Strada Pit/Quarry

Natural Environment Assessment

Prepared for:

Strada Aggregates Inc.
30 Floral Parkway
Concord, Ontario
L4K 4R1

Project No. 2473A | October 2024

NATURAL RESOURCE SOLUTIONS INC.
Aquatic, Terrestrial and Wetland Biologists

that comprise part of the NAT-18 complex, due to the combined effects of reduced stream inflow and shallow groundwater drawdown during Phase 4A. The species with high sensitivity to hydrological change that were recorded at this complex (i.e., Hooded Merganser, Gray Treefrog, Spring Peeper, and Wood Frog) (TRCA 2017) may be the most susceptible to negative habitat effects caused by the anticipated change in conditions. However, as described above, these smaller features will experience only minor reductions in water level, and minor shifts in fringing vegetation based on these anticipated hydrological effects. These features will continue to maintain a suitable hydroperiod for amphibian breeding, and no changes to their current habitat functions (e.g., as amphibian breeding habitat or as habitat for the observed bird species) are anticipated.

As described above, no negative effects on the hydrological regime of the NAT-16 natural features are anticipated during or following quarry operation. Provided the existing vegetation communities remain relatively unchanged from baseline conditions, as is anticipated, and since the large open water pond habitat (SA) will continue to exist, no negative effects to terrestrial wildlife or their habitats are anticipated within NAT-16.

Effects on Aquatic Habitats and Fish Communities

The aquatic habitats present throughout NAT-18 include several online ponds and a single permanent watercourse, which connects the ponds and crosses Main Street at several locations as it meanders in a northerly direction. The ponds provide habitat for the local fish community as well as portions of the connecting watercourse where water depths and aquatic vegetation establishment allow. Where it crosses Main Street between Oldfield Court and Fieldway Court the watercourse exhibits a coldwater thermal regime. Where the watercourse crosses Main Street, at its intersection with Mill Street, the thermal regime was characterized as coolwater, suggesting that the large online SA pond associated with NAT-18 is acting to increase the water temperature to some degree within the feature under baseline conditions. The watercourse associated with NAT-18 flows east into a larger watercourse within NAT-16, north of River Road. This larger watercourse flows south from NAT-14 and its headwaters to the north of Sideroad 15. The thermal regime of NAT-14 was cool/coldwater and at that location the watercourse supports Brook Trout (see Section 7.4.1.3). Brook Trout were also confirmed within the watercourse associated with NAT-16 at its crossing of River Road, where both adults and juveniles were captured, in addition to several other coolwater fish species including Blacknose Dace, Creek Chub, and Northern Redbelly Dace. At this location the watercourse

exhibited a coolwater thermal regime and provides more available habitat (i.e. wider wetted width and deeper pools compared to the NAT-14 watercourse.

Under Phase 1, 2C, and 4A conditions, it is predicted that the surface leakage and streamflow to the ponds and associated watercourses occurring within NAT-18 will experience varying amounts of decrease. The watercourses and smaller ponds along Main Street between Oldfield Court and Fieldway Court, which flow to the south side of the large pond, are not expected to experience much of a decrease in surface leakage/discharge but may experience a slight reduction in streamflow. However, the online ponds should act to alleviate potential reductions in flow and, given the small expected decrease, it is not anticipated that there would be any notable change in the quality or quantity of available aquatic habitat, or in the thermal regime when compared to baseline conditions. In comparison, the watercourse features in the vicinity of County Road 124, and that connect to the west side of the large pond, are predicted to experience slightly higher decreases in surface leakage, which would cause decreases in streamflow. These decreases will be higher during Phase 4A compared to Phases 1 and 2C. However, the aquatic habitat associated with these features is limited. In particular, the watercourse at its crossing of County Road 124 does not provide suitable fish habitat at or upstream of that location since the road and its associated culvert acts as a barrier. Fish may utilize the lower reach of the watercourse where it connects to the pond, but this couldn't be assessed during field investigations due to site access limitations. Further, if a direct connection to the large SA pond exists, fish are expected to utilize areas within the pond throughout the year, as required. Potential reductions in surface leakage and streamflow within these reaches may slightly reduce the amount of water flowing to the large pond, including the amount of groundwater, but the aquatic habitat or local fish community is not expected to be affected. The pond level is dictated by a weir at the northeast edge, which should act to maintain water levels within the pond to a certain extent.

