequent visits to the expansion lands from 2012 to 2015.

We have observed Wood Thrush nesting in many woodland habitats in Eastern Ontario from pristine isolated woodlands to urban forest copses, such as Lemoine Point, K&P woodlands, Miles Square Block, and CFB Kingston. Suitable habitat is also not lacking in the region as several woodlands where we once noted them calling are no longer being used. This suggests that habitat loss in the Ontario summer breeding grounds is not a critical issue. Changes and impacts associated with the wintering habitat outside of Canada is considered one of the main factors in declining numbers, and as a result, the quarry expansion is not considered to be a limiting factor to this species.

Mitigation Recommendation 2: Although there are no plans to intrude into the FOD5-8 woodland south of the quarry, these birds are protected under the Migratory Birds Convention Act and any tree clearing for the pit expansion should take place outside of the breeding season (April to July) in order to prevent the possible loss of active nests.

Significant Wildlife Habitat - Shrub/early successional bird breeding habitat

By its name, *shrub/early successional bird breeding habitat* it is implicit that this habitat is transient. It will eventually succeed into woodland, which will also be the case for any quarry shrub habitat. For example, the two shrub communities (i.e., CUT) on either side of the CUM type in Lot 12 (see Figure 15) should succeed into a woodland ELC type within 5 to 7 years, or possibly sooner. We base this timing on other shrubland/woodland successions we have observed on the quarry property in the last five years.

Significant Wildlife Habitat Recommendation 1: It is recommended that there be no quarry activities (e.g., excavation, land clearing) into Lot 12 until 2024.

Significant Wildlife Habitat Recommendation 2: In order to enhance Recommendation 1, we also recommend that large tree removal (i.e., trees greater than 2 m tall) occur throughout the FOD5-8 woodland to make this area more desirable to shrub breeding birds, as this area has a shrub understory. Removal should take place outside of the bird breeding season (September to March) either in 2017 or 2018.

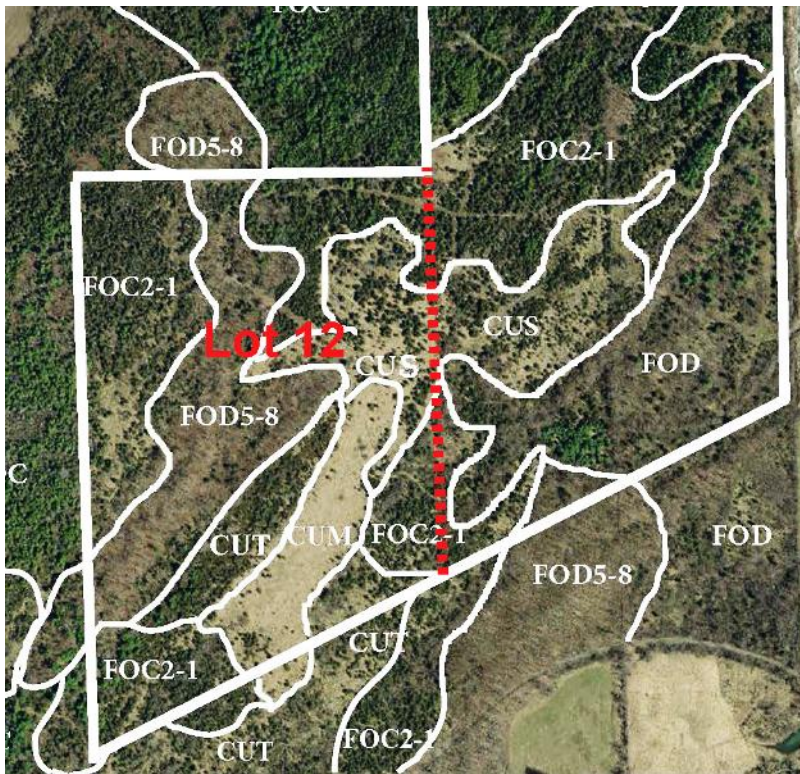


Figure 15. Lot 12.

