

# APPENDIX

**D**

LONG-TERM TREND  
ECOLOGICAL MONITORING  
PROGRAM RESULTS





**Walker Aggregates Duntroon  
Quarry Expansion, Wetland  
Vegetation Monitoring: 2020  
Annual Monitoring Report**

**FINAL REPORT**

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## Sign-off Sheet

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**WALKER AGGREGATES DUNTROON QUARRY EXPANSION, WETLAND VEGETATION  
MONITORING: 2020 ANNUAL MONITORING REPORT**

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# WALKER AGGREGATES DUNTROON QUARRY EXPANSION, WETLAND VEGETATION MONITORING: 2020

Introduction  
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## 1.0 INTRODUCTION

Ecological monitoring, including wetland monitoring, is a component of the Walker Aggregates Inc. Duntroon Expansion Quarry Adaptive Management Plan (AMP; Stantec and Hims Geoenvironmental 2013). The Long Term Trend Ecological Monitoring (LTTEM) program was developed to supplement the information from the Long Term Trend Water Monitoring (LTTWM) program with information about the health and functioning of the natural heritage features in the vicinity of the Expansion Quarry. The LTTEM program:

- provides regular updates on the current conditions and longer term trends of the Expansion Quarry Environment;
- is used to determine if the key features and functions in the Expansion Quarry Environment are experiencing unexpected changes and/or degradation as a result of the quarry operations by making reference to similar features in the Regional Environment; and
- is designed to ensure that changes to the Expansion Quarry Environment are identified and properly investigated for any possible cause-and-effect relationship with quarry operations.

If negative changes in environmental conditions are detected, the cause of the changes will be investigated and if the quarry is the cause of the change, quarry operations will be adapted and/or contingency mitigation measures will be implemented.

The focus of the wetland component of the Long Term Trend Ecological Monitoring (LTTEM) program is on amphibian vernal breeding pools and ensuring hydroperiods are suitable for continued hydrophytic plant growth in the surrounding wetland zones. Wetland water level monitoring is conducted as part of the LTTWM program. Long term trends in these wetland features and their functions are considered and interpreted with reference to long term climatic trends.

Ecological monitoring to complement the water level monitoring includes two components: vegetation monitoring and wildlife monitoring. Vegetation monitoring was initiated in 2019 at wetlands within the Rob Roy Swamp PSW Complex (RR2 and RR6) and ANSI wetlands A & B. This summary report describes the methods and results from the second year (2020) of wetland vegetation surveys and provides comparisons to the baseline (2019) surveys.

As documented in the Site Plan and AMP, wetland monitoring (vegetation and wildlife) is to be conducted annually for three years in Phase I to establish an ecological baseline, and every five years thereafter until rehabilitation is complete.



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## 2.0 METHODOLOGY

A general methodology for wetland vegetation monitoring was presented in the 2013 AMP. More detailed monitoring and data analysis methods are presented below.

### 2.1 VEGETATION MONITORING

Transects to monitor wetland vegetation were established in 2019 in each wetland area from the perimeter of the wetland to the selected drive point monitor where surface water monitoring is undertaken. In accordance with the AMP, Section 5.5.2, vegetation monitoring is to be conducted in August or September of each monitoring year.

In total, six vegetation monitoring transects (Transects 1 to 6) were established on the Subject Lands as shown on figures H.1 to H.3 of the AMP (Appendix A). The transects correspond with existing wetland features and amphibian monitoring stations as shown in Table 1.

**Table 1: Wetland Vegetation Transects in Relation to Wetland Features and Amphibian Monitoring Stations**

Transect	Wetland Feature	Nearest Amphibian Monitoring Station
T-1	Rob Roy Swamp PSW Complex (RR2)	Station 2
T-2	Rob Roy Swamp PSW Complex (RR2)	Station 3
T-3	ANSI wetland A	Station 4
T-4	ANSI wetland B	Station 5
T-5	Rob Roy Swamp PSW Complex (RR6)	Station 6
T-6	Rob Roy Swamp PSW Complex (RR6)	Station 6

Two permanent 2 m x 2 m plots were established at the beginning and end of each transect: one near the edge, and one centrally located near the designated drivepoint. The corners of each plot were marked with metal pin flags and a wooden stake was placed in the centre of the plot. Coordinates of the plots were also recorded using a sub-metre GPS unit.

In each monitoring plot, several observations were made in order to accurately characterize the current conditions. A description of the canopy and shrub-layer within the plot was recorded, including information on the species present, and percent cover of each species within the plot. Species presence and percent cover was also documented for species in the ground-layer. The general health of mature trees (greater than 10 cm diameter at breast height) within 5 m of each plot and standing water depth within the plot were recorded.



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Completed field sheets listing all species observed in each plot are in Appendix C. As evident in the field sheets, and due to the stratified nature of ground-layer species, two or more species may overlap in the same space at varying heights, and therefore the sum of percent cover by species in any one plot may exceed 100%. An estimate of total percent cover in each plot was recorded in order to characterize the amount of vegetation versus open soil in each plot.

## **2.2 PHOTOGRAPHIC MONITORING**

Photographic monitoring provides a visual representation of the current conditions on the Subjects Lands, allowing for annual comparisons. The photographic monitoring component of this program is intended to provide a qualitative description of each transect to supplement the quantitative vegetation data. The number, location and direction of each photograph at each plot and along each transect were recorded for continuity over the duration of the monitoring program.

## **2.3 DATA ANALYSIS**

A floristic quality assessment was completed for each plot based on the plant list collected, following methods described in Oldham et al. (1995). The floristic quality assessment for wetland communities includes identification of sensitive native plant species, “natural” quality and wetland tolerance of plant species within a plot.

Identification of potentially sensitive native plant species was based on their assigned Coefficient of Conservatism (C) value, as determined by Oldham et al. (1995). This C value, ranging from 0 (low) to 10 (high), is based on a species’ tolerance of disturbance and fidelity to a specific natural habitat. Species with a C value of 8, 9 or 10 generally exhibit a high degree of fidelity to a narrow range of habitat parameters and are considered habitat sensitive species and are usually typical of high-quality plant communities. The mean C was calculated for each plot.

The Floristic Quality Index (FQI) is a numerical value used to evaluate the natural quality of a site based on the C values. The greater the richness of sensitive species at a site the higher the FQI will be and the more “natural” and high quality the site. These indices are useful to track changes in floristic quality of a site over time. The FQI value was calculated for each plot by multiplying the mean C by the square root of the total number of native species present in each plot.

Co-efficient of Wetness (CW) is another part of the floristic quality assessment. Identification and ranking of wetland plants (CW value) were determined by Oldham et al. (1995). Several updates to the wetland rankings are provided in recent plant lists by the Natural Heritage Information Centre (NHIC 2019). CW ranges on an integer scale from –5 (strongest affinity to wetland conditions) to +5 (least affinity to wetland conditions). Plants within the CW range -2 and -3 are considered facultative and CW of -4 or -5 are obligate in their preference to wetland conditions. The mean CW (average CW) was calculated for each plot.





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## 3.0 RESULTS

Below is a summary of data collected during the first year (2020) of terrestrial vegetation monitoring. A photographic record is provided in Appendix B. Raw field data are provided in Appendix C (field forms). Vegetation monitoring results are summarized throughout Section 3.1 and are provided in Appendix D (data analysis), including a species list (Latin names provided) and floristic quality assessment for each plot. Field surveys for the first year of monitoring were conducted on September 12 and 13, 2019. The second year of monitoring was completed on September 29, 2020.

Results are presented below for paired plots along each transect. An overview of the floristic assessment data for 2019 and 2020 is presented in Table 2 below.

**Table 2: Floristic Quality Assessment**

	Total Native Species	Total Exotic Species	Mean C	FQI	No. of Conservative Species (C of 8, 9 or 10)	Mean CW
T1-1 (2019)	12	0	5.0	17.3	1	-3.6
T1-1 (2020)	9	0	4.6	13.7	0	-3.3
T1-2 (2019)	8	0	4.0	11.3	0	-3.0
T1-2 (2020)	9	0	3.9	11.7	0	-3.0
T2-1 (2019)	11	0	4.6	15.4	0	-1.9
T2-1 (2020)	14	0	4.4	16.5	0	-2.0
T2-2 (2019)	5	0	5.8	13.0	0	-4.2
T2-2 (2020)	7	0	5.5	14.6	1	-3.6
T3-1 (2019)	4	0	3.3	6.5	0	-2.8
T3-1 (2020)	4	0	3.3	6.5	0	-2.8
T3-2 (2019)	10	1	3.4	11.3	0	-2.6
T3-2 (2020)	7	1	3.7	10.5	0	-3.4
T4-1 (2019)	12	0	3.3	11.3	0	-3.3
T4-1 (2020)	13	0	2.8	9.9	0	-2.8
T4-2 (2019)	8	1	3.3	9.8	0	-2.7
T4-2 (2020)	6	1	3.8	10.1	0	-2.3
T5-1 (2019)	6	1	2.7	7.1	0	-3.7
T5-1 (2020)	1	0	0.0	0.0	0	-3.0
T5-2 (2019)	12	1	3.3	11.7	0	-3.5
T5-2 (2020)	9	1	3.8	11.9	0	-3.6
T6-1 (2019)	1	0	0.0	0.0	0	-3.0



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**Table 2: Floristic Quality Assessment**

	Total Native Species	Total Exotic Species	Mean C	FQI	No. of Conservative Species (C of 8, 9 or 10)	Mean CW
T6-1 (2020)	3	0	2.5	4.3	0	-4.3
T6-2 (2019)	3	0	4.7	8.1	0	-4.3
T6-2 (2020)	5	0	4.5	10.1	0	-4.3

## 3.1 TRANSECT 1 – ROB ROY SWAMP PSW COMPLEX (RR2)

Transect 1 is oriented north to south and is located within a mature deciduous swamp dominated by Freeman's (swamp) maple next to an agricultural field (hay) to the north (Figure H.1). Transect 1 crosses the west edge of a previously mapped deep vernal pooling area within the swamp. No standing water was present along Transect 1 in September 2020, but evidence that standing water was present earlier in the season was observed (e.g. hummocks, unvegetated low areas of swamp floor). Surface soil at both plots in Transect 1 was dry.

Two vegetation monitoring plots (T1-1 and T1-2) were established along this transect in 2019 and were monitored for a second year in 2020.

**Plot T1-1:** Canopy cover in this plot consisted of black ash growing inside the plot (70%) and Freeman's maple (40%) hanging over the plot. Trees within and adjacent the plot were in good condition. The ground layer was densely dominated by sensitive fern (70% cover) with overall cover at approximately 90%. No exotic or rare native species were observed in Plot T1-1.

The mean C of Plot T1-1 changed slightly from 2019 (5.0) to 2020 (4.6). The FQI decreased somewhat more abruptly from 2019 (17.3) to 2020 (13.7). Bristle-stalked sedge, a conservative species with a C value of 8 was recorded in the plot in 2019, but not in 2020. This absence accounted for much of the differences in C and FQI values between 2019 and 2020. The species could have been present, but not detected in 2020 due to the timing of the survey. It also was not abundant within the plot in 2019 (5%), which make detection difficult later in the season.

The average (mean) CW of Plot T1-1 was -3.6 in 2019 and -3.3 in 2020. These low values support field observations of wetland conditions along transect 1 and at the plot.

**Plot T1-2:** No trees originated inside the plot, but large Freeman's (swamp) maple hung over the plot (50% cover). Green ash to a lesser degree (10% cover) hung over the plot from the outside. Trees adjacent the plot were in good condition. The ground layer was low to moderately covered (30%) by herbaceous species. The most abundant species was sensitive fern which covered approximately 20% of the plot. No exotic or rare native species were observed in Plot T1-1.



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The mean *C* of Plot T1-2 changed very little from 2019 (4.0) to 2020 (3.9). The FQI was also similar from 2019 (11.3) to 2020 (11.7). No conservative species with a *C* value of 8, 9 or 10 were observed in the plot in either year.

The average (mean) CW of Plot T1-2 was -3.0 in 2019 and 2020. These low values are supported by field observations of wetland conditions along transect 1 and at the plot.

### 3.2 TRANSECT 2 – ROB ROY SWAMP PSW COMPLEX (RR2)

Transect 2 is oriented west to east and is located within a mature deciduous swamp dominated by Freeman's (swamp) maple (Figure H.1). Transect 2 is located on the other side of the maple swamp from Transect 1. Transect 2 also crosses a previously mapped vernal pooling area. However, this pooling area was noted as shallower than the pooling near Transect 1. No standing water was present along Transect 2 in September 2019 or 2020, but evidence that standing water was present earlier in the season was observed (e.g. hummocks, unvegetated low areas of swamp floor). Surface soil at both plots in Transect 2 was dry.

Two vegetation monitoring plots (T2-1 and T2-2) were established along this transect in 2019 and were monitored for a second year in 2020.

**Plot T2-1:** No trees originated inside the plot, but large Freeman's (swamp) maple hung over the plot (70% cover) from the outside and, to a lesser degree (30% cover), White elm. Trees adjacent the plot were in good condition. The ground layer was moderately covered (50%) by herbaceous species. The most abundant species was necklace sedge which covered approximately 20% of the plot. Several of the ground layer species in this plot were growing on a rotting log inside the plot rather than on the floor of the swamp. No exotic or rare native species were observed in Plot T2-1.

The mean *C* of Plot T2-1 changed little from 2019 (4.6) to 2020 (4.4). The FQI also remained similar from 2019 (15.4) to 2020 (16.5). No conservative species with a *C* value of 8, 9 or 10 were observed in the plot in either year.

The average (mean) CW of Plot T2-1 was -1.9 in 2019 and 2.0 in 2020. These moderately low values are supported by field observations of wetland conditions along transect 2 and at the plot.

**Plot T2-2:** No mature trees originated inside the plot, but mature Freeman's (swamp) maple hung over the plot (70% cover). Trees adjacent the plot were in good condition. The ground layer was moderately covered (60%) by low shrubs and small tree seedlings or saplings. Only a few herbaceous species were observed in the plot with a total cover of approximately 15%. The most abundant herbaceous species was two-seeded sedge, which covered approximately 10% of the plot. No exotic or rare native species were observed in Plot T2-2.

The mean *C* of Plot T2-2 changed little from 2019 (5.8) to 2020 (5.5). The FQI was also similar in 2019 (13.0) and 2020 (14.6). One conservative species (two-seeded sedge) with a *C* value of 8 was observed in the plot in 2020. Neither this species, nor any other conservative species, were observed in 2019.



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The average (mean) CW of Plot T2-2 was -4.2 in 2019 and -3.6 in 2020. These low values are supported by field observations of wetland conditions along transect 2 and at the plot.

### **3.3 TRANSECT 3 – ANSI WETLAND A**

Transect 3 is oriented west to east and is located within a pocket of dense thicket swamp (Figure H.2). No standing water was present along Transect 3 in September 2019 and 2020, but evidence that standing water was present earlier in the season was observed. Surface soil at both plots in Transect 3 was dry to moist.

Two vegetation monitoring plots (T3-1 and T3-2) were established along this transect in 2019 and were monitored for a second year in 2020.