A single channel collects water from NAT-18 at its northeast outlet from the large SA pond and directs it across Main Street towards NAT-16 where it flows into the watercourse flowing south from NAT-14, a distance of approximately 450m. Modelling predicts that this reach, flowing from the NAT-18 pond, will experience the largest decrease in surface discharge and streamflow, particularly during Phase 4A. Under Phase 1 conditions, this reach may experience a relatively small decrease in surface discharge at various locations along its length, which would result in an overall decrease in streamflow. However, it is also predicted that there would be an increase in surface discharge to the SWM4 swamp north of River Road, which would help

to offset some of the potential effects from the reduction in surface discharge to the watercourse reach upstream. A more substantial decrease in streamflow within this reach is predicted to occur during Phase 4A due to the reductions in surface leakage and streamflow that are anticipated in the vicinity of the large NAT-18 pond and the inflowing watercourses, which feed into and influence this reach. Under baseline conditions, this reach exhibits a coolwater thermal regime and provides direct fish habitat, evidenced by observations of fish within the channel at the crossing of Main Street. Further, it is expected that the fish community that occupy this affected reach would have access to the watercourse within the NAT-16 SWM4 swamp north of River Road, which flows southwards from NAT-14, which the affected reach confluences with. Given that Brook Trout were confirmed within the NAT-16 watercourse at River Road, it is anticipated that the NAT-18 would also contain Brook Trout. However, due to site access limitations, this could not be confirmed. The decrease in the surface leakage and streamflow, as modeled for the watercourse reach outflowing from the NAT-18 pond, may result in an overall reduction in the amount of available fish habitat, and less coldwater input to the watercourse. However, it is expected that this reach will still provide adequate water depths and suitable water temperatures to continue to support the existing cool and coldwater species within it. Under baseflow conditions, the channel just east of the River Road crossing was measured with a wetted width of approximately 2.5m with a water depth of approximately 0.3m, which is predicted to be near the minimum water depth for that location under baseflow conditions. Seasonal fluctuations will occur at this location and it is expected that water depths will be higher for much of the year and in particular throughout the spring and during precipitation events. For watercourses that exhibit a stream width of ≤5.0m, a water depth of 0.3m falls within the optimal range for Brook Trout (Raleigh 1982) when considering the average thalweg depth during the late growing season low water period. While suitability generally decreases for water depths below 0.25m, water depths above approximately 0.1m could still be considered suitable, albeit less than optimal. The proposed quarry operation is expected to result in a temporary reduction in streamflow up to a maximum of roughly 40-50% during times of the year that may see water depths drop below the optimal depth for Brook Trout during the low flow period. However, given that suitable water depths occur down to approximately 0.1m, and that the modeled reduction in streamflow will generally be less than the maximum predicted 40-50% reduction, it is expected that this reach of watercourse will still provide adequate water depths for Brook Trout. Additionally, given its connection to the larger watercourse flowing southwards from NAT-14 through NAT-16, which provides a relatively deeper channel and pools

over 0.6m deep, the opportunity exists for fish to utilize the aquatic habitats within both watercourses, as needed, throughout the year.

The decrease in surface leakage and streamflow that is predicted for the watercourse connecting NAT-18 and NAT-16 is not expected to affect the available habitat or the thermal regime of the downstream watercourse to which it flows. As noted in section 7.4.1.3, it is predicted that NAT-14 will experience an overall increase in surface leakage within the complex under Phase 1, 2C, and 4A conditions, which will provide additional groundwater to the associated watercourse and will result in an increase in streamflow and a potential cooling effect. Since this watercourse flows from NAT-14 and then through NAT-16, this increase in streamflow and the potential cooling effect associated with it will also be realized within the NAT-16 watercourse at River Road and downstream. Overall, it is expected that the NAT-16 watercourse will continue to provide suitable habitat for the existing fish community, including Brook Trout.

7.4.1.7 Predicted Effects Within the Subject Lands

Natural Feature Water Balance

The Impact Assessment Report (Earthfx 2024a) provides a west to east cross-section of the various surficial materials and bedrock conditions, along with baseline groundwater levels. The cross-section is located north of the former Bonnefield property, approximately through the centre of the Melancthon Pit #1 property (Fig. 2.6, Earthfx 2024a). A layer of Tavistock Till is present beneath the surface sand and gravel layer (Earthfx 2024b). On the east side of the former Bonnefield property, within the Dry-Fresh Sugar Maple Deciduous Forest (FOD5-1) the Tavistock till limits groundwater interaction with the surface. The baseline depth to the groundwater table near the former Bonnefield property wetlands is approximately 2.5-4.5m below the ground surface (Appendix XII, Fig. 2.9). In the area immediately surrounding the MAM2 and MAS2 wetlands, the depth to the groundwater table is greater than 5m (Fig. 2.9; Earthfx 2024a). These conditions result in perched wetlands on the former Bonnefield property. As such, the effects of groundwater dewatering and mounding during Phases 1, 2C, 4A and the rehabilitation phase will not impact the MAM2 and MAS2 wetlands. No negative impacts are expected to these wetlands during pit operations.

A portion of the NAT-19 complex extends onto the Melancthon Pit #2 property, including SWD4 and SWM4-1 vegetation communities (Map 3-14). A detailed description of the effects of groundwater mounding resulting from the central and southern infiltration ponds for the NAT-19