Quarry rehabilitation is an accepted form of compensation/mitigation for features lost from quarry operations, and which will be applied to lost shrub/early successional bird breeding habitat. The depth of the quarry operations in Lot 12 will not go below the water table, and thus it will be possible to re-establish shrub habitat for successional breeding birds. The total area of the southwest corner is 23 ha., which is well above the current 11 ha. of shrub habitat.

This can be accomplished by laying down stockpiled berm soil to a depth of 20 cm., which exceeds the existing soil depths of many on-site shrublands. A commercial pasture seed mix would then be planted to prevent erosion and to attract grassland birds. These birds are in decline in Ontario primarily due to activities in their southern winter breeding range, but habitat compensation projects to support these species have been effective. For example, in a recent solar power compensation project (Ecological Services 2016), 45 ha. of grassland was created with a commercial pasture seed mix (e.g., clover, alfalfa, timothy, brome), which attracted 33 pairs of breeding Bobolink (Threatened) the first year after planting.

All of the shrub species that are currently within the significant shrubland are common aggressive colonizers, which are expected to be present in the region well into the future. Based on current succession timing in the region, we anticipate that the first signs of shrub colonization of the planted grassland will occur after about five years and succession to a deciduous woodland type (i.e., seeded by the adjacent FOD5-8 type) will take about thirty years. In other words, we anticipate the site to exist as successional shrubland for about 25 years.

This strategy will not only compensate for the lost shrubland habitat, but will also provide habitat for grassland birds, and will also return much of the Phase 2 woodlands lost to the quarry expansion.

Significant Wildlife Habitat Recommendation3: It is recommended that Lot 12 be rehabilitated for wildlife use by laying down 20 cm of stockpiled berm soils and planting a commercial pasture seed mix. It is also recommended that the site be allowed to succeed naturally to shrubland, and then to woodland and that human access to the site be restricted by fencing.

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Qualifications

I have a M.Sc. in Biology from Queen's University and have undertaken many ecological site assessments since 1985. In that time, I have done over two hundred impact assessments, site evaluations, and baseline studies including several involving quarries. I have completed one of the regional ANSI reports and completed over one hundred wetland evaluations, and have taught both the wetland evaluation course and impact assessment courses at Queen's University. I am also a qualified Butternut Health Assessor and am certified to conduct Ecological Land Classifications.

Respectfully Submitted,

A handwritten signature in black ink, appearing to read "Rob Snetsinger". The signature is written in a cursive, flowing style.

Rob Snetsinger

Appendix: Species Lists

Unity Quarry Plant List: Please note that this is not an exhaustive plant list as the EIS was focused on habitat characterizat on and significant features analysis.