**Plot T3-1:** No trees originated inside the plot, but balsam poplar hung over the plot (80% cover). Trees adjacent the plot were in good condition. The ground layer was densely covered (90%) by red-osier dogwood shrubs and to a lesser extent riverbank grape vine (20%). As in 2019, only two herbaceous species were observed in the plot (sensitive fern and Tuckerman's sedge) at 10% and 5% cover, respectively. No exotic or rare native species were observed in Plot T3-1.

The floristic quality values remained unchanged from 2019 to 2020. The mean C of Plot T3-1 was 3.3 and the FQI was 6.5 in 2019 and 2020. No conservative species with a C value of 8, 9 or 10 were observed in the plot in either year.

The average (mean) CW of Plot T3-1 was -2.8 in 2019 and 2020. This low value is supported by field observations of wetland conditions along Transect 3 and at the plot.

**Plot T3-2:** No trees originated inside the plot, but green ash hung over the plot (60% cover). The green ash and other trees adjacent the plot were in good condition. The ground layer was moderately covered (70%) by herbaceous species and red-osier dogwood shrubs. The most abundant species were sensitive fern (30% cover), reed canary grass (30%) and red-osier dogwood (20%). One exotic species (bittersweet nightshade) was observed in the plot at 5% cover in both 2019 and 2020. No rare native species were observed in Plot T3-2.

The mean C of Plot T3-2 changed little from 2019 (3.4) to 2020 (3.7). The FQI was also similar in 2019 (11.3) and 2020 (10.5). No conservative species with a C value of 8, 9 or 10 were observed in the plot in either year.

The average (mean) CW of Plot T3-2 was -2.6 in 2019 and -3.4 in 2020. These low values are supported by field observations of wetland conditions along Transect 3 and at plot T3-2.

### **3.4 TRANSECT 4 – ANSI WETLAND B**

Transect 4 is oriented southwest to northeast and is located within a mature eastern white cedar mixed swamp community (Figure H.2). No standing water was present along Transect 4 in September 2019 and 2020. Surface soil at both plots in Transect 4 was dry to moist.



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Two vegetation monitoring plots (T4-1 and T4-2) were established along this transect in 2019 and were monitored for a second year in 2020.

**Plot T4-1:** No trees originated inside the plot, but green ash hung over the plot (50% cover). The green ash and other trees adjacent the plot were in good condition. The ground layer was densely covered (95%) by herbaceous species. The most abundant species were fowl manna grass (60% cover) and spotted Joe pye weed (30% cover). No exotic or rare native species were observed in Plot T4-1.

The mean C of Plot T4-1 changed slightly between 2019 (3.3) and 2020 (2.8). The FQI also decreased slightly from 2019 (11.3) to 2020 (9.9). These decreases are due to differences in the plant inventory in this plot between the two years, as a few species recorded in 2020 were not observed in 2019 and vice versa. No conservative species with a C value of 8, 9 or 10 were observed in the plot.

The average (mean) CW of Plot T4-1 was -3.3 in 2019 and -2.8 in 2020. These low values are supported by field observations of wetland conditions along Transect 4 and at the plot.

**Plot T4-2:** No trees originated inside the plot, but eastern white cedar hung over the plot (60% cover). Trees adjacent the plot were in good condition. The ground layer was moderately covered (60%) by herbaceous species. The most abundant species was sensitive fern (50% cover). One exotic species (bittersweet nightshade) was observed in the plot at 10% cover in 2019 and 5% cover in 2020. No rare native species were observed in Plot T4-2.

The mean C of Plot T4-2 increased slightly from 3.3 in 2019 to 3.8 in 2020. The FQI remained similar between 2019 (9.8) and 2020 (10.1). No conservative species with a C value of 8, 9 or 10 were observed in the plot.

The average (mean) CW of Plot T4-2 was -2.7 in 2019 and -2.3 in 2020. These low values are supported by field observations of wetland conditions along Transect 4 and at the plot.

### 3.5 TRANSECT 5 – ROB ROY SWAMP PSW COMPLEX (RR6)

Transect 5 is oriented north to south and is located within an inundated eastern white cedar swamp and hardwood mixed swamp. The wetland along Transect 5 was heavily inundated with water throughout during September 2019 surveys. The wetland was inundated again in 2020 with slightly deeper water. It was difficult to discern water depth change throughout the majority of the transect. However, water depth was most noticeably deeper in plot T5-1 compared to water depth in 2019. Water depth fluctuation is more noticeable at this location because it is close to the wetland edge and adjacent upland forest, which provides a useful point of reference for year to year observations.

Two vegetation monitoring plots (T5-1 and T5-2) were established along this transect in 2019 and were monitored for a second year in 2020.

**Plot T5-1:** No trees originated inside the plot, but black ash slightly hung over the plot (5% cover). A few of the black ash trees adjacent the plot appeared to be in decline. Other black ash were healthy and



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adjacent eastern white cedar were healthy at the edge of the wetland. The ground layer was inundated with water and moderately covered (50%) by one species (reed canary grass). No other species were observed in the plot in 2020, possibly due to a greater amount of water (approximately 30cm in depth) that was evident in 2020 in this plot.

The mean C of Plot T5-1 was 2.7 in 2019 and 0.0 in 2020. Similarly, the FQI was 7.1 in 2019 and 0.0 in 2020. These differences were due to the absence of any species other than reed canary grass and the C value of reed canary grass (0).

The average (mean) CW of Plot T5-1 was -3.7 in 2019 and -3.0 in 2020. These low values are supported by field observations of wetland conditions along Transect 5 and at the plot.

**Plot T5-2:** No trees originated inside the plot, but red maple hung over the plot (50% cover). The red maple trees and adjacent black ash were healthy, while other trees adjacent the plot such as eastern white cedar and yellow birch were dead or dying. Some Balsam fir adjacent the plot were dead while others were healthy. The ground layer was inundated with water and moderately covered (40%) by herbaceous species. The most abundant species were bittersweet nightshade (25% cover) and broad-leaved cattail (15% cover). One exotic species (bittersweet nightshade) was observed in the plot. No rare native species were observed in Plot T5-2.

The mean C of Plot T5-2 increased slightly from 3.3 in 2019 to 3.8 in 2020. The FQI remained nearly the same from 2019 (11.7) to 2020 (11.9). No conservative species with a C value of 8, 9 or 10 were observed in the plot.

The average (mean) CW of Plot T5-2 remained nearly the same from 2019 (-3.5) to 2020 (-3.6). These low values are supported by field observations of wetland conditions along Transect 5 and at the plot.

### 3.6 TRANSECT 6 – ROB ROY SWAMP PSW COMPLEX (RR6)

Transect 6 is oriented northeast to southwest and is located within an open eastern white cedar swamp. Many or most of the cedar trees in the swamp appear to have died in recent years. It was not possible to establish a full length transect in 2019 due to pockets of standing water and the soft mucky swamp bottom. Evidence of heavy inundation throughout the transect and swamp earlier in the season in 2019 was evident in September 2019, but standing water was not widespread at that time. The swamp was heavily inundated throughout in September 2020, covering the length of the transect and both plots in 30cm+ deep water.

Two vegetation monitoring plots (T6-1 and T6-2) were established along this partial transect in 2019 and were monitored for a second year in 2020.

**Plot T6-1:** No living trees originated inside or adjacent the plot. Several eastern white cedar and white elm adjacent the plot and along the transect were dead. The ground layer was moderately densely covered (80%) by reed canary grass. Aquatic submergents covered approximately 50% of the plot. No exotic or rare native species were observed in Plot T6-1. Appendix D is a complete list of plant species observed in this plot in 2019 and 2020.



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The mean *C* of Plot T6-1 was 0.0 in 2019 and 2.5 in 2020. The FQI was 0.0 in 2019 and 4.3 in 2020. These values increased because an additional species (lesser duckweed) was noted in 2020 and not in 2019. No conservative species with a *C* value of 8, 9 or 10 were observed in the plot.

The average (mean) CW of Plot T6-1 decreased from -3.0 in 2019 to -4.3 in 2020. These low values are supported by field observations of wetland conditions along Transect 6 and at the plot.

**Plot T6-2:** No living trees originated inside or adjacent the plot. Several eastern white cedar and one white elm adjacent the plot were dead. One red maple next to the plot was healthy, while a balsam fir and a spruce were in decline. No standing water was present in September 2019, but the plot was inundated in September 2020 by approximately 30cm deep water. The ground layer was moderately covered by aquatic submergents (75%) and willow shrubs (25%). No exotic or rare native species were observed in Plot T6-2.

The mean *C* of Plot T6-2 remained nearly the same from 2019 (4.7) to 2020 (4.5). The FQI increased slightly from 2019 (8.1) to 2020 (10.1). No conservative species with a *C* value of 8, 9 or 10 were observed in the plot.

The average (mean) CW of Plot T6-2 was the same in 2019 and 2020 (-4.3). This low value is supported by field observations of wetland conditions along Transect 6 and at the plot.



# WALKER AGGREGATES DUNTROON QUARRY EXPANSION, WETLAND VEGETATION MONITORING: 2020 ANNUAL MONITORING REPORT

Discussion  
April 30, 2021

## 4.0 DISCUSSION

All 6 monitoring transects were established in natural wetland habitats. In 2019 and 2020, all 12 plots were dominated by wetland plants and all calculated CW values were in the negative indicating wetland conditions. Wetland conditions appeared visually similar from 2019 to 2020 in all transects except for Transect 6 and a portion of Transect 5 (wetland RR6), which were inundated with water in 2020 (Appendix B). The greatest difference from 2019 to 2020 was observed at Transect 6, where the substrate was moist and mucky and slightly wet in 2019, but completely inundated with 30cm+ deep water in 2020. The north end of Transect 5 (plot T5-1) was also noticeably more inundated in 2020 compared to 2019, resulting in fewer species recorded within this plot in 2020.

Minor fluctuations in species presence / absence were documented in some of the plots which is reflected in some C and FQI values. This is certainly due to year-to-year natural variations and possibly a difference in survey timing, rather than an indication of wetland change. Second year surveys were conducted on September 29, 2020 compared to baseline surveys on September 12/13, 2019. This difference of a couple weeks can be significant in the late summer / early fall as herbaceous vegetation can die off rapidly due to frosts and other factors. This can make it difficult to identify certain types of vegetation, which affects the plot inventories and floristic quality calculations.

Surveys in future years of monitoring should be conducted between mid-August at the earliest and no later than mid-September. This will ensure that more species are visible and better comparisons to the baseline year of monitoring can be achieved. It is recommended that Section 5.5.2. of the AMP be updated with these revisions to the monitoring period.

### Vegetation Health

With respect to overall health of the natural features in the Study Lands, woody vegetation, particularly trees, are better long-term indicators of change in a vegetation community. Tree health can be influenced by several factors such as flooding, insect pests, fungal pathogens, windfall, ice storms, natural decline, competition with other trees and direct impacts to stem or roots.

The trees in the study area were generally healthy with a few exceptions. The largest exception was the tree community along Transect 6 in swamp wetland RR6 where many or most of the dominant eastern white cedar trees were dead as well as other associate trees (e.g. white elm). The cause of mortality was unclear. Quarry operation and surface water monitoring information provided by Walker (2019) indicated that although modifications to the settling ponds in the existing quarry before 2019 were made in order to establish a hydraulic barrier between the quarry and wetland RR6, where Transects 5 and 6 are located, the purpose was to maintain water levels in the wetland. RR6 is known to be wet throughout the year as drivepoint monitoring stations DP1 (corresponding with Transect 6) and DP2 (corresponding with Transect 5) have never been dry and surface water levels can reach over 1m in depth. Discharge from the existing quarry runs along the hydro corridor between Transects 5 and 6 and is released close to Grey Rd. 31. The amount of water discharged in 2019 was similar to that of previous years. Future monitoring years may provide more insight into the change experienced by this wetland feature.





# **WALKER AGGREGATES DUNTROON QUARRY EXPANSION, WETLAND VEGETATION MONITORING: 2020 ANNUAL MONITORING REPORT**

Discussion  
April 30, 2021

No notable change was observed in general health from 2019 to 2020 for trees within and adjacent the transects and plots.

## **4.1 CONCLUSIONS**

This report represents the second year of terrestrial monitoring on the Subject Lands. Future years of monitoring will provide greater opportunities to observe any changes in vegetation composition and wetland conditions along the transects.

For the most part the wetlands remain consistent in their floristic character and remain as vibrant wetland communities. RR6 appears to be experiencing inundation over a long period which is changing the character of the wetland floristic diversity. However, the wetland remains as a wetland feature, but will succeed to a more open canopy wetland environment. This wetland has historically been subject to variable water regimes. Further investigation may be warranted to assess the inundated conditions.

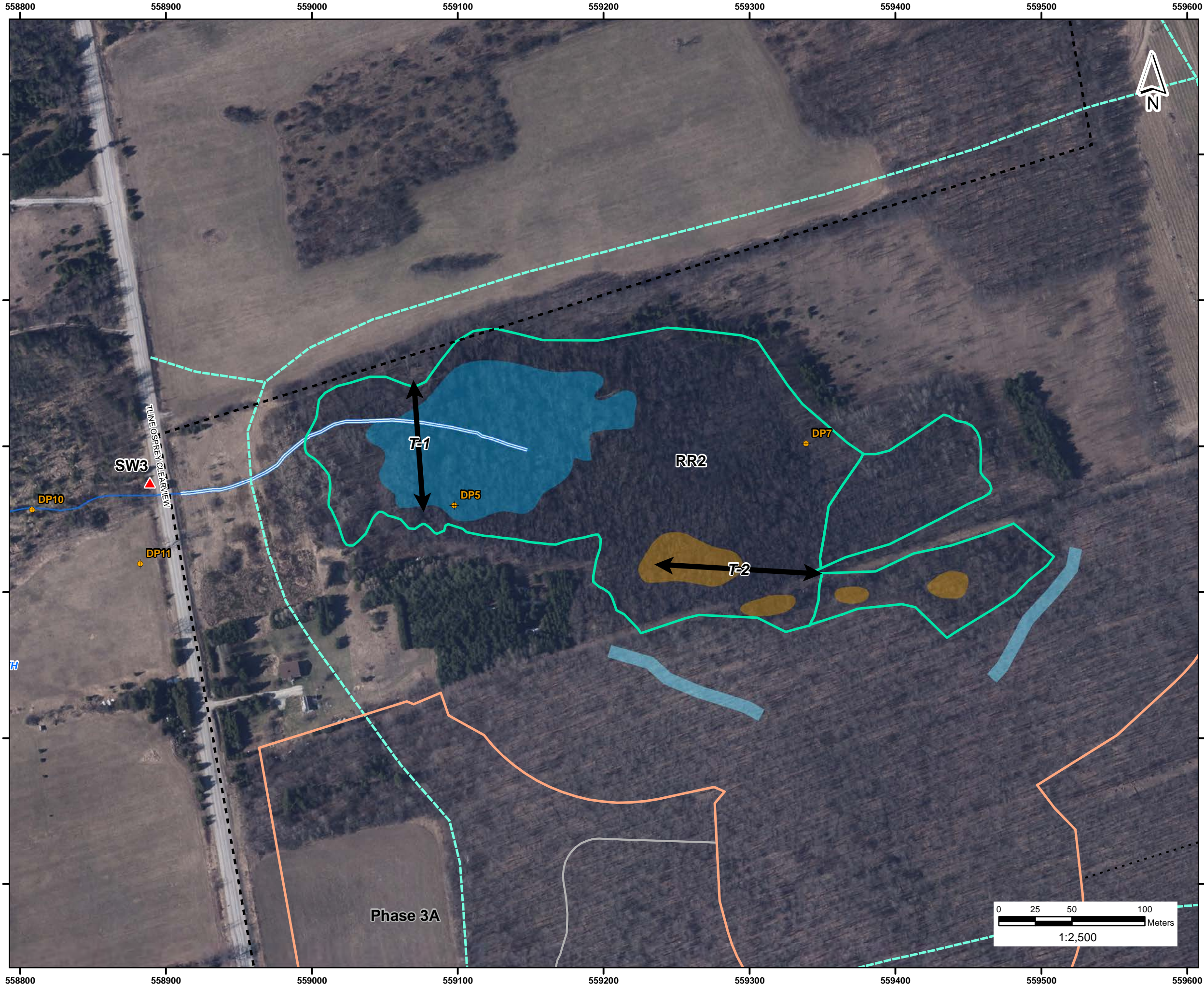


# **APPENDIX A: FIGURES**





\\Cd1220-0201609\\active\\62602732\\drawing\\GIS\\MXD\\Adaptive\_Management\_Plan\\2018\_AMP\\62602732\_AMP\_FigH-1\_RR2\_TransectLocations\_20181220.mxd  
Revised: 2018-12-21 By: dharvey



