

2021 Annual Groundwater Report



CCR Surface Impoundment System

James DeYoung Power Plant

Holland Board of Public Works

Holland, Michigan

January 28, 2021

NTH Project No. 73-160017-06

NTH Consultants, Ltd.
41780 Six Mile Road, Suite 200
Northville, MI 48168





TABLE OF CONTENTS

1.0	INTRODUCTION	1
2.0	PURPOSE AND OBJECTIVES.....	1
3.0	STATUS OF THE GROUNDWATER MONITORING PROGRAM	2
3.1	Post-closure Monitoring.....	3
4.0	ACTIONS COMPLETED	4
4.1	Additional Wells Installation	5
4.2	Groundwater Sample Collection	6
4.3	Groundwater Sample Analysis.....	6
4.4	Data Evaluation.....	7
5.0	PROBLEMS ENCOUNTERED.....	8
6.0	KEY ACTIVITIES FOR THE UPCOMING YEAR	8
7.0	RECORDKEEPING, NOTIFICATION, AND POSTING TO THE INTERNET.....	8

APPENDICES

FIGURES

- Figure 1 – Site Location Plan
- Figure 2 – Monitoring Well Location Map
- Figure 3A through 3C – Quarterly Groundwater Flow Maps

APPENDIX A

TABLE

- Table 1 – Summary of Laboratory Analytical Results

APPENDIX B

GROUNDWATER SAMPLING DATA

- Groundwater Analytical Results
- Groundwater Sampling Collection Logs

APPENDIX C



1.0 INTRODUCTION

The Holland Board of Public Works (BPW) owns and operated the James DeYoung Power Plant (JDY) located in Holland, Michigan; on the eastern end of Lake Macatawa. JDY was initially built in 1939 with a generating capacity of 15 megawatts (MW). Between 1953 and 1968, three new boilers were added. From the late 1970's to the early 2000's, the plant consisted of three coal-fired boilers capable of producing up to 62.5 MW. On May 20, 2016, BPW discontinued the use of Unit 3; and on June 1, 2017, BPW officially shut down and retired all generation units at JDY. When Units 3 - 5 were operating on coal, bottom ash from these boiler units was sluiced to the first of three surface impoundments located to the south of the plant, as shown on **Figure 1**, in **Appendix A**. These surface impoundments were operated in accordance with NPDES permit No. MI0001473 and became subject to 40 CFR Part 257, Subpart D – Standards for the Disposal of Coal Combustion Residuals (CCR) in Landfills and Surface Impoundments upon promulgation on April 17, 2015. In June 2016, BPW initiated removal of CCR material from the CCR units and final closure of the CCR units was completed in May 2018. The site restoration activities were concluded in June 2018.

2.0 PURPOSE AND OBJECTIVES

Groundwater monitoring and corrective action requirements for existing CCR units are contained in 40 CFR §257.90 through §257.98. 40 CFR §257.90(e) establishes the requirement to prepare an annual groundwater monitoring and corrective action report. Consistent with this requirement, this report:

- documents the status of the groundwater monitoring and corrective action program for the CCR units;
- summarizes actions completed;
- describes problems encountered;
- discusses actions to resolve the problems; and
- describes key activities for the upcoming year.



3.0 STATUS OF THE GROUNDWATER MONITORING PROGRAM

Prior to promulgation of 40 CFR Part 257, a limited hydrogeological investigation work plan was developed for the site in 2009 that established a groundwater detection monitoring program to address the requirements of Michigan Administrative Code R 323.2237(4) of Michigan's Natural Resources and Environmental Protection Act, 1994 Public Act 451, as amended (Act 451). The work plan pre-dated the final federal CCR rules and had the purpose of satisfying a request by Michigan Department of Environmental Quality (MDEQ), now known as Michigan Department of Environment, Great Lakes, and Energy (EGLE), to determine whether the presence of bottom ash lagoons (CCR units) may have affected groundwater quality in the surrounding area. The results of this investigation were inconclusive and additional investigative activities were merited.

In October 2015, BPW completed a three-year investigation that included collection of groundwater elevation data and samples for the analysis of a subset of metals on a quarterly basis. The results of the investigation identified that certain metals were present in the groundwater above the U.S. EPA's Safe Drinking Water Act's maximum contaminant level (MCL) established in 40 CFR §141.62 and concluded that the groundwater quality in the surrounding area may have been affected by the historic use of the CCR units.

Based on the findings of this investigation, the anticipated retirement of the plant, and 40 CFR Part 257, Subpart D requirements, BPW decided to close the CCR units through removal of CCR and decontamination of the CCR units, in accordance with 40 CFR §257.102; and initiate an assessment of corrective measures, in accordance with 40 CFR §257.96. BPW initiated removal of CCR material from the CCR units in June 2017. During construction, two of the existing downgradient monitoring wells were removed due to the location of on-site CCR removal activities. Additionally, based on previous investigation findings, an upgradient monitoring well used during the 2011 study may not have been installed at a location that provided a true background determination for the area around JDY, and was also removed during closure of the CCR units. Final closure of the CCR units was completed in May 2018 and site restoration completed in June 2018 in substantial conformance with 40 CFR §257.101 and 40 CFR §257.103, and the written closure plan prepared by NTH Consultants, Ltd., (NTH) dated October 17, 2016.



3.1 Post-Closure Monitoring

Consistent with the requirements contained in 40 CFR §257.93, a groundwater Sampling and Analysis Plan (SAP) was developed in October 2017 (revised in March 2018) to evaluate background and downgradient groundwater quality within the JDY plant property (Site), and confirm compliance with the groundwater monitoring and corrective action requirements. As discussed previously, BPW conducted groundwater monitoring prior to the effective date of the CCR rules and elected to proceed with CCR removal and clean closure of the CCR units. The SAP was developed to document the procedures to be used when collecting the necessary information to comply with detection monitoring requirements of 40 CFR §257.94, assessment monitoring requirements of 40 CFR §257.95, and clean closure verification per 40 CFR §257.102(c).

To comply with the requirements of 40 CFR §257.93, NTH designed an updated groundwater monitoring system that is representative of groundwater potentially affected by the CCR units. A review of information regarding the hydrogeologic conditions of the site available at the time the SAP was developed indicated that groundwater generally flows east-to-west across the site and discharges to the Macatawa River/Lake Macatawa. Based on this information, existing piezometer PZ-1 is located hydraulically upgradient of the former CCR units; note that PZ-1 was previously identified and sampled as monitoring well MW-7. Groundwater samples from this well represent background groundwater quality that has not been affected by the CCR units. Three additional wells, MW-1, MW-2, and MW-3 were installed downgradient of the CCR units on November 27, 2017. As part of the monitoring program, NTH collected groundwater samples from the monitoring system on a quarterly basis during seven quarterly events during the period from January of 2018 to December 2019. **Figure 2** provides the location of the monitoring wells comprising the updated groundwater monitoring system.

Water level data obtained from the monitoring wells during the quarterly events were used to develop groundwater contour maps. The quarterly maps are consistent from one sampling event to the next, and confirm groundwater flow direction. Figures 3A, 3B and 3C present groundwater contour maps for the available quarterly sampling events conducted in 2020. Note that a



groundwater sampling event was not conducted during the second quarter of 2020 due to excessive precipitation that resulted in flooded conditions at the site.

4.0 ACTIONS COMPLETED

Where possible, NTH conducted groundwater monitoring at the facility on a quarterly basis during the months of March, August, and November 2020, in accordance with the procedures established in the facility's SAP. The results of these sampling events are summarized on Table 1 in Appendix B. Appendices C-1 through C-3 provide the laboratory analytical reports for each of the quarterly sampling events completed in 2020. As stated previously, due to flooding conditions at the site, groundwater samples were not collected during the second quarter of 2020.

Groundwater monitoring activities included the collection of static water levels; field measurements of pH, temperature, conductivity, and turbidity; and collection of groundwater samples for analysis of constituents contained in Appendix III and Appendix IV of 40 CFR 257.

4.1 Additional Wells Installation

In July 2020, BPW installed two temporary wells (TW-1 and TW-2) on the southern property line, in the vicinity of monitoring well MW-1, to evaluate the concentration gradient of certain constituent in groundwater at the site, and determine whether groundwater might be impacted by off-site sources. Additionally, BPW installed a monitoring well (identified as MW-3A) between the previous waste boundary and monitoring well MW-3, in the vicinity of the previous ash ponds. Samples collected from TW-1, TW-2, and MW-3A during the July 2020 installation activities, were analyzed for lithium. Appendix C-4 includes the laboratory analytical report for the July 2020 sampling event.

As part of the quarterly August and November 2020 sampling events, MW-3A was sample and analyzed for constituents listed in Appendix III and Appendix IV of 40 CFR 257. In addition, samples were also collected from previously utilized monitoring well MW-4, located on the southeast portion of the site (which is bordered by a scrap metal recycling facility), during the most recent five quarterly events, and analyzed for the Appendix III and Appendix IV parameters.



Data collected from these wells will aid in understanding the potential source of constituents of concern in groundwater at the site.

4.2 Groundwater Sample Collection

During each of the quarterly sampling events, representatives from NTH collected groundwater samples for detection, assessment, and corrective measures monitoring from the groundwater monitoring system at the Site. The samples were submitted to ALS Environmental Laboratory (ALS) for analysis of constituents listed in Appendix III and IV of 40 CFR §257.95.

Groundwater elevation data were collected from each monitoring well prior to sample collection. Upon arrival at the site, each monitoring well was opened to allow equilibration with ambient air pressure prior to measuring the depths to water. Groundwater level measurements were taken to the nearest 0.01 foot from the entire monitoring well network prior to sampling. The water level of Lake Macatawa and each well was gauged on the same day to provide an interpretative groundwater flow contour, and to minimize temporal bias of measured groundwater elevation changes of the monitoring well network.

Depth to water was measured from established and surveyed top of casing reference points. Groundwater levels, well conditions, and pertinent observations were recorded on groundwater sampling logs, and are included in Appendices C-1 through C-3. The water elevation data obtained was used to develop groundwater contour maps for each sampling event (Groundwater Flow Maps – Figures 3A through 3C), which present the site's groundwater flow direction.

Sampling personnel collected groundwater samples from the monitoring wells using low-flow (minimal drawdown) groundwater sampling procedures (US EPA, 1996, rev. 2010). Tubing connected to a peristaltic pump was installed to a depth representing the middle of the saturated screen interval; the polyethylene tubing discharge line from the peristaltic pump was connected to a flow-cell and multi-meter to collect water quality indicator parameters during well purging to determine water quality stabilization. Water quality indicator parameters and depth-to-water were recorded at 3 to 5-minute intervals during the purging process and recorded on the groundwater sampling logs. Purging and sampling proceeded at a low pumping rate such that the water column



in the well was not lowered more than 0.3 foot (4 inches) below the initial static depth to water measurement. The wells were sampled when three consecutive water quality measurements for three of the required four parameters (pH, temperature, conductivity, or turbidity) met stabilization criteria.

Samples were collected immediately following stabilization into sample containers provided by the laboratory as required for the specified analyses. The groundwater samples were collected from the discharge tubing upstream of the water quality meter flow cell. Care was taken to allow for non-turbulent filling of laboratory containers. Samples were not filtered in the field to provide a measure of total recoverable metals that will include both the dissolved and particulate fractions of metals in natural waters, consistent with 40 CFR §257.93(h)(2)(i).

The samples were labeled, stored, and transported to the laboratory under proper chain-of-custody. Following collection, samples were immediately labeled, logged on the chain-of-custody. The chain-of-custody provides documentation of actual sample storage and transport, and contains the dates and times of collection, laboratory receipt, and acknowledgment of analyses to be completed.

Quality assurance/quality control (QA/QC) samples were collected to ensure sample containers are free of analytes of interest, assess the variability of the sampling and laboratory methods, and monitor the effectiveness of decontamination protocols. One field duplicate, one matrix spike, one matrix spike duplicate, one field blank, and one equipment blank were collected for QA/QC purposes during each quarterly sampling event.

4.3 Groundwater Sample Analysis

Groundwater samples were submitted to ALS in Holland, Michigan, for the analyses specified in Appendix III and IV to Part 257. The laboratory results, corresponding analytical methods, and practical quantitation limits (PQL) for each constituent are provided in the corresponding analytical reports for each sampling event, included in **Appendix C**.



In general, the laboratory practical quantitation limits (PQLs, reporting limits) are consistent with the reporting limits stated in the March 2018 revised SAP and are below the established MCLs. We note that, due to dilution for high concentrations of non-target analytes, or matrix interference (effervescent matrix), a few parameters in selected monitoring wells had elevated reporting limits, above the PQLs established in the SAP, as shown on the laboratory analytical report included in **Appendix C**. However, the elevated reporting limits, in general, were below the applicable criteria.

4.4 Data Evaluation

Given that an appropriate number of background samples (eight events) were collected as of March 2020, the results of the quarterly groundwater sampling events were compared to applicable groundwater protection standards (GWPS) for determination of clean closure. For those Appendix IV constituents where the statistically developed background level was higher than the MCL per 40 CFR §257.95(h)(1) or the value outlined in 40 CFR §257.95(h)(2), the GWPS was determined to be the statistically developed background concentration utilizing the data collected from upgradient/background monitoring well (PZ-1). Background concentrations for each constituent were calculated using an appropriate statistical method based on the distribution of the background data, consistent with 40 CFR §257.93. The result of these evaluations were presented in the October 2020 Groundwater Detection Monitoring and Assessment Report (October 2020 Report). The findings of this report indicate that groundwater monitoring concentrations do not exceed the established groundwater protection standards for constituents listed in Appendix IV of the rules, except for lithium in monitoring well MW-1.

The GWPS exceedance of lithium in monitoring well MW-1 is believed to be the result of on-site migration from an adjacent property. Therefore, BPW installed two additional temporary wells in the vicinity of monitoring well MW-1 to evaluate the gradient of lithium concentrations in groundwater at the site, and determine whether groundwater might be impacted by off-site sources. Additionally, as discussed previously, BPW installed a monitoring well (MW-3A) between the previous waste boundary and monitoring well MW-3, in the vicinity of the previous ash ponds. Information obtained from this additional groundwater investigative activity was used to evaluate whether lithium concentrations, reported at one isolated monitoring well, above the groundwater protection standards (GWPS) could be the result of migration unto the property from



an off-site source. The findings and conclusion are presented in a January 2021 Alternate Source Demonstration for Lithium Report (January 2021 ASD Report).

The various lines of evidence presented in the ASD provide a successful alternate source demonstration for lithium concentrations reported above the GWPS in monitoring well MW-1 and confirm the site's determination of clean closure. Therefore, BPW is exempt from further groundwater monitoring and other post-closure requirements as contained in the Preamble to 40 CFR Part 257 and 40 CFR §257.104(2).

5.0 PROBLEMS ENCOUNTERED

As discussed previously, flooding at the site caused by excessive precipitation during the second quarter precluded the collection of groundwater samples during the second quarter. Consequently, groundwater samples were collected at different times during the third and fourth quarter of 2020.

6.0 KEY ACTIVITIES FOR THE UPCOMING YEAR

The results of groundwater monitoring activities completed at the JDY plant during the last three years indicate that the facility has achieved clean closure. Therefore, no additional monitoring activities are required to be completed.

7.0 RECORDKEEPING, NOTIFICATION, AND POSTING TO THE INTERNET

Consistent with the requirements of 40 CFR §257.105(h), this groundwater monitoring and corrective action report will be placed in the Site's operating record by January 31, 2021. In accordance with 40 CFR §257.106(h), BPW will notify the State Director that this report has been developed, and that this information has been placed in the operating record and on the owner or operator's publicly accessible internet site, in accordance with 40 CFR §257.107(h).



APPENDIX A

FIGURES



NTH PROJECT No.: 62-160017	CAD FILE NAME: 160017-JDY
DESIGNED BY: SLG	PLOT DATE: 9/28/2016
DRAWN BY: SLG	DRAWING SCALE: 1" = 200'
CHECKED BY: DRL	INCEPTION DATE: 9/7/2016



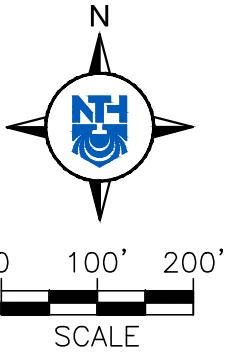
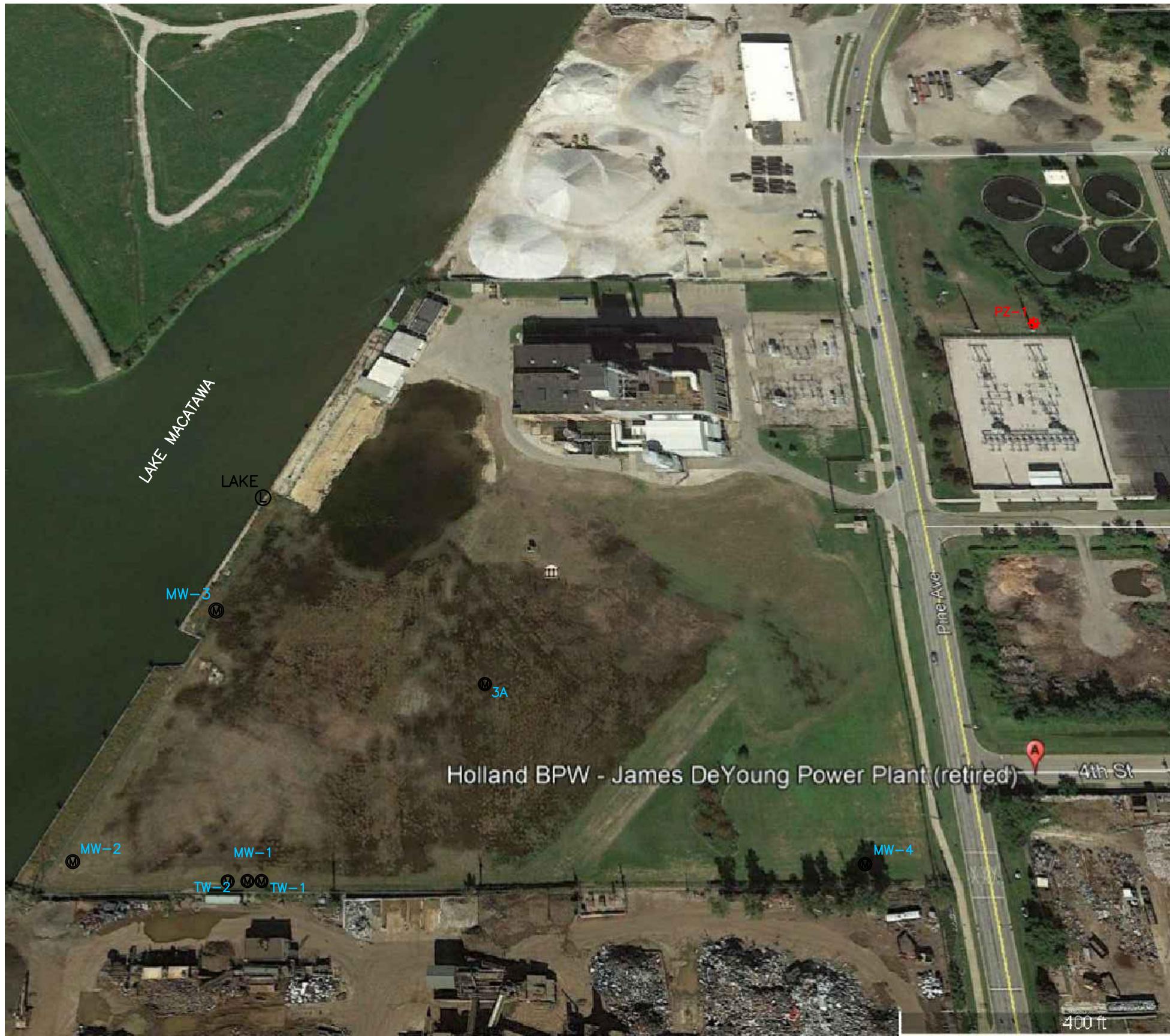
NTH Consultants, Ltd.
Infrastructure Engineering
and Environmental Services

SITE LOCATION PLAN

JAMES DEYOUNG POWER PLANT
HOLLAND, MI

FIGURE:

1



LEGEND

- MW-1 MONITORING WELL LOCATION
- 3A NEW MONITORING WELL LOCATION
- TW-1 TEMPORARY WELL LOCATION
- PZ-1 PIEZOMETER (UPGRADIENT MONITORING WELL)

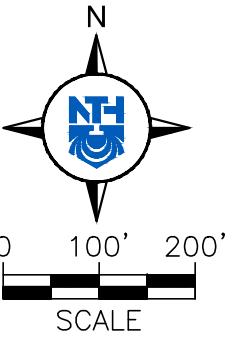
FIGURE:

2

NOTE: LOCATIONS AND DIMENSIONS ARE APPROXIMATE. NOT A LEGAL SURVEY.

MONITORING WELL LOCATION MAP	NTH PROJECT No.: 73-160017-000 DESIGNED BY: CRD DRAWN BY: CRD CHECKED BY: KWO	CAD FILE NAME: 17-UPDATED AERIAL PLOT DATE: 9/16/2020 DRAWING SCALE: Custom INCEPTION DATE: 10/13/2017
JAMES DEYOUNG POWER PLANT HOLLAND, MICHIGAN		

NTH Consultants, Ltd.
NH
Infrastructure Engineering
and Environmental Services



LEGEND

- MW-1 MONITORING WELL LOCATION
- PZ-1 PIEZOMETER (UPGRADIENT MONITORING WELL)
- LAKE LAKE LEVEL LOCATION
- [] [582.50] WATER LEVELS
- 580— WATER LEVEL CONTOUR

NOTE: LOCATIONS AND DIMENSIONS ARE APPROXIMATE. NOT A LEGAL SURVEY.

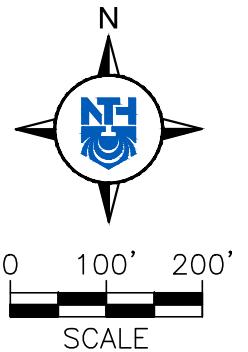
3A

GROUNDWATER LEVELS		COPY	
MARCH 6, 2020		60017-Q120	-
NTH PROJECT No:	Z3-160017-04	PLOT DATE:	03/16/2020
DESIGNED BY:	WKF	DRAWING SCALE:	1" = 200'
DRAWN BY:	WKF	CHECKED BY:	KWD
INCEPTION DATE:	10/13/2017		

| **JAMES DEYOUNG POWER PLANT** HOLLAND, MICHIGAN | | | |

FIGURE:





NTH Consultants, Ltd.
Infrastructure Engineering
and Environmental Services



PROJECT INFORMATION

NTH PROJECT No:	CAD FILE NAME:
73-160017-000	17-UPDATED AERIAL
DESIGNED BY:	PLOT DATE:
CRD	10/14/2020
DRAWN BY:	DRAWING SCALE:
CRD	Custom
CHECKED BY:	INSPECTION DATE:
KWO	10/13/2017

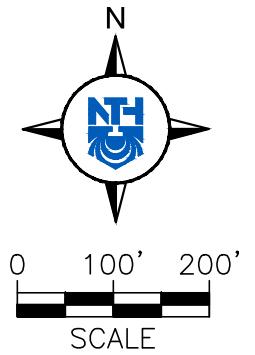
GROUND WATER LEVELS
SEPTEMBER 2020

JAMES DEYOUNG POWER PLANT
HOLLAND, MICHIGAN

FIGURE:

3B

NOTE: LOCATIONS AND DIMENSIONS ARE APPROXIMATE. NOT A LEGAL SURVEY.



LEGEND

- (M) MW-1 MONITORING WELL LOCATION
- (M) 3A NEW MONITORING WELL LOCATION
- (M) TW-1 TEMPORARY WELL LOCATION
- # PZ-1 PIEZOMETER (UPGRADIENT MONITORING WELL)
- [582.50] WATER LEVELS
- CONTOUR OF EQUAL GROUNDWATER ELEVATION

FIGURE:

3C

NOTE: LOCATIONS AND DIMENSIONS ARE APPROXIMATE. NOT A LEGAL SURVEY.

GROUND WATER LEVELS NOVEMBER 2020		CAD FILE NAME: 17-UPDATED AERIAL
NTH PROJECT No:	73-160017-01	DESIGNED BY: CRD
DRAWN BY:	CRD	DRAWING SCALE: Custom
CHECKED BY:	KWO	INCEPTION DATE: 10/13/2017
JAMES DEYOUNG POWER PLANT HOLLAND, MICHIGAN		NTH Consultants, Ltd.





APPENDIX B

SUMMARY OF LABORATORY ANALYTICAL RESULTS

HOLLAND BOARD OF PUBLIC WORKS - JAMES DeYOUNG POWER PLANT

TABLE 1

SUMMARY OF 2020 LABORATORY ANALYTICAL RESULTS

ANNUAL GROUNDWATER REPORT

PARAMETER	Units	Upgradient Well			Downdgradient Wells															Groundwater Protection Standard		
		PZ-1 ⁺			MW-1			MW-2			MW-3			MW-3A			MW-4					
		3/20/20	8/10/20	11/24/20	3/20/20	8/10/20	11/24/20	3/20/20	3/20/201	8/10/20	11/24/20	3/20/20	8/10/2020	11/24/20	8/10/2020	8/10/2020 ¹	11/24/20	3/20/20	8/10/2020	11/24/20		
APPENDIX IV TO CFR PART 257	Antimony	mg/L	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	0.006		
	Arsenic	mg/L	0.031	0.044	0.043	0.02	0.024	0.029	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	0.0058	0.0055	0.0071	0.01	
	Barium	mg/L	0.064	0.057	0.043	0.27	0.26	0.3	0.2	0.2	0.21	0.23	0.038	0.074	0.11	0.25	0.25	0.28	0.71	0.96	1.2	2
	Beryllium	mg/L	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	0.004	
	Cadmium	mg/L	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	0.005	
	Chromium	mg/L	0.014	0.007	0.013	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	80	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	0.1	
	Cobalt	mg/L	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	0.006 ⁽⁶⁾	
	Fluoride	mg/L	1.1	<1.0	<1.0	<1.0	1.1	<1.0	<2.0	<2.0	0.93	<1.0	<2.0	<1.0	<1	<1.0	<1.0	<1.0	<1.0	0.52	<1.0	4
	Lead	mg/L	0.051	0.016	0.004	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	0.015	
	Lithium	mg/L	<0.01	<0.01	<0.01	0.12	0.13	0.14	<0.010	0.01	0.01	<0.01	0.029	0.017	0.015	<0.010	<0.010	<0.010	0.016	0.035	0.028	0.040 ⁽⁶⁾
	Mercury	mg/L	<0.0002	0.06	0.00033	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	0.00024	<0.0002	<0.0002	<0.0002	0.002
	Molybdenum	mg/L	0.061	0.021	0.036	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	0.100 ⁽⁶⁾	
	Selenium	mg/L	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	0.05	
	Thallium	mg/L	<0.002	<0.002	<0.005	<0.002	<0.002	<0.005	<0.002	<0.002	<0.002	<0.005	<0.002	<0.002	<0.005	<0.002	<0.002	<0.002	<0.002	<0.002	0.002	
	Radium 226/228 Combined ^[4]	pCi/L	<0.19/<0.37	<0.33/0.83	<0.54/<0.93	0.42/1.02	0.33/<0.92	0.8/1.73	<0.24/0.75	<0.2/0.82	0.46/<0.72	<0.32/1.33	<0.18/<0.4	<0.26/<0.72	<0.32/0.8	<0.31 / <0.68	<0.39/0.93	<0.35/0.79	<0.23 /<0.42	<0.43/1.24	0.82/4.4	5
APPENDIX III TO CFR PART 257	Boron	mg/L	0.49	0.32	0.47	1.10	1.6	1.60	0.65	0.67	0.77	0.82	0.78	0.48	0.47	0.63	0.63	0.68	0.58	0.98	0.94	--
	Calcium	mg/L	33	53	27	130	86	100	81	82	75	80	360	53	95	130	130	140	140	150	180	--
	Chloride	mg/L	140	230	140	260	320	300	590	580	680	660	160	69	73	110	110	120	360	650	890	250 ^[3]
	Fluoride	mg/L	1.1	<1.0	<1.0	<1.0	1.1	<1.0	<2.0	<2.0	0.93	<1.0	<5.0	<1.0	<1	<1.0	<1.0	<1	<1.0	0.52	<1.0	4
	pH (lab)	s.u.	8.54	8.43	8.2	6.94	6.96	6.88	7.23	7.23	6.9	6.88	6.53	6.78	6.7	6.87	6.9	6.77	7.42	6.91	6.89	6.5-8.5
	pH (field)	s.u.		8.44	8.54	6.96	6.75	6.94	7.05	7.08	6.72	6.94	7.05	6.38	6.77	6.46	6.46	6.69	7.05	6.88	7.22	6.5-8.5
	Sulfate	mg/L	2.1	37	6.3	20	<1	11	<4.0	<4.0	<2.0	<10	1100	41	100	<2.0	<2.0	2.8	2.1	<2.0	<2.0	250 ^[3]
	Total Dissolved Solids	mg/L	1600	1700	1200	980	930	1100	1200	1200	1400	1500	2200	410	530	610	580	560	1100	1700	3000	500 ^[3]

1) Duplicate Sample

2) Maximum Contaminant Level (MCL) promulgated by the USEPA pursuant to the provisions of Section 1412 of the Safe Drinking Water Act (40 CFR Part 141).

3) Secondary drinking water standards established for aesthetic purposes

4) Sum of values reported above the minimum detectable concentration (MDC) for radium 226 and radium 228.

5) + - PZ-1 was previously identified and sampled with the MW-7 identifier.

< = parameter not detected at or above laboratory report limit or, in the case of radium 226/228, above the MDC.

NA - Not analyzed. Well inaccessible due to flooding.



APPENDIX C

GROUNDWATER SAMPLING DATA



02-Apr-2020

Karen Okonta
NTH Consultants, Ltd.
41780 Six Mile Road
Northville, MI 48168

Re: **Holland Board of Public Works**

Work Order: **20030574**

Dear Karen,

ALS Environmental received 7 samples on 07-Mar-2020 10:00 AM for the analyses presented in the following report.

The analytical data provided relates directly to the samples received by ALS Environmental - Holland and for only the analyses requested.

Sample results are compliant with industry accepted practices and Quality Control results achieved laboratory specifications. Any exceptions are noted in the Case Narrative, or noted with qualifiers in the report or QC batch information. Should this laboratory report need to be reproduced, it should be reproduced in full unless written approval has been obtained from ALS Environmental. Samples will be disposed in 30 days unless storage arrangements are made.

The total number of pages in this report is 43.

If you have any questions regarding this report, please feel free to contact me:

ADDRESS: 3352 128th Avenue, Holland, MI, USA
PHONE: +1 (616) 399-6070 FAX: +1 (616) 399-6185

Sincerely,

A handwritten signature in black ink, appearing to read "Chad Whelton".

Electronically approved by: Chad Whelton

Chad Whelton
Project Manager

Report of Laboratory Analysis

Certificate No: MN 026-999-449

ALS GROUP USA, CORP Part of the ALS Laboratory Group A Campbell Brothers Limited Company

Client: NTH Consultants, Ltd.
Project: Holland Board of Public Works
Work Order: 20030574

Work Order Sample Summary

Lab Samp ID	Client Sample ID	Matrix	Tag Number	Collection Date	Date Received	Hold
20030574-01	PZ-1	Groundwater		3/6/2020 10:00	3/7/2020 10:00	<input type="checkbox"/>
20030574-02	MW-1	Groundwater		3/6/2020 14:30	3/7/2020 10:00	<input type="checkbox"/>
20030574-03	MW-2	Groundwater		3/6/2020 14:30	3/7/2020 10:00	<input type="checkbox"/>
20030574-04	MW-3	Groundwater		3/6/2020 17:00	3/7/2020 10:00	<input type="checkbox"/>
20030574-05	DUP	Groundwater		3/6/2020	3/7/2020 10:00	<input type="checkbox"/>
20030574-06	EQB	Water		3/6/2020 13:20	3/7/2020 10:00	<input type="checkbox"/>
20030574-07	FB	Water		3/6/2020 14:20	3/7/2020 10:00	<input type="checkbox"/>

Client: NTH Consultants, Ltd.
Project: Holland Board of Public Works
Work Order: 20030574

Case Narrative

Samples for the above noted Work Order were received on 03/07/2020. The attached "Sample Receipt Checklist" documents the status of custody seals, container integrity, preservation, and temperature compliance.

Samples were analyzed according to the analytical methodology previously transmitted in the "Work Order Acknowledgement". Methodologies are also documented in the "Analytical Result" section for each sample. Quality control results are listed in the "QC Report" section. Sample association for the reported quality control is located at the end of each batch summary. If applicable, results are appropriately qualified in the Analytical Result and QC Report sections. The "Qualifiers" section documents the various qualifiers, units, and acronyms utilized in reporting. A copy of the laboratory's scope of accreditation is available upon request.

With the following exceptions, all sample analyses achieved analytical criteria.

Metals:

Batch 153249, Method ICP_6020_W, Sample 20030574-04A MS/MSD: The MS/MSD recovery was outside of the control limit for Calcium; however, the result in the parent sample is greater than 4x the spike amount. No qualification is required.

Wet Chemistry:

Batch R284177, Method PH_4500_W, Sample LCS-R284177: Sample was processed outside of holding time for pH, as the analysis is a field test and holding time is defined as 15 minutes.

Batch R284202, Method PH_4500_W, Sample LCS-R284202: Sample was processed outside of holding time for pH, as the analysis is a field test and holding time is defined as 15 minutes.

Batch R284330, Method IC_300.0_WW, Samples 20030574-03B and -05B: The reporting limits for Fluoride and Sulfate are elevated due to dilution for high concentrations of non-target analytes.

Batch R284330, Method IC_300.0_WW, Sample 20030574-04B: The reporting limit for Fluoroide is elevated due to dilution for high concentrations of non-target analytes.

Radium analysis performed by ALS Fort Collins laboratory.

<u>Qualifier</u>	<u>Description</u>
*	Value exceeds Regulatory Limit
**	Estimated Value
a	Analyte is non-accredited
B	Analyte detected in the associated Method Blank above the Reporting Limit
E	Value above quantitation range
H	Analyzed outside of Holding Time
Hr	BOD/CBOD - Sample was reset outside Hold Time, value should be considered estimated.
J	Analyte is present at an estimated concentration between the MDL and Report Limit
ND	Not Detected at the Reporting Limit
O	Sample amount is > 4 times amount spiked
P	Dual Column results percent difference > 40%
R	RPD above laboratory control limit
S	Spike Recovery outside laboratory control limits
U	Analyzed but not detected above the MDL
X	Analyte was detected in the Method Blank between the MDL and Reporting Limit, sample results may exhibit background or reagent contamination at the observed level.

<u>Acronym</u>	<u>Description</u>
DUP	Method Duplicate
LCS	Laboratory Control Sample
LCSD	Laboratory Control Sample Duplicate
LOD	Limit of Detection (see MDL)
LOQ	Limit of Quantitation (see PQL)
MBLK	Method Blank
MDL	Method Detection Limit
MS	Matrix Spike
MSD	Matrix Spike Duplicate
PQL	Practical Quantitation Limit
RPD	Relative Percent Difference
TDL	Target Detection Limit
TNTC	Too Numerous To Count
A	APHA Standard Methods
D	ASTM
E	EPA
SW	SW-846 Update III

<u>Units Reported</u>	<u>Description</u>
°C	Degrees Celcius
as noted	
mg/L	Milligrams per Liter
s.u.	Standard Units

Client: NTH Consultants, Ltd.
Project: Holland Board of Public Works
Sample ID: PZ-1
Collection Date: 3/6/2020 10:00 AM

Work Order: 20030574
Lab ID: 20030574-01
Matrix: GROUNDWATER

Analyses	Result	Qual	Report Limit	Units	Dilution Factor	Date Analyzed
MERCURY BY CVAA						
Mercury	ND		0.00020	mg/L	1	3/13/2020 01:02 PM
METALS BY ICP-MS						
Antimony	ND		0.0050	mg/L	1	3/12/2020 05:04 PM
Arsenic	0.031		0.0050	mg/L	1	3/12/2020 05:04 PM
Barium	0.064		0.0050	mg/L	1	3/12/2020 05:04 PM
Beryllium	ND		0.0020	mg/L	1	3/12/2020 05:04 PM
Boron	0.32		0.020	mg/L	1	3/12/2020 05:04 PM
Cadmium	ND		0.0020	mg/L	1	3/12/2020 05:04 PM
Calcium	53		0.50	mg/L	1	3/12/2020 05:04 PM
Chromium	0.0070		0.0050	mg/L	1	3/12/2020 05:04 PM
Cobalt	ND		0.0050	mg/L	1	3/12/2020 05:04 PM
Lead	0.016		0.0050	mg/L	1	3/12/2020 05:04 PM
Lithium	ND		0.010	mg/L	1	3/12/2020 05:04 PM
Molybdenum	0.060		0.0050	mg/L	1	3/12/2020 05:04 PM
Selenium	ND		0.0050	mg/L	1	3/12/2020 05:04 PM
Thallium	ND		0.0020	mg/L	1	3/12/2020 05:04 PM
ANIONS BY ION CHROMATOGRAPHY						
Chloride	230		25	mg/L	25	3/10/2020 05:24 PM
Fluoride	ND		1.0	mg/L	1	3/10/2020 05:05 PM
Sulfate	37		20	mg/L	10	3/12/2020 12:55 PM
PH (LABORATORY)						
pH (laboratory)	8.40	H	0.100	s.u.	1	3/9/2020 04:52 PM
Temperature	21.0	H	0.100	°C	1	3/9/2020 04:52 PM
TOTAL DISSOLVED SOLIDS						
Total Dissolved Solids	1,700		50	mg/L	1	3/12/2020 01:44 PM
SUBCONTRACTED ANALYSES						
Subcontracted Analyses	See attached		SUBCONTRACT as noted		1	Analyst: ALS 4/1/2020

Note: See Qualifiers page for a list of qualifiers and their definitions.

Client: NTH Consultants, Ltd.
Project: Holland Board of Public Works
Sample ID: MW-1
Collection Date: 3/6/2020 02:30 PM

Work Order: 20030574
Lab ID: 20030574-02
Matrix: GROUNDWATER

Analyses	Result	Qual	Report Limit	Units	Dilution Factor	Date Analyzed
MERCURY BY CVAA						
Mercury	ND		0.00020	mg/L	1	3/13/2020 01:04 PM
METALS BY ICP-MS						
Antimony	ND		0.0050	mg/L	1	3/12/2020 05:05 PM
Arsenic	0.020		0.0050	mg/L	1	3/12/2020 05:05 PM
Barium	0.27		0.0050	mg/L	1	3/12/2020 05:05 PM
Beryllium	ND		0.0020	mg/L	1	3/12/2020 05:05 PM
Boron	1.1		0.020	mg/L	1	3/12/2020 05:05 PM
Cadmium	ND		0.0020	mg/L	1	3/12/2020 05:05 PM
Calcium	130		0.50	mg/L	1	3/12/2020 05:05 PM
Chromium	ND		0.0050	mg/L	1	3/12/2020 05:05 PM
Cobalt	ND		0.0050	mg/L	1	3/12/2020 05:05 PM
Lead	ND		0.0050	mg/L	1	3/12/2020 05:05 PM
Lithium	0.12		0.010	mg/L	1	3/12/2020 05:05 PM
Molybdenum	ND		0.0050	mg/L	1	3/12/2020 05:05 PM
Selenium	ND		0.0050	mg/L	1	3/12/2020 05:05 PM
Thallium	ND		0.0020	mg/L	1	3/12/2020 05:05 PM
ANIONS BY ION CHROMATOGRAPHY						
Chloride	260		40	mg/L	40	3/10/2020 06:02 PM
Fluoride	ND		1.0	mg/L	1	3/10/2020 05:43 PM
Sulfate	20		2.0	mg/L	1	3/10/2020 05:43 PM
PH (LABORATORY)						
pH (laboratory)	6.96	H	0.100	s.u.	1	3/9/2020 04:52 PM
Temperature	20.8	H	0.100	°C	1	3/9/2020 04:52 PM
TOTAL DISSOLVED SOLIDS						
Total Dissolved Solids	980		50	mg/L	1	3/12/2020 01:44 PM
SUBCONTRACTED ANALYSES						
Subcontracted Analyses	See attached			SUBCONTRACT as noted	1	Analyst: ALS 4/1/2020

Note: See Qualifiers page for a list of qualifiers and their definitions.

Client: NTH Consultants, Ltd.
Project: Holland Board of Public Works
Sample ID: MW-2
Collection Date: 3/6/2020 02:30 PM

Work Order: 20030574
Lab ID: 20030574-03
Matrix: GROUNDWATER

Analyses	Result	Qual	Report Limit	Units	Dilution Factor	Date Analyzed
MERCURY BY CVAA						
Mercury	ND		0.00020	mg/L	1	3/13/2020 01:16 PM
METALS BY ICP-MS						
Antimony	ND		0.0050	mg/L	1	3/13/2020 06:36 PM
Arsenic	ND		0.0050	mg/L	1	3/13/2020 06:36 PM
Barium	0.20		0.0050	mg/L	1	3/13/2020 06:36 PM
Beryllium	ND		0.0020	mg/L	1	3/13/2020 06:36 PM
Boron	0.65		0.020	mg/L	1	3/13/2020 06:36 PM
Cadmium	ND		0.0020	mg/L	1	3/13/2020 06:36 PM
Calcium	81		0.50	mg/L	1	3/13/2020 06:36 PM
Chromium	ND		0.0050	mg/L	1	3/13/2020 06:36 PM
Cobalt	ND		0.0050	mg/L	1	3/13/2020 06:36 PM
Lead	ND		0.0050	mg/L	1	3/13/2020 06:36 PM
Lithium	ND		0.010	mg/L	1	3/13/2020 06:36 PM
Molybdenum	ND		0.0050	mg/L	1	3/13/2020 06:36 PM
Selenium	ND		0.0050	mg/L	1	3/13/2020 06:36 PM
Thallium	ND		0.0020	mg/L	1	3/13/2020 06:36 PM
ANIONS BY ION CHROMATOGRAPHY						
Chloride	590		50	mg/L	50	3/10/2020 08:17 PM
Fluoride	ND		2.0	mg/L	2	3/10/2020 07:57 PM
Sulfate	ND		4.0	mg/L	2	3/10/2020 07:57 PM
PH (LABORATORY)						
pH (laboratory)	7.05	H	0.100	s.u.	1	3/9/2020 04:52 PM
Temperature	20.3	H	0.100	°C	1	3/9/2020 04:52 PM
TOTAL DISSOLVED SOLIDS						
Total Dissolved Solids	1,200		50	mg/L	1	3/12/2020 01:44 PM
SUBCONTRACTED ANALYSES						
Subcontracted Analyses	See attached		SUBCONTRACT as noted		1	Analyst: ALS 4/1/2020

Note: See Qualifiers page for a list of qualifiers and their definitions.

Client: NTH Consultants, Ltd.
Project: Holland Board of Public Works
Sample ID: MW-3
Collection Date: 3/6/2020 05:00 PM

Work Order: 20030574
Lab ID: 20030574-04
Matrix: GROUNDWATER

Analyses	Result	Qual	Report Limit	Units	Dilution Factor	Date Analyzed
MERCURY BY CVAA						
Mercury	ND		0.00020	mg/L	1	3/13/2020 01:18 PM
METALS BY ICP-MS						
Antimony	ND		0.0050	mg/L	1	3/13/2020 06:38 PM
Arsenic	ND		0.0050	mg/L	1	3/13/2020 06:38 PM
Barium	0.038		0.0050	mg/L	1	3/13/2020 06:38 PM
Beryllium	ND		0.0020	mg/L	1	3/13/2020 06:38 PM
Boron	0.78		0.020	mg/L	1	3/13/2020 06:38 PM
Cadmium	ND		0.0020	mg/L	1	3/13/2020 06:38 PM
Calcium	360		5.0	mg/L	10	3/16/2020 05:09 PM
Chromium	ND		0.0050	mg/L	1	3/13/2020 06:38 PM
Cobalt	ND		0.0050	mg/L	1	3/13/2020 06:38 PM
Lead	ND		0.0050	mg/L	1	3/13/2020 06:38 PM
Lithium	0.029		0.010	mg/L	1	3/13/2020 06:38 PM
Molybdenum	ND		0.0050	mg/L	1	3/13/2020 06:38 PM
Selenium	ND		0.0050	mg/L	1	3/13/2020 06:38 PM
Thallium	ND		0.0020	mg/L	1	3/13/2020 06:38 PM
ANIONS BY ION CHROMATOGRAPHY						
Chloride	160		20	mg/L	20	3/10/2020 08:55 PM
Fluoride	ND		5.0	mg/L	5	3/10/2020 08:36 PM
Sulfate	1,100		160	mg/L	80	3/10/2020 09:14 PM
PH (LABORATORY)						
pH (laboratory)	6.44	H	0.100	s.u.	1	3/9/2020 04:52 PM
Temperature	20.3	H	0.100	°C	1	3/9/2020 04:52 PM
TOTAL DISSOLVED SOLIDS						
Total Dissolved Solids	2,200		50	mg/L	1	3/12/2020 01:44 PM
SUBCONTRACTED ANALYSES						
Subcontracted Analyses	See attached			SUBCONTRACT as noted	1	Analyst: ALS 4/1/2020

Note: See Qualifiers page for a list of qualifiers and their definitions.

Client: NTH Consultants, Ltd.
Project: Holland Board of Public Works
Sample ID: DUP
Collection Date: 3/6/2020

Work Order: 20030574
Lab ID: 20030574-05
Matrix: GROUNDWATER

Analyses	Result	Qual	Report Limit	Units	Dilution Factor	Date Analyzed
MERCURY BY CVAA						
Mercury	ND		0.00020	mg/L	1	3/13/2020 01:21 PM
METALS BY ICP-MS						
Antimony	ND		0.0050	mg/L	1	3/13/2020 06:46 PM
Arsenic	ND		0.0050	mg/L	1	3/13/2020 06:46 PM
Barium	0.20		0.0050	mg/L	1	3/13/2020 06:46 PM
Beryllium	ND		0.0020	mg/L	1	3/13/2020 06:46 PM
Boron	0.67		0.020	mg/L	1	3/13/2020 06:46 PM
Cadmium	ND		0.0020	mg/L	1	3/13/2020 06:46 PM
Calcium	82		0.50	mg/L	1	3/13/2020 06:46 PM
Chromium	ND		0.0050	mg/L	1	3/13/2020 06:46 PM
Cobalt	ND		0.0050	mg/L	1	3/13/2020 06:46 PM
Lead	ND		0.0050	mg/L	1	3/13/2020 06:46 PM
Lithium	0.010		0.010	mg/L	1	3/13/2020 06:46 PM
Molybdenum	ND		0.0050	mg/L	1	3/13/2020 06:46 PM
Selenium	ND		0.0050	mg/L	1	3/13/2020 06:46 PM
Thallium	ND		0.0020	mg/L	1	3/13/2020 06:46 PM
ANIONS BY ION CHROMATOGRAPHY						
Chloride	580		50	mg/L	50	3/10/2020 09:53 PM
Fluoride	ND		2.0	mg/L	2	3/10/2020 09:33 PM
Sulfate	ND		4.0	mg/L	2	3/10/2020 09:33 PM
PH (LABORATORY)						
pH (laboratory)	7.08	H	0.100	s.u.	1	3/10/2020 09:40 AM
Temperature	18.2	H	0.100	°C	1	3/10/2020 09:40 AM
TOTAL DISSOLVED SOLIDS						
Total Dissolved Solids	1,200		50	mg/L	1	3/12/2020 01:44 PM
SUBCONTRACTED ANALYSES						
Subcontracted Analyses	See attached		SUBCONTRACT as noted		1	Analyst: ALS 4/1/2020

Note: See Qualifiers page for a list of qualifiers and their definitions.

Client: NTH Consultants, Ltd.
Project: Holland Board of Public Works
Sample ID: EQB
Collection Date: 3/6/2020 01:20 PM

Work Order: 20030574
Lab ID: 20030574-06
Matrix: WATER

Analyses	Result	Qual	Report Limit	Units	Dilution Factor	Date Analyzed
MERCURY BY CVAA						
Mercury	ND		0.00020	mg/L	1	3/13/2020 01:23 PM
METALS BY ICP-MS						
Antimony	ND		0.0050	mg/L	1	3/13/2020 06:48 PM
Arsenic	ND		0.0050	mg/L	1	3/13/2020 06:48 PM
Barium	ND		0.0050	mg/L	1	3/13/2020 06:48 PM
Beryllium	ND		0.0020	mg/L	1	3/13/2020 06:48 PM
Boron	ND		0.020	mg/L	1	3/13/2020 06:48 PM
Cadmium	ND		0.0020	mg/L	1	3/13/2020 06:48 PM
Calcium	ND		0.50	mg/L	1	3/13/2020 06:48 PM
Chromium	ND		0.0050	mg/L	1	3/13/2020 06:48 PM
Cobalt	ND		0.0050	mg/L	1	3/13/2020 06:48 PM
Lead	ND		0.0050	mg/L	1	3/13/2020 06:48 PM
Lithium	ND		0.010	mg/L	1	3/13/2020 06:48 PM
Molybdenum	ND		0.0050	mg/L	1	3/13/2020 06:48 PM
Selenium	ND		0.0050	mg/L	1	3/13/2020 06:48 PM
Thallium	ND		0.0020	mg/L	1	3/13/2020 06:48 PM
ANIONS BY ION CHROMATOGRAPHY						
Chloride	ND		1.0	mg/L	1	3/10/2020 01:53 PM
Fluoride	ND		1.0	mg/L	1	3/10/2020 01:53 PM
Sulfate	ND		2.0	mg/L	1	3/10/2020 01:53 PM
PH (LABORATORY)						
pH (laboratory)	5.67	H	0.100	s.u.	1	3/10/2020 09:40 AM
Temperature	15.2	H	0.100	°C	1	3/10/2020 09:40 AM
TOTAL DISSOLVED SOLIDS						
Total Dissolved Solids	76		30	mg/L	1	3/12/2020 01:44 PM
SUBCONTRACTED ANALYSES						
Subcontracted Analyses	See attached		SUBCONTRACT as noted		1	Analyst: ALS 4/1/2020

Note: See Qualifiers page for a list of qualifiers and their definitions.

Client: NTH Consultants, Ltd.
Project: Holland Board of Public Works
Sample ID: FB
Collection Date: 3/6/2020 02:20 PM

Work Order: 20030574
Lab ID: 20030574-07
Matrix: WATER

Analyses	Result	Qual	Report Limit	Units	Dilution Factor	Date Analyzed
MERCURY BY CVAA						
Mercury	ND		0.00020	mg/L	1	3/13/2020 01:25 PM
METALS BY ICP-MS						
Antimony	ND		0.0050	mg/L	1	3/13/2020 06:50 PM
Arsenic	ND		0.0050	mg/L	1	3/13/2020 06:50 PM
Barium	ND		0.0050	mg/L	1	3/13/2020 06:50 PM
Beryllium	ND		0.0020	mg/L	1	3/13/2020 06:50 PM
Boron	ND		0.020	mg/L	1	3/13/2020 06:50 PM
Cadmium	ND		0.0020	mg/L	1	3/13/2020 06:50 PM
Calcium	ND		0.50	mg/L	1	3/13/2020 06:50 PM
Chromium	ND		0.0050	mg/L	1	3/13/2020 06:50 PM
Cobalt	ND		0.0050	mg/L	1	3/13/2020 06:50 PM
Lead	ND		0.0050	mg/L	1	3/13/2020 06:50 PM
Lithium	ND		0.010	mg/L	1	3/13/2020 06:50 PM
Molybdenum	ND		0.0050	mg/L	1	3/13/2020 06:50 PM
Selenium	ND		0.0050	mg/L	1	3/13/2020 06:50 PM
Thallium	ND		0.0020	mg/L	1	3/13/2020 06:50 PM
ANIONS BY ION CHROMATOGRAPHY						
Chloride	ND		1.0	mg/L	1	3/10/2020 02:12 PM
Fluoride	ND		1.0	mg/L	1	3/10/2020 02:12 PM
Sulfate	ND		2.0	mg/L	1	3/10/2020 02:12 PM
PH (LABORATORY)						
pH (laboratory)	5.96	H	0.100	s.u.	1	3/10/2020 09:40 AM
Temperature	16.1	H	0.100	°C	1	3/10/2020 09:40 AM
TOTAL DISSOLVED SOLIDS						
Total Dissolved Solids	150		30	mg/L	1	3/12/2020 01:44 PM
SUBCONTRACTED ANALYSES						
Subcontracted Analyses	See attached		SUBCONTRACT as noted		1	Analyst: ALS 4/1/2020

Note: See Qualifiers page for a list of qualifiers and their definitions.

Client: NTH Consultants, Ltd.
Work Order: 20030574
Project: Holland Board of Public Works

QC BATCH REPORT

Batch ID: **153262** Instrument ID **HG4** Method: **SW7470A**

MBLK Sample ID: MBLK-153262-153262			Units: mg/L		Analysis Date: 3/13/2020 12:49 PM					
Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	RPD %RPD	RPD Limit	Qual
Mercury	ND		0.00020							
LCS Sample ID: LCS-153262-153262			Units: mg/L		Analysis Date: 3/13/2020 12:51 PM					
Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	RPD %RPD	RPD Limit	Qual
Mercury	0.002	0.00020	0.002	0	100	80-120		0		
MS Sample ID: 20030574-02AMS			Units: mg/L		Analysis Date: 3/13/2020 01:06 PM					
Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	RPD %RPD	RPD Limit	Qual
Mercury	0.00186	0.00020	0.002	0.000005	92.8	75-125		0		
MSD Sample ID: 20030574-02AMSD			Units: mg/L		Analysis Date: 3/13/2020 01:08 PM					
Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	RPD %RPD	RPD Limit	Qual
Mercury	0.00187	0.00020	0.002	0.000005	93.2	75-125	0.00186	0.536	20	

The following samples were analyzed in this batch:

20030574-01A	20030574-02A	20030574-03A
20030574-04A	20030574-05A	20030574-06A
20030574-07A		

Client: NTH Consultants, Ltd.
Work Order: 20030574
Project: Holland Board of Public Works

QC BATCH REPORT

Batch ID: **153185** Instrument ID **ICPMS4** Method: **SW6020B**

Sample ID: MBLK-153185-153185				Units: mg/L		Analysis Date: 3/12/2020 04:14 PM				
Client ID:		Run ID: ICPMS4_200312A		SeqNo: 6299880		Prep Date: 3/12/2020		DF: 1		
Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
Antimony	ND	0.0050								
Arsenic	ND	0.0050								
Barium	ND	0.0050								
Beryllium	ND	0.0020								
Boron	ND	0.020								
Cadmium	ND	0.0020								
Calcium	ND	0.50								
Chromium	ND	0.0050								
Cobalt	ND	0.0050								
Lead	ND	0.0050								
Lithium	ND	0.010								
Molybdenum	ND	0.0050								
Selenium	ND	0.0050								
Thallium	ND	0.0050								

Sample ID: LCS-153185-153185				Units: mg/L		Analysis Date: 3/12/2020 04:15 PM				
Client ID:		Run ID: ICPMS4_200312A		SeqNo: 6299881		Prep Date: 3/12/2020		DF: 1		
Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
Antimony	0.1025	0.0050	0.1	0	102	80-120	0			
Arsenic	0.1002	0.0050	0.1	0	100	80-120	0			
Barium	0.1005	0.0050	0.1	0	101	80-120	0			
Beryllium	0.1027	0.0020	0.1	0	103	80-120	0			
Boron	0.4929	0.020	0.5	0	98.6	80-120	0			
Cadmium	0.1054	0.0020	0.1	0	105	80-120	0			
Calcium	10.48	0.50	10	0	105	80-120	0			
Chromium	0.09945	0.0050	0.1	0	99.4	80-120	0			
Cobalt	0.1025	0.0050	0.1	0	102	80-120	0			
Lead	0.1019	0.0050	0.1	0	102	80-120	0			
Lithium	0.1035	0.010	0.1	0	104	80-120	0			
Molybdenum	0.1018	0.0050	0.1	0	102	80-120	0			
Selenium	0.09834	0.0050	0.1	0	98.3	80-120	0			
Thallium	0.09757	0.0050	0.1	0	97.6	80-120	0			

Note: See Qualifiers Page for a list of Qualifiers and their explanation.

