TECHNICAL MEMORANDUM

DATE June 12, 2023 **Project No.** 21453907

TO Lafarge Canada Inc.
6509 Airport Road, Mississauga ON L4N 1S7

CC Caitlin Port (MHBC)

FROM Sean McFarland, Hayley Wallace **EMAIL** **Sean.Mcfarland@wsp.com**

LAFARGE GOODWOOD PIT EXTENSION: RESPONSE FOR REGIONAL MUNICIPALITY OF DURHAM APPENDIX C SITE SCREENING QUESTIONNAIRE FORM

1.0 INTRODUCTION AND BACKGROUND

WSP Canada Inc. ("WSP") is pleased to provide Lafarge Canada Inc. (Lafarge) with this response to address the Regional Municipality of Durham Appendix C Site Screening Questionnaire Form for the Lafarge Goodwood Pit Extension Site in Uxbridge, Ontario.

The answer is 'Yes' to question eight on the questionnaire form: the land abutting the Site is currently a Canadian National Railway (CNR) corridor, which is identified as one of the Potentially Contaminating Activities indemnified in Table 2 of Schedule D of O.Reg 153/04. The form states the following:

"If Yes was selected in any of the questions above, a Phase One ESA (and possibly a Phase Two ESA) at a minimum prepared in accordance with O.Reg. 153/04, is required. Please submit two hard copies and a digital copy of the Phase One and/or a Phase Two ESA that satisfies the requirements of O.Reg 153/04, as amended. ESA's may be waived at the Region's discretion provided that the Applicant/Qualified Person (QP) can demonstrate that the response(s) does not pose a risk to human health and the environment to the Region's satisfaction (e.g. consent applications relating to easements, leases, mortgages, correction of title as well as location of off-site Potentially Contaminated Activities; and direction of surface and groundwater flow etc.)."

The presence of this railway corridor is not expected to pose a threat to water quality at the proposed extension Site based on the results of the groundwater monitoring program undertaken by Golder from 2018 to 2021 and summarized in *Water Report Level 1 and 2: Lafarge Goodwood Pit Extension* (Golder, 2023). The findings of the groundwater monitoring program, as they relate to the potential effect of the railway at the Site, are outlined in the sections below.

2.0 GROUNDWATER FLOW DIRECTION

Groundwater level monitoring of the three monitoring wells at the Site began in May 2018 with monthly monitoring events occurring thereafter. Based on this monitoring, and the inferred natural groundwater flow direction is northward across the site (see Figure 5 and 6 from Golder 2023 attached). This is confirmed by regional groundwater modelling undertaken for the Regional Municipality of Durham, which suggests that the Site is just downgradient of a regional groundwater divide within the Oak Ridges Aquifer complex (ORAC) with groundwater flowing in a generally northwards direction through the Site (Earthfx, 2010). As the railway

corridor is located north of the Site, natural groundwater flow is inferred to be from the site toward the railway. As such, any contaminants in the railways would be flowing away from the site and not toward it.

During the proposed operation of the extension Site, the below water operation will not involve any pumping or active dewatering. Rather, the majority of pore water removed during extraction will eventually return to the aquifer via passive drainage within the stockpiled material. Thus, the principal mechanism for Site development to instigate long-term effects on groundwater levels is exposing the water table to the atmosphere. Below-water aggregate extraction results in the eventual creation of a permanent pond that will tend to "flatten" water levels in its vicinity. The area upgradient of the pond experiences water level drawdown whereas the area downgradient of the pond experiences water level rise. Under this paradigm the potential future rehabilitation scenario for the Site provides the "worst-case" outcome with respect to long-term water level change, as this scenario involves the largest pond area. It is estimated that a water level drawdown of 0.25 m upgradient and a water level increase of 0.25 m downgradient of the proposed pond area will occur within a lateral extent of 474 m under the rehabilitation scenario.

Although this radius of influence for the rehabilitation scenario includes the railway corridor, the estimated water level changes across the Site do not change the overall groundwater flow direction. The groundwater flow will be northward across the Site, and therefore groundwater flow will remain from the site toward the railway corridor under the "worst-case" water level change condition.

3.0 GROUNDWATER QUALITY

Baseline groundwater quality conditions were evaluated by taking water samples from the three monitoring wells and the on-Site domestic well during September and October 2018 (well locations shown in Figure 6 from Golder 2021). Follow up sampling events occurred during April 2019 and October 2020. The groundwater samples were analysed for inorganic water quality parameters including metals, bacteria, Polycyclic Aromatic Hydrocarbons (PAHs), Volatile Organic Compounds (VOCs), and Petroleum hydrocarbons (PHC) (F1 – F4). Parameter concentrations were compared to "Table 2: Full Depth Generic Site Condition Standards [SCS] in a Potable Ground Water Condition" from the Ministry of Environment, Conservation and Parks (MECP) *Soil, ground water and sediment standards for use under Part XV.1 of the Environmental Protection Act*, dated July 1, 2011.