## Legend

- Walker Owned Lands
- Limit of Extraction - Walker
- Phase Boundary
- Phase 4 - Lower Bench
- Surface Water Monitoring Station and Designation (Jagger Hims, 2005)
- Surface Water Monitoring Station with Observed Seepage (within 120m of the proposed licensed area)
- Surface Water Monitoring Station - Karst 2007
- Drive Point Monitoring Location
- Transect
- Karst Infiltration Area
- Surface Trench Discharge
- Dual purpose Monitoring/Recharge Wells
- Wetland <sup>4</sup>
- Interpreted Wetland Catchment Areas
- Approximate location of diffuse overflow channel between ANSI A and ANSI B
- Intermittent Surface Water Features and Fisheries Habitat
- Undefined Braided Channel
- Dug Agricultural Ponds
- Vernal Pools
- Approximate Location of Deeper Vernal Pools
- Approximate Location of Shallower Vernal Pools

## Notes

- Coordinate System: UTM NAD 83 - Zone 17(N)
- Data Sources: Ontario Ministry of Natural Resources, © Queens Printer Ontario, 2009.
- Image Source: First Base Solutions WMS, 2008
- Wetland boundaries approximated using handheld GPS and air photo except where adjacent to proposed license boundary, surveyed in consultation with MNR.

December 2018  
62602732

Client / Project

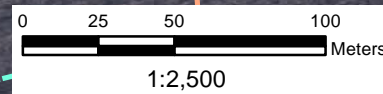
WALKER AGGREGATES INC.  
DUNTROON QUARRY EXPANSION  
ADAPTIVE MANAGEMENT PLAN

Figure No.

H.1

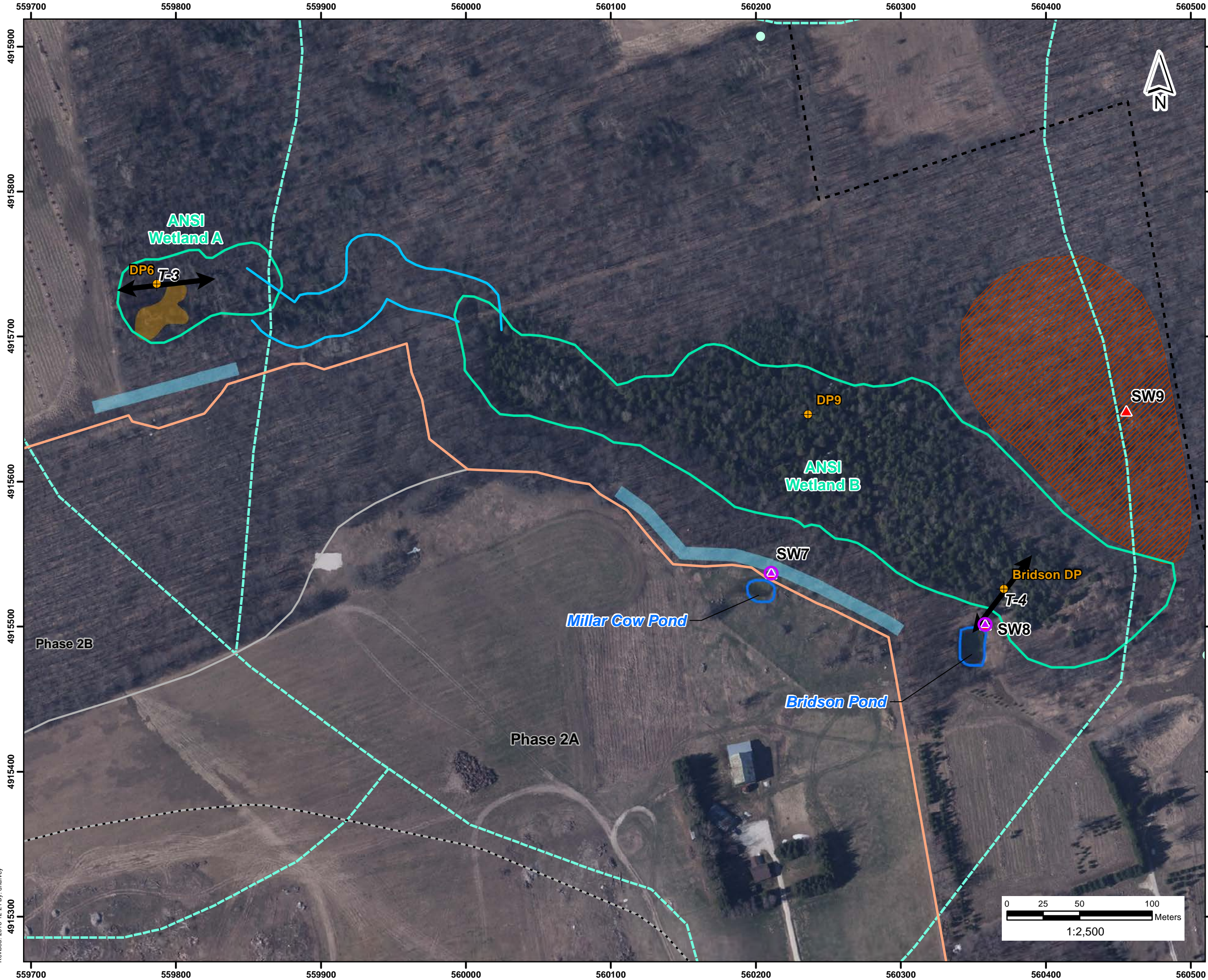
Title

RR2 TRANSECT LOCATIONS





\\Cd1220-0201609active62602732drawing\\GISMXD\\Adaptive\_Management\_Plan\\2018-12-21 By: dharvey  
Revised: 2018-12-21 By: dharvey



### Legend

- Walker Owned Lands
- Limit of Extraction - Walker
- Phase Boundary
- Phase 4 - Lower Bench
- Surface Water Monitoring Station and Designation (Jagger Hims, 2005)
- Surface Water Monitoring Station with Observed Seepage (within 120m of the proposed licensed area)
- Surface Water Monitoring Station - Karst 2007
- Drive Point Monitoring Location
- Transect
- Karst Infiltration Area
- Surface Trench Discharge
- Dual purpose Monitoring/Recharge Wells
- Wetland <sup>4</sup>
- Interpreted Wetland Catchment Areas
- Approximate location of diffuse overflow channel between ANSI A and ANSI B
- Intermittent Surface Water Features and Fisheries Habitat
- Undefined Braided Channel
- Dug Agricultural Ponds
- Vernal Pools
- Approximate Location of Deeper Vernal Pools
- Approximate Location of Shallower Vernal Pools

### Notes

1. Coordinate System: UTM NAD 83 - Zone 17(N)
2. Data Sources: Ontario Ministry of Natural Resources, © Queens Printer Ontario, 2009.
3. Image Source: First Base Solutions WMS, 2008.
4. Wetland boundaries approximated using handheld GPS and air photo except where adjacent to proposed license boundary, surveyed in consultation with MNR.

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ADAPTIVE MANAGEMENT PLAN

Figure No.

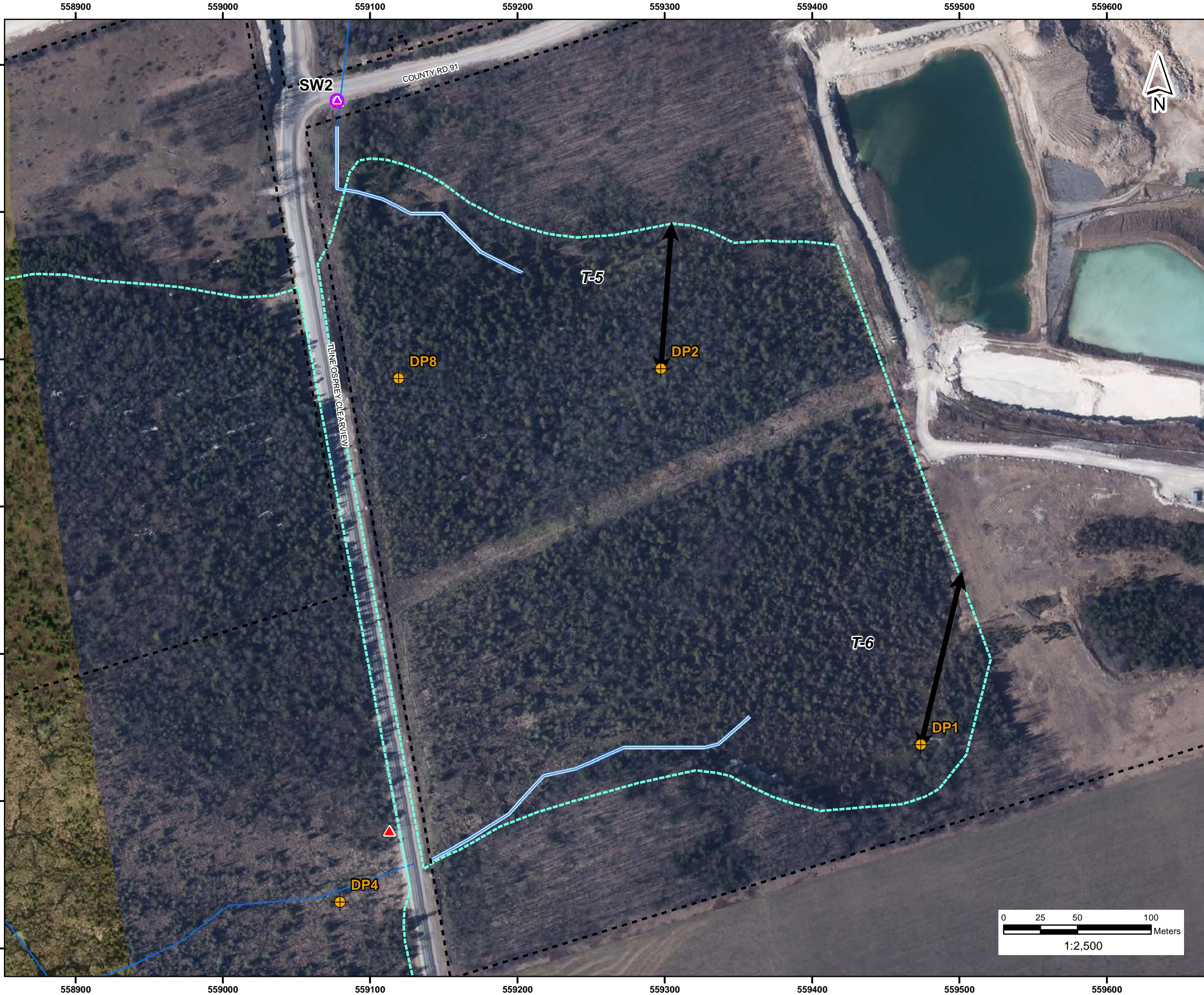
H.2

Title

**ANSI WETLAND TRANSECT  
LOCATIONS**



\\Cd1220-0201609active\62602732\Drawing\GISMXD\Adaptive\_Management\_Plan\2018\_AMP\62602732\_AMP\_FigH-3\_RR6\_WetlandTransectLocations\_20181220\_DH.mxd  
Revised: 2018-12-21 By: dharvey



## Legend

- Walker Owned Lands
- Limit of Extraction - Walker
- Phase Boundary
- Phase 4 - Lower Bench
- Surface Water Monitoring Station and Designation (Jagger Hims, 2005)
- Surface Water Monitoring Station with Observed Seepage (within 120m of the proposed licensed area)
- Surface Water Monitoring Station - Karst 2007
- Drive Point Monitoring Location
- Transect
- Karst Infiltration Area
- Surface Trench Discharge
- Dual purpose Monitoring/Recharge Wells
- Rob Roy Swamp PSW Complex
- Wetland <sup>4</sup>
- Interpreted Wetland Catchment Areas
- Approximate location of diffuse overflow channel between ANSI A and ANSI B
- Intermittent Surface Water Features and Fisheries Habitat
- Undefined Braided Channel
- Dug Agricultural Ponds
- Vernal Pools
- Approximate Location of Deeper Vernal Pools
- Approximate Location of Shallower Vernal Pools

## Notes

- Coordinate System: UTM NAD 83 - Zone 17(N)
- Data Sources: Ontario Ministry of Natural Resources, © Queens Printer Ontario, 2009.
- Image Source: First Base Solutions WMS, 2008.
- Wetland boundaries approximated using handheld GPS and air photo except where adjacent to proposed license boundary, surveyed in consultation with MNR.

December 2018  
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DUNTROON QUARRY EXPANSION  
ADAPTIVE MANAGEMENT PLAN

Figure No.

