GROUNDWATER MONITORING WELL NETWORK INSTALLATION IN THE SOUTH BRUCE AREA

Project Demobilization Report for Groundwater Monitoring Well Network Installation

APM-REP-01332-0361 **January 2024**

Geofirma Engineering Ltd.

nwmo
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Revision Tracking Table

Revision	Revision Release Date	Description of Modifications/Edits
R0A	July 26, 2022	Initial Release to NWMO for Review
R0	Sep 26, 2022	Final Report to NWMO
R1	Jan 17, 2023	Revised Final Report to NWMO
R2	Mar 07, 2023	Revised Final Report to NWMO
R3	Jan 12, 2024	Revised Appendix A with photo of MW9

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1 INTRODUCTION

The objective of this project, *Groundwater Monitoring Well Network Installation in the South Bruce Area,* was to provide a monitoring well network in the shallow bedrock and overburden in the South Bruce area that can be used for monitoring of water levels, estimation of hydrogeologic properties, measurement of vertical and horizontal hydraulic gradients, and periodic collection and analysis of groundwater samples.

This project involved drilling, instrumentation, and testing of monitoring well clusters at six sites within the South Bruce area. Each monitoring well cluster included a shallow monitoring well installed in the overburden and a bedrock well instrumented with three nested piezometers. Two of the well clusters (SB_MW02 and SB_MW06) had a third borehole drilled into bedrock to install a replacement monitoring well interval.

The locations of the six monitoring well clusters installed as part of this project (SB_MW02 through SB_MW07 and SB_MW09) are shown on Figure 1. Care and control of the shallow drilling sites was given to Geofirma as of October 14, 2021.

The purpose of this report is to provide a summary of the demobilization activities including the removal of equipment (materials, waste, fencing etc.) at the completion work activities and to describe any environmental sampling and remediation measures undertaken to return the sites to the Care, Custody and Control of the NWMO.



LEGEND

- Bruce County Property Parcels
- Wetlands
- SB_MW Series Monitoring Wells

INSET MAP

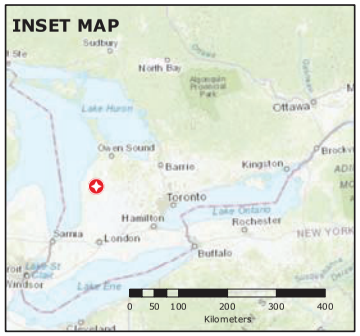


Figure 1
SB_MW02 to SB_MW07 and SB_MW09 Well Locations

Scale 1:17,000

0 100 200 400 600 800
Meters

N

Projection: NAD 1983 UTM Zone 17N

Source: Ontario GeoBase, MECP

Service Layer Credits: Source: Esri, Maxar, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community
Sources: Esri, HERE, Garmin, Intermap, increment P Corp., GEBCO, USGS, FAO, NPS, NRCAN, GeoBase, IGN, Kadaster

PROJECT No. 21-223-1

NWMO South Bruce
Shallow Monitoring Well Program

DESIGN: ADG
CAD/GIS: ADG
CHECK: SNS/GDB

DATE: 2023-03-06

GEOFIRMA ENGINEERING

E:\Data\Project\Bruce\Maps\21-223_SB_ShallowMW\21-223-1_SB_MW_AllWells.mxd

2 DESCRIPTION OF FIELD ACTIVITIES

2.1 Demobilization Activities

The demobilization activities generally consisted of the removal of WPA Site Infrastructure items in accordance with the WPA Test Plan (Geofirma, 2021) including temporary fences, mats, tanks, washrooms, pumps, generators and other infrastructure to support drilling and testing activities. Demobilization at each monitoring well cluster was carried out following the completion of field activities, therefore complete demobilization of equipment varied at each location. Site demobilization activities occurred between November 2021 and December 2022.

2.1.1 November 2021

- Temporary wooden access mats removed from SB_MW02 (November 15).
- Temporary wooden access mats removed from SB_MW05 (November 17).

2.1.2 December 2021

- Temporary fences, tanks, washrooms, pump/generators, and mobile field office demobilized following completion of drilling activities from all sites.
- Temporary wooden access mats removed from all remaining sites SB_MW03, SB_MW04, SB_MW06, and SB_MW07 (December 20 to 22).
- Sites were inspected to remove all wood debris from the mat deployment and any residual drilling or well installation materials.