PHCs (F3 fraction) were found at MW18-01 in September 2018 at a concentration of 2,400 ug/L, notably above the Table 2 SCS criteria of 500 ug/L. Additionally, PHCs (F2 and F3) were detected at MW18-03 in October 2018 but at concentrations below Table 2 SCS criteria. The location of the PHC detects could suggest that the railway corridor is a possible source or could originate from another source. We further note that the on-Site domestic well and upgradient well MW18-02 did not have PHCs. The results of subsequent PHC-focused sampling events are summarized as follows:

- April 2019: Sampling at all wells did not detect any PHCs except for MW18-03 which had PHC F3 at a concentration below Table 2 SCS.
- October 2020: Well MW18-03 could not be sampled as a result of the tubing snapping in the well. Sampling at all the remaining wells did not detect any PHCs except for MW18-01 which had a PHC F3 concentration at the Table 2 SCS limit of 500 ug/L.
- May 2021: Sampling at all wells did not detect any PHCs.

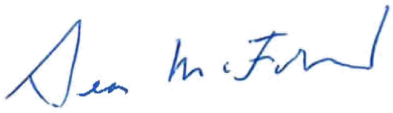
The sampling regime to-date generally suggests that the presence of PHC has been declining at tested wells and, as of the most recent sampling event, is no longer detected. As such, the historic presence of PHC is not

considered to be a factor in the licence application, as it is not expected to pose a threat to water quality during or after operation.

4.0 CLOSURE

We trust that this memo meets the current requirements of this peer review. Should you have any further questions please do not hesitate to contact the undersigned.

WSP Canada Inc.



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Hydrogeologist, Senior Principal/Fellow

HW/SM/rk

Distribution: e Copy - Lafarge Canada Inc.
e Copy - MHBC
e Copy - WSP Canada Inc.

Attachments: Figure 5: Groundwater Hydrographs
Figure 6: Inferred Water Table

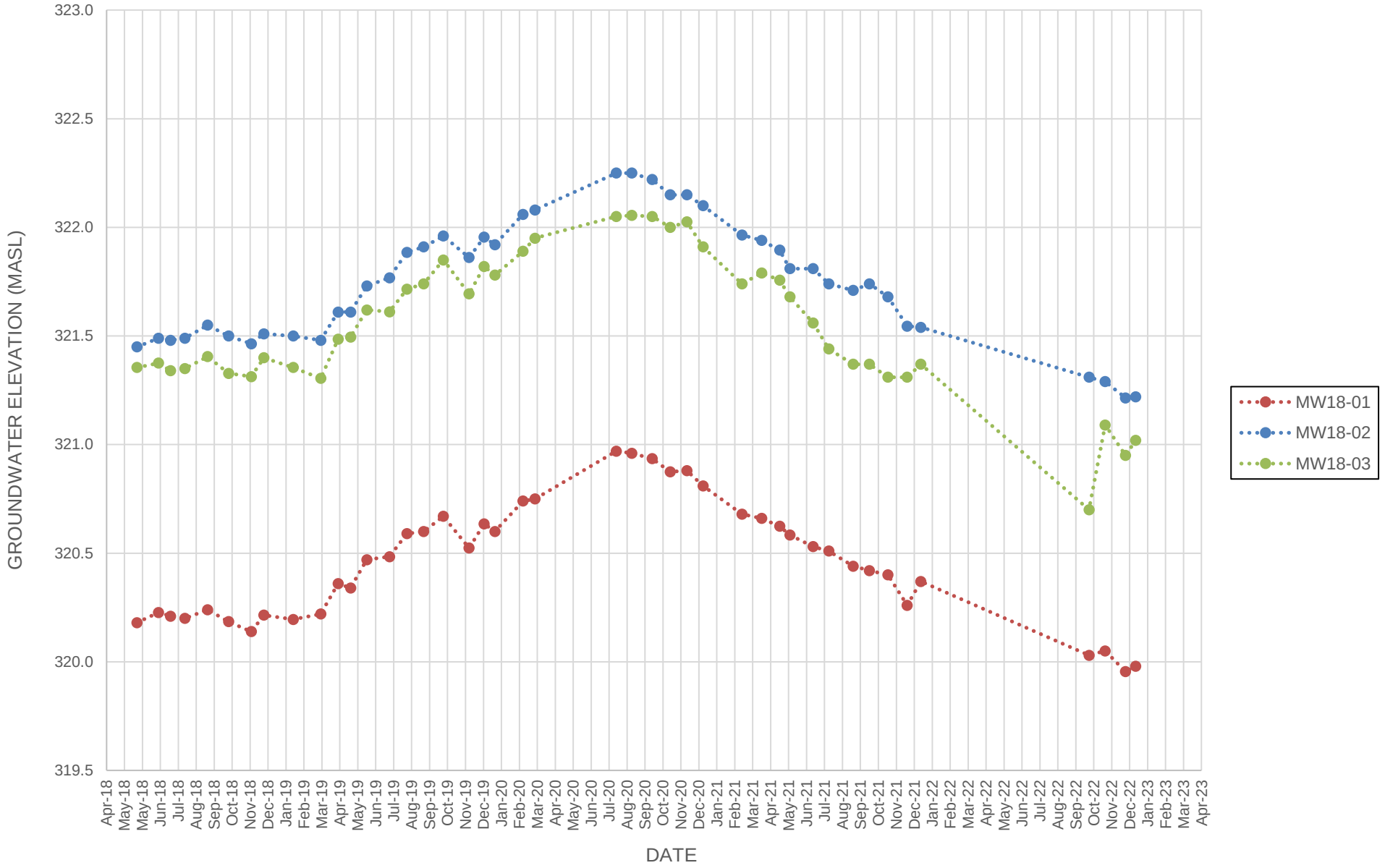
https://golderassociates.sharepoint.com/sites/141632/project files/6 deliverables/additional requests/site screening questionnaire/rev 1/21453907 final memo site screening 06-12-2023-rev1.docx