H.3

Title

RR6 WETLAND TRANSECT  
LOCATIONS



## **APPENDIX B: PHOTOGRAPHIC RECORD (2020)**







Photo 1: Transect 1, Plot 1 – September 29, 2020



Photo 2: Transect 1 Habitat Photo (Mid-transect)



Photo 3: Transect 1 Habitat Photo (Mid-transect)



Photo 4: Transect 1, Plot 2 – September 29, 2020

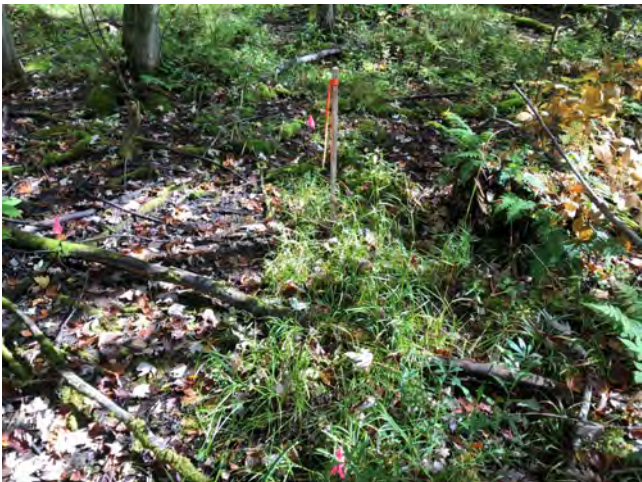


Photo 5: Transect 2, Plot 1 – September 29, 2020



Photo 6: Transect 2 Habitat Photo (Mid-transect)





Photo 7: Transect 2 Habitat Photo (Mid-transect)



Photo 8: Transect 2, Plot 2 – September 29, 2020



Photo 9: Transect 3, Plot 1 – September 29, 2020



Photo 10: Transect 3, Plot 2 – September 29, 2020



Photo 11: Transect 4, Plot 1 – September 29, 2020



Photo 12: Transect 4 Habitat Photo (Mid-transect)





Photo 13: Transect 4 Habitat Photo (Mid-transect)



Photo 14: Transect 4, Plot 2 – September 29, 2020



Photo 15: Transect 5, Plot 1 – September 29, 2020



Photo 16: Transect 5 Habitat Photo (Mid-transect)



Photo 17: Transect 5 Habitat Photo (Mid-transect)



Photo 18: Transect 5, Plot 2 – September 29, 2020





Photo 19: Transect 6, Plot 1 – September 29, 2020



Photo 20: Transect 6, Plot 2 – September 29, 2020

**APPENDIX C:  
FIELD DATA SHEETS (2020)**

~~\_\_\_\_\_~~ Duntroon Veg. Monitoring

Date: Sept. 29, 2020  
Personnel:

UTM:

**Community:**

Layer	Dominant species above Plot and % cover by species	Overall Percent Cover of Layer
Canopy	Black <del>Green</del> Ash in plot Freeman's Maple hanging in	70% 40%
Shrub	* See below	

Ground-layer species in Plot and % cover by species	
(Overall % Cover of Ground-layer: <u>90</u> )	
<i>Oxoclea sens.</i>	70%
<i>Carex brunn.</i>	5%
<i>Eutrochium macu.</i>	5%
<i>Rhamnus alni.</i>	10%
<i>Equisetum arve.</i>	10%
<i>Carex intumescens</i>	10%
<i>Glyceria striata</i>	5%
<i>Carex projecta</i>	5%

Water Depth: No standing water  
Photos Taken:

General Health of Trees within 5m of Plot: *Good*

Freeman's maple. Black Ash

**Additional Notes** (habitat, disturbance, incidental wildlife):

#62602732

~~XXXXXXXXXXXX~~ Duntroon Veg. Monitoring

Transect #: 1 Plot: 2

Date: Sept. 29, 2020 B. Miller

Personnel:

UTM:

Community:

Layer	Dominant species above Plot and % cover by species	Overall Percent Cover of Layer
Canopy	Green Ash + Freeman's maple Hanging in.	10 + 50%
Shrub	Prunus virg. Hanging in. * See below	<5%

## Ground-layer species in Plot and % cover by species

(Overall % Cover of Ground-layer: 30 )

	Onoclea sens.	20%	
	Carex tuck.	5%	
	Equisetum arve.	2%	
	Symphro. later.	2%	
*	Acer x free (seedlings)	2%	
*	Ulmus amer. (seedling)	5%	
	Lycopus unifl.	2%	
*	Robus pube.	2%	
	Epilobium cf. ciliatum	1%	

Water Depth: No standing water. Much of plot was recently inundated.  
 Photos Taken:

General Health of Trees within 5m of Plot: Good.

Freeman's maple. Green Ash.

Additional Notes (habitat, disturbance, incidental wildlife):

#62602732

~~XXXXXXXXXXXXXXXXXXXX~~ Duntroon Veg. Monitoring.

Transect #: 2 Plot: 1

Date: Sept. 29, 2020 B. Miller

Personnel:

UTM:

Community:

Layer	Dominant species above Plot and % cover by species	Overall Percent Cover of Layer
Canopy	Ulmus amer. + Acer x free Betula sp.	30% + 70% 10%
Shrub	* See below <del>XXXXXXXXXX</del>	

Both hanging in

Ground-layer species in Plot and % cover by species (Overall % Cover of Ground-layer: <u>50</u> )				Species growing on rotting log:	
Carex projecta	20%	Aralia nudl.	15%		
Bidens frond.	5%	Oxalis mont.	15%		
Lycopus unifl.	10%	* Rubus pube.	10%		
Acer x free. (seedling)	5%	Dryopteris cart.	15%		
Viola sp.	5%				
Glyceria striata	5%				
Cinna cf. latifolia	2%				
Solidago cana.	2%				

Water Depth: No standing water. Recently inundated

Photos Taken:

General Health of Trees within 5m of Plot: Good.

Acer x free. white elm. Betula sp.

Additional Notes (habitat, disturbance, incidental wildlife):

#62602732

~~XXXXXXXXXXXX~~ Duntroon Veg. Monitoring

Transect #: 2 Plot: 2

Date: Sept. 29, 2020 B. Miller

Personnel:

UTM:

Community:

Layer	Dominant species above Plot and % cover by species	Overall Percent Cover of Layer
Canopy	Acer x free. - Hanging in. Black Ash sapling. → 10%	70%
Shrub	* See below	

## Ground-layer species in Plot and % cover by species

(Overall % Cover of Ground-layer: 60 )

* Rhamnus alai.	40%	
Carex disperma	10%	
Carex sp.	2%	
Equisetum arve	2%	
Cinna cf. latifolia	2%	
Ulmus amer. sapling	10%	
Black Ash saplings/	10%	
Seedlings		

Water Depth: No standing water

Photos Taken:

General Health of Trees within 5m of Plot: Same as 2019

Acer x free.

Additional Notes (habitat, disturbance, incidental wildlife):

#62602732

~~Site Name~~ Duntroon Veg. Monitoring

Transect #: 3 Plot: 1

Date: Sept. 29, 2020 B. Miller

Personnel:

UTM:

Community:

Layer	Dominant species above Plot and % cover by species	Overall Percent Cover of Layer
Canopy	Populus bals. Hanging Ia.	80%
Shrub	* See below	

## Ground-layer species in Plot and % cover by species

(Overall % Cover of Ground-layer: 90%)

* Cornus stolon.	90%	
Oxoclea sens.	10%	
Carex tuck.	5%	
* Vitis riparia	20%	

Water Depth: No standing water

Photos Taken:

General Health of Trees within 5m of Plot: Good

Populus bals. Ulmus amer.

Additional Notes (habitat, disturbance, incidental wildlife):



#62602732

~~Site Name~~ Duntroon Veg. Monitoring

Transect #: 4 Plot: 1

Date: Sept. 29, 2020 B. Miller

Personnel:

UTM:

Community:

Layer	Dominant species above Plot and % cover by species	Overall Percent Cover of Layer
Canopy	No woody veg. growing in plot. Green Ash Hanging in.	50%
Shrub	<del>None</del> Cornus stolon.	2%

## Ground-layer species in Plot and % cover by species

(Overall % Cover of Ground-layer: 95 )

Eutroch. macv.		Carex vulg.	2%
Symphyo. lanc.	40%	Phalaris arund.	2%
Glyceria stria.	60%		
Equisetum arve.	5%		
Impatiens cape.	10%		
Symphyo. puni.	10%		
Solidago rugo.	10%		
Geum sp.	2%		
Scirpus cf. atrovirens	2%		
Circaea cana.	1%		

Water Depth: No standing water

Photos Taken:

General Health of Trees within 5m of Plot: Good.

Abies bals. Frax. Thuja occi.

Additional Notes (habitat, disturbance, incidental wildlife):

Duntroon Expansion Quarry – Wetland Vegetation Monitoring  
62602732

Transect #: 5 Plot: 1  
Date: Sept. 29, 2020  
Personnel: B. Miller  
UTM:  
Community:

Layer	Dominant species above Plot and % cover by species	Overall Percent Cover of Layer
Canopy	Black ash hanging in	5%
Shrub	None	

Ground-layer species in Plot and % cover by species (Overall % Cover of Ground-layer: 50%)	
Phalaris arund.	50%

Water Depth: Plot inundated. Water approx 30cm deep.  
Photos Taken:

General Health of Trees within 5m of Plot:

A few black ash in decline. Others are healthy.  
White cedar healthy.

Additional Notes (habitat, disturbance, incidental wildlife):

→ Abundant Tussilago farfara at edge of wetland  
5m away from plot.

# 62602732

~~Plot 5~~ Duntroon Veg. Monitoring

Transect #: 5 Plot: 2

Date: Sept. 29, 2020 B. Miller

Personnel:

UTM:

Community:

Layer	Dominant species above Plot and % cover by species	Overall Percent Cover of Layer
Canopy	Hanging into plot	50%
Shrub		

## Ground-layer species in Plot and % cover by species

(Overall % Cover of Ground-layer: 40 )

Typha lat.	15%	Carex sp.	5%
Solanum dulc.	25%		
Bidens connata	10%		
Solidago rugosa	5%		
Glyceria striata	20%		
Lycopus unifl.	5%		
Scutellaria later.	5%		
Impatiens cape.	2%		
Caltha palu.	2%		
Bidens cernua	2%		

Water Depth: Plot inundated except for a hummock.

Photos Taken:

## General Health of Trees within 5m of Plot:

Black Ash, red maple, → Both healthy  
 white cedar and yellow birch → dead or dying  
 Balsam fir → some dead, a few alive

Additional Notes (habitat, disturbance, incidental wildlife):

Duntroon Expansion Quarry – Wetland Vegetation Monitoring  
62602732

Transect #: 6 Plot: 1  
Date: September 29, 2020  
Personnel: B. Miller  
UTM:  
Community:

Layer	Dominant species above Plot and % cover by species	Overall Percent Cover of Layer
Canopy	No living trees in plot or hanging in.	
Shrub	None.	

Ground-layer species in Plot and % cover by species (Overall % Cover of Ground-layer: 80%)		
Phalaris arund.	80%	
Lemna minor	5%	
Submergents	50%	

Water Depth: Plot inundated. Approx. 40-50cm Deep.  
Photos Taken:

General Health of Trees within 5m of Plot:

All dead

Additional Notes (habitat, disturbance, incidental wildlife):

Duntroon Expansion Quarry – Wetland Vegetation Monitoring  
62602732

Transect #: 6 Plot: 2  
Date: Sept. 29, 2020  
Personnel: B. Miller  
UTM:  
Community:

Layer	Dominant species above Plot and % cover by species	Overall Percent Cover of Layer
Canopy	No living trees within or hanging into plot.	
Shrub	* See below.	

Ground-layer species in Plot and % cover by species  
(Overall % Cover of Ground-layer: 80%)

* Salix discolor	25%	
Bidens sp.	<1%	
Immature/undeveloped grass	5%	
Carex sp.	5%	
Submergents	75%	

Water Depth: Plot inundated. Approx  
Photos Taken:

General Health of Trees within 5m of Plot: ~~poor~~ ~~dead~~ Poor - Dead

See 2019 notes for tree health. Mostly all dead with exception of a red maple, one black ash and

Additional Notes (habitat, disturbance, incidental wildlife):

These two spp. are dying. (a balsam fir and spruce)

#62602732

~~Shrubland Forest Monitoring~~ Duntroon Veg. Monitoring

Transect #: 3 Plot: 2

Date: Sept. 29, 2020 B. Miller

Personnel:

UTM:

Community:

Layer	Dominant species above Plot and % cover by species	Overall Percent Cover of Layer
Canopy	Green Ash - Hanging In.	60%
Shrub	* See below	

Ground-layer species in Plot and % cover by species  
(Overall % Cover of Ground-layer: 70 )

	Oxoclea sens.	30%	
	Phalaris arund.	30%	
*	Cornus stolon.	25%	
	<del>Phalaris arund.</del>		
	Carex tuck.	10%	
	Lycopus unifl.	10%	
	Carex cf. projecta	20%	
*	Solanum dub.	5%	
	<del>Phalaris arund.</del>		
	Epilobium ciliatum or color	→ 2%	

Water Depth: No standing water

Photos Taken:

General Health of Trees within 5m of Plot: Good

Green Ash. Black Ash. Salix discolor.  
Freeman's Maple.

Additional Notes (habitat, disturbance, incidental wildlife):

# 62602732

~~\_\_\_\_\_~~ Duntroon Veg. Monitoring

Transect #: 4 Plot: 2

Date: Sept. 29, 2020 B. Miller

Personnel:

UTM:

Community:

Layer	Dominant species above Plot and % cover by species	Overall Percent Cover of Layer
Canopy	THU. OCC1. } Both Hanging BET. ALLE. } in.	60%
Shrub	* See below	

Ground-layer species in Plot and % cover by species  
(Overall % Cover of Ground-layer: 60%)

	Onoclea sens.	50%	
	Glyceria stria.	10%	
*	Rubus pube.	10%	
	Lycopus unifl.	5%	
*	Solanum dule.	5%	
	Galium trif.	2%	
*	Fraxinus seedling	5%	

Water Depth: - No standing water

Photos Taken:

General Health of Trees within 5m of Plot: Good.

THU. OCC1. BETALLE. ABIES BALS. Fraxinus  
POP TREM.