Client: NTH Consultants, Ltd.
Work Order: 20030574
Project: Holland Board of Public Works

QC BATCH REPORT

Batch ID: **153185** Instrument ID **ICPMS4** Method: **SW6020B**

MS	Sample ID: 20030574-02AMS				Units: mg/L		Analysis Date: 3/12/2020 05:07 PM			
Client ID: MW-1	Run ID: ICPMS4_200312A			SeqNo: 6299913		Prep Date: 3/12/2020		DF: 1		
Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
Antimony	0.1045	0.0050	0.1	0.000304	104	75-125		0		
Arsenic	0.1205	0.0050	0.1	0.02014	100	75-125		0		
Barium	0.377	0.0050	0.1	0.2731	104	75-125		0		
Beryllium	0.1024	0.0020	0.1	0.000021	102	75-125		0		
Boron	1.633	0.020	0.5	1.129	101	75-125		0		
Cadmium	0.1025	0.0020	0.1	-0.000023	103	75-125		0		
Calcium	135.1	0.50	10	125.3	98	75-125		0		O
Chromium	0.09812	0.0050	0.1	0.000351	97.8	75-125		0		
Cobalt	0.09934	0.0050	0.1	0.000467	98.9	75-125		0		
Lead	0.1051	0.0050	0.1	0.000044	105	75-125		0		
Lithium	0.2208	0.010	0.1	0.119	102	75-125		0		
Molybdenum	0.1056	0.0050	0.1	0.002695	103	75-125		0		
Selenium	0.1002	0.0050	0.1	-0.000014	100	75-125		0		
Thallium	0.0998	0.0050	0.1	0.000002	99.8	75-125		0		

MSD	Sample ID: 20030574-02AMSD				Units: mg/L		Analysis Date: 3/12/2020 05:09 PM			
Client ID: MW-1	Run ID: ICPMS4_200312A			SeqNo: 6299914		Prep Date: 3/12/2020		DF: 1		
Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
Antimony	0.106	0.0050	0.1	0.000304	106	75-125	0.1045	1.37	20	
Arsenic	0.1213	0.0050	0.1	0.02014	101	75-125	0.1205	0.671	20	
Barium	0.3737	0.0050	0.1	0.2731	101	75-125	0.377	0.888	20	
Beryllium	0.1021	0.0020	0.1	0.000021	102	75-125	0.1024	0.302	20	
Boron	1.614	0.020	0.5	1.129	97	75-125	1.633	1.15	20	
Cadmium	0.1018	0.0020	0.1	-0.000023	102	75-125	0.1025	0.67	20	
Calcium	134.8	0.50	10	125.3	94.9	75-125	135.1	0.235	20	O
Chromium	0.097	0.0050	0.1	0.000351	96.6	75-125	0.09812	1.15	20	
Cobalt	0.09948	0.0050	0.1	0.000467	99	75-125	0.09934	0.145	20	
Lead	0.1051	0.0050	0.1	0.000044	105	75-125	0.1051	0.0143	20	
Lithium	0.2167	0.010	0.1	0.119	97.7	75-125	0.2208	1.85	20	
Molybdenum	0.1057	0.0050	0.1	0.002695	103	75-125	0.1056	0.18	20	
Selenium	0.1031	0.0050	0.1	-0.000014	103	75-125	0.1002	2.85	20	
Thallium	0.1016	0.0050	0.1	0.000002	102	75-125	0.0998	1.77	20	

The following samples were analyzed in this batch:

20030574-01A	20030574-02A
--------------	--------------

Note: See Qualifiers Page for a list of Qualifiers and their explanation.

Client: NTH Consultants, Ltd.
Work Order: 20030574
Project: Holland Board of Public Works

QC BATCH REPORT

Batch ID: **153249** Instrument ID **ICPMS4** Method: **SW6020B**

MLBK		Sample ID: MLBK-153249-153249			Units: mg/L		Analysis Date: 3/13/2020 06:33 PM			
Client ID:		Run ID: ICPMS4_200313A			SeqNo: 6302379		Prep Date: 3/13/2020		DF: 1	
Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
Antimony	ND	0.0050								
Arsenic	ND	0.0050								
Barium	ND	0.0050								
Beryllium	ND	0.0020								
Boron	ND	0.020								
Cadmium	ND	0.0020								
Calcium	ND	0.50								
Chromium	ND	0.0050								
Cobalt	ND	0.0050								
Lead	ND	0.0050								
Lithium	ND	0.010								
Molybdenum	ND	0.0050								
Selenium	ND	0.0050								
Thallium	ND	0.0050								

LCS		Sample ID: LCS-153249-153249			Units: mg/L		Analysis Date: 3/13/2020 06:34 PM			
Client ID:		Run ID: ICPMS4_200313A			SeqNo: 6302380		Prep Date: 3/13/2020		DF: 1	
Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
Antimony	0.1033	0.0050	0.1	0	103	80-120	0	0		
Arsenic	0.1017	0.0050	0.1	0	102	80-120	0	0		
Barium	0.102	0.0050	0.1	0	102	80-120	0	0		
Beryllium	0.1028	0.0020	0.1	0	103	80-120	0	0		
Boron	0.4975	0.020	0.5	0	99.5	80-120	0	0		
Cadmium	0.1064	0.0020	0.1	0	106	80-120	0	0		
Calcium	10.64	0.50	10	0	106	80-120	0	0		
Chromium	0.1046	0.0050	0.1	0	105	80-120	0	0		
Cobalt	0.1028	0.0050	0.1	0	103	80-120	0	0		
Lead	0.1031	0.0050	0.1	0	103	80-120	0	0		
Lithium	0.1038	0.010	0.1	0	104	80-120	0	0		
Molybdenum	0.1035	0.0050	0.1	0	103	80-120	0	0		
Selenium	0.1018	0.0050	0.1	0	102	80-120	0	0		
Thallium	0.0981	0.0050	0.1	0	98.1	80-120	0	0		

Note: See Qualifiers Page for a list of Qualifiers and their explanation.

Client: NTH Consultants, Ltd.
Work Order: 20030574
Project: Holland Board of Public Works

QC BATCH REPORT

Batch ID: **153249** Instrument ID **ICPMS4** Method: **SW6020B**

MS		Sample ID: 20030574-04AMS			Units: mg/L		Analysis Date: 3/13/2020 06:39 PM			
Client ID: MW-3		Run ID: ICPMS4_200313A			SeqNo: 6302383		Prep Date: 3/13/2020		DF: 1	
Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
Antimony	0.1053	0.0050	0.1	0.000189	105	75-125		0		
Arsenic	0.104	0.0050	0.1	0.000438	104	75-125		0		
Barium	0.1377	0.0050	0.1	0.03809	99.6	75-125		0		
Beryllium	0.1014	0.0020	0.1	0.000051	101	75-125		0		
Boron	1.281	0.020	0.5	0.7846	99.4	75-125		0		
Cadmium	0.1014	0.0020	0.1	-0.000002	101	75-125		0		
Chromium	0.09879	0.0050	0.1	0.000016	98.8	75-125		0		
Cobalt	0.09842	0.0050	0.1	0.000499	97.9	75-125		0		
Lead	0.1041	0.0050	0.1	0.000044	104	75-125		0		
Lithium	0.1321	0.010	0.1	0.02858	104	75-125		0		
Molybdenum	0.1054	0.0050	0.1	0.000677	105	75-125		0		
Selenium	0.1081	0.0050	0.1	-0.000121	108	75-125		0		
Thallium	0.0979	0.0050	0.1	0.000002	97.9	75-125		0		

MS		Sample ID: 20030574-04AMS			Units: mg/L		Analysis Date: 3/16/2020 05:11 PM			
Client ID: MW-3		Run ID: ICPMS4_200316A			SeqNo: 6304644		Prep Date: 3/13/2020	DF: 10		
Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
Calcium	373.4	5.0	10	360.2	132	75-125		0		SO

MSD		Sample ID: 20030574-04AMSD			Units: mg/L		Analysis Date: 3/13/2020 06:44 PM			
Client ID: MW-3		Run ID: ICPMS4_200313A			SeqNo: 6302386		Prep Date: 3/13/2020	DF: 1		
Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
Antimony	0.1065	0.0050	0.1	0.000189	106	75-125	0.1053	1.12	20	
Arsenic	0.1045	0.0050	0.1	0.000438	104	75-125	0.104	0.482	20	
Barium	0.1388	0.0050	0.1	0.03809	101	75-125	0.1377	0.822	20	
Beryllium	0.1017	0.0020	0.1	0.000051	102	75-125	0.1014	0.265	20	
Boron	1.27	0.020	0.5	0.7846	97	75-125	1.281	0.907	20	
Cadmium	0.101	0.0020	0.1	-0.000002	101	75-125	0.1014	0.393	20	
Chromium	0.09931	0.0050	0.1	0.000016	99.3	75-125	0.09879	0.525	20	
Cobalt	0.09922	0.0050	0.1	0.000499	98.7	75-125	0.09842	0.804	20	
Lead	0.103	0.0050	0.1	0.000044	103	75-125	0.1041	0.994	20	
Lithium	0.1315	0.010	0.1	0.02858	103	75-125	0.1321	0.429	20	
Molybdenum	0.1045	0.0050	0.1	0.000677	104	75-125	0.1054	0.9	20	
Selenium	0.1053	0.0050	0.1	-0.000121	105	75-125	0.1081	2.58	20	
Thallium	0.09781	0.0050	0.1	0.000002	97.8	75-125	0.0979	0.0961	20	

Note: See Qualifiers Page for a list of Qualifiers and their explanation.

Client: NTH Consultants, Ltd.
Work Order: 20030574
Project: Holland Board of Public Works

QC BATCH REPORT

Batch ID: **153249** Instrument ID **ICPMS4** Method: **SW6020B**

MSD	Sample ID: 20030574-04AMSD			Units: mg/L		Analysis Date: 3/16/2020 05:12 PM		
Client ID: MW-3	Run ID: ICPMS4_200316A			SeqNo: 6304645		Prep Date: 3/13/2020		DF: 10
Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	RPD %RPD Limit Qual
Calcium	375.8	5.0	10	360.2	156	75-125	373.4	0.628 20 SO

The following samples were analyzed in this batch:

20030574-03A	20030574-04A	20030574-05A
20030574-06A	20030574-07A	

Note: See Qualifiers Page for a list of Qualifiers and their explanation.

Client: NTH Consultants, Ltd.
Work Order: 20030574
Project: Holland Board of Public Works

QC BATCH REPORT

Batch ID: **153063** Instrument ID **TDS** Method: **A2540 C-11**

MLBK	Sample ID: MLBK-153063-153063			Units: mg/L		Analysis Date: 3/12/2020 01:44 PM		
Client ID:	Run ID: TDS_200312C			SeqNo: 6298863		Prep Date: 3/10/2020		DF: 1
Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	RPD %RPD Limit Qual

Total Dissolved Solids ND 30

MLBK	Sample ID: MLBK-153063-153063			Units: mg/L		Analysis Date: 3/12/2020 01:44 PM		
Client ID:	Run ID: TDS_200312C			SeqNo: 6298865		Prep Date: 3/10/2020		DF: 1
Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	RPD %RPD Limit Qual

Total Dissolved Solids ND 30

LCS	Sample ID: LCS-153063-153063			Units: mg/L		Analysis Date: 3/12/2020 01:44 PM		
Client ID:	Run ID: TDS_200312C			SeqNo: 6298862		Prep Date: 3/10/2020		DF: 1
Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	RPD %RPD Limit Qual

Total Dissolved Solids 462 30 495 0 93.3 85-109 0

LCS	Sample ID: LCS-153063-153063			Units: mg/L		Analysis Date: 3/12/2020 01:44 PM		
Client ID:	Run ID: TDS_200312C			SeqNo: 6298864		Prep Date: 3/10/2020		DF: 1
Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	RPD %RPD Limit Qual

Total Dissolved Solids 462 30 495 0 93.3 85-109 0

DUP	Sample ID: 20030574-02B DUP			Units: mg/L		Analysis Date: 3/12/2020 01:44 PM		
Client ID: MW-1	Run ID: TDS_200312C			SeqNo: 6298848		Prep Date: 3/10/2020		DF: 1
Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	RPD %RPD Limit Qual

Total Dissolved Solids 1010 50 0 0 0 0-0 983.3 2.68 10

DUP	Sample ID: 20030639-07B DUP			Units: mg/L		Analysis Date: 3/12/2020 01:44 PM		
Client ID:	Run ID: TDS_200312C			SeqNo: 6298854		Prep Date: 3/10/2020		DF: 1
Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	RPD %RPD Limit Qual

Total Dissolved Solids 3290 30 0 0 0 0-0 3278 0.365 10

The following samples were analyzed in this batch:

20030574-01B	20030574-02B	20030574-03B
20030574-04B	20030574-05B	20030574-06B
20030574-07B		

Note: See Qualifiers Page for a list of Qualifiers and their explanation.

Client: NTH Consultants, Ltd.
Work Order: 20030574
Project: Holland Board of Public Works

QC BATCH REPORT

Batch ID: **R284177** Instrument ID **Titrator 1** Method: **A4500-H B-11**

LCS		Sample ID: LCS-R284177-R284177			Units: s.u.			Analysis Date: 3/9/2020 04:52 PM		
Client ID:		Run ID: TITRATOR 1_200309D			SeqNo: 6292063		Prep Date:		DF: 1	
Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
pH (laboratory)	4.02	0.10	4	0	100	92-108	0	0		
DUP	Sample ID: 20030463-05C DUP			Units: s.u.			Analysis Date: 3/9/2020 04:52 PM			
Client ID:	Run ID: TITRATOR 1_200309D			SeqNo: 6292069		Prep Date:		DF: 1		
Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
pH (laboratory)	7.96	0.10	0	0	0	0-0	7.96	0	5	H
Temperature	19.54	0.10	0	0	0	0-0	19.4	0.719		H
DUP	Sample ID: 20030574-02B DUP			Units: s.u.			Analysis Date: 3/9/2020 04:52 PM			
Client ID: MW-1	Run ID: TITRATOR 1_200309D			SeqNo: 6292076		Prep Date:		DF: 1		
Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
pH (laboratory)	6.97	0.10	0	0	0	0-0	6.96	0.144	5	H
Temperature	20.44	0.10	0	0	0	0-0	20.81	1.79		H

The following samples were analyzed in this batch:

20030574-01B	20030574-02B	20030574-03B
20030574-04B		

Note: See Qualifiers Page for a list of Qualifiers and their explanation.

Client: NTH Consultants, Ltd.
Work Order: 20030574
Project: Holland Board of Public Works

QC BATCH REPORT

Batch ID: **R284202** Instrument ID **WETCHEM** Method: **A4500-H B-11**

LCS		Sample ID: LCS-R284202-R284202			Units: s.u.			Analysis Date: 3/10/2020 09:40 AM		
Client ID:		Run ID: WETCHEM_200310C			SeqNo: 6292517			Prep Date: DF: 1		
Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
pH (laboratory)	3.96	0.10	4	0	99	92-108		0		
LCS		Sample ID: LCS-R284202-R284202			Units: s.u.			Analysis Date: 3/10/2020 09:40 AM		
Client ID:		Run ID: WETCHEM_200310C			SeqNo: 6292529			Prep Date: DF: 1		
Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
pH (laboratory)	3.96	0.10	4	0	99	92-108		0		
DUP		Sample ID: 20030420-02A DUP			Units: s.u.			Analysis Date: 3/10/2020 09:40 AM		
Client ID:		Run ID: WETCHEM_200310C			SeqNo: 6292522			Prep Date: DF: 1		
Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
pH (laboratory)	8.57	0.10	0	0	0	0-0	8.59	0.233	5	H
Temperature	18.8	0.10	0	0	0	0-0	19.1	1.58		H
DUP		Sample ID: 20030519-01B DUP			Units: s.u.			Analysis Date: 3/10/2020 09:40 AM		
Client ID:		Run ID: WETCHEM_200310C			SeqNo: 6292533			Prep Date: DF: 1		
Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
pH (laboratory)	7.15	0.10	0	0	0	0-0	7.1	0.702	5	H
Temperature	15.3	0.10	0	0	0		15.1	1.32		H

The following samples were analyzed in this batch:

20030574-05B 20030574-06B 20030574-07B

Note: See Qualifiers Page for a list of Qualifiers and their explanation.

Client: NTH Consultants, Ltd.
Work Order: 20030574
Project: Holland Board of Public Works

QC BATCH REPORT

Batch ID: **R284330** Instrument ID **IC3** Method: **E300.0**

MBLK	Sample ID: CCB/MBLK-R284330			Units: mg/L		Analysis Date: 3/10/2020 10:41 AM		
Client ID:	Run ID: IC3_200310A			SeqNo: 6295382		Prep Date:		DF: 1
Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	RPD %RPD Limit Qual
Chloride	ND	1.0						
Fluoride	ND	0.10						
Sulfate	ND	1.0						
LCS	Sample ID: LCS-R284330			Units: mg/L		Analysis Date: 3/10/2020 11:01 AM		
Client ID:	Run ID: IC3_200310A			SeqNo: 6295383		Prep Date:		DF: 1
Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	RPD %RPD Limit Qual
Chloride	9.33	1.0	10	0	93.3	90-110	0	
Fluoride	1.918	0.10	2	0	95.9	90-110	0	
Sulfate	9.581	1.0	10	0	95.8	90-110	0	
MS	Sample ID: 20030417-04A MS			Units: mg/L		Analysis Date: 3/10/2020 03:48 PM		
Client ID:	Run ID: IC3_200310A			SeqNo: 6295398		Prep Date:		DF: 40
Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	RPD %RPD Limit Qual
Chloride	678.5	40	400	289.2	97.3	80-120	0	
Fluoride	84.46	4.0	80	0	106	80-120	0	
Sulfate	458.2	40	400	73.61	96.2	80-120	0	
MS	Sample ID: 20030574-02B MS			Units: mg/L		Analysis Date: 3/10/2020 07:19 PM		
Client ID: MW-1	Run ID: IC3_200310A			SeqNo: 6295408		Prep Date:		DF: 40
Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	RPD %RPD Limit Qual
Chloride	653.5	40	400	260.7	98.2	80-120	0	
Fluoride	85.16	4.0	80	0	106	80-120	0	
Sulfate	401.2	40	400	20.28	95.2	80-120	0	
MSD	Sample ID: 20030417-04A MSD			Units: mg/L		Analysis Date: 3/10/2020 04:07 PM		
Client ID:	Run ID: IC3_200310A			SeqNo: 6295399		Prep Date:		DF: 40
Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	RPD %RPD Limit Qual
Chloride	678.5	40	400	289.2	97.3	80-120	678.5	0.00472 20
Fluoride	84.44	4.0	80	0	106	80-120	84.46	0.0284 20
Sulfate	456.5	40	400	73.61	95.7	80-120	458.2	0.374 20

Note: See Qualifiers Page for a list of Qualifiers and their explanation.

Client: NTH Consultants, Ltd.
Work Order: 20030574
Project: Holland Board of Public Works

QC BATCH REPORT

Batch ID: **R284330** Instrument ID **IC3** Method: **E300.0**

MSD		Sample ID: 20030574-02B MSD			Units: mg/L		Analysis Date: 3/10/2020 07:38 PM			
Client ID: MW-1		Run ID: IC3_200310A			SeqNo: 6295409		Prep Date:		DF: 40	
Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
Chloride	655	40	400	260.7	98.6	80-120	653.5	0.223	20	
Fluoride	86.1	4.0	80	0	108	80-120	85.16	1.1	20	
Sulfate	402.5	40	400	20.28	95.6	80-120	401.2	0.313	20	

The following samples were analyzed in this batch:

20030574-01B	20030574-02B	20030574-03B
20030574-04B	20030574-05B	20030574-06B
20030574-07B		

Note: See Qualifiers Page for a list of Qualifiers and their explanation.

QC Page: 11 of 12

Client: NTH Consultants, Ltd.
Work Order: 20030574
Project: Holland Board of Public Works

QC BATCH REPORT

Batch ID: **R284569** Instrument ID **IC3** Method: **E300.0**

MLK		Sample ID: CCB/MLK-R284569			Units: mg/L		Analysis Date: 3/12/2020 12:16 PM		
Client ID:		Run ID: IC3_200312A		SeqNo: 6300440		Prep Date:		DF: 1	
Analyte		Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	RPD %RPD Limit Qual
Sulfate		ND		1.0					
LCS		Sample ID: LCS-R284569			Units: mg/L		Analysis Date: 3/12/2020 12:36 PM		
Client ID:		Run ID: IC3_200312A		SeqNo: 6300441		Prep Date:		DF: 1	
Analyte		Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	RPD %RPD Limit Qual
Sulfate		9.178	1.0	10	0	91.8	90-110	0	
MS		Sample ID: 20030463-04B MS			Units: mg/L		Analysis Date: 3/12/2020 06:59 PM		
Client ID:		Run ID: IC3_200312A		SeqNo: 6300462		Prep Date:		DF: 10	
Analyte		Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	RPD %RPD Limit Qual
Sulfate		198.3	10	100	103.1	95.2	80-120	0	
MS		Sample ID: 20030463-07B MS			Units: mg/L		Analysis Date: 3/12/2020 10:30 PM		
Client ID:		Run ID: IC3_200312A		SeqNo: 6300472		Prep Date:		DF: 20	
Analyte		Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	RPD %RPD Limit Qual
Sulfate		341.6	20	200	149	96.3	80-120	0	
MSD		Sample ID: 20030463-04B MSD			Units: mg/L		Analysis Date: 3/12/2020 07:18 PM		
Client ID:		Run ID: IC3_200312A		SeqNo: 6300463		Prep Date:		DF: 10	
Analyte		Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	RPD %RPD Limit Qual
Sulfate		197.4	10	100	103.1	94.3	80-120	198.3	0.485 20
MSD		Sample ID: 20030463-07B MSD			Units: mg/L		Analysis Date: 3/12/2020 10:49 PM		
Client ID:		Run ID: IC3_200312A		SeqNo: 6300473		Prep Date:		DF: 20	
Analyte		Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	RPD %RPD Limit Qual
Sulfate		341.4	20	200	149	96.2	80-120	341.6	0.0726 20

The following samples were analyzed in this batch:

20030574-01B

Note: See Qualifiers Page for a list of Qualifiers and their explanation.



Cincinnati, OH

+1 513 733 5336

Everett, WA

+1 425 356 2600

Fort Collins, CO

+1 970 490 1511

Holland, MI

+1 616 399 6070

Chain of Custody Form

Page _____ of _____

COC ID: 202459

Houston, TX
+1 281 530 5656Middletown, PA
+1 717 944 5541Spring City, PA
+1 610 948 4903Salt Lake City, UT
+1 801 266 7700South Charleston, WV
+1 304 356 3168York, PA
+1 717 505 5280

Customer Information		Project Information		ALS Project Manager:		ALS Work Order #:		Parameter/Method Request for Analysis										
Purchase Order		Project Name	Holland BPW-JDY	A	Metals including Hg													
Work Order		Project Number	73-160017	B	Chloride, Fluoride, Sulfate													
Company Name	NTH Consultants, Ltd.	Bill To Company	Holland Board of Public Works	C	pH													
Send Report To	Karen Okonta	Invoice Attn	Accounts Payable	D	TDS													
Address	41730 Six Mile Road	Address	625 Hastings	E	Radium 226 & 228													
City/State/Zip	Northville, MI 48168	City/State/Zip	Holland, MI 49423	F														
Phone	(248) 662-2668	Phone	(616) 355-1210	G														
Fax	(248) 324-6305	Fax		H														
e-Mail Address		e-Mail Address		I														
No.	Sample Description	Date	Time	Matrix	Pres.	# Bottles	A	B	C	D	E	F	G	H	I	J	Hold	
1	PZ-1	03-06-2020	10:00	GW	2	4	✓	✓	✓	✓	✓							
2	MW-1	03-06-2020	14:30	GW	2	4	✓	✓	✓	✓	✓							
3	MW-2	03-06-2020	4:00PM	GW	2	4	✓	✓	✓	✓	✓							
4	MW-3	03-06-2020	17:00	GW	2	4	✓	✓	✓	✓	✓							
5	MS	03-06-2020	14:35	GW	2	4	✓	✓	✓	✓	✓							
6	MSD	03-06-2020	14:40	GW	2	4	✓	✓	✓	✓	✓							
7	DUP	03-06-2020	-	GW	2	4	✓	✓	✓	✓	✓							
8	EQB	03-06-2020	13:20	GW	2	4	✓	✓	✓	✓	✓							
9	FB	03-06-2020	14:20	GW	2	4	✓	✓	✓	✓	✓							
10																		

Sampler(s) Please Print & Sign

Abbie Welch

Shipment Method

Required Turnaround Time: (Check Box)

 Std 10 WK Days 5 WK Days Other
 2 WK Days 24 Hour

Results Due Date:

Relinquished by:

Abbie Welch

Date:

03-06-2020 17:55

Time:

Received by:

JL

Notes:

Cooler ID

Cooler Temp.

QC Package: (Check One Box Below)

- | | |
|--|---|
| <input type="checkbox"/> Level II Std QC | <input type="checkbox"/> TPRP Checklist |
| <input type="checkbox"/> Level III Std QC/Raw Data | <input type="checkbox"/> TPRP Level IV |
| <input type="checkbox"/> Level IV SW846 CLP | |
| <input type="checkbox"/> Other | |

Logged by (Laboratory):

MT6

Date:

3-7-20

Time:

10:50

Received by (Laboratory):

JL

24°C

50%

DHG

Preservative Key:

1-HCl

2-HNO₃3-H₂SO₄

4-NaOH

5-Na₂S₂O₃6-NaHSO₄

7-Other

8-4°C

9-5035

Note: 1. Any changes must be made in writing once samples and COC Form have been submitted to ALS Environmental.

2. Unless otherwise agreed in a formal contract, services provided by ALS Environmental are expressly limited to the terms and conditions stated on the reverse.

3. The Chain of Custody is a legal document. All information must be completed accurately.

Copyright 2011 by ALS Environmental.

Sample Receipt ChecklistClient Name: **NTH - NORTHLILLE**Date/Time Received: **07-Mar-20 10:00**Work Order: **20030574**Received by: **MJG**Checklist completed by **Matthew Gaylord**

09-Mar-20

eSignature

Reviewed by: **Chad Whelton**

09-Mar-20

eSignature

Matrices: **Groundwater**Carrier name: **FedEx**

Shipping container/cooler in good condition?	Yes <input checked="" type="checkbox"/>	No <input type="checkbox"/>	Not Present <input type="checkbox"/>
Custody seals intact on shipping container/cooler?	Yes <input type="checkbox"/>	No <input type="checkbox"/>	Not Present <input checked="" type="checkbox"/>
Custody seals intact on sample bottles?	Yes <input type="checkbox"/>	No <input type="checkbox"/>	Not Present <input checked="" type="checkbox"/>
Chain of custody present?	Yes <input checked="" type="checkbox"/>	No <input type="checkbox"/>	
Chain of custody signed when relinquished and received?	Yes <input checked="" type="checkbox"/>	No <input type="checkbox"/>	
Chain of custody agrees with sample labels?	Yes <input checked="" type="checkbox"/>	No <input type="checkbox"/>	
Samples in proper container/bottle?	Yes <input checked="" type="checkbox"/>	No <input type="checkbox"/>	
Sample containers intact?	Yes <input checked="" type="checkbox"/>	No <input type="checkbox"/>	
Sufficient sample volume for indicated test?	Yes <input checked="" type="checkbox"/>	No <input type="checkbox"/>	
All samples received within holding time?	Yes <input checked="" type="checkbox"/>	No <input type="checkbox"/>	
Container/Temp Blank temperature in compliance?	Yes <input checked="" type="checkbox"/>	No <input type="checkbox"/>	
Sample(s) received on ice?	Yes <input checked="" type="checkbox"/>	No <input type="checkbox"/>	
Temperature(s)/Thermometer(s):	2.4/2.4C SR2		
Cooler(s)/Kit(s):			
Date/Time sample(s) sent to storage:	3/9/2020 1:08:35 PM		
Water - VOA vials have zero headspace?	Yes <input type="checkbox"/>	No <input type="checkbox"/>	No VOA vials submitted <input checked="" type="checkbox"/>
Water - pH acceptable upon receipt?	Yes <input checked="" type="checkbox"/>	No <input type="checkbox"/>	N/A <input type="checkbox"/>
pH adjusted?	Yes <input type="checkbox"/>	No <input checked="" type="checkbox"/>	N/A <input type="checkbox"/>
pH adjusted by:	-		

Login Notes:

Client Contacted:

Date Contacted:

Person Contacted:

Contacted By:

Regarding:

Comments:

--

CorrectiveAction:

--



Monday, March 30, 2020

Chad Whelton
ALS Environmental
3352 128th Avenue
Holland, MI 49424

Re: ALS Workorder: 2003154
Project Name:
Project Number: 20030574

Dear Mr. Whelton:

Seven water samples were received from ALS Environmental, on 3/10/2020. The samples were scheduled for the following analyses:

Radium-226

Radium-228

The results for these analyses are contained in the enclosed reports.

The data contained in the following report have been reviewed and approved by the personnel listed below. In addition, ALS certifies that the analyses reported herein are true, complete and correct within the limits of the methods employed. Should this laboratory report need to be reproduced, it should be reproduced in full unless written approval has been obtained from ALS Environmental.

Thank you for your confidence in ALS Environmental. Should you have any questions, please call.

Sincerely,

A handwritten signature in black ink, appearing to read "JJR Kujawa".

ALS Environmental
Jeff R. Kujawa
Project Manager

ALS Environmental – Fort Collins is accredited by the following accreditation bodies for various testing scopes in accordance with requirements of each accreditation body. All testing is performed under the laboratory management system, which is maintained to meet these requirement and regulations. Please contact the laboratory or accreditation body for the current scope testing parameters.

ALS Environmental – Fort Collins	
Accreditation Body	License or Certification Number
AIHA	214884
Alaska (AK)	UST-086
Alaska (AK)	CO01099
Arizona (AZ)	AZ0742
California (CA)	06251CA
Colorado (CO)	CO01099
Florida (FL)	E87914
Idaho (ID)	CO01099
Kansas (KS)	E-10381
Kentucky (KY)	90137
PJ-LA (DoD ELAP/ISO 170250)	95377
Louisiana (LA)	05057
Maryland (MD)	285
Missouri (MO)	175
Nebraska(NE)	NE-OS-24-13
Nevada (NV)	CO000782008A
New York (NY)	12036
North Dakota (ND)	R-057
Oklahoma (OK)	1301
Pennsylvania (PA)	68-03116
Tennessee (TN)	2976
Texas (TX)	T104704241
Utah (UT)	CO01099
Washington (WA)	C1280



2003154

Radium-228:

The samples were analyzed for the presence of ^{228}Ra by low background gas flow proportional counting of ^{228}Ac , which is the ingrown progeny of ^{228}Ra , according to the current revision of SOP 724.

All acceptance criteria were met.

Radium-226:

The samples were prepared and analyzed according to the current revision of SOP 783.

All acceptance criteria were met.

ALS -- Fort Collins

Sample Number(s) Cross-Reference Table

OrderNum: 2003154

Client Name: ALS Environmental

Client Project Name:

Client Project Number: 20030574

Client PO Number: 20-122019607

Client Sample Number	Lab Sample Number	COC Number	Matrix	Date Collected	Time Collected
PZ-1	2003154-1		WATER	06-Mar-20	10:00
MW-2	2003154-2		WATER	06-Mar-20	14:30
MW-3	2003154-3		WATER	06-Mar-20	17:00
DUP	2003154-4		WATER	06-Mar-20	
EQB	2003154-5		WATER	06-Mar-20	13:20
FB	2003154-6		WATER	06-Mar-20	14:20
MW-1	2003154-7		WATER	06-Mar-20	14:30



Subcontractor:
ALS Environmental, Fort Collins
225 Commerce Dr.
Fort Collins, CO 80524

TEL: (800) 443-1511
FAX:
Acct #:

2003154

CHAIN-OF-CUSTODY RECORD

Page 1 of 1

Date: 09-Mar-20
COC ID: 12561
Due Date: 24-Mar-20

Salesperson Brian Root

Customer Information		Project Information		Parameter/Method Request for Analysis										
Purchase Order		Project Name 20030574		A Subcontracted Analyses (SUBCONTRACT) Radium 226/228										
Work Order		Project Number		B 151150										
Company Name	ALS Group USA, Corp	Bill To Company	ALS Group USA, Corp	C										
Send Report To	Chad Whelton	Inv Attn	Accounts Payable	D										
Address	3352 128th Ave	Address	3352 128th Ave	E										
				F										
City/State/Zip	Holland, Michigan 49424	City/State/Zip	Holland, Michigan 49424	G										
Phone	(616) 399-6070	Phone	(616) 399-6070	H										
Fax	(616) 399-6185	Fax	(616) 399-6185	I										
eMail Address	chad.whelton@alsglobal.com	eMail CC		J										
ALS Sample ID	Client Sample ID	Matrix	Collection Date 24hr	Bottle	A	B	C	D	E	F	G	H	I	J
1 20030574-01C	PZ-1	Groundwater	6/Mar/2020 10:00	(2) 1LPHNO3	X									
2 20030574-03C	MW-2	Groundwater	6/Mar/2020 14:30	(2) 1LPHNO3	X									
3 20030574-04C	MW-3	Groundwater	6/Mar/2020 17:00	(2) 1LPHNO3	X									
4 20030574-05C	DUP	Groundwater	6/Mar/2020	(2) 1LPHNO3	X									
5 20030574-06C	EQB	Water	6/Mar/2020 13:20	(2) 1LPHNO3	X									
6 20030574-07C	FB	Water	6/Mar/2020 14:20	(2) 1LPHNO3	X									
7 20030574-02C	MW-1	Groundwater	6/Mar/2020 14:30	(6) 1LPHNO3	X	X								

Comments:

Please analyze these samples per our instructions and indicated turnaround requirements. Please include all QC with data. The samples do not need to be returned and can be disposed after 30 days.

Relinquished by: 	Date/Time 3-9-20 1500	Received by: C Drumheller	Date/Time 3-10-20 0930	Cooler IDs	Report/QC Level Std
Relinquished by: _____ _____ _____	Date/Time _____ _____ _____	Received by: _____ _____ _____	Date/Time _____ _____ _____	_____ _____ _____	_____ _____ _____



ALS Environmental - Fort Collins
CONDITION OF SAMPLE UPON RECEIPT FORM

Client: ALS-Holland

Workorder No: 2003154

Project Manager: JK

Initials: CDT Date: 3-10-20

1. Are airbills / shipping documents present and/or removable?	DROP OFF	YES	NO
2. Are custody seals on shipping containers intact?	NONE	YES	NO
3. Are custody seals on sample containers intact?	NONE	YES	NO
4. Is there a COC (chain-of-custody) present?	YES	NO	NO
5. Is the COC in agreement with samples received? (IDs, dates, times, # of samples, # of containers, matrix, requested analyses, etc.)	YES	NO	NO
6. Are short-hold samples present?	YES	NO	NO
7. Are all samples within holding times for the requested analyses?	YES	NO	NO
8. Were all sample containers received intact? (not broken or leaking)	YES	NO	NO
9. Is there sufficient sample for the requested analyses?	YES	NO	NO
10. Are samples in proper containers for requested analyses? (form 250, Sample Handling Guidelines)	YES	NO	NO
11. Are all aqueous samples preserved correctly, if required? (excluding volatiles)	N/A	YES	NO
12. Are all samples requiring no headspace (VOC, GRO, RSK/MEE, radon) free of bubbles > 6 mm (1/4 inch) diameter? (i.e. size of green pea)	N/A	YES	NO
13. Were the samples shipped on ice?	YES	NO	NO
14. Were cooler temperatures measured at 0.1-6.0°C?	IR gun used*: #3 #5	RAD ONLY	YES NO
Cooler #:	1 2		
Temperature (°C):	Anh		
# of custody seals on cooler:	0		
External mR/hr reading:	9		
Background mR/hr reading:	17		
Were external mR/hr readings ≤ two times background and within DOT acceptance criteria? YES / NO / NA (If no, see Form 008.)			

* Please provide details here for NO responses to gray boxes above - for 2 thru 5 & 7 thru 12, notify PM & continue w/ login.

[
][
][
][
][
][
][
][
][
]

Were unpreserved bottles pH checked? YES / NA

All client bottle ID's vs ALS lab ID's double-checked by: CDT

If applicable, was the client contacted? YES / NO / NA Contact: _____ Date/Time: _____

Project Manager Signature / Date:

JK 3-11-20

*IR Gun #3, VWR SN 170647571
*IR Gun #5, VWR SN 192272629

2003154

o f:
ip:
Date: 09Mar20
Wgt: 38.10 LBS
SHIPPING: 0.00
SPECIAL: 0.00
HANDLING: 0.00
DV: 0.00 TOTAL: 0.00

Svcs: PRIORITY OVERNIGHT Master 1668 7919 0367
TRACK: 1668 7919 0367

ORIGIN ID:GRRA (616) 399-6070
ALS ENVIRONMENTAL
ALS ENVIRONMENTAL
3352 128TH AVENUE

SHIP DATE: 09MAR20
ACTWGT: 38.10 LB
CAD: 0122071/CAFE3311

HOLLAND, MI 494249263
UNITED STATES US

BILL THIRD PARTY

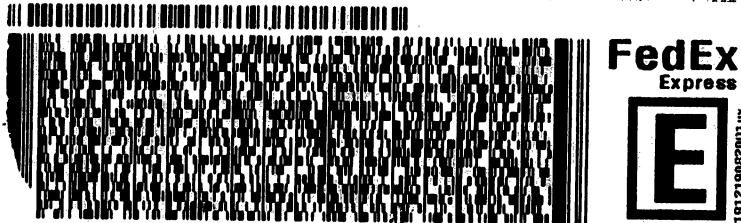
0 SAMPLE RECEIVING
ALS ENVIRONMENTAL
225 COMMERCE DR

9-0
ans

FORT COLLINS CO 80524

(970) 490-1611
TNU:
PO:

REF:
DEPT:



1 of 2
IK#
01 1668 7919 0367
MASTER.##

TUE - 10 MAR 10:30A
PRIORITY OVERNIGHT

80524
CO-US DEN



2003 154

Ref: Date: 09Mar20
Dep: Wgt: 30.45 LBS
DV: 0.00 TOTAL: 0.00
Svcs: STANDARD OVERNIGHT
TRCK: 1668 7919 0323

ORIGIN ID:GRRA (616) 399-6070
ALS ENVIRONMENTAL
ALS ENVIRONMENTAL
3352 128TH AVENUE

HOLLAND, MI 494249263
UNITED STATES US

SHIP DATE: 09MAR20
ACTWGT: 30.45 LB
CAD: 0122071/CAFE3311

10-0 BILL THIRD PARTY

TO SAMPLE RECEIVING
ALS ENVIRONMENTAL
225 COMMERCE DR

FORT COLLINS CO 80524

(970) 480-1611

REF:

PO#

DEPT:



TRK#
0201 1668 7919 0323

TUE - 10 MAR 3:00P
STANDARD OVERNIGHT

NA FTCA

80524
CO-US DEN



Client: ALS Environmental **Date:** 30-Mar-20
Project: 20030574 **Work Order:** 2003154
Sample ID: PZ-1 **Lab ID:** 2003154-1
Legal Location: **Matrix:** WATER
Collection Date: 3/6/2020 10:00 **Percent Moisture:**

Analyses	Result	Qual	Report Limit	Units	Dilution Factor	Date Analyzed
Radium-226 by Radon Emanation - Method 903.1						
Ra-226	ND (+/- 0.19)	U	0.33	pCi/l	NA	3/24/2020 11:01
Carr: BARIUM	98.4		40-110	%REC	DL = NA	3/24/2020 11:01
Radium-228 Analysis by GFPC						
Ra-228	ND (+/- 0.37)	U	0.78	pCi/l	NA	3/19/2020 08:16
Carr: BARIUM	90.3		40-110	%REC	DL = NA	3/19/2020 08:16

Client: ALS Environmental **Date:** 30-Mar-20
Project: 20030574 **Work Order:** 2003154
Sample ID: MW-2 **Lab ID:** 2003154-2
Legal Location: **Matrix:** WATER
Collection Date: 3/6/2020 14:30 **Percent Moisture:**

Analyses	Result	Qual	Report Limit	Units	Dilution Factor	Date Analyzed
Radium-226 by Radon Emanation - Method 903.1						
Ra-226	ND (+/- 0.24)	Y1,U	0.42	pCi/l	NA	3/24/2020 11:01
Carr: BARIUM	100	Y1	40-110	%REC	DL = NA	3/24/2020 11:01
Radium-228 Analysis by GFPC						
Ra-228	0.75 (+/- 0.4)		0.73	pCi/l	NA	3/19/2020 08:16
Carr: BARIUM	96.7		40-110	%REC	DL = NA	3/19/2020 08:16

Client: ALS Environmental **Date:** 30-Mar-20
Project: 20030574 **Work Order:** 2003154
Sample ID: MW-3 **Lab ID:** 2003154-3
Legal Location: **Matrix:** WATER
Collection Date: 3/6/2020 17:00 **Percent Moisture:**

Analyses	Result	Qual	Report Limit	Units	Dilution Factor	Date Analyzed
Radium-226 by Radon Emanation - Method 903.1						
Ra-226	ND (+/- 0.18)	Y1,U	0.39	pCi/l	NA	3/24/2020 11:01
Carr: BARIUM	101	Y1	40-110	%REC	DL = NA	3/24/2020 11:01
Radium-228 Analysis by GFPC						
Ra-228	ND (+/- 0.4)	U	0.74	pCi/l	NA	3/19/2020 08:16
Carr: BARIUM	96.5		40-110	%REC	DL = NA	3/19/2020 08:16

Client: ALS Environmental **Date:** 30-Mar-20
Project: 20030574 **Work Order:** 2003154
Sample ID: DUP **Lab ID:** 2003154-4
Legal Location:
Collection Date: 3/6/2020 **Percent Moisture:**

Analyses	Result	Qual	Report Limit	Units	Dilution Factor	Date Analyzed
Radium-226 by Radon Emanation - Method 903.1						
Ra-226	ND (+/- 0.2)	U	0.25	pCi/l	NA	3/24/2020 11:01
Carr: BARIUM	99		40-110	%REC	DL = NA	3/24/2020 11:01
Radium-228 Analysis by GFPC						
Ra-228	0.82 (+/- 0.42)		0.74	pCi/l	NA	3/19/2020 08:16
Carr: BARIUM	94.1		40-110	%REC	DL = NA	3/19/2020 08:16

Client: ALS Environmental **Date:** 30-Mar-20
Project: 20030574 **Work Order:** 2003154
Sample ID: EQB **Lab ID:** 2003154-5
Legal Location: **Matrix:** WATER
Collection Date: 3/6/2020 13:20 **Percent Moisture:**

Analyses	Result	Qual	Report Limit	Units	Dilution Factor	Date Analyzed
Radium-226 by Radon Emanation - Method 903.1						
Ra-226	ND (+/- 0.13)	Y1,U	0.32	pCi/l	NA	3/24/2020 11:01
Carr: BARIUM	103	Y1	40-110	%REC	DL = NA	3/24/2020 11:01
Radium-228 Analysis by GFPC						
Ra-228	ND (+/- 0.33)	U	0.71	pCi/l	NA	3/19/2020 08:16
Carr: BARIUM	98.6		40-110	%REC	DL = NA	3/19/2020 08:16

Client: ALS Environmental **Date:** 30-Mar-20
Project: 20030574 **Work Order:** 2003154
Sample ID: FB **Lab ID:** 2003154-6
Legal Location: **Matrix:** WATER
Collection Date: 3/6/2020 14:20 **Percent Moisture:**

Analyses	Result	Qual	Report Limit	Units	Dilution Factor	Date Analyzed
Radium-226 by Radon Emanation - Method 903.1						
Ra-226	ND (+/- 0.19)	Y1,U	0.38	pCi/l	NA	3/24/2020 11:01
Carr: BARIUM	102	Y1	40-110	%REC	DL = NA	3/24/2020 11:01
Radium-228 Analysis by GFPC						
Ra-228	ND (+/- 0.34)	U	0.74	pCi/l	NA	3/19/2020 08:16
Carr: BARIUM	96.4		40-110	%REC	DL = NA	3/19/2020 08:16

Client: ALS Environmental **Date:** 30-Mar-20
Project: 20030574 **Work Order:** 2003154
Sample ID: MW-1 **Lab ID:** 2003154-7
Legal Location: **Matrix:** WATER
Collection Date: 3/6/2020 14:30 **Percent Moisture:**

Analyses	Result	Qual	Report Limit	Units	Dilution Factor	Date Analyzed
Radium-226 by Radon Emanation - Method 903.1			SOP 783		Prep Date: 3/16/2020	PrepBy: TRW
Ra-226	0.42 (+/- 0.27)		0.24	pCi/l	NA	3/24/2020 11:01
Carr: BARIUM	97.2		40-110	%REC	DL = NA	3/24/2020 11:01
Radium-228 Analysis by GFPC			SOP 724		Prep Date: 3/12/2020	PrepBy: RGS
Ra-228	1.02 (+/- 0.48)		0.81	pCi/l	NA	3/19/2020 08:16
Carr: BARIUM	90.6		40-110	%REC	DL = NA	3/19/2020 08:16

Client: ALS Environmental **Date:** 30-Mar-20
Project: 20030574 **Work Order:** 2003154
Sample ID: MW-1 **Lab ID:** 2003154-7
Legal Location: **Matrix:** WATER
Collection Date: 3/6/2020 14:30 **Percent Moisture:**

Analyses	Result	Qual	Report Limit	Units	Dilution Factor	Date Analyzed
----------	--------	------	--------------	-------	-----------------	---------------

Explanation of Qualifiers

Radiochemistry:

- "Report Limit" is the MDC
- U or ND - Result is less than the sample specific MDC.
- Y1 - Chemical Yield is in control at 100-110%. Quantitative yield is assumed.
- Y2 - Chemical Yield outside default limits.
- W - DER is greater than Warning Limit of 1.42
- * - Aliquot Basis is 'As Received' while the Report Basis is 'Dry Weight'.
- # - Aliquot Basis is 'Dry Weight' while the Report Basis is 'As Received'.
- G - Sample density differs by more than 15% of LCS density.
- D - DER is greater than Control Limit
- M - Requested MDC not met.
- M3 - The requested MDC was not met, but the reported activity is greater than the reported MDC.
- L - LCS Recovery below lower control limit.
- H - LCS Recovery above upper control limit.
- P - LCS, Matrix Spike Recovery within control limits.
- N - Matrix Spike Recovery outside control limits
- NC - Not Calculated for duplicate results less than 5 times MDC
- B - Analyte concentration greater than MDC.
- B3 - Analyte concentration greater than MDC but less than Requested MDC.

Inorganics:

- B - Result is less than the requested reporting limit but greater than the instrument method detection limit (MDL).
- U or ND - Indicates that the compound was analyzed for but not detected.
- E - The reported value is estimated because of the presence of interference. An explanatory note may be included in the narrative.
- M - Duplicate injection precision was not met.
- N - Spiked sample recovery not within control limits. A post spike is analyzed for all ICP analyses when the matrix spike and or spike duplicate fail and the native sample concentration is less than four times the spike added concentration.
- Z - Spiked recovery not within control limits. An explanatory note may be included in the narrative.
- * - Duplicate analysis (relative percent difference) not within control limits.
- S - SAR value is estimated as one or more analytes used in the calculation were not detected above the detection limit.

Organics:

- U or ND - Indicates that the compound was analyzed for but not detected.
- B - Analyte is detected in the associated method blank as well as in the sample. It indicates probable blank contamination and warns the data user.
- E - Analyte concentration exceeds the upper level of the calibration range.
- J - Estimated value. The result is less than the reporting limit but greater than the instrument method detection limit (MDL).
- A - A tentatively identified compound is a suspected aldol-condensation product.
- X - The analyte was diluted below an accurate quantitation level.
- * - The spike recovery is equal to or outside the control criteria used.
- + - The relative percent difference (RPD) equals or exceeds the control criteria.
- G - A pattern resembling gasoline was detected in this sample.
- D - A pattern resembling diesel was detected in this sample.
- M - A pattern resembling motor oil was detected in this sample.
- C - A pattern resembling crude oil was detected in this sample.
- 4 - A pattern resembling JP-4 was detected in this sample.
- 5 - A pattern resembling JP-5 was detected in this sample.
- H - Indicates that the fuel pattern was in the heavier end of the retention time window for the analyte of interest.
- L - Indicates that the fuel pattern was in the lighter end of the retention time window for the analyte of interest.
- Z - This flag indicates that a significant fraction of the reported result did not resemble the patterns of any of the following petroleum hydrocarbon products:
 - gasoline
 - JP-8
 - diesel
 - mineral spirits
 - motor oil
 - Stoddard solvent
 - bunker C

ALS -- Fort Collins

Date: 3/30/2020 3:32:

Client: ALS Environmental
Work Order: 2003154
Project: 20030574

QC BATCH REPORT

Batch ID: RE200316-1-2			Instrument ID Alpha Scin			Method: Radium-226 by Radon Emanation					
DUP	Sample ID: 2003154-7						Units: pCi/l		Analysis Date: 3/24/2020 11:18		
Client ID: MW-1	Run ID: RE200316-1A						Prep Date: 3/16/2020			DF: NA	
Analyte	Result	ReportLimit	SPK Val	SPK Ref Value	%REC	Control Limit	Decision Level	DER Ref	DER	DER Limit	Qual
Ra-226	ND	0.55						0.42	0.4	2.1	U
Carr: BARIUM	16050		16650		96.4	40-110			16180		
LCS	Sample ID: RE200316-1						Units: pCi/l		Analysis Date: 3/30/2020 11:41		
Client ID:	Run ID: RE200316-1A						Prep Date: 3/16/2020			DF: NA	
Analyte	Result	ReportLimit	SPK Val	SPK Ref Value	%REC	Control Limit	Decision Level	DER Ref	DER	DER Limit	Qual
Ra-226	50 (+/- 13)	0	46.47		108	67-120					P
Carr: BARIUM	15560		16360		95.1	40-110					
MB	Sample ID: RE200316-1						Units: pCi/l		Analysis Date: 3/24/2020 11:35		
Client ID:	Run ID: RE200316-1A						Prep Date: 3/16/2020			DF: NA	
Analyte	Result	ReportLimit	SPK Val	SPK Ref Value	%REC	Control Limit	Decision Level	DER Ref	DER	DER Limit	Qual
Ra-226	ND	0.32									U
Carr: BARIUM	16150		16360		98.7	40-110					

The following samples were analyzed in this batch:

2003154-1	2003154-2	2003154-3
2003154-4	2003154-5	2003154-6
2003154-7		

Client: ALS Environmental
Work Order: 2003154
Project: 20030574

QC BATCH REPORT

Batch ID: **RA200312-2-2**Instrument ID **LB4100-C**Method: **Radium-228 Analysis by GFPC**

DUP	Sample ID: 2003154-7			Units: pCi/l		Analysis Date: 3/19/2020 08:16					
Client ID:	MW-1	Run ID: RA200312-2A			Prep Date: 3/12/2020			DF: NA			
Analyte	Result	ReportLimit	SPK Val	SPK Ref Value	%REC	Control Limit	Decision Level	DER Ref	DER DER	DER Limit	Qual
Ra-228	1.18 (+/- 0.53)	0.9						1.02	0.2	2.1	
Carr: BARIUM	31550		34260		92.1	40-110		31040			

LCS	Sample ID: RA200312-2			Units: pCi/l		Analysis Date: 3/19/2020 08:16					
Client ID:	Run ID: RA200312-2A			Prep Date: 3/12/2020			DF: NA				
Analyte	Result	ReportLimit	SPK Val	SPK Ref Value	%REC	Control Limit	Decision Level	DER Ref	DER DER	DER Limit	Qual
Ra-228	23.3 (+/- 5.4)	0.7	24.47		95.3	70-130					P
Carr: BARIUM	32860		33980		96.7	40-110					

MB	Sample ID: RA200312-2			Units: pCi/l		Analysis Date: 3/19/2020 08:16					
Client ID:	Run ID: RA200312-2A			Prep Date: 3/12/2020			DF: NA				
Analyte	Result	ReportLimit	SPK Val	SPK Ref Value	%REC	Control Limit	Decision Level	DER Ref	DER DER	DER Limit	Qual
Ra-228	ND	0.79									U
Carr: BARIUM	32820		33980		96.6	40-110					

The following samples were analyzed in this batch:

2003154-1	2003154-2	2003154-3
2003154-4	2003154-5	2003154-6
2003154-7		



02-Apr-2020

Karen Okonta
NTH Consultants, Ltd.
41780 Six Mile Road
Northville, MI 48168

Re: **Holland Board of Public Works**

Work Order: **20030565**

Dear Karen,

ALS Environmental received 1 sample on 07-Mar-2020 10:00 AM for the analyses presented in the following report.

The analytical data provided relates directly to the samples received by ALS Environmental - Holland and for only the analyses requested.

Sample results are compliant with industry accepted practices and Quality Control results achieved laboratory specifications. Any exceptions are noted in the Case Narrative, or noted with qualifiers in the report or QC batch information. Should this laboratory report need to be reproduced, it should be reproduced in full unless written approval has been obtained from ALS Environmental. Samples will be disposed in 30 days unless storage arrangements are made.

The total number of pages in this report is 26.

If you have any questions regarding this report, please feel free to contact me:

ADDRESS: 3352 128th Avenue, Holland, MI, USA
PHONE: +1 (616) 399-6070 FAX: +1 (616) 399-6185

Sincerely,

A handwritten signature in black ink, appearing to read "Chad Whelton".

Electronically approved by: Chad Whelton

Chad Whelton
Project Manager

Report of Laboratory Analysis

Certificate No: MI: 0022

ALS GROUP USA, CORP Part of the ALS Laboratory Group A Campbell Brothers Limited Company

Client: NTH Consultants, Ltd.
Project: Holland Board of Public Works
Work Order: **20030565**

Work Order Sample Summary

Lab Samp ID	Client Sample ID	Matrix	Tag Number	Collection Date	Date Received	Hold
20030565-01	MW-4	Groundwater		3/6/2020 12:20	3/7/2020 10:00	<input type="checkbox"/>

Client: NTH Consultants, Ltd.
Project: Holland Board of Public Works
Work Order: 20030565

Case Narrative

Samples for the above noted Work Order were received on 03/07/2020. The attached "Sample Receipt Checklist" documents the status of custody seals, container integrity, preservation, and temperature compliance.

Samples were analyzed according to the analytical methodology previously transmitted in the "Work Order Acknowledgement". Methodologies are also documented in the "Analytical Result" section for each sample. Quality control results are listed in the "QC Report" section. Sample association for the reported quality control is located at the end of each batch summary. If applicable, results are appropriately qualified in the Analytical Result and QC Report sections. The "Qualifiers" section documents the various qualifiers, units, and acronyms utilized in reporting. A copy of the laboratory's scope of accreditation is available upon request.

With the following exceptions, all sample analyses achieved analytical criteria.

Metals:

No other deviations or anomalies were noted.

Wet Chemistry:

Batch R284202, Method PH_4500_W, Sample LCS-R284202: Sample was processed outside of holding time for pH, as the analysis is a field test and holding time is defined as 15 minutes.

Radium analysis performed by ALS Fort Collins laboratory.

<u>Qualifier</u>	<u>Description</u>
*	Value exceeds Regulatory Limit
**	Estimated Value
a	Analyte is non-accredited
B	Analyte detected in the associated Method Blank above the Reporting Limit
E	Value above quantitation range
H	Analyzed outside of Holding Time
Hr	BOD/CBOD - Sample was reset outside Hold Time, value should be considered estimated.
J	Analyte is present at an estimated concentration between the MDL and Report Limit
ND	Not Detected at the Reporting Limit
O	Sample amount is > 4 times amount spiked
P	Dual Column results percent difference > 40%
R	RPD above laboratory control limit
S	Spike Recovery outside laboratory control limits
U	Analyzed but not detected above the MDL
X	Analyte was detected in the Method Blank between the MDL and Reporting Limit, sample results may exhibit background or reagent contamination at the observed level.