Scientific Name	Common Name	SRANK
<i>Acer negundo</i>	Box Elder	S5
<i>Acer saccharum</i> var. <i>saccharum</i>	Sugar Maple	S5
<i>Achillea millefolium</i> var. <i>millefolium</i>	Common Yarrow	SNA
<i>Agrostis perennans</i>	Perennial Bentgrass	S5
<i>Alliaria petiolata</i>	Garlic mustard	SNA
<i>Amaranthus retrofractus</i>	Red-root Amaranth	SNA
<i>Ambrosia artemisiifolia</i>	Ragweed	SNA
<i>Anemone canadensis</i>	Canada Anemone	S5
<i>Apocynum androsaemifolium</i>	Spreading Dogbane	S5
<i>Arctium minus</i> ssp. <i>minus</i>	Common Burdock	SNA
<i>Asclepias syriaca</i>	Common Milkweed	S5
<i>Barbarea vulgaris</i>	Yellow Rocket	SNA
<i>Brassica nigra</i>	Black mustard	SNA
<i>Bromus inermis</i>	Awnless Brome	SNA
<i>Campanula rapunculoides</i>	Creeping Bellflower	SNA
<i>Carex bebbii</i>	Bebb's Sedge	S5
<i>Carex comosa</i>	Long Hair Sedge	S5
<i>Carex pennsylvanica</i>	Pennsylvania Sedge	S5
<i>Carex vulpinoidea</i>	Fox Sedge	S5
<i>Carya cordiformis</i>	Bitternut Hickory	S5
<i>Carya ovata</i>	Shag-bark Hickory	S5
<i>Cerastium fontanum</i>	Chickweed	SNA
<i>Chenopodium album</i>	Lambs Quarters	SNA
<i>Chenopodium simplex</i>	Maple Leaved Goosewort	SNA
<i>Cichorium intybus</i>	Chicory	SNA
<i>Circuta maculata</i>	Water hemlock	S5
<i>Cirsium arvense</i>	Thistle	SNA
<i>Convallaria majalis</i>	Lily of the Valley	SNA
<i>Cornus racemosa</i>	Grey Dogwood	S5
<i>Cornus sericea</i>	Red-osier Dogwood	S5
<i>Cynanchum rossicum</i>	European Swallow-wort	SNA
<i>Daucus carota</i>	Wild Carrot	SNA
<i>Dianthus armeria</i>	Deptford-pink	SNA
<i>Dipsacus fullonum</i>	Teasel	S5
<i>Echinochloa crusgalli</i>	Barnyard grass	SNA
<i>Echium vulgare</i>	Viper's-bugloss	SNA
<i>Epipactis helleborine</i>	Helleborine	SNA
<i>Erigeron acris</i>	Fleabane	S5

<i>Erythronium americanum</i>	Trout Lily	S5
<i>Eupatorium perfoliatum</i>	Boneset	S5
<i>Eurybia macrophylla</i>	Large-leaf Wood-aster	S5
<i>Euthamia graminifolia</i>	Flat-top Fragrant-golden-rod	S5
<i>Eutrochium maculatum</i>	Joe-pye-weed	S5
<i>Fallopia cilinodis</i>	Bindweed	S5
<i>Festuca rubra</i>	Red Fescue	S5
<i>Fragaria virginiana</i>	Virginia Strawberry	S5
<i>Fraxinus americana</i>	White Ash	S5
<i>Galium triflorum</i>	Sweet-scent Bedstraw	S5
<i>Geum laciniatum</i>	Rough Avens	S4
<i>Hemerocallis fulva</i>	Orange Daylily	SNA
<i>Hepatica americana</i>	Hepatica	S5
<i>Hieracium aurantiacum</i>	Orange Hawkweed	SNA
<i>Hieracium praealtum</i>	King Devil	SNA
<i>Hypericum perforatum</i>	Common St. Johnswort	S5
<i>Inula helenium</i>	Elecampane	SNA
<i>Juncus tenuis</i>	Path Rush	S5
<i>Juniperus communis</i>	Ground Juniper	S5
<i>Juniperus virginiana</i>	Eastern Red Cedar	S5
<i>Lactuca serriola</i>	Prickly lettuce	SNA
<i>Leersia oryzoides</i>	Rice cut grass	S5
<i>Leonurus cardiaca</i>	Motherwort	SNA
<i>Leucanthemum vulgare</i>	Oxeye Daisy	SNA
<i>Lilium bulbiferum</i>	Orange Lily	SNA
<i>Linaria vulgaris</i>	Toadflax	SNA
<i>Lonicera tatarica</i>	Tartarian Honeysuckle	SNA
<i>Lotus corniculatus</i>	Bird's-foot Trefoil	SNA
<i>Lycopus americanus</i>	American Bugleweed	S5
<i>Maianthemum racemosum</i>	False Solomons Seal	S5
<i>Malus pumila</i>	Common Apple	SNA
<i>Malva neglecta</i>	Common Mallow	SNA
<i>Medicago lupulina</i>	Black Medick	SNA
<i>Medicago sativa</i>	Alfalfa	SNA
<i>Melilotus alba</i>	Tall White Clover	SNA
<i>Melilotus albus</i>	White Sweet Clover	SNA
<i>Melilotus altissimus</i>	Tall Yellow Sweetclover	SNA
<i>Minuartia michauxii</i>	Michaux's Stitchwort	S5
<i>Nepeta cataria</i>	Catnip	SNA
<i>Ostrya virginiana</i>	Ironwood	S5
<i>Packera paupercula</i>	Balsam ragwort	S5
<i>Parthenocissus quinquefolia</i>	Virginia Creeper	S5
<i>Pastinaca sativa</i>	Wild Parsnip	SNA