Additional Notes (habitat, disturbance, incidental wildlife):

**APPENDIX D:  
VEGETATION PLOT DATA SUMMARY &  
ANALYSIS (2020)**



**DUNTROON EXPANSION QUARRY - WETLAND VEGETATION MONITORING**  
**Transect 1, Plot 1**

MONITORING YEAR - 2019	MONITORING YEAR - 2020	SCIENTIFIC NAME	COMMON NAME	PROVINCIAL STATUS (S-RANK)	COSEWIC / SARO STATUS	COEFFICIENT OF CONSERVATISM (C VALUE)	COEFFICIENT OF WETNESS
<b>PTERIDOPHYTES (Ferns &amp; Fern Allies)</b>							
x	x	Equisetum arvense	Field Horsetail	S5		0	0
x	x	Onoclea sensibilis	Sensitive Fern	S5		4	-3
<b>ANGIOSPERMS (Dicots)</b>							
x	x	Endotropis alnifolia	Alder-leaved Buckthorn	S5		7	-5
x	x	Eutrochium maculatum	Spotted Joe Pye Weed	S5		3	-5
x	x	Fraxinus nigra	Black Ash	S4		7	-3
	x	Glyceria striata	Fowl Mannagrass	S5		3	-5
x		Lycopus uniflorus	Northern Water-horehound	S5		5	-5
x		Rubus pubescens	Dewberry	S5		4	-3
x		Scutellaria lateriflora	Mad Dog Skullcap	S5		5	-5
<b>ANGIOSPERMS (Monocots)</b>							
x	x	Carex brunnescens	Brownish Sedge	S5		6	-3
x	x	Carex intumescens	Bladder Sedge	S5		6	-3
x		Carex leptalea	Bristle-stalked Sedge	S5		8	-5
x	x	Carex projecta	Necklace Sedge	S5		5	-3

2019	2020	FLORISTIC ASSESSMENT FOR TRANSECT 1, PLOT 1
12	9	Total Species
12	9	Native Species
0	0	Introduced (exotic) species
0	0	Species at Risk in Ontario (END, THR or SC)
0	0	Rare in Ontario (S1, S2 or S3)
5.0	4.6	Average Coefficient of Conservatism (mean C)
17.3	13.7	Floristic Quality Index (FQI)
1	0	Highly sensitive plant species with C value of 8, 9 or 10
-3.6	-3.3	Mean Wetness Value

# DUNTROON EXPANSION QUARRY - WETLAND VEGETATION MONITORING

## Transect 1, Plot 2

MONITORING YEAR - 2019	MONITORING YEAR - 2020	SCIENTIFIC NAME	COMMON NAME	PROVINCIAL STATUS (S-RANK)	COSEWIC / SARO STATUS	COEFFICIENT OF CONSERVATISM (C VALUE)	COEFFICIENT OF WETNESS
<b>PTERIDOPHYTES (Ferns &amp; Fern Allies)</b>							
x	x	Equisetum arvense	Field Horsetail	S5		0	0
x	x	Onoclea sensibilis	Sensitive Fern	S5		4	-3
<b>ANGIOSPERMS (Dicots)</b>							
x	x	Acer x freemanii	Freeman (Swamp) Maple	S5		6	-5
	x	Epilobium cf. ciliatum	Northern Willowherb	S5		3	-3
x	x	Lycopus uniflorus	Northern Water-horehound	S5		5	-5
x	x	Rubus pubescens	Dewberry	S5		4	-3
x	x	Symphytotrichum lateriflorum	Calico Aster	S5		3	0
x	x	Ulmus americana	American Elm	S5		3	-3
<b>ANGIOSPERMS (Monocots)</b>							
x	x	Carex tuckermanii	Tuckerman's Sedge	S5		7	-5

2019	2020	FLORISTIC ASSESSMENT FOR TRANSECT 1, PLOT 2
8	9	Total Species
8	9	Native Species
0	0	Introduced (exotic) species
0	0	Species at Risk in Ontario (END, THR or SC)
0	0	Rare in Ontario (S1, S2 or S3)
4.0	3.9	Average Coefficient of Conservatism (mean C)
11.3	11.7	Floristic Quality Index (FQI)
0	0	Highly sensitive plant species with C value of 8, 9 or 10
-3.0	-3.0	Mean Wetness Value

# DUNTROON EXPANSION QUARRY - WETLAND VEGETATION MONITORING

## Transect 2, Plot 1

MONITORING YEAR - 2019	MONITORING YEAR - 2020	SCIENTIFIC NAME	COMMON NAME	PROVINCIAL STATUS (S-RANK)	COSEWIC / SARO STATUS	COEFFICIENT OF CONSERVATISM (C VALUE)	COEFFICIENT OF WETNESS
<b>PTERIDOPHYTES (Ferns &amp; Fern Allies)</b>							
x	x	Dryopteris carthusiana	Spinulose Wood Fern	S5		5	-3
<b>ANGIOSPERMS (Dicots)</b>							
x	x	Acer x freemanii	Freeman (Swamp) Maple	S5		6	-5
x	x	Aralia nudicaulis	Wild Sarsaparilla	S5		4	3
	x	Betula sp.	Birch Species seedling				
x		Bidens connata	Purple-stemmed Beggarticks	S4?		5	-3
	x	Bidens frondosa	Devil's Beggarticks	S5		3	-3
x	x	Lycopus uniflorus	Northern Water-horehound	S5		5	-5
x	x	Oxalis montana	Common Wood-sorrel	S5		7	3
x		Rubus idaeus ssp. strigosus	Wild Red Raspberry	S5		2	3
x	x	Rubus pubescens	Dewberry	S5		4	-3
	x	Solidago canadensis	Canada Goldenrod	S5		1	3
	x	Ulmus americana	American Elm	S5		3	-3
x	x	Viola sp.	Violet Species				
<b>ANGIOSPERMS (Monocots)</b>							
x		Arisaema triphyllum	Jack-in-the-pulpit	S5		5	-3
x	x	Carex projecta	Necklace Sedge	S5		5	-3
	x	Cinna latifolia	Drooping Woodreed	S5		7	-3
x	x	Glyceria striata	Fowl Mannagrass	S5		3	-5

2019	2020	FLORISTIC ASSESSMENT FOR TRANSECT 2, PLOT 1
11	14	Total Species
11	14	Native Species
0	0	Introduced (exotic) species
0	0	Species at Risk in Ontario (END, THR or SC)
0	0	Rare in Ontario (S1, S2 or S3)
4.6	4.4	Average Coefficient of Conservatism (mean C)
15.4	16.5	Floristic Quality Index (FQI)
0	0	Highly sensitive plant species with C value of 8, 9 or 10
-1.9	-2.0	Mean Wetness Value

**DUNTROON EXPANSION QUARRY - WETLAND VEGETATION MONITORING**  
**Transect 2, Plot 2**

MONITORING YEAR - 2019	MONITORING YEAR - 2020	SCIENTIFIC NAME	COMMON NAME	PROVINCIAL STATUS (S-RANK)	COSEWIC / SARO STATUS	COEFFICIENT OF CONSERVATISM (C VALUE)	COEFFICIENT OF WETNESS
		<b>PTERIDOPHYTES (Ferns &amp; Fern Allies)</b>					
	x	Equisetum arvense	Field Horsetail	S5		0	0
		<b>ANGIOSPERMS (Dicots)</b>					
x		Acer x freemanii	Freeman (Swamp) Maple	S5		6	-5
x	x	Endotropis alnifolia	Alder-leaved Buckthorn	S5		7	-5
x	x	Fraxinus nigra	Black Ash	S4		7	-3
x	x	Ulmus americana	American Elm	S5		3	-3
		<b>ANGIOSPERMS (Monocots)</b>					
	x	Carex disperma	Two-seeded Sedge	S5		8	-5
x		Carex cf. interior	Inland Sedge	S5		6	-5
	x	Carex sp.	Sedge Species				
	x	Cinna cf. latifolia	Drooping Woodreed	S5		7	3

2019	2020	FLORISTIC ASSESSMENT FOR TRANSECT 2, PLOT 2
5	7	Total Species
5	7	Native Species
0	0	Introduced (exotic) species
0	0	Species at Risk in Ontario (END, THR or SC)
0	0	Rare in Ontario (S1, S2 or S3)
5.8	5.5	Average Coefficient of Conservatism (mean C)
13.0	14.6	Floristic Quality Index (FQI)
0	1	Highly sensitive plant species with C value of 8, 9 or 10
-4.2	-3.6	Mean Wetness Value

**DUNTROON EXPANSION QUARRY - WETLAND VEGETATION MONITORING**  
**Transect 3, Plot 1**

MONITORING YEAR - 2019	MONITORING YEAR - 2020	SCIENTIFIC NAME	COMMON NAME	PROVINCIAL STATUS (S-RANK)	COSEWIC / SARO STATUS	COEFFICIENT OF CONSERVATISM (C VALUE)	COEFFICIENT OF WETNESS
<b>PTERIDOPHYTES (Ferns &amp; Fern Allies)</b>							
x	x	<i>Onoclea sensibilis</i>	Sensitive Fern	S5		4	-3
<b>ANGIOSPERMS (Dicots)</b>							
x	x	<i>Cornus sericea</i>	Red-osier Dogwood	S5		2	-3
x	x	<i>Vitis riparia</i>	Riverbank Grape	S5		0	0
<b>ANGIOSPERMS (Monocots)</b>							
x	x	<i>Carex tuckermanii</i>	Tuckerman's Sedge	S5		7	-5

2019	2020	FLORISTIC ASSESSMENT FOR TRANSECT 3, PLOT 1
4	4	Total Species
4	4	Native Species
0	0	Introduced (exotic) species
0	0	Species at Risk in Ontario (END, THR or SC)
0	0	Rare in Ontario (S1, S2 or S3)
3.3	3.3	Average Coefficient of Conservatism (mean C)
6.5	6.5	Floristic Quality Index (FQI)
0	0	Highly sensitive plant species with C value of 8, 9 or 10
-2.8	-2.8	Mean Wetness Value

**DUNTROON EXPANSION QUARRY - WETLAND VEGETATION MONITORING**  
**Transect 3, Plot 2**

MONITORING YEAR - 2019	MONITORING YEAR - 2020	SCIENTIFIC NAME	COMMON NAME	PROVINCIAL STATUS (S-RANK)	COSEWIC / SARO STATUS	COEFFICIENT OF CONSERVATISM (C VALUE)	COEFFICIENT OF WETNESS
<b>PTERIDOPHYTES (Ferns &amp; Fern Allies)</b>							
x	x	Onoclea sensibilis	Sensitive Fern	S5		4	-3
<b>ANGIOSPERMS (Dicots)</b>							
x	x	Cornus sericea	Red-osier Dogwood	S5		2	-3
x	x	Epilobium cf. coloratum	Purple-veined Willowherb	S5		3	-5
x	x	Lycopus uniflorus	Northern Water-horehound	S5		5	-5
x	x	Solanum dulcamara	Bittersweet Nightshade	SE5			0
x		Solidago cf. canadensis	Canada Goldenrod	S5		1	3
x		Symphytotrichum lateriflorum	Calico Aster	S5		3	0
<b>ANGIOSPERMS (Monocots)</b>							
x		Calamagrostis canadensis	Bluejoint Reedgrass	S5		4	-5
x	x	Carex projecta	Necklace Sedge	S5		5	-3
x	x	Carex tuckermanii	Tuckerman's Sedge	S5		7	-5
x	x	Phalaris arundinacea	Reed Canary Grass	S5		0	-3

2019	2020	FLORISTIC ASSESSMENT FOR TRANSECT 3, PLOT 2
11	8	Total Species
10	7	Native Species
1	1	Introduced (exotic) species
0	0	Species at Risk in Ontario (END, THR or SC)
0	0	Rare in Ontario (S1, S2 or S3)
3.4	3.7	Average Coefficient of Conservatism (mean C)
11.3	10.5	Floristic Quality Index (FQI)
0	0	Highly sensitive plant species with C value of 8, 9 or 10
-2.6	-3.4	Mean Wetness Value

# DUNTROON EXPANSION QUARRY - WETLAND VEGETATION MONITORING

## Transect 4, Plot 1

MONITORING YEAR - 2019	MONITORING YEAR - 2020	SCIENTIFIC NAME	COMMON NAME	PROVINCIAL STATUS (S-RANK)	COSEWIC / SARO STATUS	COEFFICIENT OF CONSERVATISM (C VALUE)	COEFFICIENT OF WETNESS
<b>PTERIDOPHYTES (Ferns &amp; Fern Allies)</b>							
x	x	Equisetum arvense	Field Horsetail	S5		0	0
<b>ANGIOSPERMS (Dicots)</b>							
x		Circaea sp.	Enchanter's Nightshade	S5			
	x	Circaea canadensis	Enchanter's Nightshade	S5		2	3
	x	Cornus sericea	Red-osier Dogwood	S5		2	-3
x		Euthamia graminifolia	Grass-leaved Goldenrod	S5		2	0
x	x	Eutrochium maculatum	Spotted Joe Pye Weed	S5		3	-5
	x	Geum sp.	Avens Species				
x	x	Impatiens capensis	Spotted Jewelweed	S5		4	-3
x	x	Solidago rugosa	Rough-stemmed Goldenrod	S5		4	0
x	x	Symphotrichum lanceolatum	Panicled Aster	S5		3	-3
x	x	Symphotrichum puniceum	Swamp Aster	S5		6	-5
<b>ANGIOSPERMS (Monocots)</b>							
x		Carex hystericina	Porcupine Sedge	S5		5	-5
x		Carex stipata	Awl-fruited Sedge	S5		3	-5
x	x	Carex vulpinoidea	Fox Sedge	S5		3	-5
x	x	Glyceria striata	Fowl Mannagrass	S5		3	-5
	x	Phalaris arundinacea	Reed Canary Grass	S5		0	-3
	x	Scirpus cf. atrovirens	Dark-green Bulrush	S5		3	-5

2019	2020	FLORISTIC ASSESSMENT FOR TRANSECT 4, PLOT 1
12	13	Total Species
12	13	Native Species
0	0	Introduced (exotic) species
0	0	Species at Risk in Ontario (END, THR or SC)
0	0	Rare in Ontario (S1, S2 or S3)
3.3	2.8	Average Coefficient of Conservatism (mean C)
11.3	9.9	Floristic Quality Index (FQI)
0	0	Highly sensitive plant species with C value of 8, 9 or 10
-3.3	-2.8	Mean Wetness Value

**DUNTROON EXPANSION QUARRY - WETLAND VEGETATION MONITORING**  
**Transect 4, Plot 2**

MONITORING YEAR - 2019	MONITORING YEAR - 2020	SCIENTIFIC NAME	COMMON NAME	PROVINCIAL STATUS (S-RANK)	COSEWIC / SARO STATUS	COEFFICIENT OF CONSERVATISM (C VALUE)	COEFFICIENT OF WETNESS
<b>PTERIDOPHYTES (Ferns &amp; Fern Allies)</b>							
x		Equisetum arvense	Field Horsetail	S5		0	0
x	x	Onoclea sensibilis	Sensitive Fern	S5		4	-3
<b>ANGIOSPERMS (Dicots)</b>							
x		Eutrochium maculatum	Spotted Joe Pye Weed	S5		3	-5
x	x	Fraxinus pennsylvanica	Green Ash	S4		3	-3
	x	Galium triflorum	Three-flowered Bedstraw	S5		4	3
x	x	Lycopus uniflorus	Northern Water-horehound	S5		5	-5
x	x	Rubus pubescens	Dewberry	S5		4	-3
x	x	Solanum dulcamara	Bittersweet Nightshade	SE5			0
x		Solidago rugosa	Rough-stemmed Goldenrod	S5		4	0
<b>ANGIOSPERMS (Monocots)</b>							
x	x	Glyceria striata	Fowl Mannagrass	S5		3	-5

2019	2020	FLORISTIC ASSESSMENT FOR TRANSECT 4, PLOT 2
9	7	Total Species
8	6	Native Species
1	1	Introduced (exotic) species
0	0	Species at Risk in Ontario (END, THR or SC)
0	0	Rare in Ontario (S1, S2 or S3)
3.3	3.8	Average Coefficient of Conservatism (mean C)
9.8	10.1	Floristic Quality Index (FQI)
0	0	Highly sensitive plant species with C value of 8, 9 or 10
-2.7	-2.3	Mean Wetness Value



# DUNTROON EXPANSION QUARRY - WETLAND VEGETATION MONITORING

## Transect 5, Plot 1

MONITORING YEAR - 2019	MONITORING YEAR - 2020	SCIENTIFIC NAME	COMMON NAME	PROVINCIAL STATUS (S-RANK)	COSEWIC / SARO STATUS	COEFFICIENT OF CONSERVATISM (C VALUE)	COEFFICIENT OF WETNESS
<b>ANGIOSPERMS (Dicots)</b>							
x		<i>Bidens cernua</i>	Nodding Beggarticks	S5		2	-5
x		<i>Bidens connata</i>	Purple-stemmed Beggarticks	S4?		5	-3
x		<i>Caltha palustris</i>	Yellow Marsh Marigold	S5		5	-5
x		<i>Solanum dulcamara</i>	Bittersweet Nightshade	SE5			0
<b>ANGIOSPERMS (Monocots)</b>							
x		<i>Glyceria striata</i>	Fowl Mannagrass	S5		3	-5
x	x	<i>Phalaris arundinacea</i>	Reed Canary Grass	S5		0	-3
x		<i>Typha latifolia</i>	Broad-leaved Cattail	S5		1	-5