<u>Acronym</u>	<u>Description</u>
DUP	Method Duplicate
LCS	Laboratory Control Sample
LCSD	Laboratory Control Sample Duplicate
LOD	Limit of Detection (see MDL)
LOQ	Limit of Quantitation (see PQL)
MBLK	Method Blank
MDL	Method Detection Limit
MS	Matrix Spike
MSD	Matrix Spike Duplicate
PQL	Practical Quantitation Limit
RPD	Relative Percent Difference
TDL	Target Detection Limit
TNTC	Too Numerous To Count
A	APHA Standard Methods
D	ASTM
E	EPA
SW	SW-846 Update III

<u>Units Reported</u>	<u>Description</u>
°C	Degrees Celcius
as noted	
mg/L	Milligrams per Liter
s.u.	Standard Units

Client: NTH Consultants, Ltd.
Project: Holland Board of Public Works
Sample ID: MW-4
Collection Date: 3/6/2020 12:20 PM

Work Order: 20030565
Lab ID: 20030565-01
Matrix: GROUNDWATER

Analyses	Result	Qual	Report Limit	Units	Dilution Factor	Date Analyzed
MERCURY BY CVAA						
Mercury	ND		0.00020	mg/L	1	3/13/2020 01:00 PM
METALS BY ICP-MS						
Antimony	ND		0.0050	mg/L	1	3/13/2020 06:16 PM
Arsenic	0.0058		0.0050	mg/L	1	3/13/2020 06:16 PM
Barium	0.71		0.0050	mg/L	1	3/13/2020 06:16 PM
Beryllium	ND		0.0020	mg/L	1	3/13/2020 06:16 PM
Boron	0.58		0.020	mg/L	1	3/13/2020 06:16 PM
Cadmium	ND		0.0020	mg/L	1	3/13/2020 06:16 PM
Calcium	140		0.50	mg/L	1	3/13/2020 06:16 PM
Chromium	ND		0.0050	mg/L	1	3/13/2020 06:16 PM
Cobalt	ND		0.0050	mg/L	1	3/13/2020 06:16 PM
Lead	ND		0.0050	mg/L	1	3/13/2020 06:16 PM
Lithium	0.016		0.010	mg/L	1	3/13/2020 06:16 PM
Molybdenum	ND		0.0050	mg/L	1	3/13/2020 06:16 PM
Selenium	ND		0.0050	mg/L	1	3/13/2020 06:16 PM
Thallium	ND		0.0020	mg/L	1	3/13/2020 06:16 PM
ANIONS BY ION CHROMATOGRAPHY						
Chloride	360		40	mg/L	40	3/10/2020 04:46 PM
Fluoride	ND		1.0	mg/L	1	3/10/2020 04:27 PM
Sulfate	ND		2.0	mg/L	1	3/10/2020 04:27 PM
PH (LABORATORY)						
pH (laboratory)	7.05	H	0.100	s.u.	1	3/10/2020 09:40 AM
Temperature	18.2	H	0.100	°C	1	3/10/2020 09:40 AM
TOTAL DISSOLVED SOLIDS						
Total Dissolved Solids	1,100		50	mg/L	1	3/12/2020 01:42 PM
SUBCONTRACTED ANALYSES						
Subcontracted Analyses	See attached			SUBCONTRACT as noted	1	Analyst: ALS 4/1/2020

Note: See Qualifiers page for a list of qualifiers and their definitions.

Client: NTH Consultants, Ltd.
Work Order: 20030565
Project: Holland Board of Public Works

QC BATCH REPORT

Batch ID: **153262** Instrument ID **HG4** Method: **SW7470A**

MBLK			Sample ID: MBLK-153262-153262			Units: mg/L		Analysis Date: 3/13/2020 12:49 PM		
Client ID:		Run ID: HG4_200313A		SeqNo: 6301398		Prep Date: 3/13/2020		DF: 1		
Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
Mercury	ND	0.00020								
LCS			Sample ID: LCS-153262-153262			Units: mg/L		Analysis Date: 3/13/2020 12:51 PM		
Client ID:		Run ID: HG4_200313A		SeqNo: 6301399		Prep Date: 3/13/2020		DF: 1		
Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
Mercury	0.002	0.00020	0.002	0	100	80-120		0		
MS			Sample ID: 20030574-02AMS			Units: mg/L		Analysis Date: 3/13/2020 01:06 PM		
Client ID:		Run ID: HG4_200313A		SeqNo: 6301406		Prep Date: 3/13/2020		DF: 1		
Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
Mercury	0.00186	0.00020	0.002	0.000005	92.8	75-125		0		
MSD			Sample ID: 20030574-02AMSD			Units: mg/L		Analysis Date: 3/13/2020 01:08 PM		
Client ID:		Run ID: HG4_200313A		SeqNo: 6301407		Prep Date: 3/13/2020		DF: 1		
Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
Mercury	0.00187	0.00020	0.002	0.000005	93.2	75-125	0.00186	0.536	20	

The following samples were analyzed in this batch:

20030565-01A

Client: NTH Consultants, Ltd.
Work Order: 20030565
Project: Holland Board of Public Works

QC BATCH REPORT

Batch ID: **153272** Instrument ID **ICPMS4** Method: **SW6020B** (Dissolve)

MBLK		Sample ID: MBLK-153245-153272			Units: mg/L		Analysis Date: 3/13/2020 06:05 PM		
Client ID:		Run ID: ICPMS4_200313A			SeqNo: 6302362		Prep Date: 3/13/2020		DF: 1
Analyte		Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	RPD %RPD Limit Qual
Antimony		0.003048		0.0050					J
Arsenic		ND		0.0050					
Barium		ND		0.0050					
Beryllium		ND		0.0020					
Boron		0.007134		0.020					J
Cadmium		ND		0.0020					
Calcium		ND		0.50					
Chromium		ND		0.0050					
Cobalt		ND		0.0050					
Lead		ND		0.0050					
Lithium		ND		0.010					
Molybdenum		ND		0.0050					
Selenium		ND		0.0050					
Thallium		ND		0.0050					

MBLK		Sample ID: MBLK-153272-153272			Units: mg/L		Analysis Date: 3/13/2020 06:08 PM		
Client ID:		Run ID: ICPMS4_200313A			SeqNo: 6302364		Prep Date: 3/13/2020		DF: 1
Analyte		Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	RPD %RPD Limit Qual
Antimony		ND		0.0050					
Arsenic		ND		0.0050					
Barium		ND		0.0050					
Beryllium		ND		0.0020					
Boron		0.01194		0.020					J
Cadmium		ND		0.0020					
Calcium		ND		0.50					
Chromium		ND		0.0050					
Cobalt		ND		0.0050					
Lead		ND		0.0050					
Lithium		ND		0.010					
Molybdenum		ND		0.0050					
Selenium		ND		0.0050					
Thallium		ND		0.0050					

Note: See Qualifiers Page for a list of Qualifiers and their explanation.

Client: NTH Consultants, Ltd.
Work Order: 20030565
Project: Holland Board of Public Works

QC BATCH REPORT

Batch ID: **153272**

Instrument ID **ICPMS4**

Method: **SW6020B**

(Dissolve)

LCS Sample ID: LCS-153245-153272				Units: mg/L		Analysis Date: 3/13/2020 06:06 PM				
Client ID:		Run ID: ICPMS4_200313A		SeqNo: 6302363		Prep Date: 3/13/2020		DF: 1		
Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
Antimony	0.102	0.0050	0.1	0	102	80-120	0	0		
Arsenic	0.09678	0.0050	0.1	0	96.8	80-120	0	0		
Barium	0.09884	0.0050	0.1	0	98.8	80-120	0	0		
Beryllium	0.0926	0.0020	0.1	0	92.6	80-120	0	0		
Boron	0.4679	0.020	0.5	0	93.6	80-120	0	0		
Cadmium	0.1016	0.0020	0.1	0	102	80-120	0	0		
Calcium	10.25	0.50	10	0	102	80-120	0	0		
Chromium	0.1021	0.0050	0.1	0	102	80-120	0	0		
Cobalt	0.1019	0.0050	0.1	0	102	80-120	0	0		
Lead	0.1007	0.0050	0.1	0	101	80-120	0	0		
Lithium	0.09313	0.010	0.1	0	93.1	80-120	0	0		
Molybdenum	0.1007	0.0050	0.1	0	101	80-120	0	0		
Selenium	0.09823	0.0050	0.1	0	98.2	80-120	0	0		
Thallium	0.09571	0.0050	0.1	0	95.7	80-120	0	0		

LCS Sample ID: LCS-153272-153272				Units: mg/L		Analysis Date: 3/13/2020 06:10 PM				
Client ID:		Run ID: ICPMS4_200313A		SeqNo: 6302365		Prep Date: 3/13/2020		DF: 1		
Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
Antimony	0.09549	0.0050	0.1	0	95.5	80-120	0	0		
Arsenic	0.09212	0.0050	0.1	0	92.1	80-120	0	0		
Barium	0.09461	0.0050	0.1	0	94.6	80-120	0	0		
Beryllium	0.09198	0.0020	0.1	0	92	80-120	0	0		
Boron	0.4671	0.020	0.5	0	93.4	80-120	0	0		
Cadmium	0.09671	0.0020	0.1	0	96.7	80-120	0	0		
Calcium	9.829	0.50	10	0	98.3	80-120	0	0		
Chromium	0.09772	0.0050	0.1	0	97.7	80-120	0	0		
Cobalt	0.09757	0.0050	0.1	0	97.6	80-120	0	0		
Lead	0.09621	0.0050	0.1	0	96.2	80-120	0	0		
Lithium	0.09176	0.010	0.1	0	91.8	80-120	0	0		
Molybdenum	0.09542	0.0050	0.1	0	95.4	80-120	0	0		
Selenium	0.09207	0.0050	0.1	0	92.1	80-120	0	0		
Thallium	0.09124	0.0050	0.1	0	91.2	80-120	0	0		

Note: See Qualifiers Page for a list of Qualifiers and their explanation.

Client: NTH Consultants, Ltd.
Work Order: 20030565
Project: Holland Board of Public Works

QC BATCH REPORT

Batch ID: **153272**

Instrument ID **ICPMS4**

Method: **SW6020B**

(Dissolve)

MS	Sample ID: 20030808-02AMS			Units: mg/L		Analysis Date: 3/13/2020 06:13 PM			
Client ID:	Run ID: ICPMS4_200313A			SeqNo: 6302367		Prep Date: 3/13/2020		DF: 1	
Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	RPD Limit	Qual
Antimony	1.025	0.050	1	0.0173	101	80-120	0		
Arsenic	0.9987	0.050	1	0.004873	99.4	80-120	0		
Barium	1.739	0.050	1	0.7585	98.1	80-120	0		
Beryllium	1.001	0.020	1	0.000913	100	80-120	0		
Boron	5.65	0.20	5	0.7165	98.7	80-120	0		
Cadmium	1.007	0.020	1	0.002882	100	80-120	0		
Calcium	837.5	5.0	100	748.3	89.2	80-120	0		O
Chromium	1.066	0.050	1	0.03045	104	80-120	0		
Cobalt	1.023	0.050	1	0.007975	102	80-120	0		
Lead	0.9989	0.050	1	0.00154	99.7	80-120	0		
Molybdenum	1.031	0.050	1	0.006875	102	80-120	0		
Selenium	1.032	0.050	1	-0.001243	103	80-120	0		
Thallium	0.9525	0.050	1	0.001188	95.1	80-120	0		

MSD	Sample ID: 20030808-02AMSD			Units: mg/L		Analysis Date: 3/13/2020 06:15 PM			
Client ID:	Run ID: ICPMS4_200313A			SeqNo: 6302368		Prep Date: 3/13/2020		DF: 1	
Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	RPD Limit	Qual
Antimony	1.02	0.050	1	0.0173	100	80-120	1.025	0.555	20
Arsenic	0.9831	0.050	1	0.004873	97.8	80-120	0.9987	1.58	20
Barium	1.714	0.050	1	0.7585	95.5	80-120	1.739	1.47	20
Beryllium	1.011	0.020	1	0.000913	101	80-120	1.001	1.06	20
Boron	5.69	0.20	5	0.7165	99.5	80-120	5.65	0.701	20
Cadmium	1.012	0.020	1	0.002882	101	80-120	1.007	0.449	20
Calcium	813.1	5.0	100	748.3	64.8	80-120	837.5	2.96	20 SO
Chromium	1.198	0.050	1	0.03045	117	80-120	1.066	11.7	20
Cobalt	1.015	0.050	1	0.007975	101	80-120	1.023	0.845	20
Lead	1.004	0.050	1	0.00154	100	80-120	0.9989	0.525	20
Molybdenum	1.032	0.050	1	0.006875	103	80-120	1.031	0.131	20
Selenium	0.99	0.050	1	-0.001243	99.1	80-120	1.032	4.14	20
Thallium	0.9511	0.050	1	0.001188	95	80-120	0.9525	0.15	20

The following samples were analyzed in this batch:

20030565-01A

Note: See Qualifiers Page for a list of Qualifiers and their explanation.

Client: NTH Consultants, Ltd.
Work Order: 20030565
Project: Holland Board of Public Works

QC BATCH REPORT

Batch ID: **153046** Instrument ID **TDS** Method: **A2540 C-11**

MLBK		Sample ID: MLBK-153046-153046			Units: mg/L		Analysis Date: 3/12/2020 01:42 PM		
Client ID:		Run ID: TDS_200312B			SeqNo: 6298845		Prep Date: 3/10/2020		DF: 1
Analyte		Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	RPD %RPD Limit Qual
Total Dissolved Solids		ND		30					
LCS		Sample ID: LCS-153046-153046			Units: mg/L		Analysis Date: 3/12/2020 01:42 PM		
Client ID:		Run ID: TDS_200312B			SeqNo: 6298844		Prep Date: 3/10/2020		DF: 1
Analyte		Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	RPD %RPD Limit Qual
Total Dissolved Solids		480	30	495	0	97	85-109	0	
DUP		Sample ID: 20030545-03B DUP			Units: mg/L		Analysis Date: 3/12/2020 01:42 PM		
Client ID:		Run ID: TDS_200312B			SeqNo: 6298841		Prep Date: 3/10/2020		DF: 1
Analyte		Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	RPD %RPD Limit Qual
Total Dissolved Solids		1246	30	0	0	0	0-0	1250	0.321 10
DUP		Sample ID: 20030565-01B DUP			Units: mg/L		Analysis Date: 3/12/2020 01:42 PM		
Client ID: MW-4		Run ID: TDS_200312B			SeqNo: 6298843		Prep Date: 3/10/2020		DF: 1
Analyte		Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	RPD %RPD Limit Qual
Total Dissolved Solids		1153	50	0	0	0	0-0	1127	2.34 10

The following samples were analyzed in this batch:

20030565-01B

Note: See Qualifiers Page for a list of Qualifiers and their explanation.

Client: NTH Consultants, Ltd.
Work Order: 20030565
Project: Holland Board of Public Works

QC BATCH REPORT

Batch ID: **R284202** Instrument ID **WETCHEM** Method: **A4500-H B-11**

LCS		Sample ID: LCS-R284202-R284202			Units: s.u.			Analysis Date: 3/10/2020 09:40 AM		
Client ID:		Run ID: WETCHEM_200310C			SeqNo: 6292517			Prep Date: DF: 1		
Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
pH (laboratory)	3.96	0.10	4	0	99	92-108		0		
LCS		Sample ID: LCS-R284202-R284202			Units: s.u.			Analysis Date: 3/10/2020 09:40 AM		
Client ID:		Run ID: WETCHEM_200310C			SeqNo: 6292529			Prep Date: DF: 1		
Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
pH (laboratory)	3.96	0.10	4	0	99	92-108		0		
DUP		Sample ID: 20030420-02A DUP			Units: s.u.			Analysis Date: 3/10/2020 09:40 AM		
Client ID:		Run ID: WETCHEM_200310C			SeqNo: 6292522			Prep Date: DF: 1		
Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
pH (laboratory)	8.57	0.10	0	0	0	0-0	8.59	0.233	5	H
Temperature	18.8	0.10	0	0	0	0-0	19.1	1.58		H
DUP		Sample ID: 20030519-01B DUP			Units: s.u.			Analysis Date: 3/10/2020 09:40 AM		
Client ID:		Run ID: WETCHEM_200310C			SeqNo: 6292533			Prep Date: DF: 1		
Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
pH (laboratory)	7.15	0.10	0	0	0	0-0	7.1	0.702	5	H
Temperature	15.3	0.10	0	0	0		15.1	1.32		H

The following samples were analyzed in this batch:

20030565-
01B

Note: See Qualifiers Page for a list of Qualifiers and their explanation.

Client: NTH Consultants, Ltd.
Work Order: 20030565
Project: Holland Board of Public Works

QC BATCH REPORT

Batch ID: **R284330** Instrument ID **IC3** Method: **E300.0**

MBLK	Sample ID: CCB/MBLK-R284330				Units: mg/L		Analysis Date: 3/10/2020 10:41 AM		
Client ID:	Run ID: IC3_200310A				SeqNo: 6295382		Prep Date:	DF: 1	
Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit
Chloride	ND	1.0							
Fluoride	ND	0.10							
Sulfate	ND	1.0							
LCS	Sample ID: LCS-R284330				Units: mg/L		Analysis Date: 3/10/2020 11:01 AM		
Client ID:	Run ID: IC3_200310A				SeqNo: 6295383		Prep Date:	DF: 1	
Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit
Chloride	9.33	1.0	10	0	93.3	90-110		0	
Fluoride	1.918	0.10	2	0	95.9	90-110		0	
Sulfate	9.581	1.0	10	0	95.8	90-110		0	
MS	Sample ID: 20030417-04A MS				Units: mg/L		Analysis Date: 3/10/2020 03:48 PM		
Client ID:	Run ID: IC3_200310A				SeqNo: 6295398		Prep Date:	DF: 40	
Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit
Chloride	678.5	40	400	289.2	97.3	80-120		0	
Fluoride	84.46	4.0	80	0	106	80-120		0	
Sulfate	458.2	40	400	73.61	96.2	80-120		0	
MS	Sample ID: 20030574-02B MS				Units: mg/L		Analysis Date: 3/10/2020 07:19 PM		
Client ID:	Run ID: IC3_200310A				SeqNo: 6295408		Prep Date:	DF: 40	
Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit
Chloride	653.5	40	400	260.7	98.2	80-120		0	
Fluoride	85.16	4.0	80	0	106	80-120		0	
Sulfate	401.2	40	400	20.28	95.2	80-120		0	
MSD	Sample ID: 20030417-04A MSD				Units: mg/L		Analysis Date: 3/10/2020 04:07 PM		
Client ID:	Run ID: IC3_200310A				SeqNo: 6295399		Prep Date:	DF: 40	
Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit
Chloride	678.5	40	400	289.2	97.3	80-120	678.5	0.00472	20
Fluoride	84.44	4.0	80	0	106	80-120	84.46	0.0284	20
Sulfate	456.5	40	400	73.61	95.7	80-120	458.2	0.374	20

Note: See Qualifiers Page for a list of Qualifiers and their explanation.

Client: NTH Consultants, Ltd.
Work Order: 20030565
Project: Holland Board of Public Works

QC BATCH REPORT

Batch ID: **R284330** Instrument ID **IC3** Method: **E300.0**

MSD		Sample ID: 20030574-02B MSD			Units: mg/L		Analysis Date: 3/10/2020 07:38 PM			
Client ID:		Run ID: IC3_200310A			SeqNo: 6295409		Prep Date:		DF: 40	
Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
Chloride	655	40	400	260.7	98.6	80-120	653.5	0.223	20	
Fluoride	86.1	4.0	80	0	108	80-120	85.16	1.1	20	
Sulfate	402.5	40	400	20.28	95.6	80-120	401.2	0.313	20	

The following samples were analyzed in this batch:

20030565-
01B

Note: See Qualifiers Page for a list of Qualifiers and their explanation.

Cincinnati, OH
+1 513 733 5336Everett, WA
+1 425 356 2600Fort Collins, CO
+1 970 490 1511Holland, MI
+1 616 399 6070

Chain of Custody Form

Page _____ of _____

Houston, TX
+1 281 530 5656Middletown, PA
+1 717 944 5541Spring City, PA
+1 610 948 4903Salt Lake City, UT
+1 801 266 7700South Charleston, WV
+1 304 356 3168York, PA
+1 717 505 5280

COC ID: 202461

Customer Information		Project Information		Parameter/Method Request for Analysis													
Purchase Order		Project Name	Holland BPW-JDY	A	Metals including Hg												
Work Order		Project Number	73-160017	B	Chloride, Fluoride, Sulfate												
Company Name	NTH Consultants, Ltd.	Bill To Company	Holland Board of Public Works	C	pH												
Send Report To	Karen Okonta	Invoice Attn	Accounts Payable	D	TDS												
Address	41780 Six Mile Road	Address	625 Hastings	E	Radium 226 & 228												
City/State/Zip	Northville, MI 48168	City/State/Zip	Holland, MI 49423	F													
Phone	(248) 662-2668	Phone	(616) 355-1210	G													
Fax	(248) 324-5305	Fax		H													
e-Mail Address		e-Mail Address		I													
No.	Sample Description	Date	Time	Matrix	Pres.	# Bottles	A	B	C	D	E	F	G	H	I	J	Hold
1	MW-4	03-06-2020	12:20	GW	2	4	✓	✓	✓	✓	✓						
2																	
3																	
4																	
5																	
6																	
7																	
8																	
9																	
10																	

Sampler(s) Please Print & Sign			Shipment Method	Required Turnaround Time: (Check Box)				Results Due Date:						
Abbie Welch				<input type="checkbox"/> Std 10 Wk Days	<input type="checkbox"/> 5 Wk Days	<input checked="" type="checkbox"/> 2 Wk Days	<input type="checkbox"/> Other	<input type="checkbox"/> 24 Hour						
Relinquished by: Abbie Welch			Date: 03-06-2020 Time: 12:25 Received by:	Notes:										
Relinquished by: Lee Ann			Date: 3/6/20 Time: 1725 Received by (Laboratory):											
Logged by (Laboratory): K			Date: 3/9/20 Time: 1230 Checked by (Laboratory):	Cooler ID: SP2	Cooler Temp: 3.0°C	QC Package: (Check One Box Below)								
Preservative Key: 1-HCl 2-HNO ₃ 3-H ₂ SO ₄ 4-NaOH 5-Na ₂ S ₂ O ₃ 6-NaHSO ₄ 7-Other 8-4°C 9-5035							<input type="checkbox"/> Level II Std QC <input type="checkbox"/> TPRP Checklist <input type="checkbox"/> Level III Std QC/Raw Data <input type="checkbox"/> TPRP Level IV <input type="checkbox"/> Level IV SW846/CLP <input type="checkbox"/> Other							

Note: 1. Any changes must be made in writing once samples and COC Form have been submitted to ALS Environmental.

2. Unless otherwise agreed in a formal contract, services provided by ALS Environmental are expressly limited to the terms and conditions stated on the reverse.

3. The Chain of Custody is a legal document. All information must be completed accurately.

Copyright 2011 by ALS Environmental.

Sample Receipt ChecklistClient Name: NTH - NORTHLILLEDate/Time Received: 07-Mar-20 10:00Work Order: 20030565Received by: KRWChecklist completed by Keith Wierenga

09-Mar-20

eSignature

Reviewed by: Chad Whelton

09-Mar-20

eSignature

Matrices: WaterCarrier name: Client

Shipping container/cooler in good condition?	Yes <input checked="" type="checkbox"/>	No <input type="checkbox"/>	Not Present <input type="checkbox"/>
Custody seals intact on shipping container/cooler?	Yes <input type="checkbox"/>	No <input type="checkbox"/>	Not Present <input checked="" type="checkbox"/>
Custody seals intact on sample bottles?	Yes <input type="checkbox"/>	No <input type="checkbox"/>	Not Present <input checked="" type="checkbox"/>
Chain of custody present?	Yes <input checked="" type="checkbox"/>	No <input type="checkbox"/>	
Chain of custody signed when relinquished and received?	Yes <input checked="" type="checkbox"/>	No <input type="checkbox"/>	
Chain of custody agrees with sample labels?	Yes <input checked="" type="checkbox"/>	No <input type="checkbox"/>	
Samples in proper container/bottle?	Yes <input checked="" type="checkbox"/>	No <input type="checkbox"/>	
Sample containers intact?	Yes <input checked="" type="checkbox"/>	No <input type="checkbox"/>	
Sufficient sample volume for indicated test?	Yes <input checked="" type="checkbox"/>	No <input type="checkbox"/>	
All samples received within holding time?	Yes <input checked="" type="checkbox"/>	No <input type="checkbox"/>	
Container/Temp Blank temperature in compliance?	Yes <input checked="" type="checkbox"/>	No <input type="checkbox"/>	
Sample(s) received on ice?	Yes <input checked="" type="checkbox"/>	No <input type="checkbox"/>	
Temperature(s)/Thermometer(s):	<u>3.0/3.0 C</u> <u>SR2</u>		
Cooler(s)/Kit(s):	<u></u>		
Date/Time sample(s) sent to storage:	<u>3/9/2020 12:32:35 PM</u>		
Water - VOA vials have zero headspace?	Yes <input type="checkbox"/>	No <input type="checkbox"/>	No VOA vials submitted <input checked="" type="checkbox"/>
Water - pH acceptable upon receipt?	Yes <input checked="" type="checkbox"/>	No <input type="checkbox"/>	N/A <input type="checkbox"/>
pH adjusted?	Yes <input type="checkbox"/>	No <input checked="" type="checkbox"/>	N/A <input type="checkbox"/>
pH adjusted by:	<u>-</u>		

Login Notes:

Client Contacted:

Date Contacted:

Person Contacted:

Contacted By:

Regarding:

Comments:

<u></u>

CorrectiveAction:

<u></u>



Monday, March 30, 2020

Chad Whelton
ALS Environmental
3352 128th Avenue
Holland, MI 49424

Re: ALS Workorder: 2003156
Project Name:
Project Number: 20030565

Dear Mr. Whelton:

One water sample was received from ALS Environmental, on 3/10/2020. The sample was scheduled for the following analyses:

Radium-226

Radium-228

The results for these analyses are contained in the enclosed reports.

The data contained in the following report have been reviewed and approved by the personnel listed below. In addition, ALS certifies that the analyses reported herein are true, complete and correct within the limits of the methods employed. Should this laboratory report need to be reproduced, it should be reproduced in full unless written approval has been obtained from ALS Environmental.

Thank you for your confidence in ALS Environmental. Should you have any questions, please call.

Sincerely,

A handwritten signature in black ink, appearing to read "JJR Kujawa".

ALS Environmental
Jeff R. Kujawa
Project Manager

ALS Environmental – Fort Collins is accredited by the following accreditation bodies for various testing scopes in accordance with requirements of each accreditation body. All testing is performed under the laboratory management system, which is maintained to meet these requirement and regulations. Please contact the laboratory or accreditation body for the current scope testing parameters.

ALS Environmental – Fort Collins	
Accreditation Body	License or Certification Number
AIHA	214884
Alaska (AK)	UST-086
Alaska (AK)	CO01099
Arizona (AZ)	AZ0742
California (CA)	06251CA
Colorado (CO)	CO01099
Florida (FL)	E87914
Idaho (ID)	CO01099
Kansas (KS)	E-10381
Kentucky (KY)	90137
PJ-LA (DoD ELAP/ISO 170250)	95377
Louisiana (LA)	05057
Maryland (MD)	285
Missouri (MO)	175
Nebraska(NE)	NE-OS-24-13
Nevada (NV)	CO000782008A
New York (NY)	12036
North Dakota (ND)	R-057
Oklahoma (OK)	1301
Pennsylvania (PA)	68-03116
Tennessee (TN)	2976
Texas (TX)	T104704241
Utah (UT)	CO01099
Washington (WA)	C1280



2003156

Radium-228:

The sample was analyzed for the presence of ^{228}Ra by low background gas flow proportional counting of ^{228}Ac , which is the ingrown progeny of ^{228}Ra , according to the current revision of SOP 724.

All acceptance criteria were met.

Radium-226:

The sample was prepared and analyzed according to the current revision of SOP 783.

All acceptance criteria were met.

ALS -- Fort Collins

Sample Number(s) Cross-Reference Table

OrderNum: 2003156

Client Name: ALS Environmental

Client Project Name:

Client Project Number: 20030565

Client PO Number: 20-122019606

Client Sample Number	Lab Sample Number	COC Number	Matrix	Date Collected	Time Collected
MW-4	2003156-1		WATER	06-Mar-20	12:20



Subcontractor:
ALS Environmental, Fort Collins
225 Commerce Dr.
Fort Collins, CO 80524

2003156

CHAIN-OF-CUSTODY RECORD

TEL: (800) 443-1511
FAX:
Acct #:

Page 1 of 1

Date: 09-Mar-20
COC ID: 12560
Due Date: 24-Mar-20

Salesperson **Brian Root**

Customer Information		Project Information		Parameter/Method Request for Analysis										
Purchase Order		Project Name	20030565	A Subcontracted Analyses (SUBCONTRACT) <i>Radium 226/228</i>										
Work Order		Project Number		B										
Company Name	ALS Group USA, Corp	Bill To Company	ALS Group USA, Corp	C										
Send Report To	Chad Whelton	Inv Attn	Accounts Payable	D										
Address	3352 128th Ave	Address	3352 128th Ave	E										
				F										
City/State/Zip	Holland, Michigan 49424	City/State/Zip	Holland, Michigan 49424	G										
Phone	(616) 399-6070	Phone	(616) 399-6070	H										
Fax	(616) 399-6185	Fax	(616) 399-6185	I										
eMail Address	chad.whelton@alsglobal.com	eMail CC		J										
ALS Sample ID	Client Sample ID	Matrix	Collection Date 24hr	Bottle	A	B	C	D	E	F	G	H	I	J
20030565-01C	MW-4	Groundwater	6/Mar/2020 12:20	(2) 1LPHNO3	X									

(I)

Comments:

Please analyze these samples per our instructions and indicated turnaround requirements. Please include all QC with data. The samples do not need to be returned and can be disposed after 30 days.

Relinquished by: 	Date/Time 3-9-20 1500	Received by: 	Date/Time 3-10-20 0930	Cooler IDs	Report/QC Level Std
Relinquished by: _____ _____ _____	Date/Time _____ _____ _____	Received by: _____ _____ _____	Date/Time _____ _____ _____	_____ _____ _____	_____ _____ _____



ALS Environmental - Fort Collins
CONDITION OF SAMPLE UPON RECEIPT FORM

Client: ALS-Holland

Workorder No: 2003156

Project Manager: JK

Initials: CDT Date: 3-10-20

1. Are airbills / shipping documents present and/or removable?	DROP OFF	YES	NO
2. Are custody seals on shipping containers intact?	NONE	YES	NO
3. Are custody seals on sample containers intact?	NONE	YES	NO
4. Is there a COC (chain-of-custody) present?	YES	NO	
5. Is the COC in agreement with samples received? (IDs, dates, times, # of samples, # of containers, matrix, requested analyses, etc.)	YES	NO	
6. Are short-hold samples present?	YES	NO	
7. Are all samples within holding times for the requested analyses?	YES	NO	
8. Were all sample containers received intact? (not broken or leaking)	YES	NO	
9. Is there sufficient sample for the requested analyses?	YES	NO	
10. Are samples in proper containers for requested analyses? (form 250, <i>Sample Handling Guidelines</i>)	YES	NO	
11. Are all aqueous samples preserved correctly, if required? (excluding volatiles)	N/A	YES	NO
12. Are all samples requiring no headspace (VOC, GRO, RSK/MEE, radon) free of bubbles > 6 mm (1/4 inch) diameter? (i.e. size of green pea)	N/A	YES	NO
13. Were the samples shipped on ice?	YES	NO	
14. Were cooler temperatures measured at 0.1-6.0°C?	IR gun used*: #3 #5	RAD ONLY	YES NO
Cooler #: <u>1</u>			
Temperature (°C): <u>Amb</u>			
# of custody seals on cooler: <u>0</u>			
External mR/hr reading:			
Background mR/hr reading:			
Were external mR/hr readings ≤ two times background and within DOT acceptance criteria? YES / NO / NA (If no, see Form 008.)			

* Please provide details here for NO responses to gray boxes above - for 2 thru 5 & 7 thru 12, notify PM & continue w/ login.

Were unpreserved bottles pH checked? YES / NA

All client bottle ID's vs ALS lab ID's double-checked by:

If applicable, was the client contacted? YES / NO / NA Contact: _____

Date/Time: _____

Project Manager Signature / Date: JM/SJ 3-11-20

2003154

Ref: Date: 09Mar20 SHIPPING: 0.00
Dep: Wgt: 24.85 LBS SPECIAL: 0.00
DV: 0.00 HANDLING: 0.00
TOTAL: 0.00

Svc: PRIORITY OVERNIGHT Master 1668 7919 0367
TRACK: 1668 7919 0378

ORIGIN ID:GRRA (616) 399-6070
ALS ENVIRONMENTAL
ALS ENVIRONMENTAL
3352 128TH AVENUE

HOLLAND, MI 494249263
UNITED STATES US

SHIP DATE: 09MAR20
ACTWGT: 24.85 LB
CRD: 0122071/CAFE3311

BILL THIRD PARTY

TO **SAMPLE RECEIVING**
ALS ENVIRONMENTAL
225 COMMERCE DR

FORT COLLINS CO 80524

REF:

DEPT:



2 of 2
MPS# 1668 7919 0378
[0263] [0201]
Mstr# 1668 7919 0367

TUE - 10 MAR 10:30A
PRIORITY OVERNIGHT

80524
CO-US DEN

NAFTCA



Client: ALS Environmental **Date:** 30-Mar-20
Project: 20030565 **Work Order:** 2003156
Sample ID: MW-4 **Lab ID:** 2003156-1
Legal Location: **Matrix:** WATER
Collection Date: 3/6/2020 12:20 **Percent Moisture:**

Analyses	Result	Qual	Report Limit	Units	Dilution Factor	Date Analyzed
Radium-226 by Radon Emanation - Method 903.1						
Ra-226	ND (+/- 0.23)	Y1,U	0.3	pCi/l	NA	3/24/2020 11:18
Carr: BARIUM	100	Y1	40-110	%REC	DL = NA	3/24/2020 11:18
Radium-228 Analysis by GFPC						
Ra-228	ND (+/- 0.42)	U	0.81	pCi/l	NA	3/19/2020 08:16
Carr: BARIUM	93.8		40-110	%REC	DL = NA	3/19/2020 08:16

Client: ALS Environmental **Date:** 30-Mar-20
Project: 20030565 **Work Order:** 2003156
Sample ID: MW-4 **Lab ID:** 2003156-1
Legal Location: **Matrix:** WATER
Collection Date: 3/6/2020 12:20 **Percent Moisture:**

Analyses	Result	Qual	Report Limit	Units	Dilution Factor	Date Analyzed
----------	--------	------	--------------	-------	-----------------	---------------

Explanation of Qualifiers

Radiochemistry:

- "Report Limit" is the MDC
- U or ND - Result is less than the sample specific MDC.
- Y1 - Chemical Yield is in control at 100-110%. Quantitative yield is assumed.
- Y2 - Chemical Yield outside default limits.
- W - DER is greater than Warning Limit of 1.42
- * - Aliquot Basis is 'As Received' while the Report Basis is 'Dry Weight'.
- # - Aliquot Basis is 'Dry Weight' while the Report Basis is 'As Received'.
- G - Sample density differs by more than 15% of LCS density.
- D - DER is greater than Control Limit
- M - Requested MDC not met.
- M3 - The requested MDC was not met, but the reported activity is greater than the reported MDC.
- L - LCS Recovery below lower control limit.
- H - LCS Recovery above upper control limit.
- P - LCS, Matrix Spike Recovery within control limits.
- N - Matrix Spike Recovery outside control limits
- NC - Not Calculated for duplicate results less than 5 times MDC
- B - Analyte concentration greater than MDC.
- B3 - Analyte concentration greater than MDC but less than Requested MDC.

Inorganics:

- B - Result is less than the requested reporting limit but greater than the instrument method detection limit (MDL).
- U or ND - Indicates that the compound was analyzed for but not detected.
- E - The reported value is estimated because of the presence of interference. An explanatory note may be included in the narrative.
- M - Duplicate injection precision was not met.
- N - Spiked sample recovery not within control limits. A post spike is analyzed for all ICP analyses when the matrix spike and or spike duplicate fail and the native sample concentration is less than four times the spike added concentration.
- Z - Spiked recovery not within control limits. An explanatory note may be included in the narrative.
- * - Duplicate analysis (relative percent difference) not within control limits.
- S - SAR value is estimated as one or more analytes used in the calculation were not detected above the detection limit.

Organics:

- U or ND - Indicates that the compound was analyzed for but not detected.
- B - Analyte is detected in the associated method blank as well as in the sample. It indicates probable blank contamination and warns the data user.
- E - Analyte concentration exceeds the upper level of the calibration range.
- J - Estimated value. The result is less than the reporting limit but greater than the instrument method detection limit (MDL).
- A - A tentatively identified compound is a suspected aldol-condensation product.
- X - The analyte was diluted below an accurate quantitation level.
- * - The spike recovery is equal to or outside the control criteria used.
- + - The relative percent difference (RPD) equals or exceeds the control criteria.
- G - A pattern resembling gasoline was detected in this sample.
- D - A pattern resembling diesel was detected in this sample.
- M - A pattern resembling motor oil was detected in this sample.
- C - A pattern resembling crude oil was detected in this sample.
- 4 - A pattern resembling JP-4 was detected in this sample.
- 5 - A pattern resembling JP-5 was detected in this sample.
- H - Indicates that the fuel pattern was in the heavier end of the retention time window for the analyte of interest.
- L - Indicates that the fuel pattern was in the lighter end of the retention time window for the analyte of interest.
- Z - This flag indicates that a significant fraction of the reported result did not resemble the patterns of any of the following petroleum hydrocarbon products:
 - gasoline
 - JP-8
 - diesel
 - mineral spirits
 - motor oil
 - Stoddard solvent
 - bunker C

ALS -- Fort Collins

Date: 3/30/2020 3:23:

Client: ALS Environmental

QC BATCH REPORT

Work Order: 2003156

Project: 20030565

Batch ID: RE200316-1-2

Instrument ID Alpha Scin

Method: Radium-226 by Radon Emanation

LCS	Sample ID:	RE200316-1	Units: pCi/l				Analysis Date: 3/30/2020 11:41					
Client ID:		Run ID:	RE200316-1A				Prep Date: 3/16/2020		DF: NA			
Analyte		Result	ReportLimit	SPK Val	SPK Ref Value	%REC	Control Limit	Decision Level	DER Ref	DER	DER Limit	Qual
Ra-226		50 (+/- 13)	0	46.47		108	67-120				P	
Carr: BARIUM		15560		16360		95.1	40-110					

MB	Sample ID:	RE200316-1	Units: pCi/l				Analysis Date: 3/24/2020 11:35					
Client ID:		Run ID:	RE200316-1A				Prep Date: 3/16/2020		DF: NA			
Analyte		Result	ReportLimit	SPK Val	SPK Ref Value	%REC	Control Limit	Decision Level	DER Ref	DER	DER Limit	Qual
Ra-226		ND	0.32								U	
Carr: BARIUM		16150		16360		98.7	40-110					

The following samples were analyzed in this batch:

2003156-1

Client: ALS Environmental
Work Order: 2003156
Project: 20030565

QC BATCH REPORT

Batch ID: **RA200312-2-2**

Instrument ID **LB4100-A**

Method: **Radium-228 Analysis by GFPC**

LCS Sample ID: RA200312-2				Units: pCi/l		Analysis Date: 3/19/2020 08:16					
Client ID: RA200312-2A					Prep Date: 3/12/2020			DF: NA			
Analyte	Result	ReportLimit	SPK Val	SPK Ref Value	%REC	Control Limit	Decision Level	DER Ref	DER DER	DER Limit	Qual
Ra-228	23.3 (+/- 5.4)	0.7	24.47	95.3	70-130					P	
Carr: BARIUM	32860		33980	96.7	40-110						

MB Sample ID: RA200312-2				Units: pCi/l		Analysis Date: 3/19/2020 08:16					
Client ID: RA200312-2A					Prep Date: 3/12/2020			DF: NA			
Analyte	Result	ReportLimit	SPK Val	SPK Ref Value	%REC	Control Limit	Decision Level	DER Ref	DER DER	DER Limit	Qual
Ra-228	ND	0.79								U	
Carr: BARIUM	32820		33980	96.6	40-110						

The following samples were analyzed in this batch:

2003156-1

Low-Flow Test Report:

Test Date / Time: 3/6/2020 7:34:02 AM

Project: Low-Flow Test 2 (2)

Operator Name:

Location Name: PZ-1 Initial Depth to Water: 9.85 ft	Estimated Total Volume Pumped: 3000 ml Flow Cell Volume: 130 ml Final Flow Rate: 250 ml/min Final Draw Down: 0 ft	Instrument Used: Aqua TROLL 600 Serial Number: 518546
--	---	--

Test Notes:

Low-Flow Readings:

Date Time	Elapsed Time	pH	Temperature	Specific Conductivity	RDO Concentration	Turbidity	ORP	Depth To Water	Flow
		+/- 0.1	+/- 0.5	+/- 3 %	+/- 0.3	+/- 10	+/- 10	+/- 5	
3/6/2020 7:34 AM	00:00	8.23 pH	6.32 °C	1,925.6 µS/cm	1.33 mg/L	5.77 NTU	-133.5 mV	300.23 cm	250.00 ml/min
3/6/2020 7:35 AM	01:00	8.25 pH	6.32 °C	1,936.7 µS/cm	1.12 mg/L	3.51 NTU	-139.8 mV	300.23 cm	250.00 ml/min
3/6/2020 7:36 AM	02:00	8.26 pH	6.30 °C	1,936.4 µS/cm	1.01 mg/L	4.98 NTU	-140.4 mV	300.23 cm	250.00 ml/min
3/6/2020 7:37 AM	03:00	8.28 pH	6.23 °C	1,942.7 µS/cm	0.83 mg/L	3.28 NTU	-142.6 mV	300.23 cm	250.00 ml/min
3/6/2020 7:38 AM	04:00	8.29 pH	6.20 °C	1,947.7 µS/cm	0.72 mg/L	2.68 NTU	-146.2 mV	300.23 cm	250.00 ml/min
3/6/2020 7:39 AM	05:00	8.30 pH	6.21 °C	1,950.0 µS/cm	0.61 mg/L	2.37 NTU	-147.5 mV	300.23 cm	250.00 ml/min
3/6/2020 7:40 AM	06:00	8.33 pH	6.23 °C	1,955.8 µS/cm	0.57 mg/L	5.18 NTU	-158.4 mV	300.23 cm	250.00 ml/min
3/6/2020 7:41 AM	07:00	8.36 pH	6.22 °C	1,959.5 µS/cm	0.45 mg/L	1.91 NTU	-164.1 mV	300.23 cm	250.00 ml/min
3/6/2020 7:42 AM	08:00	8.37 pH	6.15 °C	1,962.4 µS/cm	0.38 mg/L	1.62 NTU	-167.1 mV	300.23 cm	250.00 ml/min
3/6/2020 7:43 AM	09:00	8.39 pH	6.11 °C	1,962.5 µS/cm	0.38 mg/L	1.73 NTU	-170.8 mV	300.23 cm	250.00 ml/min
3/6/2020 7:44 AM	10:00	8.40 pH	6.04 °C	1,964.6 µS/cm	0.36 mg/L	1.50 NTU	-173.7 mV	300.23 cm	250.00 ml/min
3/6/2020 7:45 AM	11:00	8.42 pH	6.12 °C	1,971.6 µS/cm	0.36 mg/L	0.66 NTU	-177.8 mV	300.23 cm	250.00 ml/min
3/6/2020 7:46 AM	12:00	8.43 pH	6.13 °C	1,970.3 µS/cm	0.36 mg/L	0.97 NTU	-183.1 mV	300.23 cm	250.00 ml/min

Samples

Sample ID:	Description:



GROUNDWATER SAMPLE COLLECTION LOG

GENERAL INFORMATION									
Project Name: Holland BPW – James DeYoung PP					Date: 03/06/2020				
Project #: 73-160017					Field Personnel: Abbie Welch and Keith Farquhar				
Site Location: Holland, MI					Well Const.: PVC				
Well ID: PZ-1					Casing Diameter: 2.0"				
Sample ID (if different than Well ID): NA					Screened Interval (ft. from TOC): NA				
					Top of Casing (ft.): 592.91				
PURGING DATA									
Time:	12 min	Start: 9:34 am	Finish: 9:46 am						
Purging Volume			Casing Diameter (in)	Casing Vol. (Gal./Ft.)	3 Casing Vol. (Gal./Ft.)				
			1	0.04	0.12				
Total Well Depth (ft. from TOC) = 13.54			1.5	0.10	0.30				
Depth to Water (ft. from TOC) = 9.85			2	0.16	0.48				
Height of Water in Well (ft.) = 3.69			3	0.36	1.08				
One Well Volume (gallons) = 0.59			4	0.63	1.89				
Gallons Purged: 0.78			Purging and Sampling Device: Peristaltic Pump and In-Situ Meter						
Well Volumes Purged: 1.32			Purging Rate (g.p.m.) 0.065 g.p.m. (250 mL/min)						
Was Well Purged Dry? <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No			Note: Average low flow rate of 0.13 g.p.m. (500 mL/min) on a 2-inch well typically results in a drawdown of 0.5 ft or less						
FIELD MONITORING PARAMETERS									
Time	00:00	03:00	06:00	09:00	12:00	15:00	18:00	21:00	24:00
Accum. Volume Purged (gal)	0	0.20	0.39	0.59	0.78				
Drawdown (ft)	0	-	-	-	0.82				
pH	8.23	8.28	8.33	8.39	8.43				
Temperature (C)	6.32	6.23	6.23	6.11	6.13				
Conductivity (mS/cm)	1.93	1.94	1.96	1.96	1.97				
ORP (mV)	-133.5	-142.6	-158.4	-170.8	-183.1				
Dissolved Oxygen (mg/L)	1.33	0.83	0.57	0.38	0.36				
Turbidity (NTU)	5.77	3.28	5.18	1.73	0.97				
Odor	No Odor								
Appearance and/or Color	Brown tint								
SAMPLING DATA									
Time: 12 min Start: 9:34 am Finish: 9:46 am	Pump Rate (g.p.m.): 0.065								
Sample Collection Device:									
Weather Conditions: Air Temperature (F): 36° Wind Speed/Direction: 20 mph/SE Other:									
Samples Collected On chain of Custody No: PZ-1 Analytical Laboratory: ALS Environmental									

Other Notes: Depth to water at end of Sampling: 10.67 ft

Low-Flow Test Report:

Test Date / Time: 3/6/2020 12:16:36 PM

Project:

Operator Name:

Location Name: MW-1 Initial Depth to Water: 6.2 ft	Estimated Total Volume Pumped: 2250 ml Flow Cell Volume: 130 ml Final Flow Rate: 250 ml/min Final Draw Down: 0 ft	Instrument Used: Aqua TROLL 600 Serial Number: 518546
---	---	--

Test Notes:

Low-Flow Readings:

Date Time	Elapsed Time	pH	Temperature	Specific Conductivity	RDO Concentration	Turbidity	ORP	Depth To Water	Flow
		+/- 0.1	+/- 0.2	+/- 3 %	+/- 0.3	+/- 10	+/- 10	+/- 5	
3/6/2020 12:16 PM	00:00	7.22 pH	5.58 °C	1,842.1 µS/cm	0.33 mg/L	0.00 NTU	-140.0 mV	188.98 cm	250.00 ml/min
3/6/2020 12:19 PM	03:00	7.22 pH	5.52 °C	1,855.0 µS/cm	0.18 mg/L	0.02 NTU	-135.8 mV	188.98 cm	250.00 ml/min
3/6/2020 12:22 PM	06:00	7.22 pH	5.53 °C	1,843.2 µS/cm	0.43 mg/L	0.00 NTU	-133.7 mV	188.98 cm	250.00 ml/min
3/6/2020 12:25 PM	09:00	7.22 pH	5.57 °C	1,838.8 µS/cm	0.23 mg/L	0.31 NTU	-137.7 mV	188.98 cm	250.00 ml/min

Samples

Sample ID:	Description:



GROUNDWATER SAMPLE COLLECTION LOG

GENERAL INFORMATION									
Project Name: <u>Holland BPW – James DeYoung PP</u>	Date: <u>03/06/2020</u>								
Project #: <u>73-160017</u>	Field Personnel: <u>Abbie Welch and Keith Farquhar</u>								
Site Location: <u>Holland, MI</u>	Well Const.: <u>Sch 40 PVC</u>								
Well ID: <u>MW-1</u>	Casing Diameter: <u>2.0"</u>								
Sample ID (if different than Well ID): <u>NA</u>	Screened Interval (ft. from TOC): <u>9.0'-14.0 (12.0'-17.0')</u>								
	Top of Casing (ft.): <u>588.53</u>								
PURGING DATA									
Time: <u>9 min</u>	Start: <u>2:16 pm</u>	Finish: <u>2:25 pm</u>	Casing Diameter (in)	Casing Vol. (Gal./Ft.)	3 Casing Vol. (Gal./Ft.)				
Purging Volume		1	0.04	0.12					
Total Well Depth (ft. from TOC) = <u>16.88</u>		1.5	0.10	0.30					
Depth to Water (ft. from TOC) = <u>6.20</u>		2	<u>0.16</u>	0.48					
Height of Water in Well (ft.) = <u>10.68</u>		3	0.36	1.08					
One Well Volume (gallons) = <u>1.71</u>		4	0.63	1.89					
Gallons Purged: <u>0.59</u>			Purging and Sampling Device: <u>Peristaltic Pump and In-Situ Meter</u>						
Well Volumes Purged: <u>0.34</u>			Purging Rate (g.p.m.) <u>0.065 g.p.m. (250 mL/min)</u>						
Was Well Purged Dry? <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No			Note: Average low flow rate of 0.13 g.p.m. (500 mL/min) on a 2-inch well typically results in a drawdown of 0.5 ft or less						
FIELD MONITORING PARAMETERS									
Time/Elapsed time (minutes)	00:00	03:00	06:00	09:00	12:00	15:00	18:00	21:00	24:00
Accum. Volume Purged (gal)	0	0.20	0.39	0.59					
Drawdown (ft)	-	-	-	0.12					
pH	7.22	7.22	7.22	7.22					
Temperature (C)	5.58	5.52	5.53	5.57					
Conductivity (mS/cm)	1.84	1.86	1.84	1.84					
ORP (mV)	-140.0	-135.8	-133.7	-137.7					
Dissolved Oxygen (mg/L)	0.33	0.18	0.43	0.23					
Turbidity (NTU)	0.00	0.02	0.00	0.31					
Odor	No odor								
Appearance and/or Color	Clear								
SAMPLING DATA									
Time: <u>9 min</u> Start: <u>2:16 pm</u> Finish: <u>2:25 pm</u>	Pump Rate (g.p.m.): <u>0.065 gpm (250 mL/min)</u>								
Sample Collection Depth (ft. from TOC): _____									
Weather Conditions: Air Temperature (F): <u>36°</u> Wind Speed/Direction: <u>20 mph/SE</u> Other: _____									
Samples Collected On chain of Custody No: <u>MW-1</u> Analytical Laboratory: <u>ALS Environmental</u>									

Other Notes: MS & MSD Samples collected at MW-1

Depth to water at end of sampling: 6.32 ft

Low-Flow Test Report:

Test Date / Time: 3/6/2020 1:24:28 PM

Project:

Operator Name:

Location Name: MW-2 Initial Depth to Water: 3.35 ft	Estimated Total Volume Pumped: 1998 ml Flow Cell Volume: 130 ml Final Flow Rate: 333 ml/min Final Draw Down: 0 ft	Instrument Used: Aqua TROLL 600 Serial Number: 518546
--	---	--

Test Notes:

Low-Flow Readings:

Date Time	Elapsed Time	pH	Temperature	Specific Conductivity	RDO Concentration	Turbidity	ORP	Depth To Water	Flow
		+/- 0.1	+/- 0.2	+/- 3 %	+/- 0.3	+/- 10	+/- 10	+/- 5	
3/6/2020 1:24 PM	00:00	7.25 pH	5.71 °C	2.52 mS/cm	3.42 mg/L	11.06 NTU	-87.2 mV	102.11 cm	333.00 ml/min
3/6/2020 1:27 PM	03:00	7.23 pH	5.52 °C	2.52 mS/cm	0.43 mg/L	6.63 NTU	-109.3 mV	102.11 cm	333.00 ml/min
3/6/2020 1:30 PM	06:00	7.23 pH	5.58 °C	2.52 mS/cm	0.24 mg/L	6.66 NTU	-115.8 mV	102.11 cm	333.00 ml/min

Samples

Sample ID:	Description:



GROUNDWATER SAMPLE COLLECTION LOG

GENERAL INFORMATION									
Project Name: <u>Holland BPW – James DeYoung PP</u>				Date: <u>03/06/2020</u>					
Project #: <u>73-160017</u>				Field Personnel: <u>Abbie Welch and Keith Farquhar</u>					
Site Location: <u>Holland, MI</u>				Well Const.: <u>Sch 40 PVC</u>					
Well ID: <u>MW-2</u>				Casing Diameter: <u>2.0"</u>					
Sample ID (if different than Well ID): <u>NA</u>				Screened Interval (ft. from TOC): <u>8.0'-13.0 (14.0'-19.0')</u>					
				Top of Casing (ft.): <u>585.49</u>					
PURGING DATA									
Time: <u>6 min</u>	Start: <u>3:24 pm</u>	Finish: <u>3:30 pm</u>	Casing Diameter (in)	Casing Vol. (Gal./Ft.)	3 Casing Vol. (Gal./Ft.)				
Purging Volume		1	0.04	0.12					
		1.5	0.10	0.30					
Total Well Depth (ft. from TOC) = <u>16.13</u>		2	<u>0.16</u>	0.48					
Depth to Water (ft. from TOC) = <u>3.35</u>		3	0.36	1.08					
Height of Water in Well (ft.) = <u>12.18</u>		4	0.63	1.89					
One Well Volume (gallons) = <u>2.04</u>									
Gallons Purged: <u>0.52</u>			Purging and Sampling Device: <u>Peristaltic Pump and In-Situ Meter</u>						
Well Volumes Purged: <u>0.25</u>			Purging Rate (g.p.m.) <u>0.087 g.p.m. (333 mL/min)</u>						
Was Well Purged Dry? <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No			Note: Average low flow rate of 0.13 g.p.m. (500 mL/min) on a 2-inch well typically results in a drawdown of 0.5 ft or less						
FIELD MONITORING PARAMETERS									
Time/Elapsed time (minutes)	00:00	03:00	06:00	09:00	12:00	15:00	18:00	21:00	24:00
Accum. Volume Purged (gal)	<u>0</u>	<u>0.26</u>	<u>0.52</u>						
Drawdown (ft)	<u>~</u>	<u>~</u>	<u>0.04</u>						
pH	<u>7.25</u>	<u>7.23</u>	<u>7.23</u>						
Temperature (C)	<u>5.71</u>	<u>5.52</u>	<u>5.58</u>						
Conductivity (mS/cm)	<u>2.52</u>	<u>2.52</u>	<u>2.52</u>						
ORP (mV)	<u>-87.2</u>	<u>-109.3</u>	<u>-115.8</u>						
Dissolved Oxygen (mg/L)	<u>3.42</u>	<u>0.43</u>	<u>0.24</u>						
Turbidity (NTU)	<u>11.06</u>	<u>6.63</u>	<u>6.66</u>						
Odor	<u>No odor</u>								
Appearance and/or Color	<u>Clear</u>								
SAMPLING DATA									
Time: <u>6 min</u>	Start: <u>3:24 pm</u>	Finish: <u>3:30 pm</u>	Pump Rate (g.p.m.): <u>0.087 gpm (333 mL/min)</u>						
Sample Collection Depth (ft. from TOC):									
Weather Conditions: Air Temperature (F): <u>36°</u>			Wind Speed/Direction: <u>20 mph/SE</u>						
Samples Collected On chain of Custody No: <u>MW-2</u> Analytical Laboratory: <u>ALS Environmental</u>									

Other Notes: Depth to Water at end of Sampling: 3.39 ft

Low-Flow Test Report:

Test Date / Time: 3/6/2020 2:59:00 PM

Project:

Operator Name:

Location Name: MW-3 Initial Depth to Water: 3.19 ft	Estimated Total Volume Pumped: 1998 ml Flow Cell Volume: 130 ml Final Flow Rate: 333 ml/min Final Draw Down: 0 ft	Instrument Used: Aqua TROLL 600 Serial Number: 518546
--	---	--