<i>Penstemon hirsutus</i>	Hairy beardtongue	S5
<i>Phalaris arundinacea</i>	Reed Canary Grass	S5
<i>Phleum pratense</i>	Meadow Timothy	SNA
<i>Picea glauca</i>	White Spruce	S5
<i>Pinus strobus</i>	Eastern White Pine	S5
<i>Pinus sylvestris</i>	Scotch Pine	SNA
<i>Plantago major</i>	Plantain	SNA
<i>Poa annua</i>	Bentgrass	SNA
<i>Poa compressa</i>	Canada Bluegrass	SNA
<i>Poa palustris</i>	Fowl Bluegrass	S5
<i>Poa pratensis ssp. pratensis</i>		S5
<i>Populus tremuloides</i>	Trembling aspen	S5
<i>Potentilla recta</i>	Sulphur Cinquefoil	SNA
<i>Prunella vulgaris ssp. lanceolata</i>	Self-heal	S5
<i>Prunus pennsylvanica</i>	Pin Cherry	S5
<i>Prunus serotina</i>	Wild Black Cherry	S5
<i>Prunus virginiana</i>	Choke Cherry	S5
<i>Quercus alba</i>	White Oak	S5
<i>Quercus rubra</i>	Northern Red Oak	S5
<i>Ranunculus acris</i>	Tall Butter-cup	SNA
<i>Rhamnus cathartica</i>	Buckthorn	SNA
<i>Rhus radicans</i>	Poison Ivy	S5
<i>Rhus typhina</i>	Staghorn Sumac	S5
<i>Rosa blanda</i>	Smooth Rose	S5
<i>Rubus idaeus ssp. strigosus</i>	Raspberry	S5
<i>Rubus occidentalis</i>	Black Raspberry	S5
<i>Rubus odoratus</i>	P Flowering Raspberry	S5
<i>Sambucus racemosa</i>	European Red Elder	S5
<i>Scrophularia lanceolata</i>	Hare Figwort	S4
<i>Setaria pumila</i>	Foxtail	SNA
<i>Silene cucubalus</i>	Bladder Champion	SNA
<i>Solidago caesia</i>	Bluestem Goldenrod	S5
<i>Solidago canadensis var. canadensis</i>	Goldenrod	S5
<i>Solidago juncea</i>	Early Goldenrod	S5
<i>Solidago ptarmicoides</i>	Upland WhiteAster	S5
<i>Sonchus arvensis</i>	Sow thistle	SNA
<i>Spirodela polyrhiza</i>	Greater duckweed	S5
<i>Stellaria pallida</i>	Common Chickweed	SNA
<i>Symphyotrichum cordifolium</i>	Heart-leaf Aster	S5
<i>Symphyotrichum lanceolatum ssp. lanceolatum</i>	Panicled Aster	S5
<i>Symphyotrichum lateriflorum var. lateriflorum</i>	Small White Aster	S5
<i>Symphyotrichum novae-angliae</i>	New England Aster	S5
<i>Syringa vulgaris</i>	Common Lilac	SNA