2019	2020	FLORISTIC ASSESSMENT FOR TRANSECT 5, PLOT 1
7	1	Total Species
6	1	Native Species
1	0	Introduced (exotic) species
0	0	Species at Risk in Ontario (END, THR or SC)
0	0	Rare in Ontario (S1, S2 or S3)
2.7	0.0	Average Coefficient of Conservatism (mean C)
7.1	0.0	Floristic Quality Index (FQI)
0	0	Highly sensitive plant species with C value of 8, 9 or 10
-3.7	-3.0	Mean Wetness Value

# DUNTROON EXPANSION QUARRY - WETLAND VEGETATION MONITORING

## Transect 5, Plot 2

MONITORING YEAR - 2019	MONITORING YEAR - 2020	SCIENTIFIC NAME	COMMON NAME	PROVINCIAL STATUS (S-RANK)	COSEWIC / SARO STATUS	COEFFICIENT OF CONSERVATISM (C VALUE)	COEFFICIENT OF WETNESS
<b>ANGIOSPERMS (Dicots)</b>							
x		Betula sp.	Birch Seedling				
x	x	Bidens cernua	Nodding Beggarticks	S5		2	-5
x	x	Bidens connata	Purple-stemmed Beggarticks	S4?		5	-3
	x	Caltha palustris	Yellow Marsh Marigold	S5		5	-5
x		Galium sp.	Bedstraw Species				
x	x	Impatiens capensis	Spotted Jewelweed	S5		4	-3
x	x	Lycopus uniflorus	Northern Water-horehound	S5		5	-5
x		Rubus pubescens	Dewberry	S5		4	-3
x	x	Scutellaria lateriflora	Mad Dog Skullcap	S5		5	-5
x	x	Solanum dulcamara	Bittersweet Nightshade	SE5			0
x	x	Solidago rugosa	Rough-stemmed Goldenrod	S5		4	0
x		Symphotrichum lanceolatum	Panicled Aster	S5		3	-3
<b>ANGIOSPERMS (Monocots)</b>							
x		Carex stipata	Awl-fruited Sedge	S5		3	-5
	x	Carex sp.	Sedge Species				
x	x	Glyceria striata	Fowl Mannagrass	S5		3	-5
x		Phalaris arundinacea	Reed Canary Grass	S5		0	-3
x	x	Typha latifolia	Broad-leaved Cattail	S5		1	-5

2019	2020	FLORISTIC ASSESSMENT FOR TRANSECT 5, PLOT 2
13	10	Total Species
12	9	Native Species
1	1	Introduced (exotic) species
0	0	Species at Risk in Ontario (END, THR or SC)
0	0	Rare in Ontario (S1, S2 or S3)
3.3	3.8	Average Coefficient of Conservatism (mean C)
11.7	11.9	Floristic Quality Index (FQI)
0	0	Highly sensitive plant species with C value of 8, 9 or 10
-3.5	-3.6	Mean Wetness Value

**DUNTROON EXPANSION QUARRY - WETLAND VEGETATION MONITORING**  
**Transect 6, Plot 1**

MONITORING YEAR - 2019	MONITORING YEAR - 2020	SCIENTIFIC NAME	COMMON NAME	PROVINCIAL STATUS (S-RANK)	COSEWIC / SARO STATUS	COEFFICIENT OF CONSERVATISM (C VALUE)	COEFFICIENT OF WETNESS
<b>ANGIOSPERMS (Monocots)</b>							
x	x	Phalaris arundinacea	Reed Canary Grass	S5		0	-3
<b>ANGIOSPERMS (Monocots)</b>							
	x	Lemna minor	Lesser Duckweed	S5?		5	-5
	x	Unknown	Submergent				-5

2019	2020	FLORISTIC ASSESSMENT FOR TRANSECT 6, PLOT 1
1	3	Total Species
1	3	Native Species
0	0	Introduced (exotic) species
0	0	Species at Risk in Ontario (END, THR or SC)
0	0	Rare in Ontario (S1, S2 or S3)
0.0	2.5	Average Coefficient of Conservatism (mean C)
0.0	4.3	Floristic Quality Index (FQI)
0	0	Highly sensitive plant species with C value of 8, 9 or 10
-3.0	-4.3	Mean Wetness Value

**DUNTROON EXPANSION QUARRY - WETLAND VEGETATION MONITORING**  
**Transect 6, Plot 2**

MONITORING YEAR - 2019	MONITORING YEAR - 2020	SCIENTIFIC NAME	COMMON NAME	PROVINCIAL STATUS (S-RANK)	COSEWIC / SARO STATUS	COEFFICIENT OF CONSERVATISM (C VALUE)	COEFFICIENT OF WETNESS
<b>ANGIOSPERMS (Dicots)</b>							
x	x	Bidens sp.	Beggarticks Species				
x		Lycopus uniflorus	Northern Water-horehound	S5		5	-5
x		Rubus sp.	Raspberry Species				
x	x	Salix discolor	Pussy Willow	S5		3	-3
<b>ANGIOSPERMS (Monocots)</b>							
x	x	Carex pseudocyperus	Cyperus-like Sedge	S5		6	-5
	x	n/a	Withered / undeveloped grass				
	x	Unknown	Submergents				-5

2019	2020	FLORISTIC ASSESSMENT FOR TRANSECT 6, PLOT 2
3	5	Total Species
3	5	Native Species
0	0	Introduced (exotic) species
0	0	Species at Risk in Ontario (END, THR or SC)
0	0	Rare in Ontario (S1, S2 or S3)
4.7	4.5	Average Coefficient of Conservatism (mean C)
8.1	10.1	Floristic Quality Index (FQI)
0	0	Highly sensitive plant species with C value of 8, 9 or 10
-4.3	-4.3	Mean Wetness Value



**Walker Aggregates Duntroon  
Quarry Expansion, Amphibian  
Monitoring Program: 2020 Annual  
Monitoring Report**

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**WALKER AGGREGATES DUNTROON QUARRY EXPANSION, AMPHIBIAN MONITORING PROGRAM:  
2020 ANNUAL MONITORING REPORT**

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**WALKER AGGREGATES DUNTROON QUARRY EXPANSION, AMPHIBIAN MONITORING  
PROGRAM: 2020 ANNUAL MONITORING REPORT**

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# WALKER AGGREGATES DUNTROON QUARRY EXPANSION, AMPHIBIAN MONITORING PROGRAM: 2020 ANNUAL MONITORING REPORT

Introduction  
April 30, 2021

## 1.0 INTRODUCTION

Ecological monitoring, including wetland monitoring, is a component of the Walker Aggregates Inc. Duntroon Expansion Quarry Adaptive Management Plan (AMP; Stantec and Hims Geoenvironmental 2013). The Long Term Trend Ecological Monitoring (LTTEM) program was developed to supplement the information from the Long Term Trend Water Monitoring (LTTWM) program with information about the health and functioning of the natural heritage features in the vicinity of the Expansion Quarry. The LTTEM program:

1. provides regular updates on the current conditions and longer term trends of the Expansion Quarry Environment;
2. is used to determine if the key features and functions in the Expansion Quarry Environment are experiencing unexpected changes and/or degradation as a result of the quarry operations by making reference to similar features in the Regional Environment; and
3. is designed to ensure that changes to the Expansion Quarry Environment are identified and properly investigated for any possible cause-and-effect relationship with quarry operations.

If negative changes in environmental conditions are detected, the cause of the changes will be investigated and if the quarry is the cause of the change, quarry operations will be adapted and/or contingency mitigation measures will be implemented.

The focus of the wetland component of the Long Term Trend Ecological Monitoring (LTTEM) program is on amphibian vernal breeding pools and ensuring hydroperiods are suitable for continued hydrophytic plant growth in the surrounding wetland zones. Wetland water level monitoring is conducted as part of the LTTWM program. Long term trends in these wetland features and their functions are considered and interpreted with reference to long term climatic trends.

Ecological monitoring to complement the water level monitoring includes two components: vegetation monitoring and wildlife monitoring. Wildlife monitoring in wetlands is focused on amphibians (Anura: frogs and toads and Urodela: salamanders). Amphibians are excellent indicators of the health of the wetland area and water regime trends that could be affecting wetland function. As documented in the Site Plan and AMP, wetland monitoring (vegetation and wildlife) is to be conducted annually for three years in Phase I to establish an ecological baseline, and every five years thereafter until rehabilitation is complete. Wildlife monitoring was initiated in 2018 (Stantec 2018) and continued in 2019 and 2020. The 2020 results are described below.





# **WALKER AGGREGATES DUNTROON QUARRY EXPANSION, AMPHIBIAN MONITORING PROGRAM: 2020 ANNUAL MONITORING REPORT**

Methods  
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## **2.0 METHODS**

Site visits occurred on Walker Aggregates Inc. Duntroon Expansion Quarry property on three occasions in 2020 (May 1, May 21, and June 19). Surveys were completed at six predetermined Stations (Stations 1 – 6, Figure 1) and consisted of amphibian habitat assessments, egg mass surveys and acoustic breeding call surveys, as described below. Survey Stations were selected based on previous amphibian monitoring at the Subject Property and proximity to the Duntroon Expansion Quarry.

### **2.1 HABITAT ASSESSMENT**

Habitat conditions were recorded at each Station. The habitat assessment included a variety of parameters which can affect the presence, abundance, reproduction, survival and diversity of amphibian communities: average depth, maximum depth, average length and width, substrate type, amount of litter/debris, number of egg attachment sites, likelihood of fish, emergent/wetland vegetation, edge vegetation, dominant surrounding vegetation/community, percent canopy closure and percent in-pond shrub cover and species.

A photographic record was completed at all Stations during each Site visit.

### **2.2 AMPHIBIAN EGG MASS SURVEY**

One Stantec biologist along with Walker's Environmental Coordinator surveyed for amphibian egg masses at Stations 2 and 4 during each Site visit by wading through the habitat for 30 minutes and visually looking for egg masses. Each egg mass encountered was recorded and identified to species, and mass condition was described (dead/alive/hatched). Polarized sunglasses were worn which decreased glare on the water, improving egg mass detection. Incidental amphibian observations were recorded during the egg mass surveys.

### **2.3 AMPHIBIAN BREEDING CALL SURVEY**

During the first Site visit, Automated Recording Units (ARU's) were fastened to a tree or pole at each station in proximity to wetland features, in areas with little ground vegetation to minimize background noise. Each ARU was programmed to record daily between May 1 and June 19, 2020. For each day within the schedule period, one 30-minute recording window was programmed, starting at 21:50. With this start time, the survey would be completed at least one-half hour after sunset throughout the call survey dates. Incidental records of amphibians observed were recorded during the deployment of ARU's and in subsequent Site visits. ARU's were visited during all Site visits to check on battery levels.

ARU's were collected during the last Site visit (June 19, 2019) and brought back to the Stantec Guelph office for data downloading and analysis.



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## **2.3.1 Data Analysis**

The Bird Studies Canada (BSC) Marsh Monitoring Program (MMP) for Surveying Amphibians (BSC 2009) was utilized for analyzing the ARU data. Standardized methodology in the MMP provides repeatable data analysis for future years of monitoring. Following the MMP methodology, dates selected for amphibian call analysis at the Walker Aggregates Duntroon Expansion Quarry met the following conditions:

1. Each station was surveyed three times during spring and early summer, a minimum of 15 days apart. Per the MMP, if possible, survey dates should fall within these windows: Survey 1 April 15 – 30, Survey 2 May 15 – 30, Survey 3 June 15 – 30. Survey 1 was completed on May 1, one day after the suggested survey window. Parameters on this day (air temperature, wind speed) were suitable for early spring calling amphibian species. Conducting the survey in suitable conditions for the target species is more important than completing the survey in the suggested survey window (BSC 2009).
2. Air temperatures were greater than 5 °C for first survey, 10 °C for second survey, and 17 °C for third survey.
3. Each station was surveyed for 3 minutes, beginning at least one-half hour after sunset
4. Wind strength was Beaufort Scale (BS) Code 0, 1, 2 or 3

The ARU recording periods were analyzed on May 1, May 22 and June 18, 2020. Dates were selected through an analysis of weather conditions archived from the Environment Canada Collingwood weather station. Considerations were made for an appropriate spread between analysis dates, ideal weather conditions (light winds, no precipitation, seasonal temperatures) and background noise.

Each analysis included listening for three minutes for all calling toads and frogs at a survey Station. Call levels were described using values of 1, 2, or 3. Level 1 indicates that individuals could be counted, and calls were not simultaneous. Level 2 denotes that calls are distinguishable but with some simultaneous calling. Level 3 indicates a full chorus where calls are continuous and overlapping.

## **2.4 ESTABLISHMENT OF BASELINE**

Data collected in 2020 were compared to previous years egg mass survey and breeding call survey data to observe trends in abundance and diversity, and to establish a baseline ecological condition. Previous studies include the following:

### **Egg Mass Surveys**

- Walker Aggregates Duntroon Expansion Quarry Amphibian Monitoring Program (Stantec 2019)
- Walker Aggregates Duntroon Expansion Quarry Amphibian Monitoring Program (Stantec 2018)
- Investigation of Salamander Community, Wildlife Scientific Collector's Permit No. 1031106 (Stantec 2010)
- Investigation of Salamander Community, Wildlife Scientific Collector's Permit No. 10452052 (Stantec - April 2008)



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- Investigation of Salamander Community (Stantec - April 2009)

### **Breeding Call Surveys**

- Walker Aggregates Duntroon Expansion Quarry Amphibian Monitoring Program (Stantec 2019)
- Walker Aggregates Duntroon Expansion Quarry Amphibian Monitoring Program (Stantec 2018)
- Amphibian Breeding Call Survey (Stantec 2010)



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## 3.0 RESULTS

### 3.1 HABITAT ASSESSMENT

An amphibian habitat assessment was completed at each of the six Stations. Station locations are shown in Appendix A.1 (Study Area, Figure 1). A photographic record showing habitat at each Station is provided in Appendix A.2. Station UTM coordinates are provided in Table B.1, Appendix B. Station habitat descriptions are as follows:

#### Station 1

A small pond, approximately 10 m x 10 m, at the edge of a young mixed forest community bordered by a hay field/pasture. A creek approximately 15 m to the north flowed east past the feature, providing source water for the pond and surrounding area. Water was present in the pond during the June Site visit in 2018, 2019 and 2020 indicating the habitat likely supports the larval development period for most amphibians (Harding 1997). In 2020, water depth was measured to be an average of 0.40 m and maximum depth of 0.60 m. Substrate was organic with litter/debris with a depth of 0.15 m. The pond was surrounded by willow and dogwood shrubs with a 10 % canopy closure. An abundance of grasses and vegetation provided 20 % in-pond cover. Fish were not observed and are likely not present in the feature. Depending on water depth at freeze up, this feature may provide aquatic overwintering amphibian habitat. Surrounding upland area would provide terrestrial overwintering amphibian habitat.