Test Notes:

Low-Flow Readings:

Date Time	Elapsed Time	pH	Temperature	Specific Conductivity	RDO Concentration	Turbidity	ORP	Depth To Water	Flow
		+/- 0.1	+/- 0.2	+/- 3 %	+/- 0.3	+/- 10	+/- 10	+/- 5	
3/6/2020 2:59 PM	00:00	6.54 pH	7.78 °C	3,105.8 µS/cm	1.92 mg/L	38.76 NTU	-25.4 mV	97.23 cm	333.00 ml/min
3/6/2020 3:02 PM	03:00	6.53 pH	7.73 °C	3,078.6 µS/cm	0.47 mg/L	36.10 NTU	-29.4 mV	97.23 cm	333.00 ml/min
3/6/2020 3:05 PM	06:00	6.53 pH	7.82 °C	3,051.9 µS/cm	0.24 mg/L	25.02 NTU	-34.3 mV	97.23 cm	333.00 ml/min

Samples

Sample ID:	Description:



GROUNDWATER SAMPLE COLLECTION LOG

GENERAL INFORMATION									
Project Name:	Holland BPW – James DeYoung PP				Date:	03/06/2020			
Project #:	73-160017				Field Personnel:	Abbie Welch and Keith Farquhar			
Site Location:	Holland, MI				Well Const.:	Sch 40 PVC			
Well ID:	MW-3				Casing Diameter:	2.0"			
Sample ID (if different than Well ID):	NA				Screened Interval (ft. from TOC):	10.0'-15.0- bgs (13.0'-18.0')			
Top of Casing (ft.): <u>585.30</u>									
PURGING DATA									
Time:	6 min	Start:	4:59 pm	Finish:	5:05 pm	Casing Diameter (in)	Casing Vol. (Gal./Ft.)	3 Casing Vol. (Gal./Ft.)	
Purging Volume				1		0.04		0.12	
				1.5		0.10		0.30	
Total Well Depth (ft. from TOC) =		18.22		2		0.16		0.48	
Depth to Water (ft. from TOC) =		3.19		3		0.36		1.08	
Height of Water in Well (ft.) =		15.03		4		0.63		1.89	
One Well Volume (gallons) =		2.40							
Gallons Purged: <u>0.52</u>				Purging and Sampling Device: Peristaltic Pump and In-Situ Meter					
Well Volumes Purged: <u>0.22</u>				Purging Rate (g.p.m.) <u>0.087</u> g.p.m. (<u>333</u> mL/min)					
Was Well Purged Dry? <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No				Note: Average low flow rate of 0.13 g.p.m. (500 mL/min) on a 2-inch well typically results in a drawdown of 0.5 ft or less					
FIELD MONITORING PARAMETERS									
Time/Elapsed time (minutes)	00:00	03:00	06:00	09:00	12:00	15:00	18:00	21:00	24:00
Accum. Volume Purged (gal)	0	0.26	0.52						
Drawdown (ft)	—	—							
pH	6.54	6.53	6.53						
Temperature (C)	7.78	7.73	7.82						
Conductivity (mS/cm)	3.11	3.08	3.05						
ORP (mV)	-25.4	-29.4	-34.3						
Dissolved Oxygen (mg/L)	1.92	0.47	0.24						
Turbidity (NTU)	38.76	36.10	25.02						
Odor	No Odor	No Odor							
Appearance and/or Color	Clear								
SAMPLING DATA									
Time:	6 min	Start:	4:59 pm	Finish:	5:05 pm	Pump Rate (g.p.m.):	0.087 gpm	(333mL/min)	
Sample Collection Depth (ft. from TOC):									
Weather Conditions: Air Temperature (F): <u>36°</u> Wind Speed/Direction: <u>20 mph/SE</u> Other:									
Samples Collected On chain of Custody No: <u>MW-3</u> Analytical Laboratory: <u>ALS Environmental</u>									

Other Notes: Depth to Water at end of Sampling: ft

Low-Flow Test Report:

Test Date / Time: 3/6/2020 10:00:12 AM

Project:

Operator Name:

Location Name: MW-4	Estimated Total Volume Pumped: 4500 ml Flow Cell Volume: 130 ml Final Flow Rate: 250 ml/min	Instrument Used: Aqua TROLL 600 Serial Number: 518546
----------------------------	---	--

Test Notes:

Low-Flow Readings:

Date Time	Elapsed Time	pH	Temperature	Specific Conductivity	RDO Concentration	Turbidity	ORP	Depth To Water	Flow
		+/- 0.1	+/- 0.2	+/- 3 %	+/- 0.3	+/- 10	+/- 10	+/- 5	
3/6/2020 10:00 AM	00:00	7.47 pH	8.10 °C	2,043.1 µS/cm	2.26 mg/L	142.60 NTU	-164.6 mV		250.00 ml/min
3/6/2020 10:01 AM	01:00	7.47 pH	6.69 °C	2,040.1 µS/cm	1.33 mg/L	131.77 NTU	-158.4 mV		250.00 ml/min
3/6/2020 10:02 AM	02:00	7.46 pH	7.65 °C	2,053.7 µS/cm	0.92 mg/L	129.99 NTU	-161.7 mV		250.00 ml/min
3/6/2020 10:03 AM	03:00	7.46 pH	7.01 °C	2,050.8 µS/cm	0.87 mg/L	117.97 NTU	-148.0 mV		250.00 ml/min
3/6/2020 10:04 AM	04:00	7.44 pH	7.16 °C	2,068.9 µS/cm	0.53 mg/L	113.02 NTU	-148.0 mV		250.00 ml/min
3/6/2020 10:05 AM	05:00	7.43 pH	6.94 °C	2,057.1 µS/cm	0.41 mg/L	111.38 NTU	-150.3 mV		250.00 ml/min
3/6/2020 10:06 AM	06:00	7.43 pH	7.05 °C	2,057.2 µS/cm	0.28 mg/L	113.57 NTU	-161.6 mV		250.00 ml/min
3/6/2020 10:07 AM	07:00	7.43 pH	6.65 °C	2,060.8 µS/cm	0.21 mg/L	89.34 NTU	-163.1 mV		250.00 ml/min
3/6/2020 10:08 AM	08:00	7.44 pH	6.41 °C	2,075.6 µS/cm	0.22 mg/L	78.46 NTU	-162.8 mV		250.00 ml/min
3/6/2020 10:09 AM	09:00	7.42 pH	6.39 °C	2,073.0 µS/cm	0.51 mg/L	80.07 NTU	-163.5 mV		250.00 ml/min
3/6/2020 10:10 AM	10:00	7.42 pH	6.27 °C	2,085.7 µS/cm	0.43 mg/L	78.55 NTU	-146.0 mV		250.00 ml/min
3/6/2020 10:11 AM	11:00	7.42 pH	6.09 °C	2,087.9 µS/cm	0.80 mg/L	76.51 NTU	-141.6 mV		250.00 ml/min
3/6/2020 10:12 AM	12:00	7.42 pH	5.94 °C	2,079.2 µS/cm	0.41 mg/L	71.50 NTU	-151.7 mV		250.00 ml/min
3/6/2020 10:13 AM	13:00	7.42 pH	5.94 °C	2,092.9 µS/cm	0.22 mg/L	71.21 NTU	-149.2 mV		250.00 ml/min
3/6/2020 10:14 AM	14:00	7.41 pH	6.18 °C	2,084.3 µS/cm	0.14 mg/L	59.55 NTU	-144.0 mV		250.00 ml/min
3/6/2020 10:15 AM	15:00	7.41 pH	5.91 °C	2,088.2 µS/cm	0.19 mg/L	63.98 NTU	-136.0 mV		250.00 ml/min
3/6/2020 10:16 AM	16:00	7.41 pH	5.64 °C	2,101.0 µS/cm	0.14 mg/L	66.83 NTU	-139.0 mV		250.00 ml/min
3/6/2020 10:17 AM	17:00	7.41 pH	5.62 °C	2,104.8 µS/cm	0.11 mg/L	64.73 NTU	-145.9 mV		250.00 ml/min

3/6/2020 10:18 AM	18:00	7.42 pH	5.71 °C	2,103.6 µS/cm	0.32 mg/L	60.02 NTU	-147.1 mV		250.00 ml/min
----------------------	-------	---------	---------	------------------	-----------	-----------	-----------	--	---------------

Samples

Sample ID:	Description:

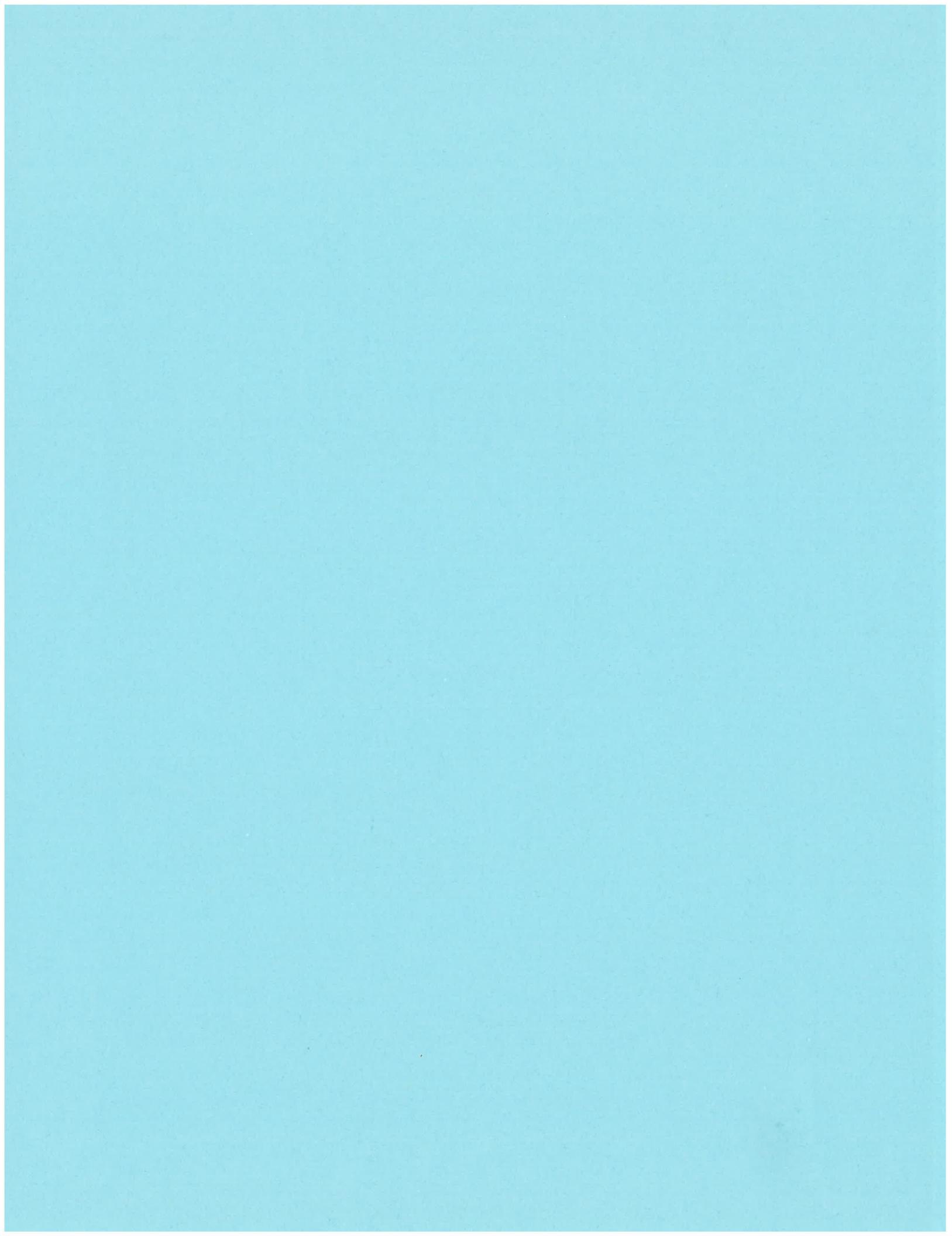
Created using VuSitu from In-Situ, Inc.



GROUNDWATER SAMPLE COLLECTION LOG

GENERAL INFORMATION									
Project Name: <u>Holland BPW – James DeYoung PP</u>					Date: <u>03/06/2020</u>				
Project #: <u>73-160017</u>					Field Personnel: <u>Abbie Welch and Keith Farquhar</u>				
Site Location: <u>Holland, MI</u>					Well Const.: <u>Sch 40 PVC</u>				
Well ID: <u>MW-4</u>					Casing Diameter: <u>2.0"</u>				
Sample ID (if different than Well ID): <u>NA</u>					Screened Interval (ft. from TOC): _____				
					Top of Casing (ft.): <u>585.65</u>				
PURGING DATA									
Time: <u>18 min</u>		Start: <u>12:00 pm</u>		Finish: <u>12:18 pm</u>					
Purging Volume		Casing Diameter (in)		Casing Vol. (Gal./Ft.)		3 Casing Vol. (Gal./Ft.)			
		<u>1</u>		<u>0.04</u>		<u>0.12</u>			
Total Well Depth (ft. from TOC) = <u>9.51</u>		<u>1.5</u>		<u>0.10</u>		<u>0.30</u>			
Depth to Water (ft. from TOC) = <u>3.28</u>		<u>2</u>		<u>0.16</u>		<u>0.48</u>			
Height of Water in Well (ft.) = <u>6.23</u>		<u>3</u>		<u>0.36</u>		<u>1.08</u>			
One Well Volume (gallons) = <u>1.00</u>		<u>4</u>		<u>0.63</u>		<u>1.89</u>			
Gallons Purged: <u>1.17</u>				Purging and Sampling Device: <u>Peristaltic Pump and In-Situ Meter</u>					
Well Volumes Purged: <u>1.17</u>				Purging Rate (g.p.m.) <u>0.065</u> g.p.m. (<u>250</u> mL/min)					
Was Well Purged Dry? <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No				Note: Average low flow rate of 0.13 g.p.m. (500 mL/min) on a 2-inch well typically results in a drawdown of 0.5 ft or less					
FIELD MONITORING PARAMETERS									
Time/Elapsed time (minutes)	00:00	03:00	06:00	09:00	12:00	15:00	18:00	21:00	24:00
Accum. Volume Purged (gal)	<u>0</u>	<u>0.20</u>	<u>0.39</u>	<u>0.59</u>	<u>0.78</u>	<u>0.98</u>	<u>1.17</u>		
Drawdown (ft)	<u>-</u>	<u>-</u>	<u>-</u>	<u>-</u>	<u>-</u>	<u>-</u>	<u>-</u>	<u>0.08</u>	
pH	<u>7.47</u>	<u>7.46</u>	<u>7.43</u>	<u>7.42</u>	<u>7.42</u>	<u>7.41</u>	<u>7.42</u>		
Temperature (C)	<u>8.10</u>	<u>7.01</u>	<u>7.05</u>	<u>6.39</u>	<u>5.94</u>	<u>5.91</u>	<u>5.71</u>		
Conductivity (mS/cm)	<u>2.04</u>	<u>2.05</u>	<u>2.06</u>	<u>2.07</u>	<u>2.08</u>	<u>2.09</u>	<u>2.10</u>		
ORP (mV)	<u>-164.6</u>	<u>-148.0</u>	<u>-161.6</u>	<u>-163.5</u>	<u>-151.7</u>	<u>-136.0</u>	<u>-147.1</u>		
Dissolved Oxygen (mg/L)	<u>2.26</u>	<u>0.87</u>	<u>0.28</u>	<u>0.51</u>	<u>0.41</u>	<u>0.19</u>	<u>0.32</u>		
Turbidity (NTU)	<u>142.60</u>	<u>117.97</u>	<u>113.57</u>	<u>80.07</u>	<u>71.50</u>	<u>63.98</u>	<u>60.02</u>		
Odor	<u>No Odor</u>								
Appearance and/or Color	<u>Brown tint</u>								
SAMPLING DATA									
Time: <u>18 min</u>	Start: <u>12:00 pm</u>	Finish: <u>12:18 pm</u>	Pump Rate (g.p.m.): <u>0.065</u> gpm (<u>250</u> mL/min)						
Sample Collection Depth (ft. from TOC): _____									
Weather Conditions: Air Temperature (F): <u>36°</u> Wind Speed/Direction: <u>20 mph/SE</u> Other: _____									
Samples Collected On chain of Custody No: <u>MW-4</u> Analytical Laboratory: <u>ALS Environmental</u>									

Other Notes: Depth to Water at end of Sampling: 3.36 ft





04-Sep-2020

Karen Okonta
NTH Consultants, Ltd.
41780 Six Mile Road
Northville, MI 48168

Re: **Holland Board of Public Works**

Work Order: **20080708**

Dear Karen,

ALS Environmental received 8 samples on 11-Aug-2020 08:00 AM for the analyses presented in the following report.

The analytical data provided relates directly to the samples received by ALS Environmental - Holland and for only the analyses requested.

Sample results are compliant with industry accepted practices and Quality Control results achieved laboratory specifications. Any exceptions are noted in the Case Narrative, or noted with qualifiers in the report or QC batch information. Should this laboratory report need to be reproduced, it should be reproduced in full unless written approval has been obtained from ALS Environmental. Samples will be disposed in 30 days unless storage arrangements are made.

The total number of pages in this report is 40.

If you have any questions regarding this report, please feel free to contact me:

ADDRESS: 3352 128th Avenue, Holland, MI, USA
PHONE: +1 (616) 399-6070 FAX: +1 (616) 399-6185

Sincerely,

A handwritten signature in black ink, appearing to read "Chad Whelton".

Electronically approved by: Chad Whelton

Chad Whelton
Project Manager

Report of Laboratory Analysis

Certificate No: MN 026-999-449

ALS GROUP USA, CORP Part of the ALS Laboratory Group A Campbell Brothers Limited Company

Client: NTH Consultants, Ltd.
Project: Holland Board of Public Works
Work Order: 20080708

Work Order Sample Summary

Lab Samp ID	Client Sample ID	Matrix	Tag Number	Collection Date	Date Received	Hold
20080708-01	MW-1	Groundwater		8/10/2020 15:06	8/11/2020 08:00	<input type="checkbox"/>
20080708-02	MW-2	Groundwater		8/10/2020 13:51	8/11/2020 08:00	<input type="checkbox"/>
20080708-03	MW-3	Groundwater		8/10/2020 12:38	8/11/2020 08:00	<input type="checkbox"/>
20080708-04	MW-3A	Groundwater		8/10/2020 17:12	8/11/2020 08:00	<input type="checkbox"/>
20080708-05	Field Blank	Groundwater		8/10/2020 16:07	8/11/2020 08:00	<input type="checkbox"/>
20080708-06	Equipment Blank	Groundwater		8/10/2020 16:15	8/11/2020 08:00	<input type="checkbox"/>
20080708-07	DUP-1 (Field DUP)	Groundwater		8/10/2020	8/11/2020 08:00	<input type="checkbox"/>
20080708-08	PZ-1	Groundwater		8/10/2020 09:40	8/11/2020 08:00	<input type="checkbox"/>

Client: NTH Consultants, Ltd.
Project: Holland Board of Public Works
Work Order: 20080708

Case Narrative

Samples for the above noted Work Order were received on 08/11/2020. The attached "Sample Receipt Checklist" documents the status of custody seals, container integrity, preservation, and temperature compliance.

Samples were analyzed according to the analytical methodology previously transmitted in the "Work Order Acknowledgement". Methodologies are also documented in the "Analytical Result" section for each sample. Quality control results are listed in the "QC Report" section. Sample association for the reported quality control is located at the end of each batch summary. If applicable, results are appropriately qualified in the Analytical Result and QC Report sections. The "Qualifiers" section documents the various qualifiers, units, and acronyms utilized in reporting. A copy of the laboratory's scope of accreditation is available upon request.

With the following exceptions, all sample analyses achieved analytical criteria.

Metals:

Batch 162899, Method ICP_6020_W, Sample 20080708-02A MSD: The MSD recovery was outside of the control limit for Calcium; however, the result in the parent sample is greater than 4x the spike amount. No qualification is required.

Wet Chemistry:

Batch R295823, Method IC_300.0_WW, Sample 20080708-02B: The reporting limit for Sulfate is elevated due to dilution for high concentrations of non-target analytes.

Batch R295863, Method PH_4500_W, Sample LCS-R295863: Sample was processed outside of holding time for pH, as the analysis is a field test and holding time is defined as 15 minutes.

Radium analysis performed by ALS Fort Collins laboratory.

<u>Qualifier</u>	<u>Description</u>
*	Value exceeds Regulatory Limit
**	Estimated Value
a	Analyte is non-accredited
B	Analyte detected in the associated Method Blank above the Reporting Limit
E	Value above quantitation range
H	Analyzed outside of Holding Time
Hr	BOD/CBOD - Sample was reset outside Hold Time, value should be considered estimated.
J	Analyte is present at an estimated concentration between the MDL and Report Limit
ND	Not Detected at the Reporting Limit
O	Sample amount is > 4 times amount spiked
P	Dual Column results percent difference > 40%
R	RPD above laboratory control limit
S	Spike Recovery outside laboratory control limits
U	Analyzed but not detected above the MDL
X	Analyte was detected in the Method Blank between the MDL and Reporting Limit, sample results may exhibit background or reagent contamination at the observed level.

<u>Acronym</u>	<u>Description</u>
DUP	Method Duplicate
LCS	Laboratory Control Sample
LCSD	Laboratory Control Sample Duplicate
LOD	Limit of Detection (see MDL)
LOQ	Limit of Quantitation (see PQL)
MBLK	Method Blank
MDL	Method Detection Limit
MS	Matrix Spike
MSD	Matrix Spike Duplicate
PQL	Practical Quantitation Limit
RPD	Relative Percent Difference
TDL	Target Detection Limit
TNTC	Too Numerous To Count
A	APHA Standard Methods
D	ASTM
E	EPA
SW	SW-846 Update III

<u>Units Reported</u>	<u>Description</u>
°C	Degrees Celcius
as noted	
mg/L	Milligrams per Liter
s.u.	Standard Units

Client: NTH Consultants, Ltd.
Project: Holland Board of Public Works
Sample ID: MW-1
Collection Date: 8/10/2020 03:06 PM

Work Order: 20080708
Lab ID: 20080708-01
Matrix: GROUNDWATER

Analyses	Result	Qual	Report Limit	Units	Dilution Factor	Date Analyzed
MERCURY BY CVAA						
Mercury	ND		0.00020	mg/L	1	8/12/2020 01:43 PM
METALS BY ICP-MS						
Antimony	ND		0.0050	mg/L	1	8/20/2020 03:10 PM
Arsenic	0.024		0.0050	mg/L	1	8/20/2020 03:10 PM
Barium	0.26		0.0050	mg/L	1	8/20/2020 03:10 PM
Beryllium	ND		0.0020	mg/L	1	8/21/2020 03:03 PM
Boron	1.6		0.020	mg/L	1	8/20/2020 03:10 PM
Cadmium	ND		0.0020	mg/L	1	8/20/2020 03:10 PM
Calcium	86		0.50	mg/L	1	8/20/2020 03:10 PM
Chromium	ND		0.0050	mg/L	1	8/20/2020 03:10 PM
Cobalt	ND		0.0050	mg/L	1	8/20/2020 03:10 PM
Lead	ND		0.0050	mg/L	1	8/20/2020 03:10 PM
Lithium	0.13		0.010	mg/L	1	8/20/2020 03:10 PM
Molybdenum	ND		0.0050	mg/L	1	8/20/2020 03:10 PM
Selenium	ND		0.0050	mg/L	1	8/20/2020 03:10 PM
Thallium	ND		0.0020	mg/L	1	8/20/2020 03:10 PM
ANIONS BY ION CHROMATOGRAPHY						
Chloride	320		40	mg/L	40	8/11/2020 03:25 PM
Fluoride	1.1		0.10	mg/L	1	8/11/2020 01:10 PM
Sulfate	ND		1.0	mg/L	1	8/11/2020 01:10 PM
PH (LABORATORY)						
pH (laboratory)	6.96	H	0.100	s.u.	1	8/12/2020 02:01 PM
Temperature	20.6	H	0.100	°C	1	8/12/2020 02:01 PM
TOTAL DISSOLVED SOLIDS						
Total Dissolved Solids	930		150	mg/L	1	8/13/2020 02:15 PM
SUBCONTRACTED ANALYSES						
Subcontracted Analyses	See attached		SUBCONTRACT as noted		1	Analyst: ALS 9/4/2020

Note: See Qualifiers page for a list of qualifiers and their definitions.

Client: NTH Consultants, Ltd.
Project: Holland Board of Public Works
Sample ID: MW-2
Collection Date: 8/10/2020 01:51 PM

Work Order: 20080708
Lab ID: 20080708-02
Matrix: GROUNDWATER

Analyses	Result	Qual	Report Limit	Units	Dilution Factor	Date Analyzed
MERCURY BY CVAA						
Mercury	ND		0.00020	mg/L	1	8/12/2020 01:50 PM
METALS BY ICP-MS						
Antimony	ND		0.0050	mg/L	1	8/20/2020 03:12 PM
Arsenic	ND		0.0050	mg/L	1	8/20/2020 03:12 PM
Barium	0.21		0.0050	mg/L	1	8/20/2020 03:12 PM
Beryllium	ND		0.0020	mg/L	1	8/21/2020 03:05 PM
Boron	0.77		0.020	mg/L	1	8/20/2020 03:12 PM
Cadmium	ND		0.0020	mg/L	1	8/20/2020 03:12 PM
Calcium	75		0.50	mg/L	1	8/20/2020 03:12 PM
Chromium	ND		0.0050	mg/L	1	8/20/2020 03:12 PM
Cobalt	ND		0.0050	mg/L	1	8/20/2020 03:12 PM
Lead	ND		0.0050	mg/L	1	8/20/2020 03:12 PM
Lithium	0.010		0.010	mg/L	1	8/20/2020 03:12 PM
Molybdenum	ND		0.0050	mg/L	1	8/20/2020 03:12 PM
Selenium	ND		0.0050	mg/L	1	8/20/2020 03:12 PM
Thallium	ND		0.0050	mg/L	1	8/20/2020 03:12 PM
ANIONS BY ION CHROMATOGRAPHY						
Chloride	680		80	mg/L	80	8/11/2020 04:22 PM
Fluoride	0.93		0.20	mg/L	2	8/11/2020 01:30 PM
Sulfate	ND		2.0	mg/L	2	8/11/2020 01:30 PM
PH (LABORATORY)						
pH (laboratory)	6.90	H	0.100	s.u.	1	8/12/2020 02:01 PM
Temperature	20.8	H	0.100	°C	1	8/12/2020 02:01 PM
TOTAL DISSOLVED SOLIDS						
Total Dissolved Solids	1,400		75	mg/L	1	8/13/2020 02:15 PM
SUBCONTRACTED ANALYSES						
Subcontracted Analyses	See attached			SUBCONTRACT as noted	1	Analyst: ALS 9/4/2020

Note: See Qualifiers page for a list of qualifiers and their definitions.

Client: NTH Consultants, Ltd.
Project: Holland Board of Public Works
Sample ID: MW-3
Collection Date: 8/10/2020 12:38 PM

Work Order: 20080708
Lab ID: 20080708-03
Matrix: GROUNDWATER

Analyses	Result	Qual	Report Limit	Units	Dilution Factor	Date Analyzed
MERCURY BY CVAA						
Mercury	ND		0.00020	mg/L	1	8/13/2020 01:52 PM
METALS BY ICP-MS						
Antimony	ND		0.0050	mg/L	1	8/20/2020 03:17 PM
Arsenic	ND		0.0050	mg/L	1	8/20/2020 03:17 PM
Barium	0.074		0.0050	mg/L	1	8/20/2020 03:17 PM
Beryllium	ND		0.0020	mg/L	1	8/21/2020 03:14 PM
Boron	0.48		0.020	mg/L	1	8/20/2020 03:17 PM
Cadmium	ND		0.0020	mg/L	1	8/20/2020 03:17 PM
Calcium	53		0.50	mg/L	1	8/20/2020 03:17 PM
Chromium	ND		0.0050	mg/L	1	8/20/2020 03:17 PM
Cobalt	ND		0.0050	mg/L	1	8/20/2020 03:17 PM
Lead	ND		0.0050	mg/L	1	8/20/2020 03:17 PM
Lithium	0.017		0.010	mg/L	1	8/20/2020 03:17 PM
Molybdenum	ND		0.0050	mg/L	1	8/20/2020 03:17 PM
Selenium	ND		0.0050	mg/L	1	8/20/2020 03:17 PM
Thallium	ND		0.0020	mg/L	1	8/20/2020 03:17 PM
ANIONS BY ION CHROMATOGRAPHY						
Chloride	69		4.0	mg/L	4	8/11/2020 05:20 PM
Fluoride	ND		1.0	mg/L	1	8/11/2020 01:49 PM
Sulfate	41		8.0	mg/L	4	8/11/2020 05:20 PM
PH (LABORATORY)						
pH (laboratory)	6.78	H	0.100	s.u.	1	8/12/2020 02:01 PM
Temperature	20.8	H	0.100	°C	1	8/12/2020 02:01 PM
TOTAL DISSOLVED SOLIDS						
Total Dissolved Solids	410		150	mg/L	1	8/13/2020 02:15 PM
SUBCONTRACTED ANALYSES						
Subcontracted Analyses	See attached		SUBCONTRACT as noted		1	Analyst: ALS 9/4/2020

Note: See Qualifiers page for a list of qualifiers and their definitions.

Client: NTH Consultants, Ltd.
Project: Holland Board of Public Works
Sample ID: MW-3A
Collection Date: 8/10/2020 05:12 PM

Work Order: 20080708
Lab ID: 20080708-04
Matrix: GROUNDWATER

Analyses	Result	Qual	Report Limit	Units	Dilution Factor	Date Analyzed
MERCURY BY CVAA						
Mercury	ND		0.00020	mg/L	1	8/13/2020 01:53 PM
METALS BY ICP-MS						
Antimony	ND		0.0050	mg/L	1	8/20/2020 03:18 PM
Arsenic	ND		0.0050	mg/L	1	8/20/2020 03:18 PM
Barium	0.25		0.0050	mg/L	1	8/20/2020 03:18 PM
Beryllium	ND		0.0020	mg/L	1	8/21/2020 03:16 PM
Boron	0.63		0.020	mg/L	1	8/20/2020 03:18 PM
Cadmium	ND		0.0020	mg/L	1	8/20/2020 03:18 PM
Calcium	130		0.50	mg/L	1	8/20/2020 03:18 PM
Chromium	ND		0.0050	mg/L	1	8/20/2020 03:18 PM
Cobalt	ND		0.0050	mg/L	1	8/20/2020 03:18 PM
Lead	ND		0.0050	mg/L	1	8/20/2020 03:18 PM
Lithium	ND		0.010	mg/L	1	8/20/2020 03:18 PM
Molybdenum	ND		0.0050	mg/L	1	8/20/2020 03:18 PM
Selenium	ND		0.0050	mg/L	1	8/20/2020 03:18 PM
Thallium	ND		0.0020	mg/L	1	8/20/2020 03:18 PM
ANIONS BY ION CHROMATOGRAPHY						
Chloride	110		16	mg/L	16	8/11/2020 05:58 PM
Fluoride	ND		1.0	mg/L	1	8/11/2020 02:08 PM
Sulfate	ND		2.0	mg/L	1	8/11/2020 02:08 PM
PH (LABORATORY)						
pH (laboratory)	6.87	H	0.100	s.u.	1	8/12/2020 02:01 PM
Temperature	20.6	H	0.100	°C	1	8/12/2020 02:01 PM
TOTAL DISSOLVED SOLIDS						
Total Dissolved Solids	610		50	mg/L	1	8/13/2020 02:15 PM
SUBCONTRACTED ANALYSES						
Subcontracted Analyses	See attached			SUBCONTRACT as noted	1	Analyst: ALS 9/4/2020

Note: See Qualifiers page for a list of qualifiers and their definitions.

Client: NTH Consultants, Ltd.
Project: Holland Board of Public Works
Sample ID: Field Blank
Collection Date: 8/10/2020 04:07 PM

Work Order: 20080708
Lab ID: 20080708-05
Matrix: GROUNDWATER

Analyses	Result	Qual	Report Limit	Units	Dilution Factor	Date Analyzed
MERCURY BY CVAA						
Mercury	ND		0.00020	mg/L	1	8/13/2020 01:55 PM
METALS BY ICP-MS						
Antimony	ND		0.0050	mg/L	1	8/20/2020 03:20 PM
Arsenic	ND		0.0050	mg/L	1	8/20/2020 03:20 PM
Barium	ND		0.0050	mg/L	1	8/20/2020 03:20 PM
Beryllium	ND		0.0020	mg/L	1	8/21/2020 03:17 PM
Boron	ND		0.020	mg/L	1	8/20/2020 03:20 PM
Cadmium	ND		0.0020	mg/L	1	8/20/2020 03:20 PM
Calcium	ND		0.50	mg/L	1	8/20/2020 03:20 PM
Chromium	ND		0.0050	mg/L	1	8/20/2020 03:20 PM
Cobalt	ND		0.0050	mg/L	1	8/20/2020 03:20 PM
Lead	ND		0.0050	mg/L	1	8/20/2020 03:20 PM
Lithium	ND		0.010	mg/L	1	8/20/2020 03:20 PM
Molybdenum	ND		0.0050	mg/L	1	8/20/2020 03:20 PM
Selenium	ND		0.0050	mg/L	1	8/20/2020 03:20 PM
Thallium	ND		0.0020	mg/L	1	8/20/2020 03:20 PM
ANIONS BY ION CHROMATOGRAPHY						
Chloride	ND		1.0	mg/L	1	8/11/2020 12:32 PM
Fluoride	ND		1.0	mg/L	1	8/11/2020 12:32 PM
Sulfate	ND		2.0	mg/L	1	8/11/2020 12:32 PM
PH (LABORATORY)						
pH (laboratory)	6.51	H	0.100	s.u.	1	8/12/2020 02:01 PM
Temperature	20.6	H	0.100	°C	1	8/12/2020 02:01 PM
TOTAL DISSOLVED SOLIDS						
Total Dissolved Solids	ND		30	mg/L	1	8/13/2020 02:15 PM
SUBCONTRACTED ANALYSES						
Subcontracted Analyses	See attached			SUBCONTRACT as noted	1	Analyst: ALS 9/4/2020

Note: See Qualifiers page for a list of qualifiers and their definitions.

Client: NTH Consultants, Ltd.
Project: Holland Board of Public Works
Sample ID: Equipment Blank
Collection Date: 8/10/2020 04:15 PM

Work Order: 20080708
Lab ID: 20080708-06
Matrix: GROUNDWATER

Analyses	Result	Qual	Report Limit	Units	Dilution Factor	Date Analyzed
MERCURY BY CVAA						
Mercury	ND		0.00020	mg/L	1	8/13/2020 01:57 PM
METALS BY ICP-MS						
Antimony	ND		0.0050	mg/L	1	8/20/2020 03:26 PM
Arsenic	ND		0.0050	mg/L	1	8/20/2020 03:26 PM
Barium	ND		0.0050	mg/L	1	8/20/2020 03:26 PM
Beryllium	ND		0.0020	mg/L	1	8/20/2020 03:26 PM
Boron	ND		0.020	mg/L	1	8/20/2020 03:26 PM
Cadmium	ND		0.0020	mg/L	1	8/20/2020 03:26 PM
Calcium	ND		0.50	mg/L	1	8/20/2020 03:26 PM
Chromium	ND		0.0050	mg/L	1	8/20/2020 03:26 PM
Cobalt	ND		0.0050	mg/L	1	8/20/2020 03:26 PM
Lead	ND		0.0050	mg/L	1	8/20/2020 03:26 PM
Lithium	ND		0.010	mg/L	1	8/20/2020 03:26 PM
Molybdenum	ND		0.0050	mg/L	1	8/20/2020 03:26 PM
Selenium	ND		0.0050	mg/L	1	8/20/2020 03:26 PM
Thallium	ND		0.0020	mg/L	1	8/20/2020 03:26 PM
ANIONS BY ION CHROMATOGRAPHY						
Chloride	ND		1.0	mg/L	1	8/11/2020 12:51 PM
Fluoride	ND		1.0	mg/L	1	8/11/2020 12:51 PM
Sulfate	ND		2.0	mg/L	1	8/11/2020 12:51 PM
PH (LABORATORY)						
pH (laboratory)	6.04	H	0.100	s.u.	1	8/12/2020 02:01 PM
Temperature	20.7	H	0.100	°C	1	8/12/2020 02:01 PM
TOTAL DISSOLVED SOLIDS						
Total Dissolved Solids	ND		30	mg/L	1	8/13/2020 02:15 PM
SUBCONTRACTED ANALYSES						
Subcontracted Analyses	See attached			SUBCONTRACT as noted	1	Analyst: ALS 9/4/2020

Note: See Qualifiers page for a list of qualifiers and their definitions.

Client: NTH Consultants, Ltd.
Project: Holland Board of Public Works
Sample ID: DUP-1 (Field DUP)
Collection Date: 8/10/2020

Work Order: 20080708
Lab ID: 20080708-07
Matrix: GROUNDWATER

Analyses	Result	Qual	Report Limit	Units	Dilution Factor	Date Analyzed
MERCURY BY CVAA						
Mercury	ND		0.00020	mg/L	1	8/13/2020 01:59 PM
METALS BY ICP-MS						
Antimony	ND		0.0050	mg/L	1	8/20/2020 03:28 PM
Arsenic	ND		0.0050	mg/L	1	8/20/2020 03:28 PM
Barium	0.25		0.0050	mg/L	1	8/20/2020 03:28 PM
Beryllium	ND		0.0020	mg/L	1	8/20/2020 03:28 PM
Boron	0.63		0.020	mg/L	1	8/20/2020 03:28 PM
Cadmium	ND		0.0020	mg/L	1	8/20/2020 03:28 PM
Calcium	130		0.50	mg/L	1	8/20/2020 03:28 PM
Chromium	ND		0.0050	mg/L	1	8/20/2020 03:28 PM
Cobalt	ND		0.0050	mg/L	1	8/20/2020 03:28 PM
Lead	ND		0.0050	mg/L	1	8/20/2020 03:28 PM
Lithium	ND		0.010	mg/L	1	8/20/2020 03:28 PM
Molybdenum	ND		0.0050	mg/L	1	8/20/2020 03:28 PM
Selenium	ND		0.0050	mg/L	1	8/20/2020 03:28 PM
Thallium	ND		0.0020	mg/L	1	8/20/2020 03:28 PM
ANIONS BY ION CHROMATOGRAPHY						
Chloride	110		16	mg/L	16	8/11/2020 06:17 PM
Fluoride	ND		1.0	mg/L	1	8/11/2020 02:27 PM
Sulfate	ND		2.0	mg/L	1	8/11/2020 02:27 PM
PH (LABORATORY)						
pH (laboratory)	6.90	H	0.100	s.u.	1	8/12/2020 02:01 PM
Temperature	20.8	H	0.100	°C	1	8/12/2020 02:01 PM
TOTAL DISSOLVED SOLIDS						
Total Dissolved Solids	580		50	mg/L	1	8/13/2020 02:15 PM
SUBCONTRACTED ANALYSES						
Subcontracted Analyses	See attached			SUBCONTRACT as noted	1	Analyst: ALS 9/4/2020

Note: See Qualifiers page for a list of qualifiers and their definitions.

Client: NTH Consultants, Ltd.
Project: Holland Board of Public Works
Sample ID: PZ-1
Collection Date: 8/10/2020 09:40 AM

Work Order: 20080708
Lab ID: 20080708-08
Matrix: GROUNDWATER

Analyses	Result	Qual	Report Limit	Units	Dilution Factor	Date Analyzed
MERCURY BY CVAA						
Mercury	ND		0.00020	mg/L	1	8/13/2020 02:00 PM
METALS BY ICP-MS						
Antimony	ND		0.0050	mg/L	1	8/20/2020 03:29 PM
Arsenic	0.044		0.0050	mg/L	1	8/20/2020 03:29 PM
Barium	0.057		0.0050	mg/L	1	8/20/2020 03:29 PM
Beryllium	ND		0.0020	mg/L	1	8/20/2020 03:29 PM
Boron	0.49		0.020	mg/L	1	8/20/2020 03:29 PM
Cadmium	ND		0.0020	mg/L	1	8/20/2020 03:29 PM
Calcium	33		0.50	mg/L	1	8/20/2020 03:29 PM
Chromium	0.014		0.0050	mg/L	1	8/20/2020 03:29 PM
Cobalt	ND		0.0050	mg/L	1	8/20/2020 03:29 PM
Lead	0.051		0.0050	mg/L	1	8/20/2020 03:29 PM
Lithium	ND		0.010	mg/L	1	8/20/2020 03:29 PM
Molybdenum	0.061		0.0050	mg/L	1	8/20/2020 03:29 PM
Selenium	ND		0.0050	mg/L	1	8/20/2020 03:29 PM
Thallium	ND		0.0020	mg/L	1	8/20/2020 03:29 PM
ANIONS BY ION CHROMATOGRAPHY						
Chloride	140		16	mg/L	16	8/11/2020 06:36 PM
Fluoride	1.1		1.0	mg/L	1	8/11/2020 02:46 PM
Sulfate	2.1		2.0	mg/L	1	8/11/2020 02:46 PM
PH (LABORATORY)						
pH (laboratory)	8.54	H	0.100	s.u.	1	8/12/2020 02:01 PM
Temperature	21.0	H	0.100	°C	1	8/12/2020 02:01 PM
TOTAL DISSOLVED SOLIDS						
Total Dissolved Solids	1,600		150	mg/L	1	8/13/2020 02:15 PM
SUBCONTRACTED ANALYSES						
Subcontracted Analyses	See attached		SUBCONTRACT as noted		1	Analyst: ALS 9/4/2020

Note: See Qualifiers page for a list of qualifiers and their definitions.

Client: NTH Consultants, Ltd.
Work Order: 20080708
Project: Holland Board of Public Works

QC BATCH REPORT

Batch ID: 161484		Instrument ID HG4		Method: SW7470A											
MBLK		Sample ID: MBLK-161484-161484			Units: mg/L		Analysis Date: 8/12/2020 01:28 PM								
Client ID:		Run ID: HG4_200812A			SeqNo: 6630236		Prep Date: 8/12/2020		DF: 1						
Analyte		Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual				
Mercury		ND	0.00020												
LCS		Sample ID: LCS-161484-161484			Units: mg/L		Analysis Date: 8/12/2020 01:30 PM								
Client ID:		Run ID: HG4_200812A			SeqNo: 6630237		Prep Date: 8/12/2020		DF: 1						
Analyte		Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual				
Mercury		0.002115	0.00020	0.002	0	106	80-120		0						
MS		Sample ID: 20080708-02AMS			Units: mg/L		Analysis Date: 8/12/2020 01:51 PM								
Client ID: MW-2		Run ID: HG4_200812A			SeqNo: 6630249		Prep Date: 8/12/2020		DF: 1						
Analyte		Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual				
Mercury		0.00207	0.00020	0.002	0.0000015	103	75-125		0						
MSD		Sample ID: 20080708-02AMSD			Units: mg/L		Analysis Date: 8/12/2020 01:53 PM								
Client ID: MW-2		Run ID: HG4_200812A			SeqNo: 6630250		Prep Date: 8/12/2020		DF: 1						
Analyte		Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual				
Mercury		0.002085	0.00020	0.002	0.0000015	104	75-125	0.00207	0.722	20					

The following samples were analyzed in this batch:

20080708-01A 20080708-02A

Client: NTH Consultants, Ltd.
Work Order: 20080708
Project: Holland Board of Public Works

QC BATCH REPORT

Batch ID: **161552** Instrument ID **HG4** Method: **SW7470A**

MBLK				Sample ID: MBLK-161552-161552		Units: mg/L		Analysis Date: 8/13/2020 01:46 PM			
Client ID:		Run ID: HG4_200813A		SeqNo: 6634238		Prep Date: 8/13/2020		DF: 1			
Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual	
Mercury	ND	0.00020									
LCS				Sample ID: LCS-161552-161552		Units: mg/L		Analysis Date: 8/13/2020 01:48 PM			
Client ID:		Run ID: HG4_200813A		SeqNo: 6634239		Prep Date: 8/13/2020		DF: 1			
Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual	
Mercury	0.00207	0.00020	0.002	0	104	80-120	0				
MS				Sample ID: 20080781-03BMS		Units: mg/L		Analysis Date: 8/13/2020 02:22 PM			
Client ID:		Run ID: HG4_200813A		SeqNo: 6634258		Prep Date: 8/13/2020		DF: 1			
Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual	
Mercury	0.003885	0.00020	0.002	0.001755	106	75-125	0				
MSD				Sample ID: 20080781-03BMSD		Units: mg/L		Analysis Date: 8/13/2020 02:23 PM			
Client ID:		Run ID: HG4_200813A		SeqNo: 6634259		Prep Date: 8/13/2020		DF: 1			
Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual	
Mercury	0.00387	0.00020	0.002	0.001755	106	75-125	0.003885	0.387	20		

The following samples were analyzed in this batch:

20080708-03A	20080708-04A	20080708-05A
20080708-06A	20080708-07A	20080708-08A

Note: See Qualifiers Page for a list of Qualifiers and their explanation.

Client: NTH Consultants, Ltd.
Work Order: 20080708
Project: Holland Board of Public Works

QC BATCH REPORT

Batch ID: **162899** Instrument ID **ICPMS3** Method: **SW6020B**

MBLK Sample ID: MBLK-162899-162899				Units: mg/L		Analysis Date: 8/20/2020 03:07 PM				
Client ID:		Run ID: ICPMS3_200820A		SeqNo: 6649372		Prep Date: 8/20/2020		DF: 1		
Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
Antimony	ND	0.0050								
Arsenic	ND	0.0050								
Barium	ND	0.0050								
Boron	0.01528	0.020								
Cadmium	ND	0.0020								
Calcium	ND	0.50								
Chromium	ND	0.0050								
Cobalt	ND	0.0050								
Lead	ND	0.0050								
Lithium	ND	0.010								
Molybdenum	ND	0.0050								
Selenium	ND	0.0050								
Thallium	ND	0.0050								

MBLK Sample ID: MBLK-162899-162899				Units: mg/L		Analysis Date: 8/21/2020 03:00 PM				
Client ID:		Run ID: ICPMS3_200821A		SeqNo: 6652422		Prep Date: 8/20/2020		DF: 1		
Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
Beryllium	ND	0.0020								

LCS Sample ID: LCS-162899-162899				Units: mg/L		Analysis Date: 8/20/2020 03:08 PM				
Client ID:		Run ID: ICPMS3_200820A		SeqNo: 6649373		Prep Date: 8/20/2020		DF: 1		
Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
Antimony	0.1042	0.0050	0.1	0	104	80-120		0		
Arsenic	0.09688	0.0050	0.1	0	96.9	80-120		0		
Barium	0.09955	0.0050	0.1	0	99.6	80-120		0		
Boron	0.5054	0.020	0.5	0	101	80-120		0		
Cadmium	0.1037	0.0020	0.1	0	104	80-120		0		
Calcium	10.36	0.50	10	0	104	80-120		0		
Chromium	0.1021	0.0050	0.1	0	102	80-120		0		
Cobalt	0.1032	0.0050	0.1	0	103	80-120		0		
Lead	0.1015	0.0050	0.1	0	101	80-120		0		
Lithium	0.09334	0.010	0.1	0	93.3	80-120		0		
Molybdenum	0.09912	0.0050	0.1	0	99.1	80-120		0		
Selenium	0.09904	0.0050	0.1	0	99	80-120		0		
Thallium	0.09549	0.0050	0.1	0	95.5	80-120		0		

Note: See Qualifiers Page for a list of Qualifiers and their explanation.

Client: NTH Consultants, Ltd.
Work Order: 20080708
Project: Holland Board of Public Works

QC BATCH REPORT

Batch ID: **162899** Instrument ID **ICPMS3** Method: **SW6020B**

MS		Sample ID: 20080708-02AMS			Units: mg/L		Analysis Date: 8/20/2020 03:13 PM			
Client ID: MW-2		Run ID: ICPMS3_200820A			SeqNo: 6649376		Prep Date: 8/20/2020		DF: 1	
Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
Antimony	0.1086	0.0050	0.1	0.0000528	109	75-125		0		
Arsenic	0.107	0.0050	0.1	0.002669	104	75-125		0		
Barium	0.3062	0.0050	0.1	0.2095	96.8	75-125		0		
Boron	1.239	0.020	0.5	0.7665	94.5	75-125		0		
Cadmium	0.1082	0.0020	0.1	-0.000033	108	75-125		0		
Calcium	82.55	0.50	10	75.02	75.3	75-125		0		O
Chromium	0.1064	0.0050	0.1	0.001461	105	75-125		0		
Cobalt	0.1076	0.0050	0.1	0.0004807	107	75-125		0		
Lead	0.1088	0.0050	0.1	0.0001419	109	75-125		0		
Lithium	0.1073	0.010	0.1	0.01028	97	75-125		0		
Molybdenum	0.1055	0.0050	0.1	-0.0000033	106	75-125		0		
Selenium	0.1035	0.0050	0.1	0.0005764	103	75-125		0		
Thallium	0.1022	0.0050	0.1	0.0000154	102	75-125		0		
MS		Sample ID: 20080708-02AMS			Units: mg/L		Analysis Date: 8/21/2020 03:06 PM			
Client ID: MW-2		Run ID: ICPMS3_200821A			SeqNo: 6652426		Prep Date: 8/20/2020		DF: 1	
Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
Beryllium	0.1078	0.0020	0.1	0.0000286	108	75-125		0		
MSD		Sample ID: 20080708-02AMSD			Units: mg/L		Analysis Date: 8/20/2020 03:15 PM			
Client ID: MW-2		Run ID: ICPMS3_200820A			SeqNo: 6649377		Prep Date: 8/20/2020		DF: 1	
Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
Antimony	0.1099	0.0050	0.1	0.0000528	110	75-125	0.1086	1.26	20	
Arsenic	0.1076	0.0050	0.1	0.002669	105	75-125	0.107	0.554	20	
Barium	0.3077	0.0050	0.1	0.2095	98.2	75-125	0.3062	0.465	20	
Boron	1.236	0.020	0.5	0.7665	94	75-125	1.239	0.195	20	
Cadmium	0.1091	0.0020	0.1	-0.000033	109	75-125	0.1082	0.835	20	
Calcium	81.86	0.50	10	75.02	68.4	75-125	82.55	0.84	20	SO
Chromium	0.1073	0.0050	0.1	0.001461	106	75-125	0.1064	0.903	20	
Cobalt	0.1084	0.0050	0.1	0.0004807	108	75-125	0.1076	0.794	20	
Lead	0.1087	0.0050	0.1	0.0001419	109	75-125	0.1088	0.0607	20	
Lithium	0.1079	0.010	0.1	0.01028	97.6	75-125	0.1073	0.579	20	
Molybdenum	0.1074	0.0050	0.1	-0.0000033	107	75-125	0.1055	1.75	20	
Selenium	0.1016	0.0050	0.1	0.0005764	101	75-125	0.1035	1.81	20	
Thallium	0.1032	0.0050	0.1	0.0000154	103	75-125	0.1022	0.978	20	

Note: See Qualifiers Page for a list of Qualifiers and their explanation.

Client: NTH Consultants, Ltd.
Work Order: 20080708
Project: Holland Board of Public Works

QC BATCH REPORT

Batch ID: **162899** Instrument ID **ICPMS3** Method: **SW6020B**

MSD		Sample ID: 20080708-02AMSD			Units: mg/L		Analysis Date: 8/21/2020 03:08 PM			
Client ID: MW-2		Run ID: ICPMS3_200821A			SeqNo: 6652427		Prep Date: 8/20/2020		DF: 1	
Analyte		Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	RPD Limit	Qual
Beryllium		0.1112	0.0020	0.1	0.0000286	111	75-125	0.1078	3.11	20

The following samples were analyzed in this batch:

20080708-01A	20080708-02A	20080708-03A
20080708-04A	20080708-05A	20080708-06A
20080708-07A	20080708-08A	

Note: See Qualifiers Page for a list of Qualifiers and their explanation.

Client: NTH Consultants, Ltd.
Work Order: 20080708
Project: Holland Board of Public Works

QC BATCH REPORT

Batch ID: **161500** Instrument ID **TDS** Method: **A2540 C-11**

Sample ID: MBLK-161500-161500				Units: mg/L		Analysis Date: 8/13/2020 02:15 PM				
Client ID:		Run ID: TDS_200813B		SeqNo: 6632659		Prep Date: 8/12/2020		DF: 1		
Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
Total Dissolved Solids	ND	30								
Sample ID: LCS-161500-161500				Units: mg/L		Analysis Date: 8/13/2020 02:15 PM				
Client ID:		Run ID: TDS_200813B		SeqNo: 6632658		Prep Date: 8/12/2020		DF: 1		
Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
Total Dissolved Solids	474	30	495	0	95.8	85-109	0			
Sample ID: 20080708-02B DUP				Units: mg/L		Analysis Date: 8/13/2020 02:15 PM				
Client ID: MW-2		Run ID: TDS_200813B		SeqNo: 6632642		Prep Date: 8/12/2020		DF: 1		
Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
Total Dissolved Solids	1410	75	0	0	0	0-0	1385	1.79	10	
Sample ID: 20080746-01A DUP				Units: mg/L		Analysis Date: 8/13/2020 02:15 PM				
Client ID:		Run ID: TDS_200813B		SeqNo: 6632655		Prep Date: 8/12/2020		DF: 1		
Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
Total Dissolved Solids	253.3	50	0	0	0	0-0	253.3	0	10	

The following samples were analyzed in this batch:

20080708-01B	20080708-02B	20080708-03B
20080708-04B	20080708-05B	20080708-06B
20080708-07B	20080708-08B	

Note: See Qualifiers Page for a list of Qualifiers and their explanation.

Client: NTH Consultants, Ltd.
Work Order: 20080708
Project: Holland Board of Public Works

QC BATCH REPORT

Batch ID: **R295823** Instrument ID **IC4** Method: **E300.0**

Sample ID: CCB/MBLK-R295823				Units: mg/L		Analysis Date: 8/11/2020 11:54 AM				
Client ID:		Run ID: IC4_200811A		SeqNo: 6628065		Prep Date:		DF: 1		
Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
Chloride	ND	1.0								
Fluoride	ND	0.10								
Sulfate	ND	1.0								

Sample ID: LCS-R295823				Units: mg/L		Analysis Date: 8/11/2020 12:13 PM				
Client ID:		Run ID: IC4_200811A		SeqNo: 6628067		Prep Date:		DF: 1		
Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
Chloride	9.393	1.0	10	0	93.9	90-110	0			
Fluoride	1.857	0.10	2	0	92.9	90-110	0			
Sulfate	9.484	1.0	10	0	94.8	90-110	0			

Sample ID: 20080708-02B MS				Units: mg/L		Analysis Date: 8/11/2020 04:41 PM				
Client ID: MW-2		Run ID: IC4_200811A		SeqNo: 6628087		Prep Date:		DF: 80		
Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
Chloride	1457	80	800	681.5	97	80-120	0			
Fluoride	170.5	8.0	160	0	107	80-120	0			
Sulfate	774.5	80	800	0	96.8	80-120	0			

Sample ID: 20080708-02B MSD				Units: mg/L		Analysis Date: 8/11/2020 05:01 PM				
Client ID: MW-2		Run ID: IC4_200811A		SeqNo: 6628088		Prep Date:		DF: 80		
Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
Chloride	1456	80	800	681.5	96.8	80-120	1457	0.122	20	
Fluoride	166.5	8.0	160	0	104	80-120	170.5	2.35	20	
Sulfate	772.9	80	800	0	96.6	80-120	774.5	0.207	20	

The following samples were analyzed in this batch:

20080708-01B	20080708-02B	20080708-03B
20080708-04B	20080708-05B	20080708-06B
20080708-07B	20080708-08B	

Note: See Qualifiers Page for a list of Qualifiers and their explanation.