5.0 REFERENCES

Earthfx Inc. 2010. *Groundwater Model of the Durham Regional Municipality of Durham.* YPDT-CAMC Groundwater Management Program. November, 2010.

WSP Canada Inc., 2023. *Water Report Level 2 Lafarge Goodwood Pit Extension.* Submitted to Lafarge Canada Inc. 21453907. April 2023.

Ministry of Environment, Conservation and Parks (MECP), 2011. "Table 2: Full Depth Generic Site Condition Standards in a Potable Ground Water Condition" *Soil, ground water and sediment standards for use under Part XV.1 of the Environmental Protection Act.* July 1, 2011.



NOTES

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LAFARGE CANADA INC.

WSP Canada Inc.
BARRIE, ONTARIO, CANADA

GROUNDWATER HYDROGRAPHS

MAY 2023	PROJECT: 21453907	FIGURE: 5

LEGEND

- MECP WATER WELL LOCATION
- On-Site Domestic Well Location
- Monitoring Well Location
- Resource Evaluation Borehole
- Groundwater Contour (0.2 masl interval)
- DH — Measured Groundwater Elevation
- RAILWAY
- EXISTING GOODWOOD PIT SITE BOUNDARY
- SITE BOUNDARY
- LIMIT OF EXTRACTION
- APPROXIMATE BELOW WATER (PIT POND) EXTENTS
- UNEVALUATED WETLAND

0 100 200 300

1:5,000 METRES

NOTE(S)

1. SITE GROUNDWATER ELEVATIONS REFLECT OBSERVED HIGH WATER TABLE AS MEASURED DURING JULY 31, 202.
2. INDIVIDUAL MECP WELL RECORD STATIC WATER LEVELS SPAN TIME PERIOD OF 1958 TO 2017 AND MAY NOT BE REFLECTIVE OF CURRENT CONDITIONS. WATER LEVELS ARE THUS POSTED FOR ILLUSTRATION PURPOSES ONLY.

REFERENCE(S)

1. BASEDATA: MNRF LIO OBTAINED APRIL 2019
2. IMAGERY: SOURCES: ESRI, HERE, GARMIN, INTERMAP, INCREMENT P CORP., GEBCO, USGS, FAO, NPS, NRCAN, GEOBASE, IGN, KADASTER NL, ORDNANCE SURVEY, ESRI JAPAN, METI, ESRI CHINA (HONG KONG), (C) OPENSTREETMAP CONTRIBUTORS, AND THE GIS USER COMMUNITY
SOURCE: ESRI, MAXAR, EARTHSTAR GEOGRAPHICS, AND THE GIS USER COMMUNITY
3. PROJECTION: TRANSVERSE MERCATOR DATUM: NAD 83 COORDINATE SYSTEM: UTM ZONE 17N

CLIENT
LAFARGE CANADA INC.

PROJECT
GOODWOOD PIT EXTENSION
4900 CONCESSION ROAD 4, TOWNSHIP OF UXBRIDGE

TITLE
INFERRED WATER TABLE

CONSULTANT

wsp

YYYY-MM-DD	2023-05-19
DESIGNED	SO
PREPARED	SO/JT
REVIEWED	DH
APPROVED	

PROJECT NO.	CONTROL	REV.	FIGURE
21453907	0001	1	6

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