#### Station 2

This feature is a large, flooded area in a mature deciduous swamp forest community which receives surface water runoff from surrounding lands. Average water depth was 0.30 m and maximum depth was 0.50 m. Water was present in the feature during the June Site visit in 2018, 2019 and 2020 indicating the habitat likely supports the larval development period for most amphibians. Substrate was organic with an abundance of leaf litter and tree branch litter. Litter depth was approximately 0.10 m. Egg attachment sites were abundant, provided by organic debris and in-water shrubs. Percent canopy closure over feature was approximately 80 % by mature maple sp. Fish were not observed and likely not present in the feature. Depending on water depth at freeze up, this feature may provide aquatic overwintering amphibian habitat. Nearby permanent ponds and surrounding upland area would provide aquatic and terrestrial overwintering amphibian habitat. The swamp wetland at Station 2 provides suitable breeding habitat for woodland amphibian breeding species.



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#### **Station 3**

Station 3 is within the mature deciduous swamp forest described for Station 2 but is located further east. Seemingly higher in elevation, Station 3 held less water than that observed at Station 2 with average depths of 0.15 m, maximum depth of 0.20 m and less flooded area. Substrate was organic with leaf litter and tree branch litter providing an abundance of egg attachment sites and in-water cover for stages of amphibian development. This feature was likely amphibian breeding and larval development habitat and not likely aquatic overwintering habitat; however, upland habitat would be available for those species that can overwinter in terrestrial habitat.

#### **Station 4**

A low-lying area with dense dogwood and willow shrubs. This feature received drainage from a mature deciduous forest to the south and mixed forest to the north. Average water depth was 0.20 m and maximum depth of 0.45 m. Water was present in the pond during the June Site visit in 2018, 2019 and 2020, indicating the habitat likely supports the larval development period for most amphibians. Substrate was organic with leaf litter and shrub branch litter providing an abundance of egg attachment sites and approximately 70 % in-water cover for developing amphibians. Canopy closure was 50 %, mainly provided by shrubs. Fish were not observed and likely not present in the feature. This feature was likely amphibian breeding and larval development habitat and not likely aquatic overwintering habitat; however, upland habitat would be available for those species that can overwinter in terrestrial habitat. The wetland at Station 4 provides suitable breeding habitat for woodland amphibian breeding species.

#### **Station 5**

A dug pond that can hold water throughout the year under adequate rainfall conditions. Approximately 21 m x 15 m, this pond had an average depth greater than 1.0 m in 2018, 2019, and 2020. Surrounding vegetation community was deciduous forest and meadow. The pond had dense emergent aquatic vegetation (cattail) along the edge and submergent vegetation (chara spp.) throughout. Substrate was a silty clay with detritus including leaf litter. Egg attachment sites were abundant from shrub debris and aquatic vegetation debris. Canopy closure was 5 % and in-water cover was 10 %, however water depth provides refuge for developing amphibians from predators. In some years, this feature could provide aquatic overwintering habitat for those species that hibernate in ponds. Fish were observed which were likely Brook Stickleback (*Culaea inconstans*) (non-predatory to amphibians). The pond at Station 5 provides suitable breeding habitat for amphibians that prefer permanent ponds with an open canopy.

#### **Station 6**

This Station is a meadow marsh floodplain habitat with a permanent creek that flows west. Grasses were dominant with wetland vegetation including marsh marigold and cattail. Trees and shrubs were sparse with mixed composition of deciduous and coniferous species. The floodplain held water during freshet events however water depths were minimal in the floodplain during the first, second and third Site visits in 2020 (0.10 m, 0.10 m, and 0.05 m, respectively). As such, breeding amphibian habitat is likely present in the creek and not the floodplain. Floodplain substrate was organic with detritus and cover was approximately 90 % from tall grasses and emergent vegetation. The amphibian community supported by



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this habitat would include those species and amphibian life stages adapted to drier conditions, such as the adult Northern Leopard Frog (Harding 1997). Aquatic overwintering habitat in the floodplain would be provided in sections of the creek and surrounding uplands would provide terrestrial overwintering habitat.

Habitat at each Station has not changed since 2007 and therefore amphibian populations are expected to have remained relatively similar or differences may be associated with natural fluctuations in population or seasonal weather.

### **3.2 AMPHIBIAN EGG MASS SURVEY**

The amphibian egg mass survey was completed at Station 2 and Station 4 during each Site visit (May 1, May 21, and June 19, 2020). Suitable habitat was present during each survey, providing conditions for amphibian breeding and larval development. Approximately 1,500 m<sup>2</sup> (50 m x 30 m) was searched at Station 2 and 800 m<sup>2</sup> (40 m x 20 m) was searched at Station 4. The area searched was dependent on available habitat and ease of survey and egg mass detection. There was more available habitat at Station 2 when compared to Station 4 and Station 2 had minimal in water vegetation, compared to Station 4 which had dense shrub vegetation (See Section 3.1 and Photographic Record). Egg masses at Station 2 were generally dispersed over a larger area when compared to Station 4. Egg mass survey results are as follows:

#### **First Survey (May 1, 2020)**

Conditions were suitable (open water, sufficient depth) for amphibian breeding during the first survey at both Stations.

At Station 2, eleven (11) viable Spotted Salamander egg masses and four (4) viable Anura egg masses of various sizes from small (200 eggs) to large conglomerate masses (thousands of eggs) were observed. Anura egg mass identification is difficult to determine for the early spring breeders (Spring Peeper, Western Chorus Frog, Wood Frog), without invasive identification techniques, however, based on the location of the egg masses (near surface) the masses were likely Western Chorus Frog or Wood Frog (CHS 2021a). During the egg mass survey at Station 2, there was a full chorus of Western Chorus Frog calling with Spring Peeper and Wood Frog calling in lesser abundance.

At Station 4, nineteen (19) viable Spotted Salamander egg masses and three (3) viable Anura egg masses were observed. Anura egg masses were potentially Western Chorus Frog as this species was actively calling during the egg mass survey (20 individuals) and the week before this survey the species was calling in full chorus at Station 4 (J. Forbs, personal communication, May 1, 2020).

The timing (May 1) of the first survey in 2020 was more suitable for detection of egg masses in the Study Area when compared to previous years studies (2018 – April 26, 2019 – April 16). In 2018 there were no egg masses observed and in 2019 the wetlands were frozen during the survey. To increase egg mass detection in future studies, it is recommended that the first egg mass survey take place in late April or early May, depending on weather conditions.



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#### **Second Survey (May 21, 2020)**

At Station 2, thirty-eight (38) viable Spotted Salamander egg masses were observed.

At Station 4, seventeen (17) viable Spotted Salamander egg masses were observed.

The number of salamander egg masses detected in the second survey of 2020 were the highest counts observed in the LTTEM program (Table 1). Habitat suitability, weather and survey timing are believed to have been favorable for the study in 2020, resulting in quality data collection and an accurate representation of the amphibian populations in the Study Area under optimum annual conditions.

#### **Third Survey (June 19, 2020)**

There were no viable egg masses observed at either Station during the third survey. Woodland breeding amphibians have typically completed their breeding cycle by mid-June (CHS 2020a) and egg masses have developed into larvae. This result was also observed in the 2018 and 2019 egg mass survey studies (Stantec 2018, Stantec 2019). An abundance of Anura and Urodela tadpoles were observed during the survey in Station 2 and Station 4, which is a positive indication of the presence of suitable habitat and successful breeding of the local amphibian population in the Study Area.

#### **Incidental Egg Mass Observations**

During the first and second Site visits, Spotted Salamander egg masses were observed at other survey Stations and breeding habitat in the Study Area. In total, thirteen (13) and thirty-five (35) Spotted Salamander egg masses were observed at Station 3 and Station 5, respectively. Another five (5) Spotted Salamander egg masses were observed in a flooded area along the fence line between Station 3 and Station 4.



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Table 1: Amphibian Egg Mass Survey Results at Station 2 and Station 4 from 2020 and Previous Survey Years at the Walker Aggregates Duntroon Expansion Quarry Study Site

Station	Species Common Name	Species Scientific Name	2006	2008	2009	2018			2019			2020		
			27-Apr	30-Apr	27-Apr	26-Apr	23-May	15-Jun	16-Apr	16-May	19-Jun	1-May	21-May	19-Jun
2	Northern Leopard Frog	<i>Lithobates pipiens</i>	1	-	-	-	-	-	-	-	-	-	-	-
	Spotted Salamander	<i>Ambystoma maculatum</i>	16	30	3	-	20	5 (hatched)	-	8	13 (hatched)	11	38	-
	Wood Frog	<i>Lithobates sylvatica</i>	200	Numerous carpets	Five large carpets	-	-	-	-	8	-	4	-	-
	Pseudacris sp.	<i>Pseudacris</i> sp.	-	1	-	-	-	-	-	-	-	-	-	-
4	Spotted Salamander	<i>Ambystoma maculatum</i>	-	-	14	-	5 (one dead)	1 (hatched)	-	13	1 (hatched)	19	17	-
	Western Chorus Frog	<i>Pseudacris triseriata</i>	-	-	-	-	-	-	-	-	-	3	-	-





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### **3.3 AMPHIBIAN BREEDING CALL SURVEY**

The amphibian breeding call survey was completed within the MMP guidelines. Three surveys were completed at each of the six Stations for a total of eighteen surveys. Survey date, time and weather are provided in Table B.2, Appendix B. Individual counts and MMP call codes for each Station, survey date and year are provided in Table B.3, Appendix B. Incidental amphibian observations are provided in Table B.4, Appendix B.

The breeding call survey documented seven (7) species utilizing habitat at the survey Stations for breeding: Wood Frog, Spring Peeper, Western Chorus Frog, Green Frog, Gray Treefrog, American Toad and Northern Leopard Frog. Background noise codes during the surveys ranged from 0 (no appreciable effect) to 2 (moderately affecting sampling) at the Stations. All Stations were confirmed to provide amphibian breeding habitat, with amphibian abundance and diversity consistent with previous years studies. A discussion of each documented species is as follows:

Wood Frog was the only species documented actively calling at all six survey Stations. This species is an early and “explosive breeder”, and all breeding is completed in one to two weeks in April or May (CHS 2020b). This species was only documented during the first breeding call survey and a full chorus was documented at Station 2. The abundance of Wood Frog (presence and number of individuals) documented in 2020 has not been observed in previous years surveys.

Spring Peeper was the most detected species with records from nine of eighteen surveys, which is a reflection of the species ability to breed in a variety of habitats and its long breeding period from April to June (CHS 2020c). Spring Peeper was especially abundant at Stations 2, 3 and 5 which is consistent with previous years surveys.

Western Chorus Frog is an early breeder from March to May (CHS 2020d). This species was documented at Stations 1 to 4. The species was most abundant at Station 4 at call counts not observed since 2007. Interestingly, this species was documented calling at a full chorus at Station 2 during the first egg mass survey but individual counts in the breeding call survey were far fewer.

Green Frog was detected calling at Station 5 at abundances consistent with previous years surveys. Green Frogs require permanent bodies of water for breeding and hibernation (CHS 2020e) making the pond at Station 5 suitable for this species. Green Frog can be found in a variety of aquatic habitats (CHS 2020e) which was supported by the incidental observations at Stations 1, 2, 4 and 6 during the 2020 surveys.

Gray Treefrog was detected calling at Stations 1, 2, 5 and 6. Call counts at Stations were consistent with previous years surveys and call counts continued to be highest at Station 5. The pond at Station 5 provides the preferred breeding habitat for this species which is permanent or ephemeral wetlands with open canopy in proximity to forest (CHS 2020f).



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American Toad was detected calling at Stations 1, 5 and 6 during the second breeding call survey. Call counts were low, which is consistent with previous years studies. The species was documented at Station 6 for the first time of the LTTEM program. The American Toad is a habitat generalist and can breed in a variety of permanent or temporary aquatic features and can be found in a range of terrestrial habitats outside the breeding season (CHS 2020g).

Northern Leopard Frog was detected calling at Station 5 during the second breeding call survey. This is the first time of the LTTEM program that this species was detected by breeding call. This species was also observed incidentally at Station 1 and Station 6. Stations 1, 5 and 6 provide suitable habitat for the Northern Leopard Frog as the species breeds in permanent or semi-permanent wetlands, streams, and shallow sections of lakes (CHS 2020h). The species can be found foraging in terrestrial habitat including meadows and fields (CHS 2020h), making the surrounding habitat of Station 5 and 6 suitable for the species.

A summary of the amphibian community documented at survey Stations in 2007, 2018, 2019 and 2020 is provided in Table 2.

**Table 2: Amphibian Community Documented in Breeding Call Survey and Incidental Observations at the Walker Aggregates Duntroon Expansion Quarry Study Site in 2020, 2019, 2018 and 2007.**

Station	Survey Year	Wood Frog	Spring Peeper	Western Chorus Frog	American Toad	Green Frog	Gray Treefrog	Northern Leopard Frog
1	2020	☐	☐	☐	☐	✓ <sub>1</sub>	☐	✓ <sub>1</sub>
	2019	☐	☐			✓ <sub>1</sub>	☐	
	2018	☐	☐			✓ <sub>1</sub>	☐	✓ <sub>1</sub>
	2007		☐	☐	☐	☐	☐	
2	2020	✓	✓	✓			✓	
	2019	✓	✓	✓			✓	
	2018		✓	✓			✓ <sub>1</sub>	
	2007	✓	✓	✓	✓		✓	✓ <sub>1</sub>
3	2020	✓	✓	✓				
	2019		✓	✓			✓ <sub>1</sub>	
	2018	✓ <sub>1</sub>	✓	✓				
4	2020	✓		✓		✓ <sub>1</sub>		
	2019	✓	✓	✓		✓	✓	



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**Table 2: Amphibian Community Documented in Breeding Call Survey and Incidental Observations at the Walker Aggregates Duntroon Expansion Quarry Study Site in 2020, 2019, 2018 and 2007.**

Station	Survey Year	Wood Frog	Spring Peeper	Western Chorus Frog	American Toad	Green Frog	Gray Treefrog	Northern Leopard Frog
	2018		✓	✓		✓ <sub>1</sub>		
	2007	✓	✓	✓				
5	2020	✓	✓		✓	✓	✓	✓
	2019	✓	✓			✓	✓	✓ <sub>1</sub>
	2018		✓	✓	✓	✓	✓	✓ <sub>1</sub>
	2007		✓	✓		✓	✓	
6	2020	✓	✓		✓		✓	
	2019		✓			✓ <sub>1</sub>		✓ <sub>1</sub>
	2018		✓			✓ <sub>1</sub>		✓ <sub>1</sub>

Note: ✓<sub>1</sub> denotes incidental species observation not recorded in breeding call survey.



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### **4.0 CONCLUSION**

The 2020 Amphibian Monitoring Program at the Walker Aggregates Inc. Duntroon Expansion Quarry was completed successfully, fulfilling the requirement of the Adaptive Management Plan which forms part of the Aggregate Resources Act licence and the established baseline conditions. Data of amphibian habitat, egg mass occurrence, incidental observation and breeding calls at each survey Station were collected, providing monitoring data for amphibian community and abundance in the Study Area. Habitat at each survey Station was suitable for amphibians and, when comparing 2020 data to previous years' surveys, amphibian communities were similar in diversity and equal to or greater in abundance at each survey Station.

This 2020 monitoring program completes year three of the baseline ecological monitoring program (2018-2020) completed during Phase I of the Duntroon Expansion Quarry operations. The ecological baseline for wetland wildlife will be used for comparison with data gathered during operations for future ecological monitoring periods to be completed at five-year intervals in accordance with the Site Plan and AMP.