Client: NTH Consultants, Ltd.
Work Order: 20080708
Project: Holland Board of Public Works

QC BATCH REPORT

Batch ID: **R295863** Instrument ID **Titrator 1** Method: **A4500-H B-11**

LCS Sample ID: LCS-R295863-R295863				Units: s.u.			Analysis Date: 8/12/2020 02:01 PM			
Client ID:		Run ID: TITRATOR 1_200812B		SeqNo: 6629470		Prep Date:		DF: 1		
Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
pH (laboratory)	3.97	0.10	4	0	99.2	92-108		0		
LCS Sample ID: LCS-R295863-R295863				Units: s.u.			Analysis Date: 8/12/2020 02:01 PM			
Client ID:		Run ID: TITRATOR 1_200812B		SeqNo: 6629492		Prep Date:		DF: 1		
Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
pH (laboratory)	3.97	0.10	4	0	99.2	92-108		0		
DUP Sample ID: 20080708-02B DUP				Units: s.u.			Analysis Date: 8/12/2020 02:01 PM			
Client ID: MW-2		Run ID: TITRATOR 1_200812B		SeqNo: 6629473		Prep Date:		DF: 1		
Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
pH (laboratory)	6.91	0.10	0	0	0	0-0		6.9	0.145	5 H
Temperature	20.89	0.10	0	0	0	0-0		20.78	0.528	H
DUP Sample ID: 20080735-02A DUP				Units: s.u.			Analysis Date: 8/12/2020 02:01 PM			
Client ID:		Run ID: TITRATOR 1_200812B		SeqNo: 6629484		Prep Date:		DF: 1		
Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
pH (laboratory)	8.16	0.10	0	0	0	0-0		8.1	0.738	5 H
Temperature	21.22	0.10	0	0	0	0-0		21.14	0.378	H

The following samples were analyzed in this batch:

20080708-01B	20080708-02B	20080708-03B
20080708-04B	20080708-05B	20080708-06B
20080708-07B	20080708-08B	

Note: See Qualifiers Page for a list of Qualifiers and their explanation.

Cincinnati, OH
+1 513 733 5336Everett, WA
+1 425 356 2600Fort Collins, CO
+1 970 490 1511Holland, MI
+1 616 399 6070

Chain of Custody Form

Page _____ of _____

Houston, TX
+1 281 530 5656Middletown, PA
+1 717 944 5541Spring City, PA
+1 610 948 4903Salt Lake City, UT
+1 801 266 7700South Charleston, WV
+1 304 356 3168York, PA
+1 717 505 5280

COC ID: 223285

ALS Project Manager:

ALS Work Order #:

20080708

Customer Information		Project Information		Parameter/Method Request for Analysis									
Purchase Order		Project Name	HBPW James DeVoe PP	A	Metals including Hg								
Work Order		Project Number	73-160017-06	B	Chloride, Fluoride, Sulfate								
Company Name	NTH Consultants, Ltd.	Bill To Company	Holland Board of Public Works	C	pH								
Send Report To	Karen Okonta	Invoice Attn	Accounts Payable	D	TDS								
Address	41780 Six Mile Road	Address	625 Hastings	E	Radium 226 & 228								
				F									
City/State/Zip	Northville, MI 48168	City/State/Zip	Holland, MI 49423	G									
Phone	(248) 662-2668	Phone	(616) 365-1210	H									
Fax	(248) 324-6305	Fax		I									
e-Mail Address		e-Mail Address		J									

No.	Sample Description	Date	Time	Matrix	Pres.	# Bottles	A	B	C	D	E	F	G	H	I	J	Hold
1	MW-1	8-10-2020	3:06pm	GW	2												
2	MW-2	8-10-2020	1:51pm	GW	2												
3	MW - 3	8-10-2020	12:38pm	GW	2												
4	MW-3A	8-10-2020	5:12pm	GW	2												
5	MS-MW-2	8-10-2020	1:51pm	GW	2												
6	MSD- MW-2	8-10-2020	1:51pm	GW	2												
7	Field blank	8-10-2020	4:07pm	GW	2												
8	Equipment blank	8-10-2020	4:15pm	GW	2												
9	Dup- 1 (field dup)	8-10-2020	-	GW	2												
10	PZ-1	8-10-2020	9:40am	GW	2												

Sampler(s) Please Print & Sign <i>Brittany Stachkunis</i>	Shipment Method <i>drop-off</i>	Required Turnaround Time: (Check Box) <input checked="" type="checkbox"/> Std 10 Wk Days <input type="checkbox"/> 5 Wk Days <input type="checkbox"/> 2 Wk Days <input type="checkbox"/> 24 Hour	Results Due Date:
--	------------------------------------	--	-------------------

Relinquished by: <i>Keu</i>	Date: 8/11/20	Time: 0800	Received by: <i>Keu</i>	Notes:
--------------------------------	------------------	---------------	----------------------------	--------

Relinquished by: <i>Keu</i>	Date: 8/11/20	Time: 0800	Received by (Laboratory): <i>Keu</i>	Cooler ID IR3	Cooler Temp. 1.8°C	QC Package: (Check One Box Below)
--------------------------------	------------------	---------------	---	------------------	-----------------------	-----------------------------------

Logged by (Laboratory): <i>Keu</i>	Date: 8/11/20	Time: 0800	Checked by (Laboratory): <i>Keu</i>	1.7°C	1.4°C	<input type="checkbox"/> Level II Std QC <input type="checkbox"/> TRRP Checklist <input type="checkbox"/> Level III Std QC/Raw Data <input type="checkbox"/> TRRP Level IV <input type="checkbox"/> Level IV SW846 CLP <input type="checkbox"/> Other
---------------------------------------	------------------	---------------	--	-------	-------	--

Preservative Key: 1-HCl 2-HNO₃ 3-H₂SO₄ 4-NaOH 5-Na₂S₂O₃ 6-NaHSO₄ 7-Other 8-4°C 9-5035

- Note: 1. Any changes must be made in writing once samples and COC Form have been submitted to ALS Environmental.
 2. Unless otherwise agreed in a formal contract, services provided by ALS Environmental are expressly limited to the terms and conditions stated on the reverse.
 3. The Chain of Custody is a legal document. All information must be completed accurately.

Copyright 2011 by ALS Environmental.

Sample Receipt ChecklistClient Name: NTH - NORTHLILLEDate/Time Received: 11-Aug-20 08:00Work Order: 20080708Received by: KRWChecklist completed by Keith Wierenga

11-Aug-20

Reviewed by: Chad Whelton

11-Aug-20

eSignature

Date

eSignature

Date

Matrices: WaterCarrier name: Client

Shipping container/cooler in good condition?	Yes <input checked="" type="checkbox"/>	No <input type="checkbox"/>	Not Present <input type="checkbox"/>
Custody seals intact on shipping container/cooler?	Yes <input type="checkbox"/>	No <input type="checkbox"/>	Not Present <input checked="" type="checkbox"/>
Custody seals intact on sample bottles?	Yes <input type="checkbox"/>	No <input type="checkbox"/>	Not Present <input checked="" type="checkbox"/>
Chain of custody present?	Yes <input checked="" type="checkbox"/>	No <input type="checkbox"/>	
Chain of custody signed when relinquished and received?	Yes <input type="checkbox"/>	No <input checked="" type="checkbox"/>	
Chain of custody agrees with sample labels?	Yes <input checked="" type="checkbox"/>	No <input type="checkbox"/>	
Samples in proper container/bottle?	Yes <input checked="" type="checkbox"/>	No <input type="checkbox"/>	
Sample containers intact?	Yes <input checked="" type="checkbox"/>	No <input type="checkbox"/>	
Sufficient sample volume for indicated test?	Yes <input checked="" type="checkbox"/>	No <input type="checkbox"/>	
All samples received within holding time?	Yes <input checked="" type="checkbox"/>	No <input type="checkbox"/>	
Container/Temp Blank temperature in compliance?	Yes <input checked="" type="checkbox"/>	No <input type="checkbox"/>	
Sample(s) received on ice?	Yes <input checked="" type="checkbox"/>	No <input type="checkbox"/>	
Temperature(s)/Thermometer(s):	<u>1.8/2.8, 1.7/2.7, 1.4/2.4 C</u> <input type="checkbox"/> IR3		
Cooler(s)/Kit(s):	<input type="checkbox"/>		
Date/Time sample(s) sent to storage:	<u>8/11/2020 9:38:31 AM</u>		
Water - VOA vials have zero headspace?	Yes <input type="checkbox"/>	No <input type="checkbox"/>	No VOA vials submitted <input checked="" type="checkbox"/>
Water - pH acceptable upon receipt?	Yes <input checked="" type="checkbox"/>	No <input type="checkbox"/>	N/A <input type="checkbox"/>
pH adjusted?	Yes <input type="checkbox"/>	No <input checked="" type="checkbox"/>	N/A <input type="checkbox"/>
pH adjusted by:	<input type="checkbox"/>		

Login Notes: Three Coolers

Client Contacted:

Date Contacted:

Person Contacted:

Contacted By:

Regarding:

Comments:

CorrectiveAction:



Friday, September 04, 2020

Chad Whelton
ALS Environmental
3352 128th Avenue
Holland, MI 49424

Re: ALS Workorder: 2008277
Project Name:
Project Number: 20080708

Dear Mr. Whelton:

Eight water samples were received from ALS Environmental, on 8/12/2020. The samples were scheduled for the following analyses:

Radium-226

Radium-228

The results for these analyses are contained in the enclosed reports.

The data contained in the following report have been reviewed and approved by the personnel listed below. In addition, ALS certifies that the analyses reported herein are true, complete and correct within the limits of the methods employed. Should this laboratory report need to be reproduced, it should be reproduced in full unless written approval has been obtained from ALS Environmental.

Thank you for your confidence in ALS Environmental. Should you have any questions, please call.

Sincerely,

A handwritten signature in black ink, appearing to read "JJ Kujawa".

ALS Environmental
Jeff R. Kujawa
Project Manager

ALS Environmental – Fort Collins is accredited by the following accreditation bodies for various testing scopes in accordance with requirements of each accreditation body. All testing is performed under the laboratory management system, which is maintained to meet these requirement and regulations. Please contact the laboratory or accreditation body for the current scope testing parameters.

ALS Environmental – Fort Collins	
Accreditation Body	License or Certification Number
AIHA	214884
Alaska (AK)	UST-086
Alaska (AK)	CO01099
Arizona (AZ)	AZ0742
California (CA)	06251CA
Colorado (CO)	CO01099
Florida (FL)	E87914
Idaho (ID)	CO01099
Kansas (KS)	E-10381
Kentucky (KY)	90137
PJ-LA (DoD ELAP/ISO 170250)	95377
Louisiana (LA)	05057
Maryland (MD)	285
Missouri (MO)	175
Nebraska(NE)	NE-OS-24-13
Nevada (NV)	CO000782008A
New York (NY)	12036
North Dakota (ND)	R-057
Oklahoma (OK)	1301
Pennsylvania (PA)	68-03116
Tennessee (TN)	2976
Texas (TX)	T104704241
Utah (UT)	CO01099
Washington (WA)	C1280



2008277

Radium-228:

The samples were analyzed for the presence of ^{228}Ra by low background gas flow proportional counting of ^{228}Ac , which is the ingrown progeny of ^{228}Ra , according to the current revision of SOP 724.

All acceptance criteria were met.

Radium-226:

The samples were prepared and analyzed according to the current revision of SOP 783.

All acceptance criteria were met.

ALS -- Fort Collins

Sample Number(s) Cross-Reference Table

OrderNum: 2008277

Client Name: ALS Environmental

Client Project Name:

Client Project Number: 20080708

Client PO Number: 20-122019844

Client Sample Number	Lab Sample Number	COC Number	Matrix	Date Collected	Time Collected
MW-1	2008277-1		WATER	10-Aug-20	15:06
MW-3	2008277-2		WATER	10-Aug-20	12:38
MW-3A	2008277-3		WATER	10-Aug-20	17:12
Field Blank	2008277-4		WATER	10-Aug-20	16:07
Equipment Blank	2008277-5		WATER	10-Aug-20	16:15
DUP-1 (Field Dup)	2008277-6		WATER	10-Aug-20	
PZ-1	2008277-7		WATER	10-Aug-20	9:40
MW-2	2008277-8		WATER	10-Aug-20	13:51



Subcontractor:
ALS Environmental, Fort Collins
225 Commerce Dr.
Fort Collins, CO 80524

TEL: (800) 443-1511
FAX:
Acct #:

CHAIN-OF-CUSTODY RECORD

Page 1 of 1

Date: 11-Aug-20
COC ID: 14448
Due Date: 01-Sep-20

2 0 0 8 2 7 7

Salesperson ALSHN Account

Customer Information		Project Information		Parameter/Method Request for Analysis										
Purchase Order		Project Name	20080708	A Subcontracted Analyses (SUBCONTRACT) Radium 226/228										
Work Order		Project Number		B MS/MSD										
Company Name	ALS Group USA, Corp	Bill To Company	ALS Group USA, Corp	C										
Send Report To	Chad Whelton	Inv Attn	Accounts Payable	D										
Address	3352 128th Ave	Address	3352 128th Ave	E										
				F										
City/State/Zip	Holland, Michigan 49424	City/State/Zip	Holland, Michigan 49424	G										
Phone	(616) 399-6070	Phone	(616) 399-6070	H										
Fax	(616) 399-6185	Fax	(616) 399-6185	I										
eMail Address	chad.whelton@alsglobal.com	eMail CC		J										
ALS Sample ID	Client Sample ID	Matrix	Collection Date 24hr	Bottle	A	B	C	D	E	F	G	H	I	J
1 20080708-01C	MW-1	Groundwater	10/Aug/2020 15:06	(2) 1LPHNO3	X									
2 20080708-03C	MW-3	Groundwater	10/Aug/2020 12:38	(2) 1LPHNO3	X									
3 20080708-04C	MW-3A	Groundwater	10/Aug/2020 17:12	(2) 1LPHNO3	X									
4 20080708-05C	Field Blank	Groundwater	10/Aug/2020 16:07	(2) 1LPHNO3	X									
5 20080708-06C	Equipment Blank	Groundwater	10/Aug/2020 16:15	(2) 1LPHNO3	X									
6 20080708-07C	DUP-1 (Field DUP)	Groundwater	10/Aug/2020	(2) 1LPHNO3	X									
7 20080708-08C	PZ-1	Groundwater	10/Aug/2020 9:40	(2) 1LPHNO3	X									
8 20080708-02C	MW-2	Groundwater	10/Aug/2020 13:51	(6) 1LPHNO3	X X									

Comments:

Please analyze these samples per our instructions and indicated turnaround requirements. Please include all QC with data. The samples do not need to be returned and can be disposed after 30 days.

Relinquished by:	Date/Time 8-11-20 1430	Received by: EMILY LYONS el	Date/Time AUG 12 2020 1000	Cooler IDs	Report/QC Level Std
Relinquished by: _____	Date/Time: _____	Received by: _____	Date/Time: _____	_____	_____



ALS Environmental - Fort Collins
CONDITION OF SAMPLE UPON RECEIPT FORM

Client Name/ID: **ALS_MI** Workorder No: **2008277**
Project Manager: **JRK** Initials: **ERL** Date: **08.13.20**

1. Are airbills / shipping documents present and/or removable?	<input type="checkbox"/> Drop Off <input checked="" type="checkbox"/> YES <input type="checkbox"/> NO
2. Are custody seals on shipping containers intact?	<input checked="" type="checkbox"/> NONE <input type="checkbox"/> YES <input type="checkbox"/> NO*
3. Are custody seals on sample containers intact?	<input checked="" type="checkbox"/> NONE <input type="checkbox"/> YES <input type="checkbox"/> NO*
4. Is there a COC (chain-of-custody) present?	<input checked="" type="checkbox"/> YES <input type="checkbox"/> NO*
5. Is the COC in agreement with samples received? (IDs, dates, times, # of samples, # of containers, matrix, requested analyses, etc.)	<input checked="" type="checkbox"/> YES <input type="checkbox"/> NO*
6. Are short-hold samples present?	<input type="checkbox"/> YES <input checked="" type="checkbox"/> NO
7. Are all samples within holding times for the requested analyses?	<input checked="" type="checkbox"/> YES <input type="checkbox"/> NO*
8. Were all sample containers received intact? (not broken or leaking)	<input checked="" type="checkbox"/> YES <input type="checkbox"/> NO*
9. Is there sufficient sample for the requested analyses?	<input checked="" type="checkbox"/> YES <input type="checkbox"/> NO*
10. Are samples in proper containers for requested analyses? (form 250, <i>Sample Handling Guidelines</i>)	<input checked="" type="checkbox"/> YES <input type="checkbox"/> NO*
11. Are all aqueous samples preserved correctly, if required?	<input type="checkbox"/> N/A <input checked="" type="checkbox"/> YES <input type="checkbox"/> NO*
12. Were unpreserved samples pH checked, if required?	<input checked="" type="checkbox"/> N/A <input type="checkbox"/> YES <input type="checkbox"/> NO
13. Are all samples requiring no headspace (VOC, GRO, RSK/MEE, radon) free of bubbles > 6 mm in diameter?	<input checked="" type="checkbox"/> N/A <input type="checkbox"/> YES <input type="checkbox"/> NO
14. Were the samples shipped on ice?	<input type="checkbox"/> YES <input checked="" type="checkbox"/> NO
15. Were cooler temperatures measured at 0.1 - 6.0°C?	IR gun used: <input type="checkbox"/> #3 <input type="checkbox"/> #5 <input checked="" type="checkbox"/> Rad Only YES <input type="checkbox"/> NO

Cooler #: **1 2**

Temperature (°C): **Amb Amb**

of custody seals on cooler: **0 0**

External mR/hr reading: **9 10**

Background mR/hr reading: **11** Were external mR/hr readings ≤ two times background and within DOT acceptance criteria? (If no, see Form 008) N/A YES NO

* Please provide details below for 'NO' responses in gray boxes above - for 2 thru 5 & 7 thru 12, notify PM & continue w/ login.

All client bottle ID's vs ALS lab ID's double-checked by:	ERL
If applicable, was the client contacted? <input type="checkbox"/> YES <input checked="" type="checkbox"/> NA Contact Name:	Date:
Project Manager Signature / Date:  8-13-20	

Ref:
 Dept:
 Date: 11Aug20
 Wgt: 36.85 LBS
 SHIPPING: 0.00
 SPECIAL: 0.00
 HANDLING: 0.00
 DV: 0.00 TOTAL: 0.00
 Svcs: PRIORITY OVERNIGHT Master 1668 7922 8721
 TRCK: 1668 7922 8721
 ORIGIN ID:GRRA (616) 399-6070
 ALS ENVIRONMENTAL
 ALS ENVIRONMENTAL
 3352 128TH AVENUE
 HOLLAND, MI 494249263
 UNITED STATES US
 BILL THIRD PARTY

To SAMPLE RECEIVING
 ALS ENVIRONMENTAL
 225 COMMERCE DR

FORT COLLINS CO 80524

(970) 490-1611
TRK:
PO:

REF:

DEPT:

FedEx
Express



1 of 2

TRK#
0201 1668 7922 8721

MASTER

NA FTCA

WED - 12 AUG 10:30A
PRIORITY OVERNIGHT

80524
CO-US DEN



Ref:
 Dept:
 Date: 11Aug20
 Wgt: 29.35 LBS
 SHIPPING: 0.00
 SPECIAL: 0.00
 HANDLING: 0.00
 DV: 0.00 TOTAL: 0.00
 Svcs: PRIORITY OVERNIGHT Master 1668 7922 8721
 TRCK: 1668 7922 8732
 ORIGIN ID:GRRA (616) 399-6070
 ALS ENVIRONMENTAL
 ALS ENVIRONMENTAL
 3352 128TH AVENUE
 HOLLAND, MI 494249263
 UNITED STATES US
 BILL THIRD PARTY

To SAMPLE RECEIVING
 ALS ENVIRONMENTAL
 225 COMMERCE DR

FORT COLLINS CO 80524

(970) 490-1611
TRK:
PO:

REF:

DEPT:

FedEx
Express



2 of 2

MPS#
0263 1668 7922 8732
Mstr# 1668 7922 8721*

[0201]
NA FTCA

WED - 12 AUG 10:30A
PRIORITY OVERNIGHT

80524
CO-US DEN



Client: ALS Environmental **Date:** 04-Sep-20
Project: 20080708 **Work Order:** 2008277
Sample ID: MW-1 **Lab ID:** 2008277-1
Legal Location: **Matrix:** WATER
Collection Date: 8/10/2020 15:06 **Percent Moisture:**

Analyses	Result	Qual	Report Limit	Units	Dilution Factor	Date Analyzed
Radium-226 by Radon Emanation - Method 903.1			SOP 783		Prep Date: 8/19/2020	PrepBy: TRW
Ra-226	0.33 (+/- 0.21)		0.19	pCi/l	NA	8/31/2020 11:32
Carr: BARIUM	90.9		40-110	%REC	DL = NA	8/31/2020 11:32
Radium-228 Analysis by GFPC			SOP 724		Prep Date: 8/27/2020	PrepBy: RGS
Ra-228	ND (+/- 0.44)	U	0.92	pCi/l	NA	9/3/2020 08:16
Carr: BARIUM	73.1		40-110	%REC	DL = NA	9/3/2020 08:16

Client: ALS Environmental **Date:** 04-Sep-20
Project: 20080708 **Work Order:** 2008277
Sample ID: MW-3 **Lab ID:** 2008277-2
Legal Location: **Matrix:** WATER
Collection Date: 8/10/2020 12:38 **Percent Moisture:**

Analyses	Result	Qual	Report Limit	Units	Dilution Factor	Date Analyzed
Radium-226 by Radon Emanation - Method 903.1						
Ra-226	ND (+/- 0.14)	U	0.26	pCi/l	NA	8/31/2020 11:32
Carr: BARIUM	98.1		40-110	%REC	DL = NA	8/31/2020 11:32
Radium-228 Analysis by GFPC						
Ra-228	ND (+/- 0.33)	U	0.72	pCi/l	NA	9/3/2020 08:16
Carr: BARIUM	96.7		40-110	%REC	DL = NA	9/3/2020 08:16

Client: ALS Environmental **Date:** 04-Sep-20
Project: 20080708 **Work Order:** 2008277
Sample ID: MW-3A **Lab ID:** 2008277-3
Legal Location: **Matrix:** WATER
Collection Date: 8/10/2020 17:12 **Percent Moisture:**

Analyses	Result	Qual	Report Limit	Units	Dilution Factor	Date Analyzed
Radium-226 by Radon Emanation - Method 903.1						
Ra-226	ND (+/- 0.18)	U	0.31	pCi/l	NA	8/31/2020 11:32
Carr: BARIUM	98.4		40-110	%REC	DL = NA	8/31/2020 11:32
Radium-228 Analysis by GFPC						
Ra-228	ND (+/- 0.35)	U	0.68	pCi/l	NA	9/3/2020 08:16
Carr: BARIUM	95.9		40-110	%REC	DL = NA	9/3/2020 08:16

Client: ALS Environmental **Date:** 04-Sep-20
Project: 20080708 **Work Order:** 2008277
Sample ID: Field Blank **Lab ID:** 2008277-4
Legal Location: **Matrix:** WATER
Collection Date: 8/10/2020 16:07 **Percent Moisture:**

Analyses	Result	Qual	Report Limit	Units	Dilution Factor	Date Analyzed
Radium-226 by Radon Emanation - Method 903.1						
Ra-226	ND (+/- 0.29)	U	0.48	pCi/l	NA	8/31/2020 11:32
Carr: BARIUM	95.3		40-110	%REC	DL = NA	8/31/2020 11:32
Radium-228 Analysis by GFPC						
Ra-228	ND (+/- 0.42)	U	0.98	pCi/l	NA	9/3/2020 08:16
Carr: BARIUM	97.7		40-110	%REC	DL = NA	9/3/2020 08:16

Client: ALS Environmental **Date:** 04-Sep-20
Project: 20080708 **Work Order:** 2008277
Sample ID: Equipment Blank **Lab ID:** 2008277-5
Legal Location: **Matrix:** WATER
Collection Date: 8/10/2020 16:15 **Percent Moisture:**

Analyses	Result	Qual	Report Limit	Units	Dilution Factor	Date Analyzed
Radium-226 by Radon Emanation - Method 903.1						
Ra-226	ND (+/- 0.17)	U	0.38	pCi/l	NA	8/31/2020 11:32
Carr: BARIUM	98.1		40-110	%REC	DL = NA	8/31/2020 11:32
Radium-228 Analysis by GFPC						
Ra-228	ND (+/- 0.52)	U,M	1.18	pCi/l	NA	9/3/2020 08:16
Carr: BARIUM	97		40-110	%REC	DL = NA	9/3/2020 08:16

Client: ALS Environmental **Date:** 04-Sep-20
Project: 20080708 **Work Order:** 2008277
Sample ID: DUP-1 (Field Dup) **Lab ID:** 2008277-6
Legal Location: **Matrix:** WATER
Collection Date: 8/10/2020 **Percent Moisture:**

Analyses	Result	Qual	Report Limit	Units	Dilution Factor	Date Analyzed
Radium-226 by Radon Emanation - Method 903.1						
Ra-226	ND (+/- 0.28)	Y1,U	0.39	pCi/l	NA	8/31/2020 11:50
Carr: BARIUM	100	Y1	40-110	%REC	DL = NA	8/31/2020 11:50
Radium-228 Analysis by GFPC						
Ra-228	0.93 (+/- 0.43)		0.73	pCi/l	NA	9/3/2020 08:16
Carr: BARIUM	97.1		40-110	%REC	DL = NA	9/3/2020 08:16

Client: ALS Environmental **Date:** 04-Sep-20
Project: 20080708 **Work Order:** 2008277
Sample ID: PZ-1 **Lab ID:** 2008277-7
Legal Location:
Collection Date: 8/10/2020 09:40 **Percent Moisture:**

Analyses	Result	Qual	Report Limit	Units	Dilution Factor	Date Analyzed
Radium-226 by Radon Emanation - Method 903.1						
Ra-226	ND (+/- 0.22)	U	0.33	pCi/l	NA	8/31/2020 11:50
Carr: BARIUM	95.2		40-110	%REC	DL = NA	8/31/2020 11:50
Radium-228 Analysis by GFPC						
Ra-228	0.83 (+/- 0.45)		0.8	pCi/l	NA	9/3/2020 08:16
Carr: BARIUM	85		40-110	%REC	DL = NA	9/3/2020 08:16

Client: ALS Environmental **Date:** 04-Sep-20
Project: 20080708 **Work Order:** 2008277
Sample ID: MW-2 **Lab ID:** 2008277-8
Legal Location: **Matrix:** WATER
Collection Date: 8/10/2020 13:51 **Percent Moisture:**

Analyses	Result	Qual	Report Limit	Units	Dilution Factor	Date Analyzed
Radium-226 by Radon Emanation - Method 903.1						
Ra-226	0.46 (+/- 0.27)	Y1	0.28	pCi/l	NA	8/31/2020 11:50
Carr: BARIUM	101	Y1	40-110	%REC	DL = NA	8/31/2020 11:50
Radium-228 Analysis by GFPC						
Ra-228	ND (+/- 0.39)	U	0.72	pCi/l	NA	9/3/2020 08:16
Carr: BARIUM	96.6		40-110	%REC	DL = NA	9/3/2020 08:16

Client: ALS Environmental **Date:** 04-Sep-20
Project: 20080708 **Work Order:** 2008277
Sample ID: MW-2 **Lab ID:** 2008277-8
Legal Location: **Matrix:** WATER
Collection Date: 8/10/2020 13:51 **Percent Moisture:**

Analyses	Result	Qual	Report Limit	Units	Dilution Factor	Date Analyzed
----------	--------	------	--------------	-------	-----------------	---------------

Explanation of Qualifiers

Radiochemistry:

- "Report Limit" is the MDC
- U or ND - Result is less than the sample specific MDC.
- Y1 - Chemical Yield is in control at 100-110%. Quantitative yield is assumed.
- Y2 - Chemical Yield outside default limits.
- W - DER is greater than Warning Limit of 1.42
- * - Aliquot Basis is 'As Received' while the Report Basis is 'Dry Weight'.
- # - Aliquot Basis is 'Dry Weight' while the Report Basis is 'As Received'.
- G - Sample density differs by more than 15% of LCS density.
- D - DER is greater than Control Limit
- M - Requested MDC not met.
- M3 - The requested MDC was not met, but the reported activity is greater than the reported MDC.
- L - LCS Recovery below lower control limit.
- H - LCS Recovery above upper control limit.
- P - LCS, Matrix Spike Recovery within control limits.
- N - Matrix Spike Recovery outside control limits
- NC - Not Calculated for duplicate results less than 5 times MDC
- B - Analyte concentration greater than MDC.
- B3 - Analyte concentration greater than MDC but less than Requested MDC.

Inorganics:

- B - Result is less than the requested reporting limit but greater than the instrument method detection limit (MDL).
- U or ND - Indicates that the compound was analyzed for but not detected.
- E - The reported value is estimated because of the presence of interference. An explanatory note may be included in the narrative.
- M - Duplicate injection precision was not met.
- N - Spiked sample recovery not within control limits. A post spike is analyzed for all ICP analyses when the matrix spike and or spike duplicate fail and the native sample concentration is less than four times the spike added concentration.
- Z - Spiked recovery not within control limits. An explanatory note may be included in the narrative.
- * - Duplicate analysis (relative percent difference) not within control limits.
- S - SAR value is estimated as one or more analytes used in the calculation were not detected above the detection limit.

Organics:

- U or ND - Indicates that the compound was analyzed for but not detected.
- B - Analyte is detected in the associated method blank as well as in the sample. It indicates probable blank contamination and warns the data user.
- E - Analyte concentration exceeds the upper level of the calibration range.
- J - Estimated value. The result is less than the reporting limit but greater than the instrument method detection limit (MDL).
- A - A tentatively identified compound is a suspected aldol-condensation product.
- X - The analyte was diluted below an accurate quantitation level.
- * - The spike recovery is equal to or outside the control criteria used.
- + - The relative percent difference (RPD) equals or exceeds the control criteria.
- G - A pattern resembling gasoline was detected in this sample.
- D - A pattern resembling diesel was detected in this sample.
- M - A pattern resembling motor oil was detected in this sample.
- C - A pattern resembling crude oil was detected in this sample.
- 4 - A pattern resembling JP-4 was detected in this sample.
- 5 - A pattern resembling JP-5 was detected in this sample.
- H - Indicates that the fuel pattern was in the heavier end of the retention time window for the analyte of interest.
- L - Indicates that the fuel pattern was in the lighter end of the retention time window for the analyte of interest.
- Z - This flag indicates that a significant fraction of the reported result did not resemble the patterns of any of the following petroleum hydrocarbon products:
 - gasoline
 - JP-8
 - diesel
 - mineral spirits
 - motor oil
 - Stoddard solvent
 - bunker C

ALS -- Fort Collins

Date: 9/4/2020 9:54:4

Client: ALS Environmental

QC BATCH REPORT

Work Order: 2008277

Project: 20080708

Batch ID: RE200819-2-2

Instrument ID Alpha Scin

Method: Radium-226 by Radon Emanation

DUP	Sample ID: 2008277-8			Units: pCi/l			Analysis Date: 8/31/2020 11:50					
Client ID:	MW-2	Run ID: RE200819-2A						Prep Date: 8/19/2020		DF: NA		
Analyte		Result	ReportLimit	SPK Val	SPK Ref Value	%REC	Control Limit	Decision Level	DER Ref	DER	DER Limit	Qual
Ra-226		0.3 (+/- 0.22)		0.28					0.46	0.4	2.1	Y1
Carr: BARIUM		15790		15750		100	40-110		15850			Y1

LCS	Sample ID: RE200819-2			Units: pCi/l			Analysis Date: 8/31/2020 11:50					
Client ID:	Run ID: RE200819-2A						Prep Date: 8/19/2020		DF: NA			
Analyte		Result	ReportLimit	SPK Val	SPK Ref Value	%REC	Control Limit	Decision Level	DER Ref	DER	DER Limit	Qual
Ra-226		44 (+/- 11)	1	46.46		94.9	67-120					P,Y1
Carr: BARIUM		15900		15530		102	40-110					Y1

MB	Sample ID: RE200819-2			Units: pCi/l			Analysis Date: 8/31/2020 12:05					
Client ID:	Run ID: RE200819-2A						Prep Date: 8/19/2020		DF: NA			
Analyte		Result	ReportLimit	SPK Val	SPK Ref Value	%REC	Control Limit	Decision Level	DER Ref	DER	DER Limit	Qual
Ra-226		ND	0.24									Y1,U
Carr: BARIUM		15910		15530		102	40-110					Y1

The following samples were analyzed in this batch:

2008277-1	2008277-2	2008277-3
2008277-4	2008277-5	2008277-6
2008277-7	2008277-8	

Client: ALS Environmental
Work Order: 2008277
Project: 20080708

QC BATCH REPORT

Batch ID: **RA200827-1-3**Instrument ID **LB4100-C**Method: **Radium-228 Analysis by GFPC**

DUP	Sample ID: 2008277-8			Units: pCi/l		Analysis Date: 9/3/2020 08:16					
Client ID:	MW-2	Run ID: RA200827-1A			Prep Date: 8/27/2020			DF: NA			
Analyte	Result	ReportLimit	SPK Val	SPK Ref Value	%REC	Control Limit	Decision Level	DER Ref	DER DER	DER Limit	Qual
Ra-228	1.17 (+/- 0.46)	0.71						0.63	0.9	2.1	
Carr: BARIUM	32830		33700	97.4	40-110			32520			

LCS	Sample ID: RA200827-1			Units: pCi/l		Analysis Date: 9/3/2020 08:16					
Client ID:	Run ID: RA200827-1A			Prep Date: 8/27/2020			DF: NA				
Analyte	Result	ReportLimit	SPK Val	SPK Ref Value	%REC	Control Limit	Decision Level	DER Ref	DER DER	DER Limit	Qual
Ra-228	24.3 (+/- 5.7)	0.7	23.9	102	70-130						P
Carr: BARIUM	32160		33430	96.2	40-110						

MB	Sample ID: RA200827-1			Units: pCi/l		Analysis Date: 9/3/2020 08:16					
Client ID:	Run ID: RA200827-1A			Prep Date: 8/27/2020			DF: NA				
Analyte	Result	ReportLimit	SPK Val	SPK Ref Value	%REC	Control Limit	Decision Level	DER Ref	DER DER	DER Limit	Qual
Ra-228	ND	0.7									U
Carr: BARIUM	32030		33430	95.8	40-110						

The following samples were analyzed in this batch:

2008277-1	2008277-2	2008277-3
2008277-4	2008277-5	2008277-6
2008277-7	2008277-8	



04-Sep-2020

Karen Okonta
NTH Consultants, Ltd.
41780 Six Mile Road
Northville, MI 48168

Re: **Holland Board of Public Works**

Work Order: **20080710**

Dear Karen,

ALS Environmental received 1 sample on 11-Aug-2020 08:00 AM for the analyses presented in the following report.

The analytical data provided relates directly to the samples received by ALS Environmental - Holland and for only the analyses requested.

Sample results are compliant with industry accepted practices and Quality Control results achieved laboratory specifications. Any exceptions are noted in the Case Narrative, or noted with qualifiers in the report or QC batch information. Should this laboratory report need to be reproduced, it should be reproduced in full unless written approval has been obtained from ALS Environmental. Samples will be disposed in 30 days unless storage arrangements are made.

The total number of pages in this report is 24.

If you have any questions regarding this report, please feel free to contact me:

ADDRESS: 3352 128th Avenue, Holland, MI, USA
PHONE: +1 (616) 399-6070 FAX: +1 (616) 399-6185

Sincerely,

A handwritten signature in black ink, appearing to read "Chad Whelton".

Electronically approved by: Chad Whelton

Chad Whelton
Project Manager

Report of Laboratory Analysis

Certificate No: MN 026-999-449

ALS GROUP USA, CORP Part of the ALS Laboratory Group A Campbell Brothers Limited Company

Client: NTH Consultants, Ltd.
Project: Holland Board of Public Works
Work Order: 20080710

Work Order Sample Summary

Lab Samp ID	Client Sample ID	Matrix	Tag Number	Collection Date	Date Received	Hold
20080710-01	MW-4	Groundwater		8/10/2020 11:07	8/11/2020 08:00	<input type="checkbox"/>

Client: NTH Consultants, Ltd.
Project: Holland Board of Public Works
Work Order: 20080710

Case Narrative

Samples for the above noted Work Order were received on 08/11/2020. The attached "Sample Receipt Checklist" documents the status of custody seals, container integrity, preservation, and temperature compliance.

Samples were analyzed according to the analytical methodology previously transmitted in the "Work Order Acknowledgement". Methodologies are also documented in the "Analytical Result" section for each sample. Quality control results are listed in the "QC Report" section. Sample association for the reported quality control is located at the end of each batch summary. If applicable, results are appropriately qualified in the Analytical Result and QC Report sections. The "Qualifiers" section documents the various qualifiers, units, and acronyms utilized in reporting. A copy of the laboratory's scope of accreditation is available upon request.

With the following exceptions, all sample analyses achieved analytical criteria.

Metals:

Batch 162826, Method ICP_6020_W, Sample 20080710-01A MS: The MS recoveries were outside of the control limits for Barium and Calcium; however, the results in the parent sample are greater than 4x the spike amount. No qualification is required.

Wet Chemistry:

Batch R295823, Method IC_300.0_WW, Sample 20080710-01B: The reporting limit for Sulfate is elevated due to dilution for high concentrations of non-target analytes.

Batch R295863, Method PH_4500_W, Sample LCS-R295863: Sample was processed outside of holding time for pH, as the analysis is a field test and holding time is defined as 15 minutes.

Radium analysis performed by ALS Fort Collins laboratory.

<u>Qualifier</u>	<u>Description</u>
*	Value exceeds Regulatory Limit
**	Estimated Value
a	Analyte is non-accredited
B	Analyte detected in the associated Method Blank above the Reporting Limit
E	Value above quantitation range
H	Analyzed outside of Holding Time
Hr	BOD/CBOD - Sample was reset outside Hold Time, value should be considered estimated.
J	Analyte is present at an estimated concentration between the MDL and Report Limit
ND	Not Detected at the Reporting Limit
O	Sample amount is > 4 times amount spiked
P	Dual Column results percent difference > 40%
R	RPD above laboratory control limit
S	Spike Recovery outside laboratory control limits
U	Analyzed but not detected above the MDL
X	Analyte was detected in the Method Blank between the MDL and Reporting Limit, sample results may exhibit background or reagent contamination at the observed level.

<u>Acronym</u>	<u>Description</u>
DUP	Method Duplicate
LCS	Laboratory Control Sample
LCSD	Laboratory Control Sample Duplicate
LOD	Limit of Detection (see MDL)
LOQ	Limit of Quantitation (see PQL)
MBLK	Method Blank
MDL	Method Detection Limit
MS	Matrix Spike
MSD	Matrix Spike Duplicate
PQL	Practical Quantitation Limit
RPD	Relative Percent Difference
TDL	Target Detection Limit
TNTC	Too Numerous To Count
A	APHA Standard Methods
D	ASTM
E	EPA
SW	SW-846 Update III

<u>Units Reported</u>	<u>Description</u>
°C	Degrees Celcius
as noted	
mg/L	Milligrams per Liter
s.u.	Standard Units

Client: NTH Consultants, Ltd.
Project: Holland Board of Public Works
Sample ID: MW-4
Collection Date: 8/10/2020 11:07 AM

Work Order: 20080710
Lab ID: 20080710-01
Matrix: GROUNDWATER

Analyses	Result	Qual	Report Limit	Units	Dilution Factor	Date Analyzed
MERCURY BY CVAA						
Mercury	ND		0.00020	mg/L	1	8/13/2020 02:02 PM
METALS BY ICP-MS						
Antimony	ND		0.0050	mg/L	1	8/19/2020 06:55 PM
Arsenic	0.0055		0.0050	mg/L	1	8/19/2020 06:55 PM
Barium	0.96		0.0050	mg/L	1	8/19/2020 06:55 PM
Beryllium	ND		0.0020	mg/L	1	8/19/2020 06:55 PM
Boron	0.98		0.020	mg/L	1	8/19/2020 06:55 PM
Cadmium	ND		0.0020	mg/L	1	8/19/2020 06:55 PM
Calcium	150		0.50	mg/L	1	8/19/2020 06:55 PM
Chromium	ND		0.0050	mg/L	1	8/19/2020 06:55 PM
Cobalt	ND		0.0050	mg/L	1	8/19/2020 06:55 PM
Lead	ND		0.0050	mg/L	1	8/19/2020 06:55 PM
Lithium	0.035		0.010	mg/L	1	8/19/2020 06:55 PM
Molybdenum	ND		0.0050	mg/L	1	8/19/2020 06:55 PM
Selenium	ND		0.0050	mg/L	1	8/19/2020 06:55 PM
Thallium	ND		0.0050	mg/L	1	8/19/2020 06:55 PM
ANIONS BY ION CHROMATOGRAPHY						
Chloride	650		80	mg/L	80	8/11/2020 06:56 PM
Fluoride	0.52		0.20	mg/L	2	8/11/2020 03:05 PM
Sulfate	ND		2.0	mg/L	2	8/11/2020 03:05 PM
PH (LABORATORY)						
pH (laboratory)	6.91	H	0.100	s.u.	1	8/12/2020 02:01 PM
Temperature	20.9	H	0.100	°C	1	8/12/2020 02:01 PM
TOTAL DISSOLVED SOLIDS						
Total Dissolved Solids	1,700		150	mg/L	1	8/13/2020 02:15 PM
SUBCONTRACTED ANALYSES						
Subcontracted Analyses	See attached		SUBCONTRACT as noted		1	Analyst: ALS 9/2/2020

Note: See Qualifiers page for a list of qualifiers and their definitions.

Client: NTH Consultants, Ltd.
Work Order: 20080710
Project: Holland Board of Public Works

QC BATCH REPORT

Batch ID: 161552		Instrument ID HG4		Method: SW7470A											
MBLK		Sample ID: MBLK-161552-161552			Units: mg/L		Analysis Date: 8/13/2020 01:46 PM								
Client ID:		Run ID: HG4_200813A			SeqNo: 6634238		Prep Date: 8/13/2020		DF: 1						
Analyte		Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual				
Mercury		ND	0.00020												
LCS		Sample ID: LCS-161552-161552			Units: mg/L		Analysis Date: 8/13/2020 01:48 PM								
Client ID:		Run ID: HG4_200813A			SeqNo: 6634239		Prep Date: 8/13/2020		DF: 1						
Analyte		Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual				
Mercury		0.00207	0.00020	0.002	0	104	80-120		0						
MS		Sample ID: 20080781-03BMS			Units: mg/L		Analysis Date: 8/13/2020 02:22 PM								
Client ID:		Run ID: HG4_200813A			SeqNo: 6634258		Prep Date: 8/13/2020		DF: 1						
Analyte		Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual				
Mercury		0.003885	0.00020	0.002	0.001755	106	75-125		0						
MSD		Sample ID: 20080781-03BMSD			Units: mg/L		Analysis Date: 8/13/2020 02:23 PM								
Client ID:		Run ID: HG4_200813A			SeqNo: 6634259		Prep Date: 8/13/2020		DF: 1						
Analyte		Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual				
Mercury		0.00387	0.00020	0.002	0.001755	106	75-125	0.003885	0.387	20					

The following samples were analyzed in this batch:

20080710-01A

Client: NTH Consultants, Ltd.
Work Order: 20080710
Project: Holland Board of Public Works

QC BATCH REPORT

Batch ID: **162826** Instrument ID **ICPMS3** Method: **SW6020B**

MBLK			Sample ID: MBLK-162826-162826		Units: mg/L		Analysis Date: 8/19/2020 06:49 PM		
Client ID:		Run ID: ICPMS3_200819A		SeqNo: 6646898		Prep Date: 8/19/2020		DF: 1	
Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	RPD %RPD Limit	Qual
Antimony	ND	0.0050							
Arsenic	ND	0.0050							
Barium	ND	0.0050							
Beryllium	ND	0.0020							
Boron	ND	0.020							
Cadmium	ND	0.0020							
Calcium	ND	0.50							
Chromium	ND	0.0050							
Cobalt	ND	0.0050							
Lead	ND	0.0050							
Lithium	ND	0.010							
Molybdenum	ND	0.0050							
Selenium	ND	0.0050							
Thallium	ND	0.0050							

LCS			Sample ID: LCS-162826-162826		Units: mg/L		Analysis Date: 8/19/2020 06:50 PM		
Client ID:		Run ID: ICPMS3_200819A		SeqNo: 6646899		Prep Date: 8/19/2020		DF: 1	
Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	RPD %RPD Limit	Qual
Antimony	0.1009	0.0050	0.1	0	101	80-120	0	0	
Arsenic	0.1042	0.0050	0.1	0	104	80-120	0	0	
Barium	0.105	0.0050	0.1	0	105	80-120	0	0	
Beryllium	0.1067	0.0020	0.1	0	107	80-120	0	0	
Boron	0.4933	0.020	0.5	0	98.7	80-120	0	0	
Cadmium	0.1052	0.0020	0.1	0	105	80-120	0	0	
Calcium	10.58	0.50	10	0	106	80-120	0	0	
Chromium	0.1039	0.0050	0.1	0	104	80-120	0	0	
Cobalt	0.1063	0.0050	0.1	0	106	80-120	0	0	
Lead	0.1048	0.0050	0.1	0	105	80-120	0	0	
Lithium	0.1063	0.010	0.1	0	106	80-120	0	0	
Molybdenum	0.1025	0.0050	0.1	0	102	80-120	0	0	
Selenium	0.1078	0.0050	0.1	0	108	80-120	0	0	
Thallium	0.1007	0.0050	0.1	0	101	80-120	0	0	

Note: See Qualifiers Page for a list of Qualifiers and their explanation.

Client: NTH Consultants, Ltd.
Work Order: 20080710
Project: Holland Board of Public Works

QC BATCH REPORT

Batch ID: **162826** Instrument ID **ICPMS3** Method: **SW6020B**

MS		Sample ID: 20080710-01AMS			Units: mg/L		Analysis Date: 8/19/2020 06:57 PM			
Client ID: MW-4		Run ID: ICPMS3_200819A			SeqNo: 6646903		Prep Date: 8/19/2020		DF: 1	
Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
Antimony	0.1021	0.0050	0.1	0.000189	102	75-125		0		
Arsenic	0.1127	0.0050	0.1	0.005451	107	75-125		0		
Barium	1.085	0.0050	0.1	0.9585	127	75-125		0		SO
Beryllium	0.1081	0.0020	0.1	0.000052	108	75-125		0		
Boron	1.434	0.020	0.5	0.9815	90.5	75-125		0		
Cadmium	0.1004	0.0020	0.1	0.000017	100	75-125		0		
Calcium	166.6	0.50	10	154	126	75-125		0		SO
Chromium	0.1069	0.0050	0.1	0.000691	106	75-125		0		
Cobalt	0.1059	0.0050	0.1	0.001226	105	75-125		0		
Lead	0.108	0.0050	0.1	0.00048	108	75-125		0		
Lithium	0.1441	0.010	0.1	0.03516	109	75-125		0		
Molybdenum	0.1051	0.0050	0.1	0.000705	104	75-125		0		
Selenium	0.1068	0.0050	0.1	0.000366	106	75-125		0		
Thallium	0.1038	0.0050	0.1	0.000062	104	75-125		0		

MSD		Sample ID: 20080710-01AMSD			Units: mg/L		Analysis Date: 8/19/2020 06:58 PM			
Client ID: MW-4		Run ID: ICPMS3_200819A			SeqNo: 6646904		Prep Date: 8/19/2020		DF: 1	
Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
Antimony	0.1013	0.0050	0.1	0.000189	101	75-125	0.1021	0.833	20	
Arsenic	0.1135	0.0050	0.1	0.005451	108	75-125	0.1127	0.762	20	
Barium	1.069	0.0050	0.1	0.9585	111	75-125	1.085	1.45	20	O
Beryllium	0.1066	0.0020	0.1	0.000052	107	75-125	0.1081	1.37	20	
Boron	1.409	0.020	0.5	0.9815	85.6	75-125	1.434	1.73	20	
Cadmium	0.0997	0.0020	0.1	0.000017	99.7	75-125	0.1004	0.719	20	
Calcium	164.9	0.50	10	154	110	75-125	166.6	1.02	20	O
Chromium	0.106	0.0050	0.1	0.000691	105	75-125	0.1069	0.89	20	
Cobalt	0.1053	0.0050	0.1	0.001226	104	75-125	0.1059	0.587	20	
Lead	0.1067	0.0050	0.1	0.00048	106	75-125	0.108	1.21	20	
Lithium	0.1422	0.010	0.1	0.03516	107	75-125	0.1441	1.36	20	
Molybdenum	0.1053	0.0050	0.1	0.000705	105	75-125	0.1051	0.137	20	
Selenium	0.1134	0.0050	0.1	0.000366	113	75-125	0.1068	5.97	20	
Thallium	0.1034	0.0050	0.1	0.000062	103	75-125	0.1038	0.424	20	

The following samples were analyzed in this batch: 20080710-01A

Note: See Qualifiers Page for a list of Qualifiers and their explanation.

Client: NTH Consultants, Ltd.
Work Order: 20080710
Project: Holland Board of Public Works

QC BATCH REPORT

Batch ID: **161500** Instrument ID **TDS** Method: **A2540 C-11**

Sample ID: MBLK-161500-161500				Units: mg/L		Analysis Date: 8/13/2020 02:15 PM				
Client ID:		Run ID: TDS_200813B		SeqNo: 6632659		Prep Date: 8/12/2020		DF: 1		
Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
Total Dissolved Solids	ND	30								
Sample ID: LCS-161500-161500				Units: mg/L		Analysis Date: 8/13/2020 02:15 PM				
Client ID:		Run ID: TDS_200813B		SeqNo: 6632658		Prep Date: 8/12/2020		DF: 1		
Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
Total Dissolved Solids	474	30	495	0	95.8	85-109	0			
Sample ID: 20080708-02B DUP				Units: mg/L		Analysis Date: 8/13/2020 02:15 PM				
Client ID:		Run ID: TDS_200813B		SeqNo: 6632642		Prep Date: 8/12/2020		DF: 1		
Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
Total Dissolved Solids	1410	75	0	0	0	0-0	1385	1.79	10	
Sample ID: 20080746-01A DUP				Units: mg/L		Analysis Date: 8/13/2020 02:15 PM				
Client ID:		Run ID: TDS_200813B		SeqNo: 6632655		Prep Date: 8/12/2020		DF: 1		
Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
Total Dissolved Solids	253.3	50	0	0	0	0-0	253.3	0	10	

The following samples were analyzed in this batch:

20080710-01B

Note: See Qualifiers Page for a list of Qualifiers and their explanation.

Client: NTH Consultants, Ltd.
Work Order: 20080710
Project: Holland Board of Public Works

QC BATCH REPORT

Batch ID: **R295823** Instrument ID **IC4** Method: **E300.0**

Sample ID: CCB/MBLK-R295823				Units: mg/L		Analysis Date: 8/11/2020 11:54 AM				
Client ID:		Run ID: IC4_200811A		SeqNo: 6628065		Prep Date:		DF: 1		
Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
Chloride	ND	1.0								
Fluoride	ND	0.10								
Sulfate	ND	1.0								

Sample ID: LCS-R295823				Units: mg/L		Analysis Date: 8/11/2020 12:13 PM				
Client ID:		Run ID: IC4_200811A		SeqNo: 6628067		Prep Date:		DF: 1		
Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
Chloride	9.393	1.0	10	0	93.9	90-110	0			
Fluoride	1.857	0.10	2	0	92.9	90-110	0			
Sulfate	9.484	1.0	10	0	94.8	90-110	0			

Sample ID: 20080708-02B MS				Units: mg/L		Analysis Date: 8/11/2020 04:41 PM				
Client ID:		Run ID: IC4_200811A		SeqNo: 6628087		Prep Date:		DF: 80		
Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
Chloride	1457	80	800	681.5	97	80-120	0			
Fluoride	170.5	8.0	160	0	107	80-120	0			
Sulfate	774.5	80	800	0	96.8	80-120	0			

Sample ID: 20080708-02B MSD				Units: mg/L		Analysis Date: 8/11/2020 05:01 PM				
Client ID:		Run ID: IC4_200811A		SeqNo: 6628088		Prep Date:		DF: 80		
Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
Chloride	1456	80	800	681.5	96.8	80-120	1457	0.122	20	
Fluoride	166.5	8.0	160	0	104	80-120	170.5	2.35	20	
Sulfate	772.9	80	800	0	96.6	80-120	774.5	0.207	20	

The following samples were analyzed in this batch: **20080710-01B**

Note: See Qualifiers Page for a list of Qualifiers and their explanation.

Client: NTH Consultants, Ltd.
Work Order: 20080710
Project: Holland Board of Public Works

QC BATCH REPORT

Batch ID: **R295863** Instrument ID **Titrator 1** Method: **A4500-H B-11**

LCS Sample ID: LCS-R295863-R295863				Units: s.u.			Analysis Date: 8/12/2020 02:01 PM			
Client ID:		Run ID: TITRATOR 1_200812B		SeqNo: 6629470		Prep Date:		DF: 1		
Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
pH (laboratory)	3.97	0.10	4	0	99.2	92-108		0		
LCS Sample ID: LCS-R295863-R295863				Units: s.u.			Analysis Date: 8/12/2020 02:01 PM			
Client ID:		Run ID: TITRATOR 1_200812B		SeqNo: 6629492		Prep Date:		DF: 1		
Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
pH (laboratory)	3.97	0.10	4	0	99.2	92-108		0		
DUP Sample ID: 20080708-02B DUP				Units: s.u.			Analysis Date: 8/12/2020 02:01 PM			
Client ID:		Run ID: TITRATOR 1_200812B		SeqNo: 6629473		Prep Date:		DF: 1		
Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
pH (laboratory)	6.91	0.10	0	0	0	0-0		6.9	0.145	5 H
Temperature	20.89	0.10	0	0	0	0-0		20.78	0.528	H
DUP Sample ID: 20080735-02A DUP				Units: s.u.			Analysis Date: 8/12/2020 02:01 PM			
Client ID:		Run ID: TITRATOR 1_200812B		SeqNo: 6629484		Prep Date:		DF: 1		
Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
pH (laboratory)	8.16	0.10	0	0	0	0-0		8.1	0.738	5 H
Temperature	21.22	0.10	0	0	0	0-0		21.14	0.378	H

The following samples were analyzed in this batch: **20080710-01B**

Note: See Qualifiers Page for a list of Qualifiers and their explanation.

Cincinnati, OH
+1 513 733 5336Everett, WA
+1 425 356 2600Fort Collins, CO
+1 970 490 1511Holland, MI
+1 616 399 6070

Chain of Custody Form

Page _____ of _____

Houston, TX
+1 281 530 5656Middletown, PA
+1 717 944 5541Spring City, PA
+1 610 948 4903Salt Lake City, UT
+1 801 266 7700South Charleston, WV
+1 304 356 3168York, PA
+1 717 505 5280

COC ID: 223283

ALS Project Manager:

ALS Work Order #:

20080768

Customer Information		Project Information		Parameter/Method Request for Analysis													
Purchase Order		Project Name	Holland Board of Public Works	A	Metals including Hg												
Work Order		Project Number	73001-160017-06	B	Chloride, Fluoride, Sulfate												
Company Name	NTH Consultants, Ltd.	Bill To Company		C	pH												
Send Report To	Karen Okonta	Invoice Attn	Accounts Payable	D	TDS												
Address	41780 Six Mile Road	Address	625 Hastings	E	Radium 226 & 228												
City/State/Zip	Northville, MI 48168	City/State/Zip	Holland, MI 49423	F													
Phone	(248) 662-2668	Phone	(616) 355-1210	G													
Fax	(248) 324-0306	Fax		H													
e-Mail Address		e-Mail Address		I													
No.	Sample Description	Date	Time	Matrix	Pres.	# Bottles	A	B	C	D	E	F	G	H	I	J	Hold
1	MW-4	8/10/2020	11:07	GW	2	4	X	X	X	X	X						
2																	
3																	
4																	
5																	
6																	
7																	
8																	
9																	
10																	

Sampler(s) Please Print & Sign

Brittany Stachkun

Shipment Method

drop-off

Required Turnaround Time: (Check Box)

 Other Std 10 WK Days 5 WK Days 2 WK Days 24 Hour

Results Due Date:

Relinquished by:

Date:

Time:

Received by:

Notes:

Relinquished by:

Date:

Time:

Received by (Laboratory):

Cooler ID

Cooler Temp.