<i>Taraxacum officinale</i>	Brown-seed Dandelion	SNA
<i>Thuja occidentalis</i>	White Cedar	S5
<i>Tilia americana</i>	American Basswood	S5
<i>Toxicodendron radicans ssp. negundo</i>	Poison Ivy	S5
<i>Tragopogon dubius</i>	Meadow Goat's-beard	SNA
<i>Trifolium campestre</i>	Low Hop Clover	SNA
<i>Trifolium hybridum</i>	Alsike Clover	SNA
<i>Trifolium pratense</i>	Red Clover	SNA
<i>Trifolium repens</i>	White Clover	SNA
<i>Trillium grandiflorum</i>	Trillium	S5
<i>Typha angustifolia</i>	Cattail	S5
<i>Typha angustifolia</i>	Narrow leaved cattail	SNA
<i>Typha latifolia</i>	Cattail	S5
<i>Ulmus americana</i>	American Elm	S5
<i>Verbascum thapsus</i>	Common Mullein	SNA
<i>Veronica americana</i>	American Speedwell	S5
<i>Vicia sativa</i>	Vetch	SNA
<i>Vincetoxicum rossicum</i>	Dog Strangling Vine	SNA
<i>Vitis riparia</i>	Riverbank grape	S5
<i>Wolffia</i>	watermeal	S5
<i>Zanthoxylum americanum</i>	Northern Prickley Ash	S5

Unity Road Quarry Birds

Comment

American Crow	Corvus	brachyrhynchos	throughout
American Goldfinch	Spinus	tristis	throughout
American Robin	Turdus	migratorius	throughout
American Woodcock	Scolopax	minor	FOD5-8
Belted Kingfisher	Megaceryle	alcyon	flyover
Black-and-white Warbler	Mniotilta	varia	CUT
Black-capped Chickadee	Poecile	atricapillus	FOC2-1
Black-throated Green Warbler	Dendroica	virens	FOC2-1
Blue Jay	Cyanocitta	cristata	throughout
Brown Thrasher	Toxostoma	rufum	CUT
Brown-headed Cowbird	Molothrus	ater	throughout
Cedar Waxwing	Bombycilla	cedrorum	CUT
Chipping Sparrow	Spizella	passerina	CUM
Common Grackle	Quiscalus	quiscula	throughout
Common Raven	Corvus	corax	flyover
Common Yellowthroat	Geothlypis	trichas	MAS2-1
Eastern Kingbird	Tyrannus	tyrannus	CUM
Eastern Towhee	Pipilo	erythrophthalmus	CUT

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Eastern Whip-poor-will	<i>Antrostomus</i>	<i>vociferus</i>	Farm to the west
European Starling	<i>Sturnus</i>	<i>vulgaris</i>	throughout
Field Sparrow	<i>Spizella</i>	<i>pusilla</i>	CUM
Great Blue Heron	<i>Ardea</i>	<i>herodias</i>	flyover
Great Crested Flycatcher	<i>Myiarchus</i>	<i>crinitus</i>	FOD5-8
House Wren	<i>Troglodytes</i>	<i>aedon</i>	quarry
Killdeer	<i>Charadrius</i>	<i>vociferus</i>	gas pipeline
Least Flycatcher	<i>Empidonax</i>	<i>minimus</i>	CUT
Mourning Dove	<i>Zenaida</i>	<i>macroura</i>	throughout
Northern Flicker	<i>Colaptes</i>	<i>auratus</i>	CUM
Ovenbird	<i>Seiurus</i>	<i>aurocapilla</i>	FOD5-8
Red-winged Blackbird	<i>Agelaius</i>	<i>phoeniceus</i>	CUM
Ring-billed Gull	<i>Larus</i>	<i>delawarensis</i>	flyover
Rock Pigeon	<i>Columba</i>	<i>livia</i>	flyover
Rose-breasted Grosbeak	<i>Pheucticus</i>	<i>ludovicianus</i>	FOC2-1
Ruffed Grouse	<i>Bonasa</i>	<i>umbellus</i>	FOD5-8
Song Sparrow	<i>Melospiza</i>	<i>melodia</i>	throughout
White-breasted Nuthatch	<i>Sitta</i>	<i>carolinensis</i>	FOC2-1
White-throated Sparrow	<i>Zonotrichia</i>	<i>albicollis</i>	FOC2-1
Wood Thrush	<i>Hylocichla</i>	<i>mustelina</i>	FOD5-8
Yellow Warbler	<i>Dendroica</i>	<i>petechia</i>	CUT