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Stantec. 2019. Walker Aggregates Duntroon Expansion Quarry Amphibian Monitoring Program. 2019 Annual Monitoring Report. Prepared for Walker Aggregates Inc. Prepared by Stantec Consulting

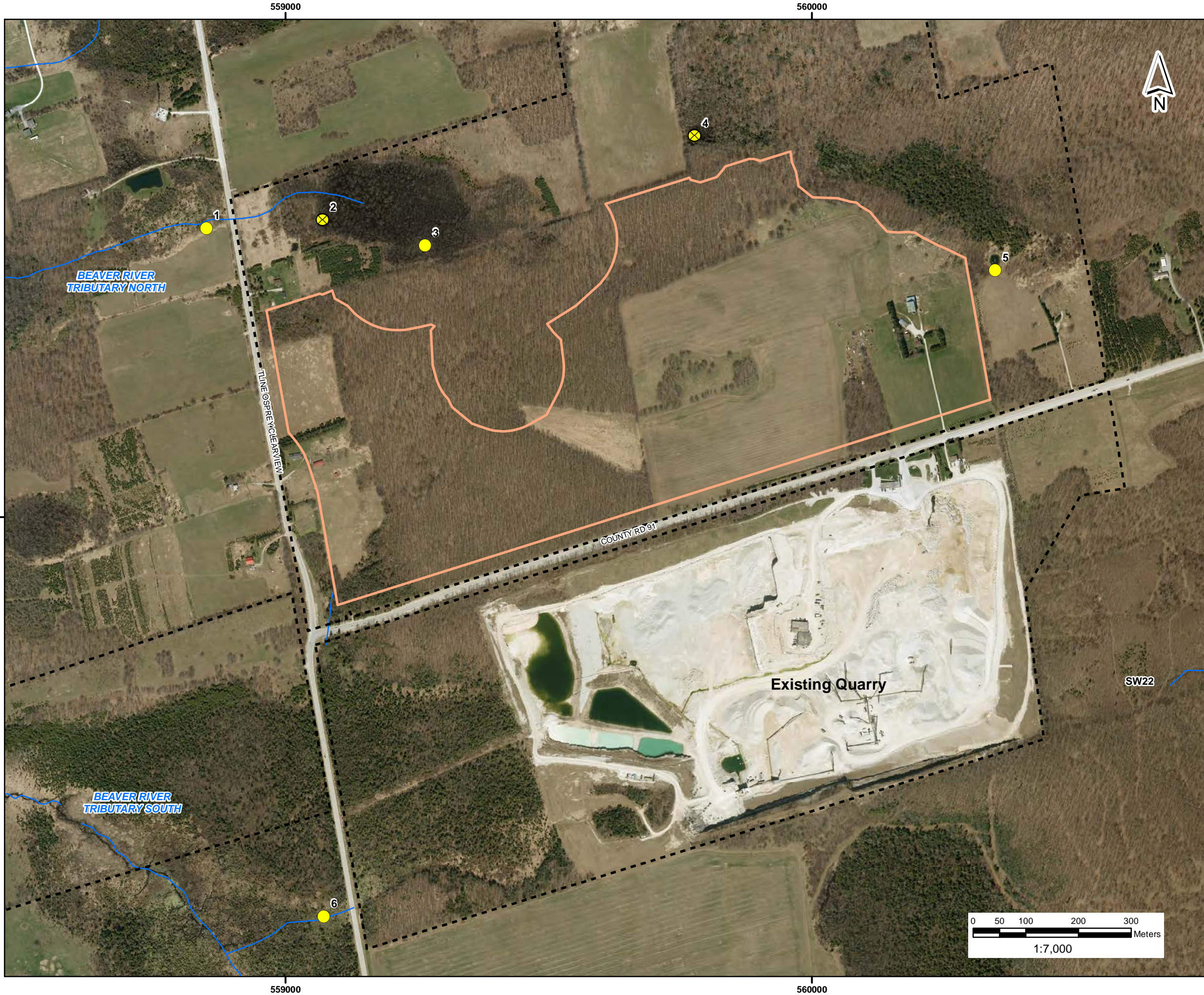


## **APPENDIX A: HABITAT ASSESSMENT**

*APPENDIX A1*  
*SURVEY LOCATIONS*



V:\01609\active\62602732\Drawing\GIS\MXD\2019\_Amphibian\_MonitoringPlan\62602732\_AmphibianMonitoringLocations.mxd  
Revised: 2020-04-03 By: dharvey



### Legend

- Egg Mass Survey
- ARU Station
- Walker Owned Lands
- Limit of Extraction - Walker
- Surface Water Features may include Fisheries Habitat

### Notes

1. Coordinate System: UTM NAD 83 - Zone 17(N)
2. Data Sources: Ontario Ministry of Natural Resources, © Queens Printer Ontario, 2009.
3. Image Source: First Base Solutions WMS, 2016.
4. Wetland boundaries approximated using handheld GPS and air photo except where adjacent to proposed license boundary, surveyed in consultation with MNR.

March 2020  
62602732

Client / Project

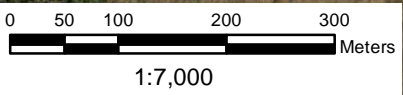
WALKER AGGREGATES INC.  
DUNTROON QUARRY EXPANSION  
AMPHIBIAN MONITORING PROGRAM

Figure No.

1

Title

**AMPHIBIAN MONITORING  
LOCATIONS**





*APPENDIX A2*  
*PHOTOGRAPHIC RECORDS*



Photo 1: Site 1, May 21, 2020: Leopard Frog.



Photo 2: Site 2, May 1, 2020: Spotted Salamander egg mass.



Photo 3: Site 3, May 21, 2020: Spotted Salamander egg masses.



Photo 4: Site 4, May 21, 2020: Spotted Salamander egg mass.



Photo 5: Site 5, May 1, 2020: Spotted Salamander egg masses.



Photo 6: Amphibian Breeding Habitat, May 21, 2020: Habitat along fence line between Station 3 and Station 4.





Photo 1: Site 1, May 1, 2020.



Photo 2: Site 1, May 1, 2020.



Photo 3: Site 1, May 21, 2020



Photo 4: Site 1, May 21, 2020



Photo 5: Site 1, June 19, 2020



Photo 6: Site 1, June 19, 2020





Photo 1: Site 2, May 1, 2020



Photo 2: Site 2, May 1, 2020



Photo 3: Site 2, May 21, 2020



Photo 4: Site 2, May 21, 2020



Photo 5: Site 2, June 19, 2020



Photo 6: Site 2, June 19, 2020





Photo 1: Site 3, May 1, 2020



Photo 2: Site 3, May 1, 2020



Photo 3: Site 3, May 21, 2020



Photo 4: Site 3, May 21, 2020



Photo 5: Site 3, June 19, 2020



Photo 6: Site 3, June 19, 2020





Photo 1: Site 4, May 1, 2020



Photo 2: Site 4, May 1, 2020



Photo 3: Site 4, May 21, 2020



Photo 4: Site 4, May 21, 2020



Photo 5: Site 4, June 19, 2020



Photo 6: Site 4, June 19, 2020





Photo 1: Site 5, May 1, 2020



Photo 2: Site 5, May 1, 2020



Photo 3: Site 5, May 21, 2020



Photo 4: Site 5, May 21, 2020



Photo 5: Site 5, June 19, 2020

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Photo 1: Site 6, May 1, 2020



Photo 2: Site 6, May 1, 2020



Photo 3: Site 6, May 21, 2020



Photo 4: Site 6, May 21, 2020



Photo 5: Site 6, June 19, 2020



Photo 6: Site 6, June 19, 2020

## **APPENDIX B: TABLES**

**WALKER AGGREGATES DUNTROON QUARRY EXPANSION, AMPHIBIAN MONITORING  
PROGRAM: 2020 ANNUAL MONITORING REPORT**

**Table B.1: ARU Stations UTM Coordinates at the Walker Aggregates Duntroon Expansion Quarry Study Site**

Station	UTM Coordinate	
	Easting	Northing
1	558849	4915550
2	559070	4915566
3	559265	4915517
4	559777	4915725
5	560348	4915470
6	559072	4914241

**Table B.2: Weather Conditions during Breeding Call Surveys at the Walker Aggregates Duntroon Expansion Quarry Study Site (2020, 2019, 2018, 2007)**

Survey Round	Survey Date	Time	WEATHER			
			Minimum Daily Temperature °C	Maximum Daily Temperature °C	Total Daily Precipitation	Beaufort Wind Scale
Survey 1	5/1/2020	21:50	5	12	0	0 - 1
Survey 2	5/22/2020	21:50	8	18	0	0 - 1
Survey 3	6/18/2020	21:50	12	24	0	0 - 1
Survey 1	4/23/2019	21:50	4	18	4	0 - 1
Survey 2	5/20/2019	21:50	6	17	0	0 - 1
Survey 3	6/18/2019	21:50	11	19	0	0 - 1
Survey 1	4/30/2018	20:29	5	14	0	-
Survey 2	5/25/2018	20:57	10	20	1	-
Survey 3	6/14/2018	21:11	13	21	0	-
Survey 1	4/30/2007	20:30	-	12	0	0
Survey 2	5/22/2007	21:10	-	13	0	1-2
Survey 3	6/14/2007	21:45	-	19	0	0

**Note:**

Breeding call surveys in 2007 were completed on site, compared to 2018, 2019 and 2020 which were recorded by ARU and analyzed at desktop. Recorded weather conditions reflect the difference in survey method.

**WALKER AGGREGATES DUNTROON QUARRY EXPANSION, AMPHIBIAN MONITORING  
PROGRAM: 2020 ANNUAL MONITORING REPORT**

**Table B.3: Comparison of Breeding Call Survey Results from the Walker Aggregate  
Duntroon Expansion Quarry Study Site (2020, 2019, 2018, 2007)**

Station	Survey Year	Survey Round	Wood Frog	Spring Peeper	Western Chorus Frog	American Toad	Green Frog	Gray Treefrog	Northern Leopard Frog
1	2020	1-May	1-1	2-10	1-1				
		22-May		2-15		1-2			
		19-Jun						1-2	
	2019	April	1-2	2-15					
		May		2-25					
		June							
	2018	April	1-2	2-10					
		May		2-5				1-3	
		June							
	2007	April		3	1-4				
		May		3		1-2			
		June					1-3	1-1	
2	2020	1-May	3	3	1-3				
		22-May		3					
		19-Jun						1-5	
	2019	April	2-8	3	1-2				
		May		3	1-3				
		June						1-2	
	2018	April		1-4	1-3				
		May						1-2	
		June		2-20					
	2007	April	1-2		3				
		May		3		1-1			
		June		2-30				2-8	
3	2020	1-May	2-5	2-30	1-2				
		22-May							
		19-Jun							
	2019	April			1-2				
		May		3	1-2				
		June		3					
	2018	April			1-3				
		May							

**WALKER AGGREGATES DUNTROON QUARRY EXPANSION, AMPHIBIAN MONITORING  
PROGRAM: 2020 ANNUAL MONITORING REPORT**

**Table B.3: Comparison of Breeding Call Survey Results from the Walker Aggregate Duntroon Expansion Quarry Study Site (2020, 2019, 2018, 2007)**

Station	Survey Year	Survey Round	Wood Frog	Spring Peeper	Western Chorus Frog	American Toad	Green Frog	Gray Treefrog	Northern Leopard Frog
4	2020	June		3					
		1-May	1-2		1-30				
		22-May			1-2				
	2019	19-Jun							
		April	2-10		2-6				
		May		1-2	1-1		1-1		
	2018	June		2-8				1-1	
		April			2-10				
		May							
	2007	June		1-3					
		April	1-5		2-20				
		May							
5	2020	June		2-30					
		1-May	1-1	2-40					
		22-May		2-20		1-1			1-1
	2019	19-Jun					1-4	2-6	
		April	1-1						
		May		2-30				2-8	
	2018	June		3			1-2		
		April			2-4				
		May				1-2	2-4	2-5	
	2007	June		2-20			2-4		
		April			1-5				
		May		2-40			1-2	1-2	
6	2020	June		3			1-3	1-5	
		1-May	1-3						
		22-May		2-15		1-4		1-1	
	2019	19-Jun							
		April							
		May		1-3					
	2018	June		2-10					
		April							

**WALKER AGGREGATES DUNTROON QUARRY EXPANSION, AMPHIBIAN MONITORING  
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**Table B.3: Comparison of Breeding Call Survey Results from the Walker Aggregate  
Duntroon Expansion Quarry Study Site (2020, 2019, 2018, 2007)**

Station	Survey Year	Survey Round	Wood Frog	Spring Peeper	Western Chorus Frog	American Toad	Green Frog	Gray Treefrog	Northern Leopard Frog
		June		2-8					

**WALKER AGGREGATES DUNTROON QUARRY EXPANSION, AMPHIBIAN MONITORING  
PROGRAM: 2020 ANNUAL MONITORING REPORT**

**Table B.4: Amphibians Incidentally Observed in 2020 at Survey Stations During Site Visits on the Walker Aggregates Duntroon Expansion Quarry Study Site**

Station	Species Common Name	Incidental Observations: Individuals / Egg Masses Observed or Breeding Call Code		
		5/1/2020	5/21/2020	6/19/2020
1	Green Frog	-	Individual (1)	Individual (1)
	Northern Leopard Frog	-	Individual (4)	Individual (1)
	Western Chorus Frog	Breeding call code 1-6	-	-
2	Green Frog	Breeding call code 3	Individual (2)	-
	Spring Peeper	Individual (1)	-	-
	Western Chorus Frog	-	Breeding call code 1-1	-
	Wood Frog	Individual (1)	-	-
	Unidentified	-	-	Abundant tadpoles observed
3	Spotted Salamander	Egg masses (2)	Egg masses (11)	-
	Spring Peeper	Individual (2)	-	-
	Western Chorus Frog	Breeding call code 3	-	-
	Wood Frog	-		Individual (1)
4	Green Frog	-	Individual (2)	Individual (1)
	Wood Frog	Individual (2)	Individual (1)	-
	Western Chorus Frog	Breeding call code 2-20	Breeding call code 1-1	-
	Unidentified	-	-	Abundant tadpoles observed
5	Green Frog	-	Individual (5)	Individual (5)
	Spotted Salamander	Egg masses (26)	Egg masses (9)	-
	Unidentified	-	Abundant tadpoles observed	-
6	Green Frog	-	Individual (5)	-
	Northern Leopard Frog	-	Individual (1)	-
	Spring Peeper	Individual (5)	-	-

**WALKER AGGREGATES DUNTROON QUARRY EXPANSION, AMPHIBIAN MONITORING  
PROGRAM: 2020 ANNUAL MONITORING REPORT**

**Table B.4: Amphibians Incidentally Observed in 2020 at Survey Stations During Site Visits on the Walker Aggregates Duntroon Expansion Quarry Study Site**

Station	Species Common Name	Incidental Observations: Individuals / Egg Masses Observed or Breeding Call Code		
		5/1/2020	5/21/2020	6/19/2020
Other Location (flooded area along fenceline in deciduous swamp between Station 3 and Station 4.	Spotted Salamander	Egg masses (5)	-	-