QC Package: (Check One Box Below)

 Level II Std QC TPRP CheckList Level III Std QC/Raw Data TPRP Level IV Level IV SW846/ICP Other

Logged by (Laboratory):

Date:

Time:

Checked by (Laboratory):

IR3

1.8 °C

PH21

1.7 °C

1.4 °C

Preservative Key: 1-HCl 2-HNO₃ 3-H₂SO₄ 4-NaOH 5-Na₂S₂O₃ 6-NaHSO₄ 7-Other 8-4°C 9-5035

- Note: 1. Any changes must be made in writing once samples and COC Form have been submitted to ALS Environmental.
 2. Unless otherwise agreed in a formal contract, services provided by ALS Environmental are expressly limited to the terms and conditions stated on the reverse.
 3. The Chain of Custody is a legal document. All information must be completed accurately.

Copyright 2011 by ALS Environmental.

Sample Receipt ChecklistClient Name: NTH - NORTHVILLEDate/Time Received: 11-Aug-20 08:00Work Order: 20080710Received by: KRW

Checklist completed by	Keith Wierenga	11-Aug-20	Reviewed by:	Chad Whelton	11-Aug-20
eSignature		Date	eSignature		Date

Matrices: WaterCarrier name: Client

Shipping container/cooler in good condition?	Yes <input checked="" type="checkbox"/>	No <input type="checkbox"/>	Not Present <input type="checkbox"/>
Custody seals intact on shipping container/cooler?	Yes <input type="checkbox"/>	No <input type="checkbox"/>	Not Present <input checked="" type="checkbox"/>
Custody seals intact on sample bottles?	Yes <input type="checkbox"/>	No <input type="checkbox"/>	Not Present <input checked="" type="checkbox"/>
Chain of custody present?	Yes <input checked="" type="checkbox"/>	No <input type="checkbox"/>	
Chain of custody signed when relinquished and received?	Yes <input type="checkbox"/>	No <input checked="" type="checkbox"/>	
Chain of custody agrees with sample labels?	Yes <input checked="" type="checkbox"/>	No <input type="checkbox"/>	
Samples in proper container/bottle?	Yes <input checked="" type="checkbox"/>	No <input type="checkbox"/>	
Sample containers intact?	Yes <input checked="" type="checkbox"/>	No <input type="checkbox"/>	
Sufficient sample volume for indicated test?	Yes <input checked="" type="checkbox"/>	No <input type="checkbox"/>	
All samples received within holding time?	Yes <input checked="" type="checkbox"/>	No <input type="checkbox"/>	
Container/Temp Blank temperature in compliance?	Yes <input checked="" type="checkbox"/>	No <input type="checkbox"/>	
Sample(s) received on ice?	Yes <input checked="" type="checkbox"/>	No <input type="checkbox"/>	
Temperature(s)/Thermometer(s):	<u>1.8/2.8, 1.7/2.7, 1.4/2.4 C</u> <input type="checkbox"/> IR3		
Cooler(s)/Kit(s):	<input type="checkbox"/>		
Date/Time sample(s) sent to storage:	<u>8/11/2020 10:06:54 AM</u>		
Water - VOA vials have zero headspace?	Yes <input type="checkbox"/>	No <input type="checkbox"/>	No VOA vials submitted <input checked="" type="checkbox"/>
Water - pH acceptable upon receipt?	Yes <input checked="" type="checkbox"/>	No <input type="checkbox"/>	N/A <input type="checkbox"/>
pH adjusted?	Yes <input type="checkbox"/>	No <input checked="" type="checkbox"/>	N/A <input type="checkbox"/>
pH adjusted by:	<input type="checkbox"/>		

Login Notes:

Client Contacted:

Date Contacted:

Person Contacted:

Contacted By:

Regarding:

Comments:

CorrectiveAction:



Monday, August 31, 2020

Chad Whelton
ALS Environmental
3352 128th Avenue
Holland, MI 49424

Re: ALS Workorder: 2008278
Project Name:
Project Number: 20080710

Dear Mr. Whelton:

One water sample was received from ALS Environmental, on 8/12/2020. The sample was scheduled for the following analyses:

Radium-226

Radium-228

The results for these analyses are contained in the enclosed reports.

The data contained in the following report have been reviewed and approved by the personnel listed below. In addition, ALS certifies that the analyses reported herein are true, complete and correct within the limits of the methods employed. Should this laboratory report need to be reproduced, it should be reproduced in full unless written approval has been obtained from ALS Environmental.

Thank you for your confidence in ALS Environmental. Should you have any questions, please call.

Sincerely,

A handwritten signature in black ink, appearing to read "JJ Kujawa".

ALS Environmental
Jeff R. Kujawa
Project Manager

ALS Environmental – Fort Collins is accredited by the following accreditation bodies for various testing scopes in accordance with requirements of each accreditation body. All testing is performed under the laboratory management system, which is maintained to meet these requirement and regulations. Please contact the laboratory or accreditation body for the current scope testing parameters.

ALS Environmental – Fort Collins	
Accreditation Body	License or Certification Number
AIHA	214884
Alaska (AK)	UST-086
Alaska (AK)	CO01099
Arizona (AZ)	AZ0742
California (CA)	06251CA
Colorado (CO)	CO01099
Florida (FL)	E87914
Idaho (ID)	CO01099
Kansas (KS)	E-10381
Kentucky (KY)	90137
PJ-LA (DoD ELAP/ISO 170250)	95377
Louisiana (LA)	05057
Maryland (MD)	285
Missouri (MO)	175
Nebraska(NE)	NE-OS-24-13
Nevada (NV)	CO000782008A
New York (NY)	12036
North Dakota (ND)	R-057
Oklahoma (OK)	1301
Pennsylvania (PA)	68-03116
Tennessee (TN)	2976
Texas (TX)	T104704241
Utah (UT)	CO01099
Washington (WA)	C1280



2008278

Radium-228:

The sample was analyzed for the presence of ^{228}Ra by low background gas flow proportional counting of ^{228}Ac , which is the ingrown progeny of ^{228}Ra , according to the current revision of SOP 724.

All acceptance criteria were met.

Radium-226:

The sample was prepared and analyzed according to the current revision of SOP 783.

All acceptance criteria were met.

ALS -- Fort Collins

Sample Number(s) Cross-Reference Table

OrderNum: 2008278

Client Name: ALS Environmental

Client Project Name:

Client Project Number: 20080710

Client PO Number: 20-122019844

Client Sample Number	Lab Sample Number	COC Number	Matrix	Date Collected	Time Collected
MW-4	2008278-1		WATER	10-Aug-20	11:07



Subcontractor:
ALS Environmental, Fort Collins
225 Commerce Dr.
Fort Collins, CO 80524

TEL: (800) 443-1511
FAX:
Acct #:

CHAIN-OF-CUSTODY RECORD

Page 1 of 1

Date: 11-Aug-20
COC ID: 14447
Due Date: 01-Sep-20

2 0 0 8 2 7 8

Salesperson **ALSHN Account**

Customer Information		Project Information		Parameter/Method Request for Analysis										
Purchase Order		Project Name 20080710		A Subcontracted Analyses (SUBCONTRACT) <u>Radium 226/228</u>										
Work Order		Project Number		B										
Company Name	ALS Group USA, Corp	Bill To Company	ALS Group USA, Corp	C										
Send Report To	Chad Whelton	Inv Attn	Accounts Payable	D										
Address	3352 128th Ave	Address	3352 128th Ave	E										
				F										
City/State/Zip	Holland, Michigan 49424	City/State/Zip	Holland, Michigan 49424	G										
Phone	(616) 399-6070	Phone	(616) 399-6070	H										
Fax	(616) 399-6185	Fax	(616) 399-6185	I										
eMail Address	chad.whelton@alsglobal.com	eMail CC		J										
ALS Sample ID	Client Sample ID	Matrix	Collection Date 24hr	Bottle	A	B	C	D	E	F	G	H	I	J
20080710-01C	MW-4	Groundwater	10/Aug/2020 11:07	(2) 1LPHNO3	X									

Comments:

Please analyze these samples per our instructions and indicated turnaround requirements. Please include all QC with data. The samples do not need to be returned and can be disposed after 30 days.

Relinquished by:	Date/Time	Received by:	Date/Time	Cooler IDs	Report/QC Level
	8-11-20 1430	EMILY LYONS	12 AUG 12 2020 1000		Std
Relinquished by:	Date/Time	Received by:	Date/Time		



ALS Environmental - Fort Collins
CONDITION OF SAMPLE UPON RECEIPT FORM

Client Name/ID: **ALS_MI** Workorder No: **2008278**

Project Manager: **JRK** Initials: **ERL** Date: **08.13.20**

1. Are airbills / shipping documents present and/or removable?	<input type="checkbox"/> Drop Off <input checked="" type="checkbox"/> YES <input type="checkbox"/> NO
2. Are custody seals on shipping containers intact?	<input checked="" type="checkbox"/> NONE <input type="checkbox"/> YES <input type="checkbox"/> NO*
3. Are custody seals on sample containers intact?	<input checked="" type="checkbox"/> NONE <input type="checkbox"/> YES <input type="checkbox"/> NO*
4. Is there a COC (chain-of-custody) present?	<input checked="" type="checkbox"/> YES <input type="checkbox"/> NO*
5. Is the COC in agreement with samples received? (IDs, dates, times, # of samples, # of containers, matrix, requested analyses, etc.)	<input checked="" type="checkbox"/> YES <input type="checkbox"/> NO*
6. Are short-hold samples present?	<input type="checkbox"/> YES <input checked="" type="checkbox"/> NO
7. Are all samples within holding times for the requested analyses?	<input checked="" type="checkbox"/> YES <input type="checkbox"/> NO*
8. Were all sample containers received intact? (not broken or leaking)	<input checked="" type="checkbox"/> YES <input type="checkbox"/> NO*
9. Is there sufficient sample for the requested analyses?	<input checked="" type="checkbox"/> YES <input type="checkbox"/> NO*
10. Are samples in proper containers for requested analyses? (form 250, <i>Sample Handling Guidelines</i>)	<input checked="" type="checkbox"/> YES <input type="checkbox"/> NO*
11. Are all aqueous samples preserved correctly, if required?	<input type="checkbox"/> N/A <input checked="" type="checkbox"/> YES <input type="checkbox"/> NO*
12. Were unpreserved samples pH checked, if required?	<input checked="" type="checkbox"/> N/A <input type="checkbox"/> YES <input type="checkbox"/> NO
13. Are all samples requiring no headspace (VOC, GRO, RSK/MEE, radon) free of bubbles > 6 mm in diameter?	<input checked="" type="checkbox"/> N/A <input type="checkbox"/> YES <input type="checkbox"/> NO
14. Were the samples shipped on ice?	<input type="checkbox"/> YES <input checked="" type="checkbox"/> NO
15. Were cooler temperatures measured at 0.1 - 6.0°C?	IR gun used: <input type="checkbox"/> #3 <input type="checkbox"/> #5 <input checked="" type="checkbox"/> Rad Only <input type="checkbox"/> YES <input type="checkbox"/> NO

Cooler #: **1 2**

Temperature (°C): **Amb Amb**

of custody seals on cooler: **0 0**

External mR/hr reading: **9 10**

Background mR/hr reading: **11** Were external mR/hr readings ≤ two times background and within DOT acceptance criteria? (If no, see Form 008) N/A YES NO

* Please provide details below for 'NO' responses in gray boxes above - for 2 thru 5 & 7 thru 12, notify PM & continue w/ login.

All client bottle ID's vs ALS lab ID's double-checked by: **ERL**

If applicable, was the client contacted? YES NA Contact Name: _____ Date: _____

Project Manager Signature / Date:  **8-13-20**

Ref: Date: 11Aug20
 Dep: Wgt: 36.85 LBS
 DV: 0.00 TOTAL: 0.00
 Svcs: PRIORITY OVERNIGHT Master 1668 7922 8721
 TRCK: 1668 7922 8721

ORIGIN ID:GRRA (616) 399-6070	SHIP DATE: 11AUG20
ALS ENVIRONMENTAL	ACTWGT: 36.85 LB
ALS ENVIRONMENTAL	CAD: 0122071/CAFE3311
3352 128TH AVENUE	
HOLLAND, MI 494249263	BILL THIRD PARTY
UNITED STATES US	

TO SAMPLE RECEIVING
 ALS ENVIRONMENTAL
 225 COMMERCE DR

FORT COLLINS CO 80524

(970) 490-1611

THU:

PO:

REF:

DEPT:

9-0
ans

FedEx
Express



of 2

TRK/
[0201] 1668 7922 8721
MASTER

NA FTCA

WED - 12 AUG 10:30A
PRIORITY OVERNIGHT

80524
CO-US DEN



Ref: Date: 11Aug20
 Dep: Wgt: 28.35 LBS
 DV: 0.00 TOTAL: 0.00
 Svcs: PRIORITY OVERNIGHT Master 1668 7922 8721
 TRCK: 1668 7922 8732

ORIGIN ID:GRRA (616) 399-6070	SHIP DATE: 11AUG20
ALS ENVIRONMENTAL	ACTWGT: 28.35 LB
ALS ENVIRONMENTAL	CAD: 0122071/CAFE3311
3352 128TH AVENUE	
HOLLAND, MI 494249263	BILL THIRD PARTY
UNITED STATES US	

TO SAMPLE RECEIVING
 ALS ENVIRONMENTAL
 225 COMMERCE DR

FORT COLLINS CO 80524

(970) 490-1611

THU:

PO:

REF:

DEPT:

100
ans

FedEx
Express



2 of 2

MPS#
[0263] 1668 7922 8732
Mstr# 1668 7922 8721*

WED - 12 AUG 10:30A
PRIORITY OVERNIGHT

[0201]

NA FTCA

80524
CO-US DEN



Client: ALS Environmental **Date:** 31-Aug-20
Project: 20080710 **Work Order:** 2008278
Sample ID: MW-4 **Lab ID:** 2008278-1
Legal Location: **Matrix:** WATER
Collection Date: 8/10/2020 11:07 **Percent Moisture:**

Analyses	Result	Qual	Report Limit	Units	Dilution Factor	Date Analyzed
Radium-226 by Radon Emanation - Method 903.1						
Ra-226	ND (+/- 0.3)	Y1,U	0.43	pCi/l	NA	8/31/2020 11:50
Carr: BARIUM	100	Y1	40-110	%REC	DL = NA	8/31/2020 11:50
Radium-228 Analysis by GFPC						
Ra-228	1.24 (+/- 0.51)		0.79	pCi/l	NA	8/28/2020 10:43
Carr: BARIUM	86.7		40-110	%REC	DL = NA	8/28/2020 10:43

Client: ALS Environmental **Date:** 31-Aug-20
Project: 20080710 **Work Order:** 2008278
Sample ID: MW-4 **Lab ID:** 2008278-1
Legal Location: **Matrix:** WATER
Collection Date: 8/10/2020 11:07 **Percent Moisture:**

Analyses	Result	Qual	Report Limit	Units	Dilution Factor	Date Analyzed
----------	--------	------	--------------	-------	-----------------	---------------

Explanation of Qualifiers

Radiochemistry:

- "Report Limit" is the MDC
- U or ND - Result is less than the sample specific MDC.
- Y1 - Chemical Yield is in control at 100-110%. Quantitative yield is assumed.
- Y2 - Chemical Yield outside default limits.
- W - DER is greater than Warning Limit of 1.42
- * - Aliquot Basis is 'As Received' while the Report Basis is 'Dry Weight'.
- # - Aliquot Basis is 'Dry Weight' while the Report Basis is 'As Received'.
- G - Sample density differs by more than 15% of LCS density.
- D - DER is greater than Control Limit
- M - Requested MDC not met.
- M3 - The requested MDC was not met, but the reported activity is greater than the reported MDC.
- L - LCS Recovery below lower control limit.
- H - LCS Recovery above upper control limit.
- P - LCS, Matrix Spike Recovery within control limits.
- N - Matrix Spike Recovery outside control limits
- NC - Not Calculated for duplicate results less than 5 times MDC
- B - Analyte concentration greater than MDC.
- B3 - Analyte concentration greater than MDC but less than Requested MDC.

Inorganics:

- B - Result is less than the requested reporting limit but greater than the instrument method detection limit (MDL).
- U or ND - Indicates that the compound was analyzed for but not detected.
- E - The reported value is estimated because of the presence of interference. An explanatory note may be included in the narrative.
- M - Duplicate injection precision was not met.
- N - Spiked sample recovery not within control limits. A post spike is analyzed for all ICP analyses when the matrix spike and or spike duplicate fail and the native sample concentration is less than four times the spike added concentration.
- Z - Spiked recovery not within control limits. An explanatory note may be included in the narrative.
- * - Duplicate analysis (relative percent difference) not within control limits.
- S - SAR value is estimated as one or more analytes used in the calculation were not detected above the detection limit.

Organics:

- U or ND - Indicates that the compound was analyzed for but not detected.
- B - Analyte is detected in the associated method blank as well as in the sample. It indicates probable blank contamination and warns the data user.
- E - Analyte concentration exceeds the upper level of the calibration range.
- J - Estimated value. The result is less than the reporting limit but greater than the instrument method detection limit (MDL).
- A - A tentatively identified compound is a suspected aldol-condensation product.
- X - The analyte was diluted below an accurate quantitation level.
- * - The spike recovery is equal to or outside the control criteria used.
- + - The relative percent difference (RPD) equals or exceeds the control criteria.
- G - A pattern resembling gasoline was detected in this sample.
- D - A pattern resembling diesel was detected in this sample.
- M - A pattern resembling motor oil was detected in this sample.
- C - A pattern resembling crude oil was detected in this sample.
- 4 - A pattern resembling JP-4 was detected in this sample.
- 5 - A pattern resembling JP-5 was detected in this sample.
- H - Indicates that the fuel pattern was in the heavier end of the retention time window for the analyte of interest.
- L - Indicates that the fuel pattern was in the lighter end of the retention time window for the analyte of interest.
- Z - This flag indicates that a significant fraction of the reported result did not resemble the patterns of any of the following petroleum hydrocarbon products:
 - gasoline
 - JP-8
 - diesel
 - mineral spirits
 - motor oil
 - Stoddard solvent
 - bunker C

ALS -- Fort Collins

Date: 8/31/2020 2:04:

Client: ALS Environmental
Work Order: 2008278
Project: 20080710

QC BATCH REPORT

Batch ID: RE200819-2-2 Instrument ID Alpha Scin Method: Radium-226 by Radon Emanation

LCS	Sample ID: RE200819-2			Units: pCi/l		Analysis Date: 8/31/2020 11:50					
Client ID:	Run ID: RE200819-2A						Prep Date: 8/19/2020		DF: NA		
Analyte	Result	ReportLimit	SPK Val	SPK Ref Value	%REC	Control Limit	Decision Level	DER Ref	DER	DER Limit	Qual
Ra-226	44 (+/- 11)	1	46.46	94.9	67-120						P,Y1
Carr: BARIUM		15900	15530	102	40-110						Y1

MB	Sample ID: RE200819-2			Units: pCi/l		Analysis Date: 8/31/2020 12:05					
Client ID:	Run ID: RE200819-2A						Prep Date: 8/19/2020		DF: NA		
Analyte	Result	ReportLimit	SPK Val	SPK Ref Value	%REC	Control Limit	Decision Level	DER Ref	DER	DER Limit	Qual
Ra-226	ND	0.24									Y1,U
Carr: BARIUM		15910	15530	102	40-110						Y1

The following samples were analyzed in this batch:

2008278-1

Client: ALS Environmental
Work Order: 2008278
Project: 20080710

QC BATCH REPORT

Batch ID: **RA200819-1-4**

Instrument ID **LB4100-C**

Method: **Radium-228 Analysis by GFPC**

LCS	Sample ID: RA200819-1			Units: pCi/l		Analysis Date: 8/28/2020 10:43					
Client ID:	Run ID: RA200819-1A			Prep Date: 8/19/2020					DF: NA		
Analyte	Result	ReportLimit	SPK Val	SPK Ref Value	%REC	Control Limit	Decision Level	DER Ref	DER DER	DER Limit	Qual
Ra-228	24.1 (+/- 5.6)	0.8	23.94		101	70-130					P
Carr: BARIUM		27430	32570		84.2	40-110					

LCSD	Sample ID: RA200819-1			Units: pCi/l		Analysis Date: 8/28/2020 10:43					
Client ID:	Run ID: RA200819-1A			Prep Date: 8/19/2020					DF: NA		
Analyte	Result	ReportLimit	SPK Val	SPK Ref Value	%REC	Control Limit	Decision Level	DER Ref	DER DER	DER Limit	Qual
Ra-228	30.3 (+/- 7.1)	0.9	23.94		126	70-130			24.1	0.7	2.1
Carr: BARIUM		26360	32570		80.9	40-110			27430		

MB	Sample ID: RA200819-1			Units: pCi/l		Analysis Date: 8/28/2020 10:43					
Client ID:	Run ID: RA200819-1A			Prep Date: 8/19/2020					DF: NA		
Analyte	Result	ReportLimit	SPK Val	SPK Ref Value	%REC	Control Limit	Decision Level	DER Ref	DER DER	DER Limit	Qual
Ra-228	ND	0.66									Y1,U
Carr: BARIUM		32590	32570		100	40-110					Y1

The following samples were analyzed in this batch:

2008278-1

Low-Flow Test Report:

Test Date / Time: 8/10/2020 8:23:57 AM

Project: Holland BPW PZ-1 (2)

Operator Name: B Stachkunis

Location Name: PZ-1 Well Diameter: 2 in Casing Type: PVC Screen Length: 5 ft Top of Screen: 6 ft Total Depth: 11 ft Initial Depth to Water: 9 ft	Pump Type: Peristaltic Tubing Type: Poly Tubing Inner Diameter: 0.25 in Tubing Length: 25 ft Pump Intake From TOC: 10.5 ft Estimated Total Volume Pumped: 4800 ml Flow Cell Volume: 130 ml Final Flow Rate: 200 ml/min Final Draw Down: 0 ft	Instrument Used: Aqua TROLL 600 Serial Number: 694478
--	---	--

Test Notes:

Low-Flow Readings:

Date Time	Elapsed Time	pH	Temperature	Specific Conductivity	RDO Concentration	Turbidity	ORP	Depth To Water	Flow
		+/- 0.1	+/- 0.5	+/- 3 %	+/- 0.3	+/- 1	+/- 10	+/- 5	
8/10/2020 8:23 AM	00:00	8.20 pH	67.33 °F	2,263.0 µS/cm	3.03 mg/L	0.00 NTU	85.1 mV	274.32 cm	200.00 ml/min
8/10/2020 8:26 AM	03:00	8.19 pH	65.41 °F	2,294.0 µS/cm	0.39 mg/L	0.00 NTU	-35.1 mV	274.32 cm	200.00 ml/min
8/10/2020 8:29 AM	06:00	8.20 pH	65.18 °F	2,298.2 µS/cm	0.13 mg/L	0.00 NTU	-91.3 mV	274.32 cm	200.00 ml/min
8/10/2020 8:32 AM	09:00	8.24 pH	64.95 °F	2,286.1 µS/cm	0.09 mg/L	0.00 NTU	-120.4 mV	274.32 cm	200.00 ml/min
8/10/2020 8:35 AM	12:00	8.27 pH	64.90 °F	2,261.1 µS/cm	0.07 mg/L	0.00 NTU	-136.6 mV	274.32 cm	200.00 ml/min
8/10/2020 8:38 AM	15:00	8.29 pH	65.06 °F	2,254.9 µS/cm	0.05 mg/L	0.00 NTU	-144.3 mV	274.32 cm	200.00 ml/min
8/10/2020 8:41 AM	18:00	8.33 pH	65.02 °F	2,222.0 µS/cm	0.05 mg/L	0.00 NTU	-149.1 mV	274.32 cm	200.00 ml/min
8/10/2020 8:44 AM	21:00	8.35 pH	65.11 °F	2,207.8 µS/cm	0.03 mg/L	0.00 NTU	-151.8 mV	274.32 cm	200.00 ml/min
8/10/2020 8:47 AM	24:00	8.38 pH	65.18 °F	2,189.5 µS/cm	0.01 mg/L	0.00 NTU	-158.7 mV	274.32 cm	200.00 ml/min

Samples

Sample ID:	Description:
------------	--------------

Low-Flow Test Report:

Test Date / Time: 8/10/2020 2:45:18 PM

Project: Holland BPW MW-1 (2)

Operator Name: B Stachkunis

Location Name: MW-1 Well Diameter: 2 in Casing Type: PVC Screen Length: 5 ft Top of Screen: 12 ft Total Depth: 17 ft Initial Depth to Water: 6.4 ft	Pump Type: Peristaltic Tubing Type: Poly Tubing Inner Diameter: 0.25 in Tubing Length: 25 ft Pump Intake From TOC: 15 ft Estimated Total Volume Pumped: 3600 ml Flow Cell Volume: 130 ml Final Flow Rate: 200 ml/min Final Draw Down: 0 ft	Instrument Used: Aqua TROLL 600 Serial Number: 694478
--	--	--

Test Notes:

Low-Flow Readings:

Date Time	Elapsed Time	pH	Temperature	Specific Conductivity	RDO Concentration	Turbidity	ORP	Depth To Water	Flow
		+/- 0.1	+/- 0.5	+/- 3 %	+/- 0.3	+/- 1	+/- 10	+/- 5	
8/10/2020 2:45 PM	00:00	6.89 pH	68.55 °F	1,817.6 µS/cm	0.84 mg/L	4.59 NTU	-91.2 mV	195.07 cm	200.00 ml/min
8/10/2020 2:48 PM	03:00	6.75 pH	68.29 °F	1,816.5 µS/cm	0.35 mg/L	5.87 NTU	-103.7 mV	195.07 cm	200.00 ml/min
8/10/2020 2:51 PM	06:00	6.73 pH	68.12 °F	1,824.5 µS/cm	0.16 mg/L	9.10 NTU	-108.1 mV	195.07 cm	200.00 ml/min
8/10/2020 2:54 PM	09:00	6.74 pH	67.90 °F	1,825.2 µS/cm	0.11 mg/L	3.23 NTU	-111.7 mV	195.07 cm	200.00 ml/min
8/10/2020 2:57 PM	12:00	6.74 pH	67.71 °F	1,828.4 µS/cm	0.09 mg/L	2.18 NTU	-114.2 mV	195.07 cm	200.00 ml/min
8/10/2020 3:00 PM	15:00	6.75 pH	67.42 °F	1,864.6 µS/cm	0.08 mg/L	1.61 NTU	-116.1 mV	195.07 cm	200.00 ml/min
8/10/2020 3:03 PM	18:00	6.75 pH	67.39 °F	1,867.6 µS/cm	0.07 mg/L	2.72 NTU	-118.6 mV	195.07 cm	200.00 ml/min

Samples

Sample ID:	Description:
------------	--------------

Low-Flow Test Report:

Test Date / Time: 8/10/2020 12:06:18 PM

Project: Holland BPW MW-3 (2)

Operator Name: B Stachkunis

Location Name: MW-3 Well Diameter: 2 in Casing Type: PVC Screen Length: 5 ft Top of Screen: 13.25 ft Total Depth: 18.25 ft Initial Depth to Water: 3.23 ft	Pump Type: Peristaltic Tubing Type: Poly Tubing Inner Diameter: 0.25 in Tubing Length: 25 ft Pump Intake From TOC: 15.75 ft Estimated Total Volume Pumped: 6000 ml Flow Cell Volume: 130 ml Final Flow Rate: 200 ml/min Final Draw Down: 0 ft	Instrument Used: Aqua TROLL 600 Serial Number: 694478
---	--	--

Test Notes:

Low-Flow Readings:

Date Time	Elapsed Time	pH	Temperature	Specific Conductivity	RDO Concentration	Turbidity	ORP	Depth To Water	Flow
		+/- 0.1	+/- 0.5	+/- 3 %	+/- 0.3	+/- 1	+/- 10	+/- 5	
8/10/2020 12:06 PM	00:00	6.83 pH	72.32 °F	493.97 µS/cm	3.58 mg/L	54.09 NTU	66.0 mV	98.45 cm	200.00 ml/min
8/10/2020 12:09 PM	03:00	6.49 pH	68.64 °F	480.96 µS/cm	0.52 mg/L	37.55 NTU	72.7 mV	98.45 cm	200.00 ml/min
8/10/2020 12:12 PM	06:00	6.47 pH	67.35 °F	497.10 µS/cm	0.33 mg/L	9.28 NTU	11.0 mV	98.45 cm	200.00 ml/min
8/10/2020 12:15 PM	09:00	6.46 pH	66.40 °F	526.30 µS/cm	0.22 mg/L	0.00 NTU	-25.9 mV	98.45 cm	200.00 ml/min
8/10/2020 12:18 PM	12:00	6.42 pH	65.71 °F	543.27 µS/cm	0.44 mg/L	1.49 NTU	-34.6 mV	98.45 cm	200.00 ml/min
8/10/2020 12:21 PM	15:00	6.40 pH	65.43 °F	556.28 µS/cm	0.40 mg/L	2.96 NTU	-37.6 mV	98.45 cm	200.00 ml/min
8/10/2020 12:24 PM	18:00	6.39 pH	65.19 °F	566.77 µS/cm	0.35 mg/L	0.00 NTU	-39.4 mV	98.45 cm	200.00 ml/min
8/10/2020 12:27 PM	21:00	6.38 pH	65.55 °F	575.27 µS/cm	0.18 mg/L	51.43 NTU	-40.9 mV	98.45 cm	200.00 ml/min
8/10/2020 12:30 PM	24:00	6.37 pH	65.71 °F	583.75 µS/cm	0.12 mg/L	0.00 NTU	-42.6 mV	98.45 cm	200.00 ml/min
8/10/2020 12:33 PM	27:00	6.37 pH	65.83 °F	591.38 µS/cm	0.11 mg/L	0.00 NTU	-44.2 mV	98.45 cm	200.00 ml/min
8/10/2020 12:36 PM	30:00	6.38 pH	65.54 °F	597.81 µS/cm	0.11 mg/L	0.00 NTU	-45.4 mV	98.45 cm	200.00 ml/min

Samples

Sample ID:	Description:
------------	--------------

Low-Flow Test Report:

Test Date / Time: 8/10/2020 1:25:10 PM

Project: Holland BPW MW-2 (2)

Operator Name: B Stachkunis

Location Name: MW-2 Well Diameter: 2 in Casing Type: PVC Screen Length: 5 ft Top of Screen: 11.15 ft Total Depth: 16.15 ft Initial Depth to Water: 3.09 ft	Pump Type: Peristaltic Tubing Type: Poly Tubing Inner Diameter: 0.25 in Tubing Length: 25 ft Pump Intake From TOC: 14.15 ft Estimated Total Volume Pumped: 4800 ml Flow Cell Volume: 130 ml Final Flow Rate: 200 ml/min Final Draw Down: 0 ft	Instrument Used: Aqua TROLL 600 Serial Number: 694478
--	--	--

Test Notes:

Low-Flow Readings:

Date Time	Elapsed Time	pH	Temperature	Specific Conductivity	RDO Concentration	Turbidity	ORP	Depth To Water	Flow
		+/- 0.1	+/- 0.5	+/- 3 %	+/- 0.3	+/- 1	+/- 10	+/- 5	
8/10/2020 1:25 PM	00:00	6.76 pH	80.33 °F	2,638.9 µS/cm	1.82 mg/L	0.15 NTU	-87.6 mV	94.18 cm	200.00 ml/min
8/10/2020 1:28 PM	03:00	6.71 pH	75.11 °F	2,739.5 µS/cm	0.28 mg/L	13.01 NTU	-105.3 mV	94.18 cm	200.00 ml/min
8/10/2020 1:31 PM	06:00	6.69 pH	73.52 °F	2,725.0 µS/cm	0.17 mg/L	8.05 NTU	-106.4 mV	94.18 cm	200.00 ml/min
8/10/2020 1:34 PM	09:00	6.69 pH	72.94 °F	2,711.8 µS/cm	0.14 mg/L	7.03 NTU	-110.2 mV	94.18 cm	200.00 ml/min
8/10/2020 1:37 PM	12:00	6.70 pH	72.89 °F	2,728.8 µS/cm	0.10 mg/L	7.44 NTU	-112.5 mV	94.18 cm	200.00 ml/min
8/10/2020 1:40 PM	15:00	6.70 pH	72.80 °F	2,724.9 µS/cm	0.09 mg/L	14.20 NTU	-111.8 mV	94.18 cm	200.00 ml/min
8/10/2020 1:43 PM	18:00	6.71 pH	72.63 °F	2,706.9 µS/cm	0.10 mg/L	4.25 NTU	-113.2 mV	94.18 cm	200.00 ml/min
8/10/2020 1:46 PM	21:00	6.71 pH	72.64 °F	2,725.9 µS/cm	0.09 mg/L	4.41 NTU	-113.9 mV	94.18 cm	200.00 ml/min
8/10/2020 1:49 PM	24:00	6.72 pH	72.30 °F	2,706.0 µS/cm	0.08 mg/L	10.41 NTU	-115.0 mV	94.18 cm	200.00 ml/min

Samples

Sample ID:	Description:
------------	--------------

Low-Flow Test Report:

Test Date / Time: 8/10/2020 4:36:51 PM

Project: Holland BPW MW-3A (2)

Operator Name: B Stachkunis

Location Name: MW-3A Well Diameter: 2 in Casing Type: PVC Screen Length: 5 ft Top of Screen: 6 ft Total Depth: 11 ft Initial Depth to Water: 3.23 ft	Pump Type: Peristaltic Tubing Type: Poly Tubing Inner Diameter: 0.25 in Tubing Length: 25 ft Pump Intake From TOC: 9 ft Estimated Total Volume Pumped: 6600 ml Flow Cell Volume: 130 ml Final Flow Rate: 200 ml/min Final Draw Down: 0 ft	Instrument Used: Aqua TROLL 600 Serial Number: 694478
---	--	--

Test Notes:

Low-Flow Readings:

Date Time	Elapsed Time	pH	Temperature	Specific Conductivity	RDO Concentration	Turbidity	ORP	Depth To Water	Flow
		+/- 0.1	+/- 0.5	+/- 3 %	+/- 0.3	+/- 1	+/- 10	+/- 5	
8/10/2020 4:36 PM	00:00	6.60 pH	73.89 °F	1,175.0 µS/cm	3.08 mg/L	0.00 NTU	-16.8 mV	98.45 cm	200.00 ml/min
8/10/2020 4:39 PM	03:00	6.48 pH	67.41 °F	1,222.9 µS/cm	0.23 mg/L	3.65 NTU	-63.5 mV	98.45 cm	200.00 ml/min
8/10/2020 4:42 PM	06:00	6.44 pH	67.17 °F	1,219.7 µS/cm	0.15 mg/L	0.00 NTU	-69.1 mV	98.45 cm	200.00 ml/min
8/10/2020 4:45 PM	09:00	6.46 pH	67.20 °F	1,219.4 µS/cm	0.14 mg/L	0.00 NTU	-73.7 mV	98.45 cm	200.00 ml/min
8/10/2020 4:48 PM	12:00	6.47 pH	67.25 °F	1,218.5 µS/cm	0.13 mg/L	5.16 NTU	-75.9 mV	98.45 cm	200.00 ml/min
8/10/2020 4:51 PM	15:00	6.47 pH	67.17 °F	1,221.6 µS/cm	0.12 mg/L	0.00 NTU	-77.1 mV	98.45 cm	200.00 ml/min
8/10/2020 4:54 PM	18:00	6.47 pH	67.14 °F	1,225.1 µS/cm	0.12 mg/L	0.00 NTU	-78.3 mV	98.45 cm	200.00 ml/min
8/10/2020 4:57 PM	21:00	6.46 pH	67.18 °F	1,223.7 µS/cm	0.10 mg/L	0.00 NTU	-79.3 mV	98.45 cm	200.00 ml/min
8/10/2020 5:00 PM	24:00	6.46 pH	67.11 °F	1,221.2 µS/cm	0.11 mg/L	0.00 NTU	-80.0 mV	98.45 cm	200.00 ml/min
8/10/2020 5:03 PM	27:00	6.46 pH	66.83 °F	1,222.4 µS/cm	0.09 mg/L	0.00 NTU	-80.6 mV	98.45 cm	200.00 ml/min
8/10/2020 5:06 PM	30:00	6.46 pH	66.65 °F	1,222.8 µS/cm	0.09 mg/L	0.00 NTU	-81.1 mV	98.45 cm	200.00 ml/min
8/10/2020 5:09 PM	33:00	6.46 pH	66.66 °F	1,223.3 µS/cm	0.08 mg/L	0.00 NTU	-81.4 mV	98.45 cm	200.00 ml/min

Samples

Sample ID:	Description:
-------------------	---------------------

Created using VuSitu from In-Situ, Inc.

Low-Flow Test Report:

Test Date / Time: 8/10/2020 10:37:01 AM

Project: Holland BPW MW-4 (2)

Operator Name: B Stachkunis

Location Name: MW-4 Well Diameter: 2 in Casing Type: PVC Screen Length: 5 ft Top of Screen: 4.5 ft Total Depth: 9.5 ft Initial Depth to Water: 3.82 ft	Pump Type: Peristaltic Tubing Type: Poly Tubing Inner Diameter: 0.25 in Tubing Length: 25 ft Pump Intake From TOC: 8.5 ft Estimated Total Volume Pumped: 6000 ml Flow Cell Volume: 130 ml Final Flow Rate: 200 ml/min Final Draw Down: 0 ft	Instrument Used: Aqua TROLL 600 Serial Number: 694478
---	---	--

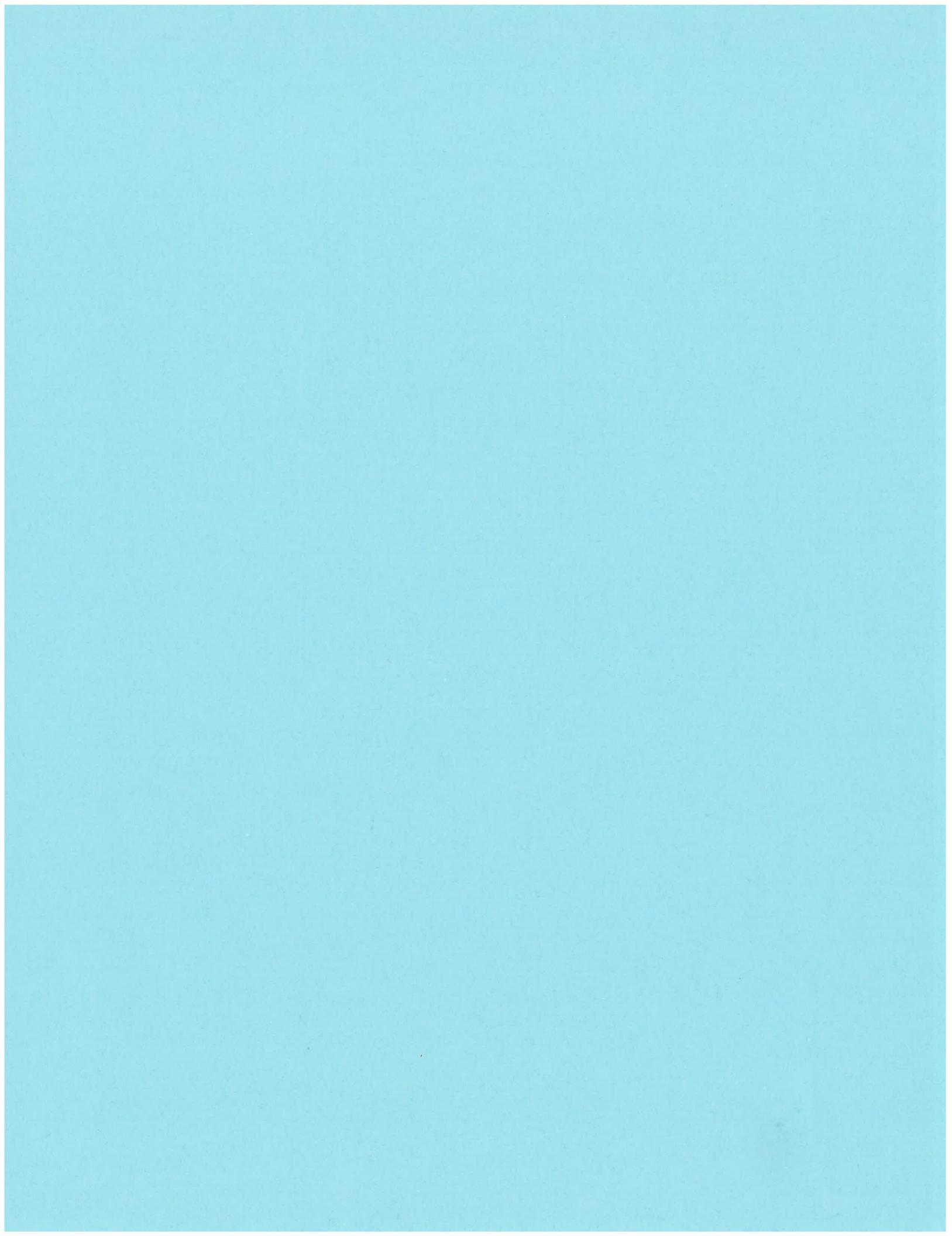
Test Notes:

Low-Flow Readings:

Date Time	Elapsed Time	pH	Temperature	Specific Conductivity	RDO Concentration	Turbidity	ORP	Depth To Water	Flow
		+/- 0.1	+/- 0.5	+/- 3 %	+/- 0.3	+/- 1	+/- 10	+/- 5	
8/10/2020 10:37 AM	00:00	6.93 pH	70.06 °F	2,978.0 µS/cm	2.13 mg/L	65.28 NTU	-138.2 mV	116.43 cm	200.00 ml/min
8/10/2020 10:40 AM	03:00	6.82 pH	65.32 °F	3,062.7 µS/cm	0.27 mg/L	43.52 NTU	-124.8 mV	116.43 cm	200.00 ml/min
8/10/2020 10:43 AM	06:00	6.82 pH	64.75 °F	3,067.6 µS/cm	0.17 mg/L	39.30 NTU	-124.1 mV	116.43 cm	200.00 ml/min
8/10/2020 10:46 AM	09:00	6.84 pH	64.84 °F	3,062.1 µS/cm	0.16 mg/L	41.43 NTU	-123.8 mV	116.43 cm	200.00 ml/min
8/10/2020 10:49 AM	12:00	6.84 pH	64.77 °F	3,058.3 µS/cm	0.10 mg/L	55.23 NTU	-121.2 mV	116.43 cm	200.00 ml/min
8/10/2020 10:52 AM	15:00	6.85 pH	64.38 °F	3,054.5 µS/cm	0.09 mg/L	60.56 NTU	-117.0 mV	116.43 cm	200.00 ml/min
8/10/2020 10:55 AM	18:00	6.86 pH	64.52 °F	3,050.5 µS/cm	0.08 mg/L	32.03 NTU	-116.0 mV	116.43 cm	200.00 ml/min
8/10/2020 10:58 AM	21:00	6.86 pH	64.56 °F	3,040.3 µS/cm	0.07 mg/L	30.25 NTU	-115.7 mV	116.43 cm	200.00 ml/min
8/10/2020 11:01 AM	24:00	6.87 pH	64.59 °F	3,035.3 µS/cm	0.07 mg/L	16.01 NTU	-116.5 mV	116.43 cm	200.00 ml/min
8/10/2020 11:04 AM	27:00	6.87 pH	64.12 °F	3,034.8 µS/cm	0.06 mg/L	17.05 NTU	-116.7 mV	116.43 cm	200.00 ml/min
8/10/2020 11:07 AM	30:00	6.88 pH	63.93 °F	3,037.0 µS/cm	0.06 mg/L	16.23 NTU	-116.4 mV	116.43 cm	200.00 ml/min

Samples

Sample ID:	Description:
------------	--------------





29-Dec-2020

Karen Okonta
NTH Consultants, Ltd.
41780 Six Mile Road
Northville, MI 48168

Re: **Holland Board of Public Works**

Work Order: **20112217**

Dear Karen,

ALS Environmental received 9 samples on 24-Nov-2020 06:00 PM for the analyses presented in the following report.

The analytical data provided relates directly to the samples received by ALS Environmental - Holland and for only the analyses requested.

Sample results are compliant with industry accepted practices and Quality Control results achieved laboratory specifications. Any exceptions are noted in the Case Narrative, or noted with qualifiers in the report or QC batch information. Should this laboratory report need to be reproduced, it should be reproduced in full unless written approval has been obtained from ALS Environmental. Samples will be disposed in 30 days unless storage arrangements are made.

The total number of pages in this report is 42.

If you have any questions regarding this report, please feel free to contact me:

ADDRESS: 3352 128th Avenue, Holland, MI, USA
PHONE: +1 (616) 399-6070 FAX: +1 (616) 399-6185

Sincerely,

A handwritten signature in black ink, appearing to read "Chad Whelton".

Electronically approved by: Chad Whelton

Chad Whelton
Project Manager

Report of Laboratory Analysis

Certificate No: MI: 0022

ALS GROUP USA, CORP Part of the ALS Laboratory Group A Campbell Brothers Limited Company

Client: NTH Consultants, Ltd.
Project: Holland Board of Public Works
Work Order: 20112217

Work Order Sample Summary

Lab Samp ID	Client Sample ID	Matrix	Tag Number	Collection Date	Date Received	Hold
20112217-01	PZ-1	Groundwater		11/24/2020 10:30	11/24/2020 18:00	<input type="checkbox"/>
20112217-02	MW-1	Groundwater		11/24/2020 13:15	11/24/2020 18:00	<input type="checkbox"/>
20112217-03	MW-2	Groundwater		11/24/2020 14:50	11/24/2020 18:00	<input type="checkbox"/>
20112217-04	MW-3	Groundwater		11/24/2020 16:35	11/24/2020 18:00	<input type="checkbox"/>
20112217-05	MW-3A	Groundwater		11/24/2020 17:55	11/24/2020 18:00	<input type="checkbox"/>
20112217-06	Field Duplicate	Groundwater		11/24/2020	11/24/2020 18:00	<input type="checkbox"/>
20112217-07	Field Blank	Water		11/24/2020 17:30	11/24/2020 18:00	<input type="checkbox"/>
20112217-08	Equipment Blank	Water		11/24/2020 17:30	11/24/2020 18:00	<input type="checkbox"/>

Client: NTH Consultants, Ltd.
Project: Holland Board of Public Works
Work Order: 20112217

Case Narrative

Samples for the above noted Work Order were received on 11/24/2020. The attached "Sample Receipt Checklist" documents the status of custody seals, container integrity, preservation, and temperature compliance.

Samples were analyzed according to the analytical methodology previously transmitted in the "Work Order Acknowledgement". Methodologies are also documented in the "Analytical Result" section for each sample. Quality control results are listed in the "QC Report" section. Sample association for the reported quality control is located at the end of each batch summary. If applicable, results are appropriately qualified in the Analytical Result and QC Report sections. The "Qualifiers" section documents the various qualifiers, units, and acronyms utilized in reporting. A copy of the laboratory's scope of accreditation is available upon request.

With the following exceptions, all sample analyses achieved analytical criteria.

Metals:

Batch 168869, Method SW6020B, Sample 20112217-04A MS/MSD: The MS/MSD recovery was outside of the control limit for calcium; however, the result in the parent sample is greater than 4x the spike amount. No qualification is required.

Wet Chemistry:

Batch R305153, Method A4500-H B-11: pH is considered a "field test" and, as such, the recommended sample holding time expired prior to sample receipt. Results should be considered estimated.

Batch R305326, Method E300.0, Sample MW-2 (20112217-03B): The reporting limits for fluoride and sulfate are elevated due to dilution for high concentrations of non-target analytes.

Batch R305326, Method E300.0, Sample MW-4 (20112217-09B): The reporting limits for fluoride and sulfate are elevated due to dilution for high concentrations of non-target analytes.

Batch R305326, Method E300.0, Sample 20112217-04B MS/MSD: The MS/MSD recovery was below the lower control limit for fluoride. The corresponding result in the parent sample may be biased low for this analyte.

Radium analysis performed by ALS Fort Collins laboratory.

<u>Qualifier</u>	<u>Description</u>
*	Value exceeds Regulatory Limit
**	Estimated Value
a	Analyte is non-accredited
B	Analyte detected in the associated Method Blank above the Reporting Limit
E	Value above quantitation range
H	Analyzed outside of Holding Time
Hr	BOD/CBOD - Sample was reset outside Hold Time, value should be considered estimated.
J	Analyte is present at an estimated concentration between the MDL and Report Limit
ND	Not Detected at the Reporting Limit
O	Sample amount is > 4 times amount spiked
P	Dual Column results percent difference > 40%
R	RPD above laboratory control limit
S	Spike Recovery outside laboratory control limits
U	Analyzed but not detected above the MDL
X	Analyte was detected in the Method Blank between the MDL and Reporting Limit, sample results may exhibit background or reagent contamination at the observed level.

<u>Acronym</u>	<u>Description</u>
DUP	Method Duplicate
LCS	Laboratory Control Sample
LCSD	Laboratory Control Sample Duplicate
LOD	Limit of Detection (see MDL)
LOQ	Limit of Quantitation (see PQL)
MBLK	Method Blank
MDL	Method Detection Limit
MS	Matrix Spike
MSD	Matrix Spike Duplicate
PQL	Practical Quantitation Limit
RPD	Relative Percent Difference
TDL	Target Detection Limit
TNTC	Too Numerous To Count
A	APHA Standard Methods
D	ASTM
E	EPA
SW	SW-846 Update III

<u>Units Reported</u>	<u>Description</u>
°C	Degrees Celcius
as noted	
mg/L	Milligrams per Liter
s.u.	Standard Units

Client: NTH Consultants, Ltd.
Project: Holland Board of Public Works
Sample ID: PZ-1
Collection Date: 11/24/2020 10:30 AM

Work Order: 20112217
Lab ID: 20112217-01
Matrix: GROUNDWATER

Analyses	Result	Qual	Report Limit	Units	Dilution Factor	Date Analyzed
MERCURY BY CVAA						
Mercury	0.00033		0.00020	mg/L	1	12/8/2020 02:24 PM
METALS BY ICP-MS						
Antimony	ND		0.0050	mg/L	1	12/8/2020 03:56 PM
Arsenic	0.043		0.0050	mg/L	1	12/8/2020 03:56 PM
Barium	0.043		0.0050	mg/L	1	12/8/2020 03:56 PM
Beryllium	ND		0.0020	mg/L	1	12/8/2020 03:56 PM
Boron	0.47		0.020	mg/L	1	12/8/2020 03:56 PM
Cadmium	ND		0.0020	mg/L	1	12/8/2020 03:56 PM
Calcium	27		0.50	mg/L	1	12/8/2020 03:56 PM
Chromium	0.013		0.0050	mg/L	1	12/8/2020 03:56 PM
Cobalt	ND		0.0050	mg/L	1	12/8/2020 03:56 PM
Lead	0.040		0.0050	mg/L	1	12/8/2020 03:56 PM
Lithium	ND		0.010	mg/L	1	12/8/2020 03:56 PM
Molybdenum	0.036		0.0050	mg/L	1	12/8/2020 03:56 PM
Selenium	ND		0.0050	mg/L	1	12/8/2020 03:56 PM
Thallium	ND		0.0020	mg/L	1	12/8/2020 03:56 PM
ANIONS BY ION CHROMATOGRAPHY						
Chloride	140		16	mg/L	16	12/8/2020 04:03 PM
Fluoride	ND		1.0	mg/L	1	12/8/2020 03:44 PM
Sulfate	6.3		2.0	mg/L	1	12/8/2020 03:44 PM
PH (LABORATORY)						
pH (laboratory)	8.20	H	0.100	s.u.	1	12/7/2020 12:54 PM
Temperature	21.1	H	0.100	°C	1	12/7/2020 12:54 PM
TOTAL DISSOLVED SOLIDS						
Total Dissolved Solids	1,200		300	mg/L	1	12/2/2020 03:48 PM
SUBCONTRACTED ANALYSES						
Subcontracted Analyses	See attached		SUBCONTRACT as noted		1	Analyst: ALS 12/29/2020

Note: See Qualifiers page for a list of qualifiers and their definitions.

Client: NTH Consultants, Ltd.
Project: Holland Board of Public Works
Sample ID: MW-1
Collection Date: 11/24/2020 01:15 PM

Work Order: 20112217
Lab ID: 20112217-02
Matrix: GROUNDWATER

Analyses	Result	Qual	Report Limit	Units	Dilution Factor	Date Analyzed
MERCURY BY CVAA						
Mercury	ND		0.00020	mg/L	1	12/8/2020 02:25 PM
METALS BY ICP-MS						
Antimony	ND		0.0050	mg/L	1	12/8/2020 03:58 PM
Arsenic	0.029		0.0050	mg/L	1	12/8/2020 03:58 PM
Barium	0.30		0.0050	mg/L	1	12/8/2020 03:58 PM
Beryllium	ND		0.0020	mg/L	1	12/8/2020 03:58 PM
Boron	1.6		0.020	mg/L	1	12/8/2020 03:58 PM
Cadmium	ND		0.0020	mg/L	1	12/8/2020 03:58 PM
Calcium	100		0.50	mg/L	1	12/8/2020 03:58 PM
Chromium	ND		0.0050	mg/L	1	12/8/2020 03:58 PM
Cobalt	ND		0.0050	mg/L	1	12/8/2020 03:58 PM
Lead	ND		0.0050	mg/L	1	12/8/2020 03:58 PM
Lithium	0.14		0.010	mg/L	1	12/8/2020 03:58 PM
Molybdenum	ND		0.0050	mg/L	1	12/8/2020 03:58 PM
Selenium	ND		0.0050	mg/L	1	12/8/2020 03:58 PM
Thallium	ND		0.0020	mg/L	1	12/8/2020 03:58 PM
ANIONS BY ION CHROMATOGRAPHY						
Chloride	300		40	mg/L	40	12/8/2020 04:42 PM
Fluoride	ND		1.0	mg/L	1	12/8/2020 04:22 PM
Sulfate	11		2.0	mg/L	1	12/8/2020 04:22 PM
PH (LABORATORY)						
pH (laboratory)	6.88	H	0.100	s.u.	1	12/7/2020 12:54 PM
Temperature	21.0	H	0.100	°C	1	12/7/2020 12:54 PM
TOTAL DISSOLVED SOLIDS						
Total Dissolved Solids	1,100		300	mg/L	1	12/2/2020 03:48 PM
SUBCONTRACTED ANALYSES						
Subcontracted Analyses	See attached		SUBCONTRACT as noted		1	Analyst: ALS 12/29/2020

Note: See Qualifiers page for a list of qualifiers and their definitions.

Client: NTH Consultants, Ltd.
Project: Holland Board of Public Works
Sample ID: MW-2
Collection Date: 11/24/2020 02:50 PM

Work Order: 20112217
Lab ID: 20112217-03
Matrix: GROUNDWATER

Analyses	Result	Qual	Report Limit	Units	Dilution Factor	Date Analyzed
MERCURY BY CVAA						
Mercury	ND		0.00020	mg/L	1	12/8/2020 02:27 PM
METALS BY ICP-MS						
Antimony	ND		0.0050	mg/L	1	12/8/2020 03:59 PM
Arsenic	ND		0.0050	mg/L	1	12/8/2020 03:59 PM
Barium	0.23		0.0050	mg/L	1	12/8/2020 03:59 PM
Beryllium	ND		0.0020	mg/L	1	12/8/2020 03:59 PM
Boron	0.82		0.020	mg/L	1	12/8/2020 03:59 PM
Cadmium	ND		0.0020	mg/L	1	12/8/2020 03:59 PM
Calcium	80		0.50	mg/L	1	12/8/2020 03:59 PM
Chromium	ND		0.0050	mg/L	1	12/8/2020 03:59 PM
Cobalt	ND		0.0050	mg/L	1	12/8/2020 03:59 PM
Lead	ND		0.0050	mg/L	1	12/8/2020 03:59 PM
Lithium	ND		0.010	mg/L	1	12/8/2020 03:59 PM
Molybdenum	ND		0.0050	mg/L	1	12/8/2020 03:59 PM
Selenium	ND		0.0050	mg/L	1	12/8/2020 03:59 PM
Thallium	ND		0.0020	mg/L	1	12/8/2020 03:59 PM
ANIONS BY ION CHROMATOGRAPHY						
Chloride	660		80	mg/L	80	12/8/2020 05:20 PM
Fluoride	ND		2.0	mg/L	2	12/8/2020 05:01 PM
Sulfate	ND		4.0	mg/L	2	12/8/2020 05:01 PM
PH (LABORATORY)						
pH (laboratory)	6.88	H	0.100	s.u.	1	12/7/2020 12:54 PM
Temperature	21.1	H	0.100	°C	1	12/7/2020 12:54 PM
TOTAL DISSOLVED SOLIDS						
Total Dissolved Solids	1,500		500	mg/L	1	12/2/2020 03:48 PM
SUBCONTRACTED ANALYSES						
Subcontracted Analyses	See attached		SUBCONTRACT as noted		1	Analyst: ALS 12/29/2020

Note: See Qualifiers page for a list of qualifiers and their definitions.