2.1.3 January 2022

- Removal of well installation materials from MW07 following completion of installation (Jan 11)
- Removal of gravel pad at SB_MW04 and installation of gravel mound at SB_MW03 (Jan 24-25).

2.1.4 February 2022

- Removal of all tanks, pumps, generators, testing equipment and mobile field office following completion of well development, hydraulic testing, and instrumentation, with the exception of SB_MW02.

2.1.5 April 2022

- Care and control of all monitoring well locations, with the exception of SB_MW02, was returned to the NWMO as of April 11, 2022.
- Site inspections of SB_MW03 through SB_MW07 were completed by NWMO and Geofirma on April 15 to confirm the site conditions were acceptable to NWMO following hand back of care and custody.

2.1.6 May 2022

- Clearing some residual wood debris from the mats at SB_MW05.
- Installation of a custom casing lid on SB_MW03_BR to accommodate Margo plugs.

2.1.7 June 2022

- Mobilize and demobilize drilling equipment and supplies for rehabilitation work at SB_MW02_BR_R.
- Levelling some soil around the well casing at SB_MW04_BR.
- Site inspections of SB_MW04 and SB_MW02 with NWMO prior to final hand back.
- Care and control of SB_MW02 was returned to the NWMO as of July 6, 2022.

2.1.8 December 2022

- Mobilize and demobilize drilling equipment and supplies to SB_MW06 for drilling SB_MW09_BR and abandonment of SB_MW06_BR-B.
- Care and control of SB_MW06 was returned to the NWMO as of December 22, 2022.

2.2 Environmental Management

All field activities were completed in accordance with the requirements outlined in the accompanying project-specific Health, Safety, and Environment Plan (HSEP) prepared by Geofirma and approved by the NWMO (Geofirma, 2022). All excess water, soil, rock and conventional waste generated during drilling and testing activities was contained and disposed offsite at appropriately licenced facilities prior to demobilization.

All water tanks, jerry cans and stationary fuel burning/hydraulic equipment was fully contained within secondary containment berms. Manual transfer of fuel from a storage vessel to fuel burning equipment was conducted with a spill containment device in place.

Minor hydrocarbon staining was observed at SB_MW07 on January 4, 2022 following well installation activities on site. The impacted soil was removed using hand tools and containerized by Geofirma personal on January 5, 2022, for off-site disposal. No other environmental concerns (spills, impacted soils etc.) were observed or reported throughout the project.

2.3 Site Return Agreement

Following completion of demobilization activities, with the exception of SB_MW02, Geofirma and NWMO personnel conducted a site inspection of all monitoring well locations (SB_MW01 through SB_MW07) on April 15, 2022. Overall, site conditions were deemed to be in acceptable condition for a return to NWMO custody. Photographs of well completions collected during the site inspection are provided in Appendix A.

Care and control of all monitoring well locations, with the exception of SB_MW02, was returned to the NWMO as of April 11, 2022. Care and control of SB_MW02 was subsequently returned to the NWMO as of July 6, 2022.

To facilitate the drilling of SB_MW09_BR the care, custody and control of the SB_MW06 borehole site was handed over to Geofirma effective November 28, 2022. Following completion of the fieldwork, the site was handed back to the NWMO on December 22, 2022. Overall, site condition was deemed to be acceptable to return to NWMO custody and a well completion photo is provided in Appendix A

3 REFERENCES

Geofirma Engineering Ltd. (2021). Groundwater Monitoring Well Network Installation in the South Bruce Area, WPA Test Plan: Site Infrastructure, Revision 0, October 12.

Geofirma Engineering Ltd. (2022). Health, Safety, and Environment Plan – Groundwater Monitoring Well Network for South Bruce, Revision 4, June 6.

Appendix A

Photographs of Well Completions



SB_MW02, looking east



SB_MW03, looking south



SB_MW04, looking southwest



SB_MW05, looking northwest

Photos captured on April 15 & July 4, 2022 by Geofirma personnel

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SB_MW06, looking northeast



SB_MW07, looking east



SB_MW09, looking north

Photos captured on April 15, 2022 & January 08, 2024

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