Client: NTH Consultants, Ltd.
Project: Holland Board of Public Works
Sample ID: MW-3
Collection Date: 11/24/2020 04:35 PM

Work Order: 20112217
Lab ID: 20112217-04
Matrix: GROUNDWATER

Analyses	Result	Qual	Report Limit	Units	Dilution Factor	Date Analyzed
MERCURY BY CVAA						
Mercury	ND		0.00020	mg/L	1	12/8/2020 02:29 PM
METALS BY ICP-MS						
Antimony	ND		0.0050	mg/L	1	12/8/2020 04:01 PM
Arsenic	ND		0.0050	mg/L	1	12/8/2020 04:01 PM
Barium	0.11		0.0050	mg/L	1	12/8/2020 04:01 PM
Beryllium	ND		0.0020	mg/L	1	12/8/2020 04:01 PM
Boron	0.47		0.020	mg/L	1	12/8/2020 04:01 PM
Cadmium	ND		0.0020	mg/L	1	12/8/2020 04:01 PM
Calcium	95		0.50	mg/L	1	12/8/2020 04:01 PM
Chromium	ND		0.0050	mg/L	1	12/8/2020 04:01 PM
Cobalt	ND		0.0050	mg/L	1	12/8/2020 04:01 PM
Lead	ND		0.0050	mg/L	1	12/8/2020 04:01 PM
Lithium	0.015		0.010	mg/L	1	12/8/2020 04:01 PM
Molybdenum	ND		0.0050	mg/L	1	12/8/2020 04:01 PM
Selenium	ND		0.0050	mg/L	1	12/8/2020 04:01 PM
Thallium	ND		0.0020	mg/L	1	12/8/2020 04:01 PM
ANIONS BY ION CHROMATOGRAPHY						
Chloride	73		8.0	mg/L	8	12/8/2020 06:37 PM
Fluoride	ND		1.0	mg/L	1	12/8/2020 06:18 PM
Sulfate	100		16	mg/L	8	12/8/2020 06:37 PM
PH (LABORATORY)						
pH (laboratory)	6.70	H	0.100	s.u.	1	12/7/2020 12:54 PM
Temperature	20.9	H	0.100	°C	1	12/7/2020 12:54 PM
TOTAL DISSOLVED SOLIDS						
Total Dissolved Solids	530		50	mg/L	1	12/2/2020 03:48 PM
SUBCONTRACTED ANALYSES						
Subcontracted Analyses	See attached			SUBCONTRACT as noted	1	Analyst: ALS 12/29/2020

Note: See Qualifiers page for a list of qualifiers and their definitions.

Client: NTH Consultants, Ltd.
Project: Holland Board of Public Works
Sample ID: MW-3A
Collection Date: 11/24/2020 05:55 PM

Work Order: 20112217
Lab ID: 20112217-05
Matrix: GROUNDWATER

Analyses	Result	Qual	Report Limit	Units	Dilution Factor	Date Analyzed
MERCURY BY CVAA						
Mercury	0.00024		0.00020	mg/L	1	12/8/2020 02:34 PM
METALS BY ICP-MS						
Antimony	ND		0.0050	mg/L	1	12/8/2020 04:06 PM
Arsenic	ND		0.0050	mg/L	1	12/8/2020 04:06 PM
Barium	0.28		0.0050	mg/L	1	12/8/2020 04:06 PM
Beryllium	ND		0.0020	mg/L	1	12/8/2020 04:06 PM
Boron	0.68		0.020	mg/L	1	12/8/2020 04:06 PM
Cadmium	ND		0.0020	mg/L	1	12/8/2020 04:06 PM
Calcium	140		0.50	mg/L	1	12/8/2020 04:06 PM
Chromium	ND		0.0050	mg/L	1	12/8/2020 04:06 PM
Cobalt	ND		0.0050	mg/L	1	12/8/2020 04:06 PM
Lead	ND		0.0050	mg/L	1	12/8/2020 04:06 PM
Lithium	ND		0.010	mg/L	1	12/8/2020 04:06 PM
Molybdenum	ND		0.0050	mg/L	1	12/8/2020 04:06 PM
Selenium	ND		0.0050	mg/L	1	12/8/2020 04:06 PM
Thallium	ND		0.0020	mg/L	1	12/8/2020 04:06 PM
ANIONS BY ION CHROMATOGRAPHY						
Chloride	120		8.0	mg/L	8	12/8/2020 08:14 PM
Fluoride	ND		1.0	mg/L	1	12/8/2020 07:55 PM
Sulfate	2.8		2.0	mg/L	1	12/8/2020 07:55 PM
PH (LABORATORY)						
pH (laboratory)	6.77	H	0.100	s.u.	1	12/7/2020 12:54 PM
Temperature	20.7	H	0.100	°C	1	12/7/2020 12:54 PM
TOTAL DISSOLVED SOLIDS						
Total Dissolved Solids	560		100	mg/L	1	12/3/2020 02:30 PM
SUBCONTRACTED ANALYSES						
Subcontracted Analyses	See attached		SUBCONTRACT as noted		1	Analyst: ALS 12/29/2020

Note: See Qualifiers page for a list of qualifiers and their definitions.

Client: NTH Consultants, Ltd.
Project: Holland Board of Public Works
Sample ID: Field Duplicate
Collection Date: 11/24/2020

Work Order: 20112217
Lab ID: 20112217-06
Matrix: GROUNDWATER

Analyses	Result	Qual	Report Limit	Units	Dilution Factor	Date Analyzed
MERCURY BY CVAA						
Mercury	0.00025		0.00020	mg/L	1	12/8/2020 02:36 PM
METALS BY ICP-MS						
Antimony	ND		0.0050	mg/L	1	12/8/2020 04:08 PM
Arsenic	0.029		0.0050	mg/L	1	12/8/2020 04:08 PM
Barium	0.29		0.0050	mg/L	1	12/8/2020 04:08 PM
Beryllium	ND		0.0020	mg/L	1	12/8/2020 04:08 PM
Boron	1.6		0.020	mg/L	1	12/8/2020 04:08 PM
Cadmium	ND		0.0020	mg/L	1	12/8/2020 04:08 PM
Calcium	100		0.50	mg/L	1	12/8/2020 04:08 PM
Chromium	ND		0.0050	mg/L	1	12/8/2020 04:08 PM
Cobalt	ND		0.0050	mg/L	1	12/8/2020 04:08 PM
Lead	ND		0.0050	mg/L	1	12/8/2020 04:08 PM
Lithium	0.14		0.010	mg/L	1	12/8/2020 04:08 PM
Molybdenum	ND		0.0050	mg/L	1	12/8/2020 04:08 PM
Selenium	ND		0.0050	mg/L	1	12/8/2020 04:08 PM
Thallium	ND		0.0020	mg/L	1	12/8/2020 04:08 PM
ANIONS BY ION CHROMATOGRAPHY						
Chloride	290		40	mg/L	40	12/8/2020 08:52 PM
Fluoride	ND		1.0	mg/L	1	12/8/2020 08:33 PM
Sulfate	9.7		2.0	mg/L	1	12/8/2020 08:33 PM
PH (LABORATORY)						
pH (laboratory)	6.87	H	0.100	s.u.	1	12/7/2020 12:54 PM
Temperature	21.0	H	0.100	°C	1	12/7/2020 12:54 PM
TOTAL DISSOLVED SOLIDS						
Total Dissolved Solids	1,000		300	mg/L	1	12/3/2020 02:30 PM
SUBCONTRACTED ANALYSES						
Subcontracted Analyses	See attached		SUBCONTRACT as noted		1	Analyst: ALS 12/29/2020

Note: See Qualifiers page for a list of qualifiers and their definitions.

Client: NTH Consultants, Ltd.
Project: Holland Board of Public Works
Sample ID: Field Blank
Collection Date: 11/24/2020 05:30 PM

Work Order: 20112217
Lab ID: 20112217-07
Matrix: WATER

Analyses	Result	Qual	Report Limit	Units	Dilution Factor	Date Analyzed
MERCURY BY CVAA						
Mercury	0.00023		0.00020	mg/L	1	12/8/2020 02:38 PM
METALS BY ICP-MS						
Antimony	ND		0.0050	mg/L	1	12/8/2020 04:16 PM
Arsenic	ND		0.0050	mg/L	1	12/8/2020 04:16 PM
Barium	ND		0.0050	mg/L	1	12/8/2020 04:16 PM
Beryllium	ND		0.0020	mg/L	1	12/8/2020 04:16 PM
Boron	ND		0.020	mg/L	1	12/8/2020 04:16 PM
Cadmium	ND		0.0020	mg/L	1	12/8/2020 04:16 PM
Calcium	ND		0.50	mg/L	1	12/8/2020 04:16 PM
Chromium	ND		0.0050	mg/L	1	12/8/2020 04:16 PM
Cobalt	ND		0.0050	mg/L	1	12/8/2020 04:16 PM
Lead	ND		0.0050	mg/L	1	12/8/2020 04:16 PM
Lithium	ND		0.010	mg/L	1	12/8/2020 04:16 PM
Molybdenum	ND		0.0050	mg/L	1	12/8/2020 04:16 PM
Selenium	ND		0.0050	mg/L	1	12/8/2020 04:16 PM
Thallium	ND		0.0020	mg/L	1	12/8/2020 04:16 PM
ANIONS BY ION CHROMATOGRAPHY						
Chloride	ND		1.0	mg/L	1	12/8/2020 03:05 PM
Fluoride	ND		1.0	mg/L	1	12/8/2020 03:05 PM
Sulfate	ND		2.0	mg/L	1	12/8/2020 03:05 PM
PH (LABORATORY)						
pH (laboratory)	6.37	H	0.100	s.u.	1	12/7/2020 12:54 PM
Temperature	21.0	H	0.100	°C	1	12/7/2020 12:54 PM
TOTAL DISSOLVED SOLIDS						
Total Dissolved Solids	ND		30	mg/L	1	12/3/2020 02:30 PM
SUBCONTRACTED ANALYSES						
Subcontracted Analyses	See attached			SUBCONTRACT as noted	1	Analyst: ALS 12/29/2020

Note: See Qualifiers page for a list of qualifiers and their definitions.

Client: NTH Consultants, Ltd.
Project: Holland Board of Public Works
Sample ID: Equipment Blank
Collection Date: 11/24/2020 05:30 PM

Work Order: 20112217
Lab ID: 20112217-08
Matrix: WATER

Analyses	Result	Qual	Report Limit	Units	Dilution Factor	Date Analyzed
MERCURY BY CVAA						
Mercury	0.00022		0.00020	mg/L	1	12/8/2020 02:40 PM
METALS BY ICP-MS						
Antimony	ND		0.0050	mg/L	1	12/8/2020 04:18 PM
Arsenic	ND		0.0050	mg/L	1	12/8/2020 04:18 PM
Barium	ND		0.0050	mg/L	1	12/8/2020 04:18 PM
Beryllium	ND		0.0020	mg/L	1	12/8/2020 04:18 PM
Boron	ND		0.020	mg/L	1	12/8/2020 04:18 PM
Cadmium	ND		0.0020	mg/L	1	12/8/2020 04:18 PM
Calcium	ND		0.50	mg/L	1	12/8/2020 04:18 PM
Chromium	ND		0.0050	mg/L	1	12/8/2020 04:18 PM
Cobalt	ND		0.0050	mg/L	1	12/8/2020 04:18 PM
Lead	ND		0.0050	mg/L	1	12/8/2020 04:18 PM
Lithium	ND		0.010	mg/L	1	12/8/2020 04:18 PM
Molybdenum	ND		0.0050	mg/L	1	12/8/2020 04:18 PM
Selenium	ND		0.0050	mg/L	1	12/8/2020 04:18 PM
Thallium	ND		0.0020	mg/L	1	12/8/2020 04:18 PM
ANIONS BY ION CHROMATOGRAPHY						
Chloride	ND		1.0	mg/L	1	12/8/2020 03:25 PM
Fluoride	ND		1.0	mg/L	1	12/8/2020 03:25 PM
Sulfate	ND		2.0	mg/L	1	12/8/2020 03:25 PM
PH (LABORATORY)						
pH (laboratory)	5.85	H	0.100	s.u.	1	12/7/2020 12:54 PM
Temperature	21.0	H	0.100	°C	1	12/7/2020 12:54 PM
TOTAL DISSOLVED SOLIDS						
Total Dissolved Solids	ND		30	mg/L	1	12/3/2020 02:30 PM
SUBCONTRACTED ANALYSES						
Subcontracted Analyses	See attached			SUBCONTRACT as noted	1	Analyst: ALS 12/29/2020

Note: See Qualifiers page for a list of qualifiers and their definitions.

ALS Group, USA

Date: 29-Dec-20

Client: NTH Consultants, Ltd.
Work Order: 20112217
Project: Holland Board of Public Works

QC BATCH REPORT

Batch ID: 168861		Instrument ID HG4		Method: SW7470A											
MBLK		Sample ID: MBLK-168861-168861			Units: mg/L		Analysis Date: 12/9/2020 08:40 AM								
Client ID:		Run ID: HG4_201209A			SeqNo: 6971362		Prep Date: 12/8/2020		DF: 1						
Analyte		Result		PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual			
Mercury		ND		0.00020											
LCS		Sample ID: LCS-168861-168861			Units: mg/L		Analysis Date: 12/8/2020 01:57 PM								
Client ID:		Run ID: HG4_201208A			SeqNo: 6969850		Prep Date: 12/8/2020		DF: 1						
Analyte		Result		PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual			
Mercury		0.002055		0.00020	0.002	0	103	80-120	0						
MS		Sample ID: 20112217-04AMS			Units: mg/L		Analysis Date: 12/8/2020 02:31 PM								
Client ID: MW-3		Run ID: HG4_201208A			SeqNo: 6969864		Prep Date: 12/8/2020		DF: 1						
Analyte		Result		PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual			
Mercury		0.00192		0.00020	0.002	-0.0000435	98.2	75-125	0						
MSD		Sample ID: 20112217-04AMSD			Units: mg/L		Analysis Date: 12/8/2020 02:32 PM								
Client ID: MW-3		Run ID: HG4_201208A			SeqNo: 6969865		Prep Date: 12/8/2020		DF: 1						
Analyte		Result		PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual			
Mercury		0.001845		0.00020	0.002	-0.0000435	94.4	75-125	0.00192	3.98	20				

The following samples were analyzed in this batch:

20112217-01A	20112217-02A	20112217-03A
20112217-04A	20112217-05A	20112217-06A
20112217-07A	20112217-08A	

Note: See Qualifiers Page for a list of Qualifiers and their explanation.

Client: NTH Consultants, Ltd.
Work Order: 20112217
Project: Holland Board of Public Works

QC BATCH REPORT

Batch ID: **168869** Instrument ID **ICPMS3** Method: **SW6020B**

MLBK				Sample ID: MLBK-168869-168869		Units: mg/L		Analysis Date: 12/8/2020 03:44 PM		
Client ID:		Run ID: ICPMS3_201208A		SeqNo: 6969146		Prep Date: 12/8/2020		DF: 1		
Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
Antimony	ND	0.0050								
Arsenic	ND	0.0050								
Barium	ND	0.0050								
Beryllium	ND	0.0020								
Boron	ND	0.020								
Cadmium	ND	0.0020								
Calcium	ND	0.50								
Chromium	ND	0.0050								
Cobalt	ND	0.0050								
Lead	ND	0.0050								
Lithium	ND	0.010								
Molybdenum	ND	0.0050								
Selenium	ND	0.0050								
Thallium	ND	0.0050								

LCS				Sample ID: LCS-168869-168869		Units: mg/L		Analysis Date: 12/8/2020 03:46 PM		
Client ID:		Run ID: ICPMS3_201208A		SeqNo: 6969147		Prep Date: 12/8/2020		DF: 1		
Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
Antimony	0.09792	0.0050	0.1	0	97.9	80-120	0	0		
Arsenic	0.1003	0.0050	0.1	0	100	80-120	0	0		
Barium	0.1008	0.0050	0.1	0	101	80-120	0	0		
Beryllium	0.1047	0.0020	0.1	0	105	80-120	0	0		
Boron	0.5338	0.020	0.5	0	107	80-120	0	0		
Cadmium	0.1028	0.0020	0.1	0	103	80-120	0	0		
Calcium	10.29	0.50	10	0	103	80-120	0	0		
Chromium	0.1038	0.0050	0.1	0	104	80-120	0	0		
Cobalt	0.1047	0.0050	0.1	0	105	80-120	0	0		
Lead	0.1015	0.0050	0.1	0	101	80-120	0	0		
Lithium	0.09842	0.010	0.1	0	98.4	80-120	0	0		
Molybdenum	0.1027	0.0050	0.1	0	103	80-120	0	0		
Selenium	0.1006	0.0050	0.1	0	101	80-120	0	0		
Thallium	0.09517	0.0050	0.1	0	95.2	80-120	0	0		

Note: See Qualifiers Page for a list of Qualifiers and their explanation.

Client: NTH Consultants, Ltd.
Work Order: 20112217
Project: Holland Board of Public Works

QC BATCH REPORT

Batch ID: **168869** Instrument ID **ICPMS3** Method: **SW6020B**

MS		Sample ID: 20112217-04AMS			Units: mg/L		Analysis Date: 12/8/2020 04:03 PM			
Client ID: MW-3		Run ID: ICPMS3_201208A			SeqNo: 6969433		Prep Date: 12/8/2020		DF: 1	
Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
Antimony	0.09679	0.0050	0.1	0.0001199	96.7	75-125		0		
Arsenic	0.09873	0.0050	0.1	0.0006677	98.1	75-125		0		
Barium	0.2085	0.0050	0.1	0.1104	98.1	75-125		0		
Beryllium	0.103	0.0020	0.1	0.0000528	103	75-125		0		
Boron	0.9917	0.020	0.5	0.4697	104	75-125		0		
Cadmium	0.1006	0.0020	0.1	0	101	75-125		0		
Calcium	101.4	0.50	10	95.26	61.2	75-125		0		SO
Chromium	0.1024	0.0050	0.1	0.0007051	102	75-125		0		
Cobalt	0.1024	0.0050	0.1	0.0002629	102	75-125		0		
Lead	0.1014	0.0050	0.1	0.0002156	101	75-125		0		
Lithium	0.112	0.010	0.1	0.01535	96.7	75-125		0		
Molybdenum	0.1028	0.0050	0.1	0.0007359	102	75-125		0		
Selenium	0.09924	0.0050	0.1	-0.0003245	99.6	75-125		0		
Thallium	0.09504	0.0050	0.1	-0.0000231	95.1	75-125		0		

MSD		Sample ID: 20112217-04AMSD			Units: mg/L		Analysis Date: 12/8/2020 04:05 PM			
Client ID: MW-3		Run ID: ICPMS3_201208A			SeqNo: 6969434		Prep Date: 12/8/2020		DF: 1	
Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
Antimony	0.09862	0.0050	0.1	0.0001199	98.5	75-125	0.09679	1.87	20	
Arsenic	0.1015	0.0050	0.1	0.0006677	101	75-125	0.09873	2.8	20	
Barium	0.208	0.0050	0.1	0.1104	97.6	75-125	0.2085	0.248	20	
Beryllium	0.1051	0.0020	0.1	0.0000528	105	75-125	0.103	2.01	20	
Boron	1.011	0.020	0.5	0.4697	108	75-125	0.9917	1.98	20	
Cadmium	0.1037	0.0020	0.1	0	104	75-125	0.1006	3.01	20	
Calcium	101	0.50	10	95.26	57.2	75-125	101.4	0.394	20	SO
Chromium	0.1025	0.0050	0.1	0.0007051	102	75-125	0.1024	0.129	20	
Cobalt	0.1041	0.0050	0.1	0.0002629	104	75-125	0.1024	1.63	20	
Lead	0.1049	0.0050	0.1	0.0002156	105	75-125	0.1014	3.34	20	
Lithium	0.1132	0.010	0.1	0.01535	97.8	75-125	0.112	0.983	20	
Molybdenum	0.1071	0.0050	0.1	0.0007359	106	75-125	0.1028	4.11	20	
Selenium	0.1027	0.0050	0.1	-0.0003245	103	75-125	0.09924	3.38	20	
Thallium	0.09767	0.0050	0.1	-0.0000231	97.7	75-125	0.09504	2.72	20	

The following samples were analyzed in this batch:

20112217-01A	20112217-02A	20112217-03A
20112217-04A	20112217-05A	20112217-06A
20112217-07A	20112217-08A	

Note: See Qualifiers Page for a list of Qualifiers and their explanation.

Client: NTH Consultants, Ltd.
Work Order: 20112217
Project: Holland Board of Public Works

QC BATCH REPORT

Batch ID: **168457** Instrument ID **TDS** Method: **A2540 C-11**

Sample ID: MBLK-168457-168457				Units: mg/L		Analysis Date: 12/2/2020 03:48 PM				
Client ID:		Run ID: TDS_201202C		SeqNo: 6952481		Prep Date: 11/30/2020		DF: 1		
Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
Total Dissolved Solids		ND	30							
Sample ID: LCS-168457-168457				Units: mg/L		Analysis Date: 12/2/2020 03:48 PM				
Client ID:		Run ID: TDS_201202C		SeqNo: 6952480		Prep Date: 11/30/2020		DF: 1		
Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
Total Dissolved Solids		486	30	495	0	98.2	85-109	0		
Sample ID: 20112115-01C DUP				Units: mg/L		Analysis Date: 12/2/2020 03:48 PM				
Client ID:		Run ID: TDS_201202C		SeqNo: 6952459		Prep Date: 11/30/2020		DF: 1		
Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
Total Dissolved Solids		366.7	50	0	0	0	0-0	383.3	4.44	10
Sample ID: 20112217-04B DUP				Units: mg/L		Analysis Date: 12/2/2020 03:48 PM				
Client ID: MW-3		Run ID: TDS_201202C		SeqNo: 6952477		Prep Date: 11/30/2020		DF: 1		
Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
Total Dissolved Solids		566.7	50	0	0	0	0-0	530	6.69	10

The following samples were analyzed in this batch:

20112217-01B 20112217-02B 20112217-03B
20112217-04B

Note: See Qualifiers Page for a list of Qualifiers and their explanation.

Client: NTH Consultants, Ltd.
Work Order: 20112217
Project: Holland Board of Public Works

QC BATCH REPORT

Batch ID: **168553** Instrument ID **TDS** Method: **A2540 C-11**

MBLK Sample ID: MBLK-168553-168553				Units: mg/L		Analysis Date: 12/3/2020 02:30 PM				
Client ID:		Run ID: TDS_201203D		SeqNo: 6956231		Prep Date: 12/1/2020		DF: 1		
Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
Total Dissolved Solids		ND	30							
LCS Sample ID: LCS-168553-168553				Units: mg/L		Analysis Date: 12/3/2020 02:30 PM				
Client ID:		Run ID: TDS_201203D		SeqNo: 6956230		Prep Date: 12/1/2020		DF: 1		
Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
Total Dissolved Solids		490	30	495	0	99	85-109	0		
DUP Sample ID: 20112217-05B DUP				Units: mg/L		Analysis Date: 12/3/2020 02:30 PM				
Client ID: MW-3A		Run ID: TDS_201203D		SeqNo: 6956225		Prep Date: 12/1/2020		DF: 1		
Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
Total Dissolved Solids		566.7	100	0	0	0	0-0	560	1.18	10

The following samples were analyzed in this batch:

20112217-05B 20112217-06B 20112217-07B
20112217-08B

Note: See Qualifiers Page for a list of Qualifiers and their explanation.

Client: NTH Consultants, Ltd.
Work Order: 20112217
Project: Holland Board of Public Works

QC BATCH REPORT

Batch ID: **R305153** Instrument ID **Titrator 1** Method: **A4500-H B-11**

LCS		Sample ID: LCS-R305153-R305153			Units: s.u.		Analysis Date: 12/7/2020 12:54 PM			
Client ID:		Run ID: TITRATOR 1_201207B		SeqNo: 6963900		Prep Date:		DF: 1		
Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
pH (laboratory)	3.95	0.10	4	0	98.8	92-108		0		
DUP	Sample ID: 20112217-01B DUP				Units: s.u.		Analysis Date: 12/7/2020 12:54 PM			
Client ID:	PZ-1		Run ID: TITRATOR 1_201207B		SeqNo: 6963902		Prep Date:		DF: 1	
Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
pH (laboratory)	8.46	0.10	0	0	0	0-0		8.2	3.12	5 H
Temperature	21.03	0.10	0	0	0	0-0		21.08	0.237	H
DUP	Sample ID: 20112328-01A DUP				Units: s.u.		Analysis Date: 12/7/2020 12:54 PM			
Client ID:	Run ID: TITRATOR 1_201207B		SeqNo: 6963913		Prep Date:		DF: 1			
Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
pH (laboratory)	7.53	0.10	0	0	0	0-0		7.39	1.88	5 H
Temperature	21.08	0.10	0	0	0	0-0		21.15	0.332	H

The following samples were analyzed in this batch:

20112217-01B	20112217-02B	20112217-03B
20112217-04B	20112217-05B	20112217-06B
20112217-07B	20112217-08B	

Note: See Qualifiers Page for a list of Qualifiers and their explanation.

Client: NTH Consultants, Ltd.
Work Order: 20112217
Project: Holland Board of Public Works

QC BATCH REPORT

Batch ID: **R305326** Instrument ID **IC3** Method: **E300.0**

MLBK		Sample ID: MLBK-R305326			Units: mg/L		Analysis Date: 12/8/2020 01:29 PM			
Client ID:		Run ID: IC3_201208A			SeqNo: 6971195		Prep Date:		DF: 1	
Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
Chloride	ND	1.0								
Fluoride	ND	0.10								
Sulfate	ND	1.0								

MLBK		Sample ID: MLBK-R305326			Units: mg/L		Analysis Date: 12/8/2020 09:12 PM			
Client ID:		Run ID: IC3_201208A			SeqNo: 6971219		Prep Date:		DF: 1	
Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
Chloride	ND	1.0								
Fluoride	ND	0.10								
Sulfate	ND	1.0								

MLBK		Sample ID: MLBK-R305326			Units: mg/L		Analysis Date: 12/9/2020 02:39 AM			
Client ID:		Run ID: IC3_201208A			SeqNo: 6971236		Prep Date:		DF: 1	
Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
Chloride	ND	1.0								
Fluoride	ND	0.10								
Sulfate	ND	1.0								

LCS		Sample ID: LCS-R305326			Units: mg/L		Analysis Date: 12/8/2020 01:48 PM			
Client ID:		Run ID: IC3_201208A			SeqNo: 6971196		Prep Date:		DF: 1	
Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
Chloride	9.372	1.0	10	0	93.7	90-110	0			
Fluoride	1.808	0.10	2	0	90.4	90-110	0			
Sulfate	9.738	1.0	10	0	97.4	90-110	0			

LCS		Sample ID: LCS-R305326			Units: mg/L		Analysis Date: 12/8/2020 09:31 PM			
Client ID:		Run ID: IC3_201208A			SeqNo: 6971220		Prep Date:		DF: 1	
Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
Chloride	9.405	1.0	10	0	94	90-110	0			
Fluoride	1.915	0.10	2	0	95.7	90-110	0			
Sulfate	9.659	1.0	10	0	96.6	90-110	0			

Note: See Qualifiers Page for a list of Qualifiers and their explanation.

Client: NTH Consultants, Ltd.
Work Order: 20112217
Project: Holland Board of Public Works

QC BATCH REPORT

Batch ID: **R305326** Instrument ID **IC3** Method: **E300.0**

LCS				Sample ID: LCS-R305326		Units: mg/L		Analysis Date: 12/9/2020 02:58 AM			
Client ID:		Run ID: IC3_201208A		SeqNo: 6971237		Prep Date:		DF: 1			
Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual	
Chloride	9.418	1.0	10	0	94.2	90-110		0			
Fluoride	1.96	0.10	2	0	98	90-110		0			
Sulfate	9.756	1.0	10	0	97.6	90-110		0			

MS				Sample ID: 20112217-04B MS		Units: mg/L		Analysis Date: 12/8/2020 07:16 PM			
Client ID: MW-3		Run ID: IC3_201208A		SeqNo: 6971213		Prep Date:		DF: 20			
Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual	
Chloride	263	20	200	71.93	95.6	80-120		0			
Fluoride	31.67	2.0	40	0	79.2	80-120		0		S	
Sulfate	285.7	20	200	98.95	93.4	80-120		0			

MS				Sample ID: 20120200-08D MS		Units: mg/L		Analysis Date: 12/9/2020 02:00 AM			
Client ID:		Run ID: IC3_201208A		SeqNo: 6971234		Prep Date:		DF: 40			
Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual	
Chloride	615.3	40	400	245.7	92.4	80-120		0			
Fluoride	72.29	4.0	80	0	90.4	80-120		0			
Sulfate	377.7	40	400	7.804	92.5	80-120		0			

MS				Sample ID: 20120200-13D MS		Units: mg/L		Analysis Date: 12/9/2020 04:54 AM			
Client ID:		Run ID: IC3_201208A		SeqNo: 6971243		Prep Date:		DF: 20			
Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual	
Chloride	441.2	20	200	239.1	101	80-120		0		E	
Fluoride	36.21	2.0	40	0	90.5	80-120		0			
Sulfate	244.3	20	200	57.51	93.4	80-120		0			

MSD				Sample ID: 20112217-04B MSD		Units: mg/L		Analysis Date: 12/8/2020 07:35 PM			
Client ID: MW-3		Run ID: IC3_201208A		SeqNo: 6971214		Prep Date:		DF: 20			
Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual	
Chloride	262.6	20	200	71.93	95.4	80-120	263	0.15	20		
Fluoride	31.48	2.0	40	0	78.7	80-120	31.67	0.621	20	S	
Sulfate	285.4	20	200	98.95	93.2	80-120	285.7	0.114	20		

Note: See Qualifiers Page for a list of Qualifiers and their explanation.

Client: NTH Consultants, Ltd.
Work Order: 20112217
Project: Holland Board of Public Works

QC BATCH REPORT

Batch ID: **R305326** Instrument ID **IC3** Method: **E300.0**

MSD Sample ID: 20120200-08D MSD				Units: mg/L		Analysis Date: 12/9/2020 02:20 AM				
Client ID:		Run ID: IC3_201208A		SeqNo: 6971235		Prep Date:		DF: 40		
Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
Chloride	613.3	40	400	245.7	91.9	80-120	615.3	0.325	20	
Fluoride	73.46	4.0	80	0	91.8	80-120	72.29	1.6	20	
Sulfate	374.6	40	400	7.804	91.7	80-120	377.7	0.824	20	

MSD Sample ID: 20120200-13D MSD				Units: mg/L		Analysis Date: 12/9/2020 05:13 AM				
Client ID:		Run ID: IC3_201208A		SeqNo: 6971244		Prep Date:		DF: 20		
Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
Chloride	441.1	20	200	239.1	101	80-120	441.2	0.019	20	E
Fluoride	36.47	2.0	40	0	91.2	80-120	36.21	0.737	20	
Sulfate	243.8	20	200	57.51	93.1	80-120	244.3	0.204	20	

The following samples were analyzed in this batch:

20112217-01B	20112217-02B	20112217-03B
20112217-04B	20112217-05B	20112217-06B
20112217-07B	20112217-08B	

Note: See Qualifiers Page for a list of Qualifiers and their explanation.

Cincinnati, OH
+1 513 733 5336Everett, WA
+1 425 356 2600Fort Collins, CO
+1 970 490 1511Holland, MI
+1 616 399 6070

Chain of Custody Form

Houston, TX
+1 281 530 5656Middletown, PA
+1 717 944 5541Spring City, PA
+1 610 948 4903Salt Lake City, UT
+1 801 266 7700South Charleston, WV
+1 304 356 3168York, PA
+1 717 505 5280

Page _____ of _____

COC ID: 189585

ALS Project Manager:

ALS Work Order #:

20112217

Customer Information		Project Information		Parameter/Method Request for Analysis													
Purchase Order		Project Name	Holland Bpw James pp	A	Metals Including Hg												
Work Order		Project Number	73-160017	B	Chloride, Fluoride, Sulfate												
Company Name	NTH Consultants, Ltd.	Bill To Company	Holland Board of Public Works	C	pH												
Send Report To	Karen Okonta	Invoice Attn	Accounts Payable	D	TDS												
Address	41780 Six Mile Road	Address	625 Hastings	E	Radium 226 & 228												
City/State/Zip	Northville, MI 48168	City/State/Zip	Holland, MI 49423	F													
Phone	(248) 662-2668	Phone	(616) 355-1210	G													
Fax	(248) 324-5305	Fax		H													
e-Mail Address		e-Mail Address		I													
No.	Sample Description	Date	Time	Matrix	Pres.	# Bottles	A	B	C	D	E	F	G	H	I	J	Hold

1	PZ-1	11-24-20	10:30a	GW	2	4	X	X	X	X	X							
2	MVR-1	11-24-20	1:15P	GW	2	4	X	X	X	X	X							
3	MW-2	11-24-20	2:50P	GW	2	4	X	X	X	X	X							
4	MW-3	11-24-20	4:35P	GW	2	4	X	X	X	X	X							
5	MW-3A	11-24-20	10:00:55P	GW	2	4	X	X	X	X	X							
6	MW-3-MS	11-24-20	4:35P	GW	2	4	X	X	X	X	X							
7	MW-3-MSD	11-24-20	4:35P	GW	2	4	X	X	X	X	X							
8	Field Duplicate	11-24-20	N/A	GW	2	4	X	X	X	X	X							
9	Field Blank	11-24-20	5:30P	GW	2	4	X	X	X	X	X							
10	Equipment Plank	11-24-20	5:30P	GW	2	4	X	X	X	X	X							

Sampler(s) Please Print & Sign <i>Brittany Stachkunz</i>	Shipment Method <i>Drop-off</i>	Required Turnaround Time: (Check Box)	Results Due Date:
		<input checked="" type="checkbox"/> Std 10 WK Days <input type="checkbox"/> 5 WK Days <input type="checkbox"/> Other 2 WK Days 24 Hour	

Relinquished by:	Date:	Time:	Received by:	Notes:
------------------	-------	-------	--------------	--------

Relinquished by:	Date: 11/24/20	Time: 1900	Received by (Laboratory): <i>CT</i>	Cooler ID	Cooler Temp.	QC Package: (Check One Box Below)
------------------	-------------------	---------------	--	-----------	--------------	-----------------------------------

Logged by (Laboratory): <i>Keu</i>	Date: 11/25/20	Time: 1035	Checked by (Laboratory): <i>CT</i>	163	24° ^o 4.9%	<input type="checkbox"/> Level II Std QC <input type="checkbox"/> Level III Std QC/Raw Data <input type="checkbox"/> Level IV SW846/CLP <input type="checkbox"/> Other
				PH23	3.9° ^o 3.7%	<input type="checkbox"/> TPRP Checklist <input type="checkbox"/> TPRP Level IV
					4.9° ^o	

Preservative Key: 1-HCl 2-HNO₃ 3-H₂SO₄ 4-NaOH 5-Na₂S₂O₃ 6-NaHSO₄ 7-Other 8-T^oC 9-5035

- Note: 1. Any changes must be made in writing once samples and COC Form have been submitted to ALS Environmental.
 2. Unless otherwise agreed in a formal contract, services provided by ALS Environmental are expressly limited to the terms and conditions stated on the reverse.
 3. The Chain of Custody is a legal document. All information must be completed accurately.

Sample Receipt ChecklistClient Name: NTH - NORTHLILLEDate/Time Received: 24-Nov-20 18:00Work Order: 20112217Received by: KRWChecklist completed by Keith Wierenga

eSignature

25-Nov-20

Date

Reviewed by: Chad Whelton

eSignature

30-Nov-20

Date

Matrices: WaterCarrier name: FedEx

Shipping container/cooler in good condition?	Yes <input checked="" type="checkbox"/>	No <input type="checkbox"/>	Not Present <input type="checkbox"/>
Custody seals intact on shipping container/cooler?	Yes <input type="checkbox"/>	No <input type="checkbox"/>	Not Present <input checked="" type="checkbox"/>
Custody seals intact on sample bottles?	Yes <input type="checkbox"/>	No <input type="checkbox"/>	Not Present <input checked="" type="checkbox"/>
Chain of custody present?	Yes <input checked="" type="checkbox"/>	No <input type="checkbox"/>	
Chain of custody signed when relinquished and received?	Yes <input type="checkbox"/>	No <input checked="" type="checkbox"/>	
Chain of custody agrees with sample labels?	Yes <input checked="" type="checkbox"/>	No <input type="checkbox"/>	
Samples in proper container/bottle?	Yes <input checked="" type="checkbox"/>	No <input type="checkbox"/>	
Sample containers intact?	Yes <input checked="" type="checkbox"/>	No <input type="checkbox"/>	
Sufficient sample volume for indicated test?	Yes <input checked="" type="checkbox"/>	No <input type="checkbox"/>	
All samples received within holding time?	Yes <input checked="" type="checkbox"/>	No <input type="checkbox"/>	
Container/Temp Blank temperature in compliance?	Yes <input checked="" type="checkbox"/>	No <input type="checkbox"/>	
Sample(s) received on ice?	Yes <input checked="" type="checkbox"/>	No <input type="checkbox"/>	
Temperature(s)/Thermometer(s):	<u>2.4, 3.8, 4.8, 4.9, 3.7 C</u> <input type="checkbox"/> IR3		
Cooler(s)/Kit(s):	<input type="checkbox"/>		
Date/Time sample(s) sent to storage:	<u>11/25/2020 10:42:39 AM</u>		
Water - VOA vials have zero headspace?	Yes <input type="checkbox"/>	No <input type="checkbox"/>	No VOA vials submitted <input checked="" type="checkbox"/>
Water - pH acceptable upon receipt?	Yes <input checked="" type="checkbox"/>	No <input type="checkbox"/>	N/A <input type="checkbox"/>
pH adjusted?	Yes <input type="checkbox"/>	No <input checked="" type="checkbox"/>	N/A <input type="checkbox"/>
pH adjusted by:	<input type="checkbox"/>		

Login Notes:

Client Contacted:

Date Contacted:

Person Contacted:

Contacted By:

Regarding:

Comments:

CorrectiveAction:



Monday, December 28, 2020

Chad Whelton
ALS Environmental
3352 128th Avenue
Holland, MI 49424

Re: ALS Workorder: 2012004

Project Name:

Project Number: 20112217

Dear Mr. Whelton:

Eight water samples were received from ALS Environmental, on 12/1/2020. The samples were scheduled for the following analyses:

Radium-226

Radium-228

The results for these analyses are contained in the enclosed reports.

The data contained in the following report have been reviewed and approved by the personnel listed below. In addition, ALS certifies that the analyses reported herein are true, complete and correct within the limits of the methods employed. Should this laboratory report need to be reproduced, it should be reproduced in full unless written approval has been obtained from ALS Environmental.

Thank you for your confidence in ALS Environmental. Should you have any questions, please call.

Sincerely,

A handwritten signature in black ink, appearing to read "Julie Ellingson".

ALS Environmental
Julie Ellingson
Project Manager

ALS Environmental – Fort Collins is accredited by the following accreditation bodies for various testing scopes in accordance with requirements of each accreditation body. All testing is performed under the laboratory management system, which is maintained to meet these requirement and regulations. Please contact the laboratory or accreditation body for the current scope testing parameters.

ALS Environmental – Fort Collins	
Accreditation Body	License or Certification Number
Alaska (AK)	17-003
Arizona (AZ)	AZ0742
California (CA)	2926
Colorado (CO)	CO01099
Florida (FL)	E87914
Idaho (ID)	CO01099
Kansas (KS)	E-10381
Kentucky (KY)	90137
PJ-LA (DoD ELAP/ISO 170250)	95377
Maryland (MD)	285
Missouri (MO)	175
Nebraska(NE)	NE-OS-24-13
Nevada (NV)	CO010992018-1
New York (NY)	12036
North Dakota (ND)	R-057
Oklahoma (OK)	1301
Pennsylvania (PA)	68-03116
Tennessee (TN)	TN02976
Texas (TX)	T104704241
Utah (UT)	CO01099
Washington (WA)	C1280



2012004

Radium-228:

The samples were analyzed for the presence of ^{228}Ra by low background gas flow proportional counting of ^{228}Ac , which is the ingrown progeny of ^{228}Ra , according to the current revision of SOP 724.

All acceptance criteria were met.

Radium-226:

The samples were analyzed for the presence of ^{226}Ra according to the current revision of SOP 724.

All acceptance criteria were met.

ALS -- Fort Collins

Sample Number(s) Cross-Reference Table

OrderNum: 2012004

Client Name: ALS Environmental

Client Project Name:

Client Project Number: 20112217

Client PO Number: 20-122020059

Client Sample Number	Lab Sample Number	COC Number	Matrix	Date Collected	Time Collected
PZ-1	2012004-1		WATER	24-Nov-20	10:30
MW-1	2012004-2		WATER	24-Nov-20	13:15
MW-2	2012004-3		WATER	24-Nov-20	14:50
MW-3A	2012004-4		WATER	24-Nov-20	17:55
Field Duplicate	2012004-5		WATER	24-Nov-20	
Field Blank	2012004-6		WATER	24-Nov-20	17:30
Equipment Blank	2012004-7		WATER	24-Nov-20	17:30
MW-3	2012004-8		WATER	24-Nov-20	16:35

2012004



Subcontractor:
ALS Environmental, Fort Collins
225 Commerce Dr.
Fort Collins, CO 80524

TEL: (800) 443-1511
FAX:
Acct #:

CHAIN-OF-CUSTODY RECORD

Page 1 of 1

Date: 30-Nov-20
COC ID: 15283
Due Date: 15-Dec-20

Salesperson	ALSHN Account
-------------	---------------

Customer Information		Project Information		Parameter/Method Request for Analysis										
Purchase Order		Project Name	20112217	A Subcontracted Analyses (SUBCONTRACT)										
Work Order		Project Number		B <i>MS/MSD</i>										
Company Name	ALS Group USA, Corp	Bill To Company	ALS Group USA, Corp	C										
Send Report To	Chad Whelton	Inv Attn	Accounts Payable	D										
Address	3352 128th Ave	Address	3352 128th Ave	E										
				F										
City/State/Zip	Holland, Michigan 49424	City/State/Zip	Holland, Michigan 49424	G										
Phone	(616) 399-6070	Phone	(616) 399-6070	H										
Fax	(616) 399-6185	Fax	(616) 399-6185	I										
eMail Address	chad.whelton@alsglobal.com	eMail CC		J										
ALS Sample ID	Client Sample ID	Matrix	Collection Date 24hr	Bottle	A	B	C	D	E	F	G	H	I	J
1 20112217-01C	PZ-1	Groundwater	24/Nov/2020 10:30	(2) 1LPHNO3	X									
2 20112217-02C	MW-1	Groundwater	24/Nov/2020 13:15	(2) 1LPHNO3	X									
3 20112217-03C	MW-2	Groundwater	24/Nov/2020 14:50	(2) 1LPHNO3	X									
4 20112217-05C	MW-3A	Groundwater	24/Nov/2020 17:55	(2) 1LPHNO3	X									
5 20112217-06C	Field Duplicate	Groundwater	24/Nov/2020	(2) 1LPHNO3	X									
6 20112217-07C	Field Blank	Water	24/Nov/2020 17:30	(2) 1LPHNO3	X									
7 20112217-08C	Equipment Blank	Water	24/Nov/2020 17:30	(2) 1LPHNO3	X									
8 20112217-09C	MW-4	Groundwater	24/Nov/2020 12:16	(2) 1LPHNO3	X									
8 20112217-04C	MW-3	Groundwater	24/Nov/2020 16:35	(6) 1LPHNO3	X	X								

Comments:

Please analyze these samples per our instructions and indicated turnaround requirements. Please include all QC with data. The samples do not need to be returned and can be disposed after 30 days. Report MW-4 separately.

Relinquished by:	Date/Time	Received by:	Date/Time	Cooler IDs	Report/QC Level
	11-30-20 1200		12/01/20 1030		Std
Relinquished by:	Date/Time	Received by:	Date/Time		



ALS Environmental - Fort Collins
CONDITION OF SAMPLE UPON RECEIPT FORM

Client Name/ID:

Holland

Workorder No:

2012004

Project Manager:

JME

Initials:

RGA

Date: 12/01/2020

1. Are airbills / shipping documents present and/or removable?	<input type="checkbox"/> Drop Off <input checked="" type="checkbox"/> YES <input type="checkbox"/> NO
2. Are custody seals on shipping containers intact?	<input checked="" type="checkbox"/> NONE <input type="checkbox"/> YES <input type="checkbox"/> NO*
3. Are custody seals on sample containers intact?	<input checked="" type="checkbox"/> NONE <input type="checkbox"/> YES <input type="checkbox"/> NO*
4. Is there a COC (chain-of-custody) present?	<input checked="" type="checkbox"/> YES <input type="checkbox"/> NO*
5. Is the COC in agreement with samples received? (IDs, dates, times, # of samples, # of containers, matrix, requested analyses, etc.)	<input checked="" type="checkbox"/> YES <input type="checkbox"/> NO*
6. Are short-hold samples present?	<input type="checkbox"/> YES <input checked="" type="checkbox"/> NO
7. Are all samples within holding times for the requested analyses?	<input checked="" type="checkbox"/> YES <input type="checkbox"/> NO*
8. Were all sample containers received intact? (not broken or leaking)	<input checked="" type="checkbox"/> YES <input type="checkbox"/> NO*
9. Is there sufficient sample for the requested analyses?	<input checked="" type="checkbox"/> YES <input type="checkbox"/> NO*
10. Are samples in proper containers for requested analyses? (form 250, Sample Handling Guidelines)	<input checked="" type="checkbox"/> YES <input type="checkbox"/> NO*
11. Are all aqueous samples preserved correctly, if required?	<input type="checkbox"/> N/A <input checked="" type="checkbox"/> YES <input type="checkbox"/> NO*
12. Were unpreserved samples pH checked, if required?	<input checked="" type="checkbox"/> N/A <input type="checkbox"/> YES <input type="checkbox"/> NO
13. Are all samples requiring no headspace (VOC, GRO, RSK/MEE, radon) free of bubbles > 6 mm in diameter?	<input checked="" type="checkbox"/> N/A <input type="checkbox"/> YES <input type="checkbox"/> NO
14. Were the samples shipped on ice?	<input type="checkbox"/> YES <input checked="" type="checkbox"/> NO
15. Were cooler temperatures measured at 0.1 - 6.0°C?	IR gun used: <input type="checkbox"/> #3 <input type="checkbox"/> #5 <input checked="" type="checkbox"/> Rad Only <input type="checkbox"/> YES <input checked="" type="checkbox"/> NO

Cooler #: 1 2

Temperature (°C): amb amb

of custody seals on cooler: 0 0

External mR/hr reading: 11 11

Background mR/hr reading: 9 Were external mR/hr readings ≤ two times background and within DOT acceptance criteria? (If no, see Form 008) N/A YES NO

* Please provide details below for 'NO' responses in gray boxes above - for 2 thru 5 & 7 thru 12, notify PM & continue w/ login.

All client bottle ID's vs ALS lab ID's double-checked by: RGA

If applicable, was the client contacted? YES N/A Contact Name _____ Date: _____

Project Manager Signature / Date:

Ref: Date: 30Nov20 SHIPPING: 0.00
 Dep: Wgt: 21.05 LBS SPECIAL: 0.00
 DV: 0.00 HANDLING: 0.00
 0.00 TOTAL: 0.00

Svcs: PRIORITY OVERNIGHT Master 1668 7926 2290
TRACK: 1668 7926 2304

ORIGIN ID:GRRA (616) 399-6070
ALS ENVIRONMENTAL
ALS ENVIRONMENTAL
3352 128TH AVENUE

HOLLAND, MI 494249263
UNITED STATES US

SHIP DATE: 30NOV20
ACTWGT: 21.05 LB
CAD: 0122071/CAFE3311

BILL THIRD PARTY

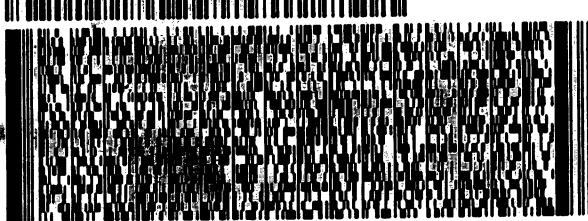
TO SAMPLE RECEIVING
ALS ENVIRONMENTAL
225 COMMERCE DR

FORT COLLINS CO 80524

(970) 490-1511
INV:
PO:

REF:

DEPT:



FedEx
Express



J191219062001AV

2 of 2
MPS# 1668 7926-2304
|0263|
Mstr# 1668 7926 2290 |0201|

TUE - 01 DEC 10:30A
PRIORITY OVERNIGHT

80524
CO-US DEN



NA FTCA

Ref: Date: 30Nov20
Dep: Wgt: 43.60 LBS
DV: 0.00 TOTAL: 0.00

Svcs: PRIORITY OVERNIGHT Master 1668 7926 2290
TRCK: 1668 7926 2290

ORIGIN ID:GRRA (616) 399-6070
ALS ENVIRONMENTAL
ALS ENVIRONMENTAL
3352 128TH AVENUE

HOLLAND, MI 494249263
UNITED STATES US

SHIP DATE: 30NOV20
ACTWGT: 43.60 LB
CAD: 0122071/CAFE3311

BILL THIRD PARTY

10 SAMPLE RECEIVING
ALS ENVIRONMENTAL
225 COMMERCE DR

FORT COLLINS CO 80524

(970) 480-1611

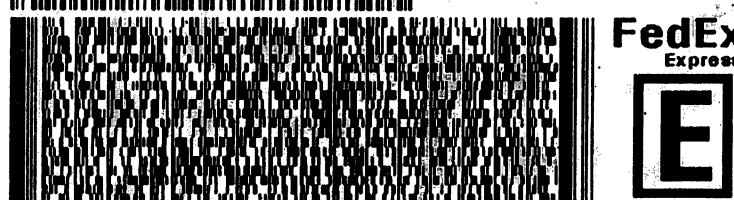
INU:

PO:

REF:

DEPT:

11-0
amb



1 of 2
TRK# 1668 7926 2290
MASTER

TUE - 01 DEC 10:30A
PRIORITY OVERNIGHT

NA FTCA

80524

CO-US DEN



Client: ALS Environmental **Date:** 28-Dec-20
Project: 20112217 **Work Order:** 2012004
Sample ID: PZ-1 **Lab ID:** 2012004-1
Legal Location: **Matrix:** WATER
Collection Date: 11/24/2020 10:30 **Percent Moisture:**

Analyses	Result	Qual	Report Limit	Units	Dilution Factor	Date Analyzed
Radium-226 by Radon Emanation - Method 903.1						
Ra-226	ND (+/- 0.28)	U	0.54	pCi/l	NA	12/19/2020 11:25
Carr: BARIUM	61.8		40-110	%REC	DL = NA	12/19/2020 11:25
Radium-228 Analysis by GFPC						
Ra-228	ND (+/- 0.49)	U	0.93	pCi/l	NA	12/22/2020 10:43
Carr: BARIUM	72.8		40-110	%REC	DL = NA	12/22/2020 10:43

Client: ALS Environmental **Date:** 28-Dec-20
Project: 20112217 **Work Order:** 2012004
Sample ID: MW-1 **Lab ID:** 2012004-2
Legal Location:
Collection Date: 11/24/2020 13:15 **Percent Moisture:**

Analyses	Result	Qual	Report Limit	Units	Dilution Factor	Date Analyzed
Radium-226 by Radon Emanation - Method 903.1			SOP 783		Prep Date: 12/9/2020	PrepBy: TRB
Ra-226	0.8 (+/- 0.6)		0.72	pCi/l	NA	12/19/2020 11:25
Carr: BARIUM	95.3		40-110	%REC	DL = NA	12/19/2020 11:25
Radium-228 Analysis by GFPC			SOP 724		Prep Date: 12/15/2020	PrepBy: RGS
Ra-228	1.73 (+/- 0.64)		0.92	pCi/l	NA	12/22/2020 10:43
Carr: BARIUM	78		40-110	%REC	DL = NA	12/22/2020 10:43

Client: ALS Environmental **Date:** 28-Dec-20
Project: 20112217 **Work Order:** 2012004
Sample ID: MW-2 **Lab ID:** 2012004-3
Legal Location:
Collection Date: 11/24/2020 14:50 **Percent Moisture:**

Analyses	Result	Qual	Report Limit	Units	Dilution Factor	Date Analyzed
Radium-226 by Radon Emanation - Method 903.1						
Ra-226	ND (+/- 0.23)	U	0.32	pCi/l	NA	12/19/2020 11:25
Carr: BARIUM	95.1		40-110	%REC	DL = NA	12/19/2020 11:25
Radium-228 Analysis by GFPC						
Ra-228	1.33 (+/- 0.51)		0.78	pCi/l	NA	12/22/2020 10:43
Carr: BARIUM	91.5		40-110	%REC	DL = NA	12/22/2020 10:43

Client: ALS Environmental **Date:** 28-Dec-20
Project: 20112217 **Work Order:** 2012004
Sample ID: MW-3A **Lab ID:** 2012004-4
Legal Location:
Collection Date: 11/24/2020 17:55 **Percent Moisture:**

Analyses	Result	Qual	Report Limit	Units	Dilution Factor	Date Analyzed
Radium-226 by Radon Emanation - Method 903.1						
Ra-226	ND (+/- 0.23)	U	0.35	pCi/l	NA	12/19/2020 11:55
Carr: BARIUM	94.8		40-110	%REC	DL = NA	12/19/2020 11:55
Radium-228 Analysis by GFPC						
Ra-228	0.79 (+/- 0.4)		0.71	pCi/l	NA	12/22/2020 10:43
Carr: BARIUM	93.6		40-110	%REC	DL = NA	12/22/2020 10:43

Client: ALS Environmental **Date:** 28-Dec-20
Project: 20112217 **Work Order:** 2012004
Sample ID: Field Duplicate **Lab ID:** 2012004-5
Legal Location: **Matrix:** WATER
Collection Date: 11/24/2020 **Percent Moisture:**

Analyses	Result	Qual	Report Limit	Units	Dilution Factor	Date Analyzed
Radium-226 by Radon Emanation - Method 903.1						
Ra-226	ND (+/- 0.28)	U	0.37	pCi/l	NA	12/19/2020 11:55
Carr: BARIUM	98.8		40-110	%REC	DL = NA	12/19/2020 11:55
Radium-228 Analysis by GFPC						
Ra-228	1.42 (+/- 0.58)	SOP 724	0.9	pCi/l	NA	12/22/2020 10:43
Carr: BARIUM	79.6		40-110	%REC	DL = NA	12/22/2020 10:43

Client: ALS Environmental **Date:** 28-Dec-20
Project: 20112217 **Work Order:** 2012004
Sample ID: Fieild Blank **Lab ID:** 2012004-6
Legal Location: **Matrix:** WATER
Collection Date: 11/24/2020 17:30 **Percent Moisture:**

Analyses	Result	Qual	Report Limit	Units	Dilution Factor	Date Analyzed
Radium-226 by Radon Emanation - Method 903.1						
Ra-226	ND (+/- 0.23)	U	0.37	pCi/l	NA	12/19/2020 11:55
Carr: BARIUM	97.9		40-110	%REC	DL = NA	12/19/2020 11:55
Radium-228 Analysis by GFPC						
Ra-228	ND (+/- 0.5)	U	0.96	pCi/l	NA	12/22/2020 10:43
Carr: BARIUM	94.4		40-110	%REC	DL = NA	12/22/2020 10:43

Client: ALS Environmental **Date:** 28-Dec-20
Project: 20112217 **Work Order:** 2012004
Sample ID: Equipment Blank **Lab ID:** 2012004-7
Legal Location: **Matrix:** WATER
Collection Date: 11/24/2020 17:30 **Percent Moisture:**

Analyses	Result	Qual	Report Limit	Units	Dilution Factor	Date Analyzed
Radium-226 by Radon Emanation - Method 903.1						
Ra-226	ND (+/- 0.37)	U	0.82	pCi/l	NA	12/19/2020 11:55
Carr: BARIUM	89.3		40-110	%REC	DL = NA	12/19/2020 11:55
Radium-228 Analysis by GFPC						
Ra-228	ND (+/- 0.47)	U	0.9	pCi/l	NA	12/22/2020 10:43
Carr: BARIUM	96.3		40-110	%REC	DL = NA	12/22/2020 10:43

Client: ALS Environmental **Date:** 28-Dec-20
Project: 20112217 **Work Order:** 2012004
Sample ID: MW-3 **Lab ID:** 2012004-8
Legal Location: **Matrix:** WATER
Collection Date: 11/24/2020 16:35 **Percent Moisture:**

Analyses	Result	Qual	Report Limit	Units	Dilution Factor	Date Analyzed
Radium-226 by Radon Emanation - Method 903.1						
Ra-226	ND (+/- 0.18)	U	0.32	pCi/l	NA	12/19/2020 11:55
Carr: BARIUM	94.1		40-110	%REC	DL = NA	12/19/2020 11:55
Radium-228 Analysis by GFPC						
Ra-228	0.8 (+/- 0.42)		0.76	pCi/l	NA	12/22/2020 10:43
Carr: BARIUM	94.8		40-110	%REC	DL = NA	12/22/2020 10:43

Client: ALS Environmental **Date:** 28-Dec-20
Project: 20112217 **Work Order:** 2012004
Sample ID: MW-3 **Lab ID:** 2012004-8
Legal Location: **Matrix:** WATER
Collection Date: 11/24/2020 16:35 **Percent Moisture:**

Analyses	Result	Qual	Report Limit	Units	Dilution Factor	Date Analyzed
----------	--------	------	--------------	-------	-----------------	---------------

Explanation of Qualifiers

Radiochemistry:

- "Report Limit" is the MDC
- U or ND - Result is less than the sample specific MDC.
- Y1 - Chemical Yield is in control at 100-110%. Quantitative yield is assumed.
- Y2 - Chemical Yield outside default limits.
- W - DER is greater than Warning Limit of 1.42
- * - Aliquot Basis is 'As Received' while the Report Basis is 'Dry Weight'.
- # - Aliquot Basis is 'Dry Weight' while the Report Basis is 'As Received'.
- G - Sample density differs by more than 15% of LCS density.
- D - DER is greater than Control Limit
- M - Requested MDC not met.
- M3 - The requested MDC was not met, but the reported activity is greater than the reported MDC.
- L - LCS Recovery below lower control limit.
- H - LCS Recovery above upper control limit.
- P - LCS, Matrix Spike Recovery within control limits.
- N - Matrix Spike Recovery outside control limits
- NC - Not Calculated for duplicate results less than 5 times MDC
- B - Analyte concentration greater than MDC.
- B3 - Analyte concentration greater than MDC but less than Requested MDC.

Inorganics:

- B - Result is less than the requested reporting limit but greater than the instrument method detection limit (MDL).
- U or ND - Indicates that the compound was analyzed for but not detected.
- E - The reported value is estimated because of the presence of interference. An explanatory note may be included in the narrative.
- M - Duplicate injection precision was not met.
- N - Spiked sample recovery not within control limits. A post spike is analyzed for all ICP analyses when the matrix spike and or spike duplicate fail and the native sample concentration is less than four times the spike added concentration.
- Z - Spiked recovery not within control limits. An explanatory note may be included in the narrative.
- * - Duplicate analysis (relative percent difference) not within control limits.
- S - SAR value is estimated as one or more analytes used in the calculation were not detected above the detection limit.

Organics:

- U or ND - Indicates that the compound was analyzed for but not detected.
- B - Analyte is detected in the associated method blank as well as in the sample. It indicates probable blank contamination and warns the data user.
- E - Analyte concentration exceeds the upper level of the calibration range.
- J - Estimated value. The result is less than the reporting limit but greater than the instrument method detection limit (MDL).
- A - A tentatively identified compound is a suspected aldol-condensation product.
- X - The analyte was diluted below an accurate quantitation level.
- * - The spike recovery is equal to or outside the control criteria used.
- + - The relative percent difference (RPD) equals or exceeds the control criteria.
- G - A pattern resembling gasoline was detected in this sample.
- D - A pattern resembling diesel was detected in this sample.
- M - A pattern resembling motor oil was detected in this sample.
- C - A pattern resembling crude oil was detected in this sample.
- 4 - A pattern resembling JP-4 was detected in this sample.
- 5 - A pattern resembling JP-5 was detected in this sample.
- H - Indicates that the fuel pattern was in the heavier end of the retention time window for the analyte of interest.
- L - Indicates that the fuel pattern was in the lighter end of the retention time window for the analyte of interest.
- Z - This flag indicates that a significant fraction of the reported result did not resemble the patterns of any of the following petroleum hydrocarbon products:
 - gasoline
 - JP-8
 - diesel
 - mineral spirits
 - motor oil
 - Stoddard solvent
 - bunker C

ALS -- Fort Collins

Date: 12/28/2020 9:09:

Client: ALS Environmental
Work Order: 2012004
Project: 20112217

QC BATCH REPORT

Batch ID: RE201209-1-1			Instrument ID: Alpha Scin			Method: Radium-226 by Radon Emanation					
DUP	Sample ID: 2012004-8						Units: pCi/l		Analysis Date: 12/19/2020 11:55		
Client ID: MW-3	Run ID: RE201209-1B						Prep Date: 12/9/2020		DF: NA		
Analyte	Result	ReportLimit	SPK Val	SPK Ref Value	%REC	Control Limit	Decision Level	DER Ref Value	DER	DER Limit	Qual
Ra-226	ND	0.46						0.09	0.41	2.13	U
Carr: BARIUM	15700		15880		98.9	40-110			14930		
LCS	Sample ID: RE201209-1						Units: pCi/l		Analysis Date: 12/19/2020 12:13		
Client ID:	Run ID: RE201209-1B						Prep Date: 12/9/2020		DF: NA		
Analyte	Result	ReportLimit	SPK Val	SPK Ref Value	%REC	Control Limit	Decision Level	DER Ref Value	DER	DER Limit	Qual
Ra-226	55 (+/- 14)	0	46.8		117	67-120					P
Carr: BARIUM	12770		15760		81	40-110					
LCSD	Sample ID: RE201209-1						Units: pCi/l		Analysis Date: 12/19/2020 12:13		
Client ID:	Run ID: RE201209-1B						Prep Date: 12/9/2020		DF: NA		
Analyte	Result	ReportLimit	SPK Val	SPK Ref Value	%REC	Control Limit	Decision Level	DER Ref Value	DER	DER Limit	Qual
Ra-226	36.4 (+/- 9.1)	0.2	46.8		77.9	67-120			55	1.11	2.13
Carr: BARIUM	15250		15760		96.7	40-110			12770		
MB	Sample ID: RE201209-1						Units: pCi/l		Analysis Date: 12/19/2020 12:13		
Client ID:	Run ID: RE201209-1B						Prep Date: 12/9/2020		DF: NA		
Analyte	Result	ReportLimit	SPK Val	SPK Ref Value	%REC	Control Limit	Decision Level	DER Ref Value	DER	DER Limit	Qual
Ra-226	ND	0.3									Y1,U
Carr: BARIUM	16820		15760		107	40-110					Y1

The following samples were analyzed in this batch:

2012004-1	2012004-2	2012004-3
2012004-4	2012004-5	2012004-6
2012004-7	2012004-8	

Client: ALS Environmental
Work Order: 2012004
Project: 20112217

QC BATCH REPORT

Batch ID: **RA201215-3-2**Instrument ID: **LB4100-C**Method: **Radium-228 Analysis by GFPC**

DUP	Sample ID: 2012004-8			Units: pCi/l			Analysis Date: 12/22/2020 10:43				
Client ID:	MW-3			Run ID: RA201215-3A			Prep Date: 12/15/2020			DF: NA	
Analyte	Result	ReportLimit	SPK Val	SPK Ref Value	%REC	Control Limit	Decision Level	DER Ref Value	DER DER	DER Limit	Qual
Ra-228	ND	0.79						0.8	0.46	2.13	U
Carr: BARIUM	30640		33760	90.8	40-110			31990			

LCS	Sample ID: RA201215-3			Units: pCi/l			Analysis Date: 12/22/2020 10:43				
Client ID:	Run ID: RA201215-3A						Prep Date: 12/15/2020			DF: NA	
Analyte	Result	ReportLimit	SPK Val	SPK Ref Value	%REC	Control Limit	Decision Level	DER Ref Value	DER DER	DER Limit	Qual
Ra-228	19.9 (+/- 4.7)	0.7	23.04	86.5	70-130						P
Carr: BARIUM	32190		33650	95.7	40-110						

MB	Sample ID: RA201215-3			Units: pCi/l			Analysis Date: 12/22/2020 10:43				
Client ID:	Run ID: RA201215-3A						Prep Date: 12/15/2020			DF: NA	
Analyte	Result	ReportLimit	SPK Val	SPK Ref Value	%REC	Control Limit	Decision Level	DER Ref Value	DER DER	DER Limit	Qual
Ra-228	ND	0.76									U
Carr: BARIUM	32510		33650	96.6	40-110						

The following samples were analyzed in this batch:

2012004-1	2012004-2	2012004-3
2012004-4	2012004-5	2012004-6
2012004-7	2012004-8	



29-Dec-2020

Karen Okonta
NTH Consultants, Ltd.
41780 Six Mile Road
Northville, MI 48168

Re: **Holland Board of Public Works**

Work Order: **20112217**

Dear Karen,

ALS Environmental received 9 samples on 24-Nov-2020 06:00 PM for the analyses presented in the following report.

The analytical data provided relates directly to the samples received by ALS Environmental - Holland and for only the analyses requested.

Sample results are compliant with industry accepted practices and Quality Control results achieved laboratory specifications. Any exceptions are noted in the Case Narrative, or noted with qualifiers in the report or QC batch information. Should this laboratory report need to be reproduced, it should be reproduced in full unless written approval has been obtained from ALS Environmental. Samples will be disposed in 30 days unless storage arrangements are made.

The total number of pages in this report is 28.

If you have any questions regarding this report, please feel free to contact me:

ADDRESS: 3352 128th Avenue, Holland, MI, USA
PHONE: +1 (616) 399-6070 FAX: +1 (616) 399-6185

Sincerely,

A handwritten signature in black ink, appearing to read "Chad Whelton".

Electronically approved by: Chad Whelton

Chad Whelton
Project Manager

Report of Laboratory Analysis

Certificate No: MI: 0022

ALS GROUP USA, CORP Part of the ALS Laboratory Group A Campbell Brothers Limited Company

Client: NTH Consultants, Ltd.
Project: Holland Board of Public Works
Work Order: 20112217

Work Order Sample Summary

Lab Samp ID	Client Sample ID	Matrix	Tag Number	Collection Date	Date Received	Hold
20112217-09	MW-4	Groundwater		11/24/2020 12:16	11/24/2020 18:00	<input type="checkbox"/>

Client: NTH Consultants, Ltd.
Project: Holland Board of Public Works
Work Order: 20112217

Case Narrative

Samples for the above noted Work Order were received on 11/24/2020. The attached "Sample Receipt Checklist" documents the status of custody seals, container integrity, preservation, and temperature compliance.

Samples were analyzed according to the analytical methodology previously transmitted in the "Work Order Acknowledgement". Methodologies are also documented in the "Analytical Result" section for each sample. Quality control results are listed in the "QC Report" section. Sample association for the reported quality control is located at the end of each batch summary. If applicable, results are appropriately qualified in the Analytical Result and QC Report sections. The "Qualifiers" section documents the various qualifiers, units, and acronyms utilized in reporting. A copy of the laboratory's scope of accreditation is available upon request.

With the following exceptions, all sample analyses achieved analytical criteria.

Metals:

Batch 168869, Method SW6020B, Sample 20112217-04A MS/MSD: The MS/MSD recovery was outside of the control limit for calcium; however, the result in the parent sample is greater than 4x the spike amount. No qualification is required.

Wet Chemistry:

Batch R305153, Method A4500-H B-11: pH is considered a "field test" and, as such, the recommended sample holding time expired prior to sample receipt. Results should be considered estimated.

Batch R305326, Method E300.0, Sample MW-2 (20112217-03B): The reporting limits for fluoride and sulfate are elevated due to dilution for high concentrations of non-target analytes.

Batch R305326, Method E300.0, Sample MW-4 (20112217-09B): The reporting limits for fluoride and sulfate are elevated due to dilution for high concentrations of non-target analytes.

Batch R305326, Method E300.0, Sample 20112217-04B MS/MSD: The MS/MSD recovery was below the lower control limit for fluoride. The corresponding result in the parent sample may be biased low for this analyte.

Radium analysis performed by ALS Fort Collins laboratory.

<u>Qualifier</u>	<u>Description</u>
*	Value exceeds Regulatory Limit
**	Estimated Value
a	Analyte is non-accredited
B	Analyte detected in the associated Method Blank above the Reporting Limit
E	Value above quantitation range
H	Analyzed outside of Holding Time
Hr	BOD/CBOD - Sample was reset outside Hold Time, value should be considered estimated.
J	Analyte is present at an estimated concentration between the MDL and Report Limit
ND	Not Detected at the Reporting Limit
O	Sample amount is > 4 times amount spiked
P	Dual Column results percent difference > 40%
R	RPD above laboratory control limit
S	Spike Recovery outside laboratory control limits
U	Analyzed but not detected above the MDL
X	Analyte was detected in the Method Blank between the MDL and Reporting Limit, sample results may exhibit background or reagent contamination at the observed level.

<u>Acronym</u>	<u>Description</u>
DUP	Method Duplicate
LCS	Laboratory Control Sample
LCSD	Laboratory Control Sample Duplicate
LOD	Limit of Detection (see MDL)
LOQ	Limit of Quantitation (see PQL)
MBLK	Method Blank
MDL	Method Detection Limit
MS	Matrix Spike
MSD	Matrix Spike Duplicate
PQL	Practical Quantitation Limit
RPD	Relative Percent Difference
TDL	Target Detection Limit
TNTC	Too Numerous To Count
A	APHA Standard Methods
D	ASTM
E	EPA
SW	SW-846 Update III

<u>Units Reported</u>	<u>Description</u>
°C	Degrees Celcius
as noted	
mg/L	Milligrams per Liter
s.u.	Standard Units

Client: NTH Consultants, Ltd.
Project: Holland Board of Public Works
Sample ID: MW-4
Collection Date: 11/24/2020 12:16 PM

Work Order: 20112217
Lab ID: 20112217-09
Matrix: GROUNDWATER

Analyses	Result	Qual	Report Limit	Units	Dilution Factor	Date Analyzed
MERCURY BY CVAA						
Mercury	0.00023		0.00020	mg/L	1	12/8/2020 02:47 PM
METALS BY ICP-MS						
Antimony	ND		0.0050	mg/L	1	12/8/2020 04:19 PM
Arsenic	0.0071		0.0050	mg/L	1	12/8/2020 04:19 PM
Barium	1.2		0.0050	mg/L	1	12/8/2020 04:19 PM
Beryllium	ND		0.0020	mg/L	1	12/8/2020 04:19 PM
Boron	0.94		0.020	mg/L	1	12/8/2020 04:19 PM
Cadmium	ND		0.0020	mg/L	1	12/8/2020 04:19 PM
Calcium	180		0.50	mg/L	1	12/8/2020 04:19 PM
Chromium	ND		0.0050	mg/L	1	12/8/2020 04:19 PM
Cobalt	ND		0.0050	mg/L	1	12/8/2020 04:19 PM
Lead	ND		0.0050	mg/L	1	12/8/2020 04:19 PM
Lithium	0.028		0.010	mg/L	1	12/8/2020 04:19 PM
Molybdenum	0.0069		0.0050	mg/L	1	12/8/2020 04:19 PM
Selenium	ND		0.0050	mg/L	1	12/8/2020 04:19 PM
Thallium	ND		0.0020	mg/L	1	12/8/2020 04:19 PM
ANIONS BY ION CHROMATOGRAPHY						
Chloride	890		80	mg/L	80	12/8/2020 10:09 PM
Fluoride	ND		2.0	mg/L	2	12/8/2020 09:50 PM
Sulfate	ND		4.0	mg/L	2	12/8/2020 09:50 PM
PH (LABORATORY)						
pH (laboratory)	6.89	H	0.100	s.u.	1	12/7/2020 12:54 PM
Temperature	21.1	H	0.100	°C	1	12/7/2020 12:54 PM
TOTAL DISSOLVED SOLIDS						
Total Dissolved Solids	3,000		1,500	mg/L	1	12/3/2020 02:30 PM
SUBCONTRACTED ANALYSES						
Subcontracted Analyses	See attached		SUBCONTRACT as noted		1	Analyst: ALS 12/29/2020

Note: See Qualifiers page for a list of qualifiers and their definitions.

Client: NTH Consultants, Ltd.
Work Order: 20112217
Project: Holland Board of Public Works

QC BATCH REPORT

Batch ID: 168861		Instrument ID HG4		Method: SW7470A						
MBLK Sample ID: MBLK-168861-168861		Units: mg/L			Analysis Date: 12/9/2020 08:40 AM					
Client ID:		Run ID: HG4_201209A		SeqNo: 6971362	Prep Date: 12/8/2020	DF: 1				
Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	RPD %RPD	RPD Limit	Qual
Mercury	ND	0.00020								
LCS Sample ID: LCS-168861-168861		Units: mg/L			Analysis Date: 12/8/2020 01:57 PM					
Client ID:		Run ID: HG4_201208A		SeqNo: 6969850	Prep Date: 12/8/2020	DF: 1				
Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	RPD %RPD	RPD Limit	Qual
Mercury	0.002055	0.00020	0.002	0	103	80-120	0			
MS Sample ID: 20112217-04AMS		Units: mg/L			Analysis Date: 12/8/2020 02:31 PM					
Client ID: MW-3		Run ID: HG4_201208A		SeqNo: 6969864	Prep Date: 12/8/2020	DF: 1				
Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	RPD %RPD	RPD Limit	Qual
Mercury	0.00192	0.00020	0.002	-0.0000435	98.2	75-125	0			
MSD Sample ID: 20112217-04AMSD		Units: mg/L			Analysis Date: 12/8/2020 02:32 PM					
Client ID: MW-3		Run ID: HG4_201208A		SeqNo: 6969865	Prep Date: 12/8/2020	DF: 1				
Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	RPD %RPD	RPD Limit	Qual
Mercury	0.001845	0.00020	0.002	-0.0000435	94.4	75-125	0.00192	3.98	20	

The following samples were analyzed in this batch:

Client: NTH Consultants, Ltd.
Work Order: 20112217
Project: Holland Board of Public Works

QC BATCH REPORT

Batch ID: **168869** Instrument ID **ICPMS3** Method: **SW6020B**

MLBK			Sample ID: MLBK-168869-168869		Units: mg/L		Analysis Date: 12/8/2020 03:44 PM			
Client ID:		Run ID: ICPMS3_201208A		SeqNo: 6969146		Prep Date: 12/8/2020		DF: 1		
Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
Antimony	ND	0.0050								
Arsenic	ND	0.0050								
Barium	ND	0.0050								
Beryllium	ND	0.0020								
Boron	ND	0.020								
Cadmium	ND	0.0020								
Calcium	ND	0.50								
Chromium	ND	0.0050								
Cobalt	ND	0.0050								
Lead	ND	0.0050								
Lithium	ND	0.010								
Molybdenum	ND	0.0050								
Selenium	ND	0.0050								
Thallium	ND	0.0050								

LCS			Sample ID: LCS-168869-168869		Units: mg/L		Analysis Date: 12/8/2020 03:46 PM			
Client ID:		Run ID: ICPMS3_201208A		SeqNo: 6969147		Prep Date: 12/8/2020		DF: 1		
Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
Antimony	0.09792	0.0050	0.1	0	97.9	80-120	0	0		
Arsenic	0.1003	0.0050	0.1	0	100	80-120	0	0		
Barium	0.1008	0.0050	0.1	0	101	80-120	0	0		
Beryllium	0.1047	0.0020	0.1	0	105	80-120	0	0		
Boron	0.5338	0.020	0.5	0	107	80-120	0	0		
Cadmium	0.1028	0.0020	0.1	0	103	80-120	0	0		
Calcium	10.29	0.50	10	0	103	80-120	0	0		
Chromium	0.1038	0.0050	0.1	0	104	80-120	0	0		
Cobalt	0.1047	0.0050	0.1	0	105	80-120	0	0		
Lead	0.1015	0.0050	0.1	0	101	80-120	0	0		
Lithium	0.09842	0.010	0.1	0	98.4	80-120	0	0		
Molybdenum	0.1027	0.0050	0.1	0	103	80-120	0	0		
Selenium	0.1006	0.0050	0.1	0	101	80-120	0	0		
Thallium	0.09517	0.0050	0.1	0	95.2	80-120	0	0		

Note: See Qualifiers Page for a list of Qualifiers and their explanation.

Client: NTH Consultants, Ltd.
Work Order: 20112217
Project: Holland Board of Public Works

QC BATCH REPORT

Batch ID: **168869** Instrument ID **ICPMS3** Method: **SW6020B**

MS Sample ID: 20112217-04AMS				Units: mg/L		Analysis Date: 12/8/2020 04:03 PM				
Client ID: MW-3		Run ID: ICPMS3_201208A		SeqNo: 6969433		Prep Date: 12/8/2020		DF: 1		
Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
Antimony	0.09679	0.0050	0.1	0.0001199	96.7	75-125	0			
Arsenic	0.09873	0.0050	0.1	0.0006677	98.1	75-125	0			
Barium	0.2085	0.0050	0.1	0.1104	98.1	75-125	0			
Beryllium	0.103	0.0020	0.1	0.0000528	103	75-125	0			
Boron	0.9917	0.020	0.5	0.4697	104	75-125	0			
Cadmium	0.1006	0.0020	0.1	0	101	75-125	0			
Calcium	101.4	0.50	10	95.26	61.2	75-125	0			SO
Chromium	0.1024	0.0050	0.1	0.0007051	102	75-125	0			
Cobalt	0.1024	0.0050	0.1	0.0002629	102	75-125	0			
Lead	0.1014	0.0050	0.1	0.0002156	101	75-125	0			
Lithium	0.112	0.010	0.1	0.01535	96.7	75-125	0			
Molybdenum	0.1028	0.0050	0.1	0.0007359	102	75-125	0			
Selenium	0.09924	0.0050	0.1	-0.0003245	99.6	75-125	0			
Thallium	0.09504	0.0050	0.1	-0.0000231	95.1	75-125	0			

MSD Sample ID: 20112217-04AMSD				Units: mg/L		Analysis Date: 12/8/2020 04:05 PM				
Client ID: MW-3		Run ID: ICPMS3_201208A		SeqNo: 6969434		Prep Date: 12/8/2020		DF: 1		
Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
Antimony	0.09862	0.0050	0.1	0.0001199	98.5	75-125	0.09679	1.87	20	
Arsenic	0.1015	0.0050	0.1	0.0006677	101	75-125	0.09873	2.8	20	
Barium	0.208	0.0050	0.1	0.1104	97.6	75-125	0.2085	0.248	20	
Beryllium	0.1051	0.0020	0.1	0.0000528	105	75-125	0.103	2.01	20	
Boron	1.011	0.020	0.5	0.4697	108	75-125	0.9917	1.98	20	
Cadmium	0.1037	0.0020	0.1	0	104	75-125	0.1006	3.01	20	
Calcium	101	0.50	10	95.26	57.2	75-125	101.4	0.394	20	SO
Chromium	0.1025	0.0050	0.1	0.0007051	102	75-125	0.1024	0.129	20	
Cobalt	0.1041	0.0050	0.1	0.0002629	104	75-125	0.1024	1.63	20	
Lead	0.1049	0.0050	0.1	0.0002156	105	75-125	0.1014	3.34	20	
Lithium	0.1132	0.010	0.1	0.01535	97.8	75-125	0.112	0.983	20	
Molybdenum	0.1071	0.0050	0.1	0.0007359	106	75-125	0.1028	4.11	20	
Selenium	0.1027	0.0050	0.1	-0.0003245	103	75-125	0.09924	3.38	20	
Thallium	0.09767	0.0050	0.1	-0.0000231	97.7	75-125	0.09504	2.72	20	

The following samples were analyzed in this batch:

Note: See Qualifiers Page for a list of Qualifiers and their explanation.

Client: NTH Consultants, Ltd.
Work Order: 20112217
Project: Holland Board of Public Works

QC BATCH REPORT

Batch ID: **168457** Instrument ID **TDS** Method: **A2540 C-11**

Sample ID: MBLK-168457-168457				Units: mg/L		Analysis Date: 12/2/2020 03:48 PM				
Client ID:		Run ID: TDS_201202C		SeqNo: 6952481		Prep Date: 11/30/2020		DF: 1		
Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
Total Dissolved Solids		ND	30							
Sample ID: LCS-168457-168457				Units: mg/L		Analysis Date: 12/2/2020 03:48 PM				
Client ID:		Run ID: TDS_201202C		SeqNo: 6952480		Prep Date: 11/30/2020		DF: 1		
Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
Total Dissolved Solids		486	30	495	0	98.2	85-109	0		
Sample ID: 20112115-01C DUP				Units: mg/L		Analysis Date: 12/2/2020 03:48 PM				
Client ID:		Run ID: TDS_201202C		SeqNo: 6952459		Prep Date: 11/30/2020		DF: 1		
Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
Total Dissolved Solids		366.7	50	0	0	0	0-0	383.3	4.44	10
Sample ID: 20112217-04B DUP				Units: mg/L		Analysis Date: 12/2/2020 03:48 PM				
Client ID: MW-3		Run ID: TDS_201202C		SeqNo: 6952477		Prep Date: 11/30/2020		DF: 1		
Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
Total Dissolved Solids		566.7	50	0	0	0	0-0	530	6.69	10

The following samples were analyzed in this batch:

Note: See Qualifiers Page for a list of Qualifiers and their explanation.

Client: NTH Consultants, Ltd.
Work Order: 20112217
Project: Holland Board of Public Works

QC BATCH REPORT

Batch ID: **168553** Instrument ID **TDS** Method: **A2540 C-11**

MBLK				Sample ID: MBLK-168553-168553		Units: mg/L		Analysis Date: 12/3/2020 02:30 PM			
Client ID:		Run ID: TDS_201203D		SeqNo: 6956231		Prep Date: 12/1/2020		DF: 1			
Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual	
Total Dissolved Solids		ND	30								
LCS				Sample ID: LCS-168553-168553		Units: mg/L		Analysis Date: 12/3/2020 02:30 PM			
Client ID:		Run ID: TDS_201203D		SeqNo: 6956230		Prep Date: 12/1/2020		DF: 1			
Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual	
Total Dissolved Solids		490	30	495	0	99	85-109	0			
DUP				Sample ID: 20112217-05B DUP		Units: mg/L		Analysis Date: 12/3/2020 02:30 PM			
Client ID: MW-3A		Run ID: TDS_201203D		SeqNo: 6956225		Prep Date: 12/1/2020		DF: 1			
Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual	
Total Dissolved Solids		566.7	100	0	0	0	0-0	560	1.18	10	

The following samples were analyzed in this batch:

Note: See Qualifiers Page for a list of Qualifiers and their explanation.

Client: NTH Consultants, Ltd.
Work Order: 20112217
Project: Holland Board of Public Works

QC BATCH REPORT

Batch ID: **R305153** Instrument ID **Titrator 1** Method: **A4500-H B-11**

LCS Sample ID: LCS-R305153-R305153				Units: s.u.			Analysis Date: 12/7/2020 12:54 PM			
Client ID:		Run ID: TITRATOR 1_201207B		SeqNo: 6963900		Prep Date:		DF: 1		
Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
pH (laboratory)	3.95	0.10	4	0	98.8	92-108		0		
DUP Sample ID: 20112217-01B DUP				Units: s.u.			Analysis Date: 12/7/2020 12:54 PM			
Client ID: PZ-1	Run ID: TITRATOR 1_201207B		SeqNo: 6963902		Prep Date:		DF: 1			
Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
pH (laboratory)	8.46	0.10	0	0	0	0-0		8.2	3.12	5 H
Temperature	21.03	0.10	0	0	0	0-0		21.08	0.237	H
DUP Sample ID: 20112328-01A DUP				Units: s.u.			Analysis Date: 12/7/2020 12:54 PM			
Client ID:	Run ID: TITRATOR 1_201207B		SeqNo: 6963913		Prep Date:		DF: 1			
Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
pH (laboratory)	7.53	0.10	0	0	0	0-0		7.39	1.88	5 H
Temperature	21.08	0.10	0	0	0	0-0		21.15	0.332	H

The following samples were analyzed in this batch:

Note: See Qualifiers Page for a list of Qualifiers and their explanation.

Client: NTH Consultants, Ltd.
Work Order: 20112217
Project: Holland Board of Public Works

QC BATCH REPORT

Batch ID: **R305326** Instrument ID **IC3** Method: **E300.0**

MBLK		Sample ID: MBLK-R305326			Units: mg/L		Analysis Date: 12/8/2020 01:29 PM			
Client ID:		Run ID: IC3_201208A			SeqNo: 6971195		Prep Date:		DF: 1	
Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
Chloride	ND	1.0								
Fluoride	ND	0.10								
Sulfate	ND	1.0								

MBLK		Sample ID: MBLK-R305326			Units: mg/L		Analysis Date: 12/8/2020 09:12 PM			
Client ID:		Run ID: IC3_201208A			SeqNo: 6971219		Prep Date:		DF: 1	
Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
Chloride	ND	1.0								
Fluoride	ND	0.10								
Sulfate	ND	1.0								

MBLK		Sample ID: MBLK-R305326			Units: mg/L		Analysis Date: 12/9/2020 02:39 AM			
Client ID:		Run ID: IC3_201208A			SeqNo: 6971236		Prep Date:		DF: 1	
Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
Chloride	ND	1.0								
Fluoride	ND	0.10								
Sulfate	ND	1.0								

LCS		Sample ID: LCS-R305326			Units: mg/L		Analysis Date: 12/8/2020 01:48 PM			
Client ID:		Run ID: IC3_201208A			SeqNo: 6971196		Prep Date:		DF: 1	
Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
Chloride	9.372	1.0	10	0	93.7	90-110	0			
Fluoride	1.808	0.10	2	0	90.4	90-110	0			
Sulfate	9.738	1.0	10	0	97.4	90-110	0			

LCS		Sample ID: LCS-R305326			Units: mg/L		Analysis Date: 12/8/2020 09:31 PM			
Client ID:		Run ID: IC3_201208A			SeqNo: 6971220		Prep Date:		DF: 1	
Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
Chloride	9.405	1.0	10	0	94	90-110	0			
Fluoride	1.915	0.10	2	0	95.7	90-110	0			
Sulfate	9.659	1.0	10	0	96.6	90-110	0			

Note: See Qualifiers Page for a list of Qualifiers and their explanation.

Client: NTH Consultants, Ltd.
Work Order: 20112217
Project: Holland Board of Public Works

QC BATCH REPORT

Batch ID: **R305326** Instrument ID **IC3** Method: **E300.0**

LCS				Sample ID: LCS-R305326		Units: mg/L		Analysis Date: 12/9/2020 02:58 AM			
Client ID:		Run ID: IC3_201208A		SeqNo: 6971237		Prep Date:		DF: 1			
Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual	
Chloride	9.418	1.0	10	0	94.2	90-110		0			
Fluoride	1.96	0.10	2	0	98	90-110		0			
Sulfate	9.756	1.0	10	0	97.6	90-110		0			

MS				Sample ID: 20112217-04B MS		Units: mg/L		Analysis Date: 12/8/2020 07:16 PM			
Client ID: MW-3		Run ID: IC3_201208A		SeqNo: 6971213		Prep Date:		DF: 20			
Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual	
Chloride	263	20	200	71.93	95.6	80-120		0			
Fluoride	31.67	2.0	40	0	79.2	80-120		0		S	
Sulfate	285.7	20	200	98.95	93.4	80-120		0			

MS				Sample ID: 20120200-08D MS		Units: mg/L		Analysis Date: 12/9/2020 02:00 AM			
Client ID:		Run ID: IC3_201208A		SeqNo: 6971234		Prep Date:		DF: 40			
Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual	
Chloride	615.3	40	400	245.7	92.4	80-120		0			
Fluoride	72.29	4.0	80	0	90.4	80-120		0			
Sulfate	377.7	40	400	7.804	92.5	80-120		0			

MS				Sample ID: 20120200-13D MS		Units: mg/L		Analysis Date: 12/9/2020 04:54 AM			
Client ID:		Run ID: IC3_201208A		SeqNo: 6971243		Prep Date:		DF: 20			
Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual	
Chloride	441.2	20	200	239.1	101	80-120		0		E	
Fluoride	36.21	2.0	40	0	90.5	80-120		0			
Sulfate	244.3	20	200	57.51	93.4	80-120		0			

MSD				Sample ID: 20112217-04B MSD		Units: mg/L		Analysis Date: 12/8/2020 07:35 PM			
Client ID: MW-3		Run ID: IC3_201208A		SeqNo: 6971214		Prep Date:		DF: 20			
Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual	
Chloride	262.6	20	200	71.93	95.4	80-120	263	0.15	20		
Fluoride	31.48	2.0	40	0	78.7	80-120	31.67	0.621	20	S	
Sulfate	285.4	20	200	98.95	93.2	80-120	285.7	0.114	20		

Note: See Qualifiers Page for a list of Qualifiers and their explanation.

Client: NTH Consultants, Ltd.
Work Order: 20112217
Project: Holland Board of Public Works

QC BATCH REPORT

Batch ID: **R305326** Instrument ID **IC3** Method: **E300.0**

MSD Sample ID: 20120200-08D MSD				Units: mg/L		Analysis Date: 12/9/2020 02:20 AM				
Client ID:		Run ID: IC3_201208A		SeqNo: 6971235		Prep Date:		DF: 40		
Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
Chloride	613.3	40	400	245.7	91.9	80-120	615.3	0.325	20	
Fluoride	73.46	4.0	80	0	91.8	80-120	72.29	1.6	20	
Sulfate	374.6	40	400	7.804	91.7	80-120	377.7	0.824	20	

MSD Sample ID: 20120200-13D MSD				Units: mg/L		Analysis Date: 12/9/2020 05:13 AM				
Client ID:		Run ID: IC3_201208A		SeqNo: 6971244		Prep Date:		DF: 20		
Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
Chloride	441.1	20	200	239.1	101	80-120	441.2	0.019	20	E
Fluoride	36.47	2.0	40	0	91.2	80-120	36.21	0.737	20	
Sulfate	243.8	20	200	57.51	93.1	80-120	244.3	0.204	20	

The following samples were analyzed in this batch:

Note: See Qualifiers Page for a list of Qualifiers and their explanation.

Cincinnati, OH
+1 513 733 5336Fort Collins, CO
+1 970 490 1511Everett, WA
+1 425 356 2600Holland, MI
+1 616 399 6070

Chain of Custody Form

Page _____ of _____

Houston, TX
+1 281 530 5656Spring City, PA
+1 610 948 4903South Charleston, WV
+1 304 356 3168Middletown, PA
+1 717 944 5541Salt Lake City, UT
+1 801 266 7700York, PA
+1 717 505 5280

COC ID: 189586

ALS Project Manager:

ALS Work Order #:

20112217

Customer Information		Project Information		Parameter/Method Request for Analysis													
Purchase Order		Project Name	<i>Holland BPW James pp0</i>	A	Metals including Hg												
Work Order		Project Number	<i>13-100017</i>	B	Chloride, Fluoride, Sulfate												
Company Name	NTH Consultants, Ltd.	Bill To Company	Holland Board of Public Works	C	pH												
Send Report To	Karen Okonta	Invoice Attn	Accounts Payable	D	TDS												
Address	41780 Six Mile Road	Address	626 Hastings	E	Radium 226 & 228												
City/State/Zip	Northville, MI 48168	City/State/Zip	Holland, MI 49423	F													
Phone	(248) 662-2668	Phone	(616) 355-1210	G													
Fax	(248) 324-5300	Fax		H													
e-Mail Address		e-Mail Address		I													
No.	Sample Description	Date	Time	Matrix	Pres.	# Bottles	A	B	C	D	E	F	G	H	I	J	Hold
1	MW-4	11-24-20	12:16p	GW	2	4	X	X	X	X	X						
2																	
3																	
4																	
5																	
6																	
7																	
8																	
9																	
10																	

Sampler(s) Please Print & Sign <i>Brittany Stachulis</i> <i>CR</i>	Shipment Method <i>Drop-off</i>	Required Turnaround Time: (Check Box) <input checked="" type="checkbox"/> Std 10 WK Days <input type="checkbox"/> 5 WK Days <input type="checkbox"/> Other _____ <input type="checkbox"/> 2 WK Days <input type="checkbox"/> 24 Hour	Results Due Date:		
Relinquished by: <i>CR</i>	Date: <i>11/24/20</i> Time: <i>1800</i>	Received by: <i>CR</i>	Notes:		
Relinquished by: <i>CR</i>	Date: <i>11/24/20</i> Time: <i>1800</i>	Received by (Laboratory): <i>CR</i>	Cooler ID <i>CR</i>	Cooler Temp. <i>CR</i>	QC Package: (Check One Box Below)
Logged by (Laboratory): <i>CR</i>	Date: <i>11/25/20</i> Time: <i>1035</i>	Checked by (Laboratory): <i>CR</i>			<input type="checkbox"/> Level II Std QC <input type="checkbox"/> Level III Std QC/Raw Data <input type="checkbox"/> Level IV SW846/CLP <input type="checkbox"/> Other
Preservative Key: 1-HCl 2-HNO ₃ 3-H ₂ SO ₄ 4-NaOH 5-Na ₂ S ₂ O ₃ 6-NaHSO ₄ 7-Other 8-4°C 9-5035					<input type="checkbox"/> TPRP CheckList <input type="checkbox"/> TPRP Level IV

Note: 1. Any changes must be made in writing once samples and COC Form have been submitted to ALS Environmental.
 2. Unless otherwise agreed in a formal contract, services provided by ALS Environmental are expressly limited to the terms and conditions stated on the reverse.
 3. The Chain of Custody is a legal document. All information must be completed accurately.

Copyright 2011 by ALS Environmental.

Sample Receipt ChecklistClient Name: NTH - NORTHLILLEDate/Time Received: 24-Nov-20 18:00Work Order: 20112217Received by: KRW

Checklist completed by	Keith Wierenga	25-Nov-20	Reviewed by:	Chad Whelton	30-Nov-20
eSignature		Date	eSignature		Date

Matrices: WaterCarrier name: FedEx

Shipping container/cooler in good condition?	Yes <input checked="" type="checkbox"/>	No <input type="checkbox"/>	Not Present <input type="checkbox"/>
Custody seals intact on shipping container/cooler?	Yes <input type="checkbox"/>	No <input type="checkbox"/>	Not Present <input checked="" type="checkbox"/>
Custody seals intact on sample bottles?	Yes <input type="checkbox"/>	No <input type="checkbox"/>	Not Present <input checked="" type="checkbox"/>
Chain of custody present?	Yes <input checked="" type="checkbox"/>	No <input type="checkbox"/>	
Chain of custody signed when relinquished and received?	Yes <input type="checkbox"/>	No <input checked="" type="checkbox"/>	
Chain of custody agrees with sample labels?	Yes <input checked="" type="checkbox"/>	No <input type="checkbox"/>	
Samples in proper container/bottle?	Yes <input checked="" type="checkbox"/>	No <input type="checkbox"/>	
Sample containers intact?	Yes <input checked="" type="checkbox"/>	No <input type="checkbox"/>	
Sufficient sample volume for indicated test?	Yes <input checked="" type="checkbox"/>	No <input type="checkbox"/>	
All samples received within holding time?	Yes <input checked="" type="checkbox"/>	No <input type="checkbox"/>	
Container/Temp Blank temperature in compliance?	Yes <input checked="" type="checkbox"/>	No <input type="checkbox"/>	
Sample(s) received on ice?	Yes <input checked="" type="checkbox"/>	No <input type="checkbox"/>	
Temperature(s)/Thermometer(s):	<u>2.4, 3.8, 4.8, 4.9, 3.7 C</u> <u>IR3</u>		
Cooler(s)/Kit(s):	<u></u>		
Date/Time sample(s) sent to storage:	<u>11/25/2020 10:42:39 AM</u>		
Water - VOA vials have zero headspace?	Yes <input type="checkbox"/>	No <input type="checkbox"/>	No VOA vials submitted <input checked="" type="checkbox"/>
Water - pH acceptable upon receipt?	Yes <input checked="" type="checkbox"/>	No <input type="checkbox"/>	N/A <input type="checkbox"/>
pH adjusted?	Yes <input type="checkbox"/>	No <input checked="" type="checkbox"/>	N/A <input type="checkbox"/>
pH adjusted by:	<u>-</u>		

Login Notes:

Client Contacted:

Date Contacted:

Person Contacted:

Contacted By:

Regarding:

Comments:

<u></u>

CorrectiveAction:

<u></u>



Wednesday, December 23, 2020

Chad Whelton
ALS Environmental
3352 128th Avenue
Holland, MI 49424

Re: ALS Workorder: 2012005
Project Name:
Project Number: 20112217

Dear Mr. Whelton:

One water sample was received from ALS Environmental, on 12/1/2020. The sample was scheduled for the following analyses:

Radium-226

Radium-228

The results for these analyses are contained in the enclosed reports.

The data contained in the following report have been reviewed and approved by the personnel listed below. In addition, ALS certifies that the analyses reported herein are true, complete and correct within the limits of the methods employed. Should this laboratory report need to be reproduced, it should be reproduced in full unless written approval has been obtained from ALS Environmental.

Thank you for your confidence in ALS Environmental. Should you have any questions, please call.

Sincerely,

A handwritten signature in black ink, appearing to read "Julie Ellingson".

ALS Environmental
Julie Ellingson
Project Manager

ALS Environmental – Fort Collins is accredited by the following accreditation bodies for various testing scopes in accordance with requirements of each accreditation body. All testing is performed under the laboratory management system, which is maintained to meet these requirement and regulations. Please contact the laboratory or accreditation body for the current scope testing parameters.

ALS Environmental – Fort Collins	
Accreditation Body	License or Certification Number
Alaska (AK)	17-003
Arizona (AZ)	AZ0742
California (CA)	2926
Colorado (CO)	CO01099
Florida (FL)	E87914
Idaho (ID)	CO01099
Kansas (KS)	E-10381
Kentucky (KY)	90137
PJ-LA (DoD ELAP/ISO 170250)	95377
Maryland (MD)	285
Missouri (MO)	175
Nebraska(NE)	NE-OS-24-13
Nevada (NV)	CO010992018-1
New York (NY)	12036
North Dakota (ND)	R-057
Oklahoma (OK)	1301
Pennsylvania (PA)	68-03116
Tennessee (TN)	TN02976
Texas (TX)	T104704241
Utah (UT)	CO01099
Washington (WA)	C1280



2012005

Radium-228:

The sample was analyzed for the presence of ^{228}Ra by low background gas flow proportional counting of ^{228}Ac , which is the ingrown progeny of ^{228}Ra , according to the current revision of SOP 724.

Ra-228 activity is reported in the associated method blank above the minimum detectable concentration value. The measured blank activity is below the requested MDC. Results are acceptable according to the current revision of SOP 715, and are submitted without further qualification.

All remaining acceptance criteria were met.

Radium-226:

The sample was prepared and analyzed according to the current revision of SOP 783.

All acceptance criteria were met.

ALS -- Fort Collins

Sample Number(s) Cross-Reference Table

OrderNum: 2012005

Client Name: ALS Environmental

Client Project Name:

Client Project Number: 20112217

Client PO Number: 20-122020059

Client Sample Number	Lab Sample Number	COC Number	Matrix	Date Collected	Time Collected
MW-4	2012005-1		WATER	24-Nov-20	12:16



Subcontractor:

ALS Environmental, Fort Collins

225 Commerce Dr.

TEL: (800) 443-1511

FAX:

Fort Collins, CO 80524

Acct#:

CHAIN-OF-CUSTODY RECORD

Date: 30-Nov-20

COC ID: 15283

Due Date: 15-Dec-20

Page 1 of 1

Comments:

Please analyze these samples per our instructions and indicated turnaround requirements. Please include all QC with data. The samples do not need to be returned and can be disposed after 30 days. Report MW-4 separately.

Relinquished by: 	Date/Time 11-30-20 1200	Received by: 	Date/Time 12/01/20 1030	Cooler IDs _____ _____ _____	Report/QC Level Std _____
Relinquished by: _____ _____ _____	Date/Time _____ _____ _____	Received by: _____ _____ _____	Date/Time _____ _____ _____	_____ _____ _____	_____ _____ _____



ALS Environmental - Fort Collins
CONDITION OF SAMPLE UPON RECEIPT FORM

Client Name/ID:

Holland

Workorder No:

2012005

Project Manager:

JME

Initials:

RGA

Date: 12/01/2020

1. Are airbills / shipping documents present and/or removable?	<input type="checkbox"/> Drop Off <input checked="" type="checkbox"/> YES <input type="checkbox"/> NO
2. Are custody seals on shipping containers intact?	<input checked="" type="checkbox"/> NONE <input type="checkbox"/> YES <input type="checkbox"/> NO*
3. Are custody seals on sample containers intact?	<input checked="" type="checkbox"/> NONE <input type="checkbox"/> YES <input type="checkbox"/> NO*
4. Is there a COC (chain-of-custody) present?	<input checked="" type="checkbox"/> YES <input type="checkbox"/> NO*
5. Is the COC in agreement with samples received? (IDs, dates, times, # of samples, # of containers, matrix, requested analyses, etc.)	<input checked="" type="checkbox"/> YES <input type="checkbox"/> NO*
6. Are short-hold samples present?	<input type="checkbox"/> YES <input checked="" type="checkbox"/> NO
7. Are all samples within holding times for the requested analyses?	<input checked="" type="checkbox"/> YES <input type="checkbox"/> NO*
8. Were all sample containers received intact? (not broken or leaking)	<input checked="" type="checkbox"/> YES <input type="checkbox"/> NO*
9. Is there sufficient sample for the requested analyses?	<input checked="" type="checkbox"/> YES <input type="checkbox"/> NO*
10. Are samples in proper containers for requested analyses? (form 250, Sample Handling Guidelines)	<input checked="" type="checkbox"/> YES <input type="checkbox"/> NO*
11. Are all aqueous samples preserved correctly, if required?	<input type="checkbox"/> N/A <input checked="" type="checkbox"/> YES <input type="checkbox"/> NO*
12. Were unpreserved samples pH checked, if required?	<input checked="" type="checkbox"/> N/A <input type="checkbox"/> YES <input type="checkbox"/> NO
13. Are all samples requiring no headspace (VOC, GRO, RSK/MEE, radon) free of bubbles > 6 mm in diameter?	<input checked="" type="checkbox"/> N/A <input type="checkbox"/> YES <input type="checkbox"/> NO
14. Were the samples shipped on ice?	<input type="checkbox"/> YES <input checked="" type="checkbox"/> NO
15. Were cooler temperatures measured at 0.1 - 6.0°C? IR gun used: <input type="checkbox"/> #3 <input type="checkbox"/> #5	<input checked="" type="checkbox"/> Rad Only <input type="checkbox"/> YES <input checked="" type="checkbox"/> NO

Cooler #: 1 2

Temperature (°C): amb amb

of custody seals on cooler: 0 0

External mR/hr reading: 11 11

Background mR/hr reading: 9 Were external mR/hr readings ≤ two times background and within DOT acceptance criteria? (If no, see Form 008) N/A YES NO

* Please provide details below for 'NO' responses in gray boxes above - for 2 thru 5 & 7 thru 12, notify PM & continue w/ login.

All client bottle ID's vs ALS lab ID's double-checked by: RGA

If applicable, was the client contacted? YES N/A Contact Name

Date:

Project Manager Signature / Date:

JME 12/1/20

Ref:	Date: 30Nov20	SHIPPING:	0.00
Dep:	Wgt: 21.05 LBS	SPECIAL:	0.00
		HANDLING:	0.00
DV:		TOTAL:	0.00

SvcS: PRIORITY OVERNIGHT Master 1668 7926 2290
TRCK: 1668 7926 2304

ORIGIN ID:GRRA (616) 399-6070
ALS ENVIRONMENTAL
ALS ENVIRONMENTAL
3352 128TH AVENUE

HOLLAND, MI 494249263
UNITED STATES US

SHIP DATE: 30NOV20
ACTWTG: 21.05 LB
CAD: 0122071/CAFE3311

BILL THIRD PARTY

1021 0002800612161r
0002800612161r
0002800612161r

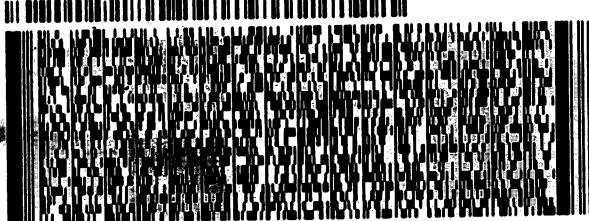
TO SAMPLE RECEIVING
ALS ENVIRONMENTAL
225 COMMERCE DR

FORT COLLINS CO 80524

(970) 490-1511
TRU:
PO:

REF:

DEPT:



FedEx

Express



AN 10002800612161r

2 of 2
MPS# 1668 7926 2304
0263|

Mstr# 1668 7926 2290

|0201|

TUE - 01 DEC 10:30A
PRIORITY OVERNIGHT

80524
CO-US DEN

NA FTCA



Ref: Date: 30Nov20 SHIPPING: 0.00
Dep: Wgt: 43.60 LBS SPECIAL: 0.00
DV: 0.00 HANDLING: 0.00
TOTAL: 0.00

Svcs: PRIORITY OVERNIGHT Master 1668 7926 2290
TRCK: 1668 7926 2290

ORIGIN ID:GRRA (616) 399-6070
ALS ENVIRONMENTAL
ALS ENVIRONMENTAL
3352 128TH AVENUE

HOLLAND, MI 494249263
UNITED STATES US

SHIP DATE: 30NOV20
ACTWGT: 43.60 LB
CAD: 0122071/CAFE3311

BILL THIRD PARTY

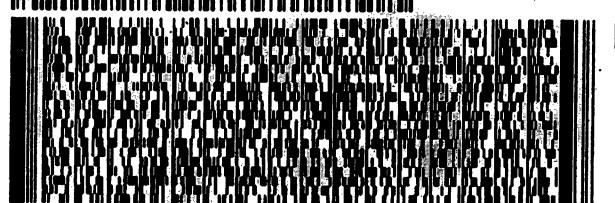
TO SAMPLE RECEIVING
ALS ENVIRONMENTAL
225 COMMERCE DR

FORT COLLINS CO 80524

11-0
amb

(970) 480-1611 REF:
TRK# DEPT:

PO#



FedEx
Express



1 of 2
TRK# 1668 7926 2290
0201 ## MASTER ##

TUE - 01 DEC 10:30A
PRIORITY OVERNIGHT

80524
CO-US DEN



Client: ALS Environmental **Date:** 23-Dec-20
Project: 20112217 **Work Order:** 2012005
Sample ID: MW-4 **Lab ID:** 2012005-1
Legal Location:
Collection Date: 11/24/2020 12:16 **Percent Moisture:**

Analyses	Result	Qual	Report Limit	Units	Dilution Factor	Date Analyzed
Radium-226 by Radon Emanation - Method 903.1			SOP 783		Prep Date: 12/9/2020	PrepBy: TRB
Ra-226	0.82 (+/- 0.39)		0.28	pCi/l	NA	12/19/2020 12:13
Carr: BARIUM	93.4		40-110	%REC	DL = NA	12/19/2020 12:13
Radium-228 Analysis by GFPC			SOP 724		Prep Date: 12/11/2020	PrepBy: RGS
Ra-228	4.4 (+/- 1.2)		0.9	pCi/l	NA	12/21/2020 07:37
Carr: BARIUM	93.9		40-110	%REC	DL = NA	12/21/2020 07:37

Client: ALS Environmental **Date:** 23-Dec-20
Project: 20112217 **Work Order:** 2012005
Sample ID: MW-4 **Lab ID:** 2012005-1
Legal Location: **Matrix:** WATER
Collection Date: 11/24/2020 12:16 **Percent Moisture:**

Analyses	Result	Qual	Report Limit	Units	Dilution Factor	Date Analyzed
----------	--------	------	--------------	-------	-----------------	---------------

Explanation of Qualifiers

Radiochemistry:

- "Report Limit" is the MDC
- U or ND - Result is less than the sample specific MDC.
- Y1 - Chemical Yield is in control at 100-110%. Quantitative yield is assumed.
- Y2 - Chemical Yield outside default limits.
- W - DER is greater than Warning Limit of 1.42
- * - Aliquot Basis is 'As Received' while the Report Basis is 'Dry Weight'.
- # - Aliquot Basis is 'Dry Weight' while the Report Basis is 'As Received'.
- G - Sample density differs by more than 15% of LCS density.
- D - DER is greater than Control Limit
- M - Requested MDC not met.
- M3 - The requested MDC was not met, but the reported activity is greater than the reported MDC.
- L - LCS Recovery below lower control limit.
- H - LCS Recovery above upper control limit.
- P - LCS, Matrix Spike Recovery within control limits.
- N - Matrix Spike Recovery outside control limits
- NC - Not Calculated for duplicate results less than 5 times MDC
- B - Analyte concentration greater than MDC.
- B3 - Analyte concentration greater than MDC but less than Requested MDC.

Inorganics:

- B - Result is less than the requested reporting limit but greater than the instrument method detection limit (MDL).
- U or ND - Indicates that the compound was analyzed for but not detected.
- E - The reported value is estimated because of the presence of interference. An explanatory note may be included in the narrative.
- M - Duplicate injection precision was not met.
- N - Spiked sample recovery not within control limits. A post spike is analyzed for all ICP analyses when the matrix spike and or spike duplicate fail and the native sample concentration is less than four times the spike added concentration.
- Z - Spiked recovery not within control limits. An explanatory note may be included in the narrative.
- * - Duplicate analysis (relative percent difference) not within control limits.
- S - SAR value is estimated as one or more analytes used in the calculation were not detected above the detection limit.

Organics:

- U or ND - Indicates that the compound was analyzed for but not detected.
- B - Analyte is detected in the associated method blank as well as in the sample. It indicates probable blank contamination and warns the data user.
- E - Analyte concentration exceeds the upper level of the calibration range.
- J - Estimated value. The result is less than the reporting limit but greater than the instrument method detection limit (MDL).
- A - A tentatively identified compound is a suspected aldol-condensation product.
- X - The analyte was diluted below an accurate quantitation level.
- * - The spike recovery is equal to or outside the control criteria used.
- + - The relative percent difference (RPD) equals or exceeds the control criteria.
- G - A pattern resembling gasoline was detected in this sample.
- D - A pattern resembling diesel was detected in this sample.
- M - A pattern resembling motor oil was detected in this sample.
- C - A pattern resembling crude oil was detected in this sample.
- 4 - A pattern resembling JP-4 was detected in this sample.
- 5 - A pattern resembling JP-5 was detected in this sample.
- H - Indicates that the fuel pattern was in the heavier end of the retention time window for the analyte of interest.
- L - Indicates that the fuel pattern was in the lighter end of the retention time window for the analyte of interest.
- Z - This flag indicates that a significant fraction of the reported result did not resemble the patterns of any of the following petroleum hydrocarbon products:
 - gasoline
 - JP-8
 - diesel
 - mineral spirits
 - motor oil
 - Stoddard solvent
 - bunker C

ALS -- Fort Collins

Date: 12/23/2020 11:5

Client: ALS Environmental

QC BATCH REPORT

Work Order: 2012005

Project: 20112217

Batch ID: RE201209-1-1

Instrument ID: Alpha Scin

Method: Radium-226 by Radon Emanation

LCS Sample ID: RE201209-1

Units: pCi/l

Analysis Date: 12/19/2020 12:13

Client ID:

Run ID: RE201209-1B

Prep Date: 12/9/2020

DF: NA

Analyte

Result

ReportLimit

SPK Val

SPK Ref
Value

%REC

Control
Limit

Decision
Level

DER Ref
Value

DER
DER

DER
Limit

DER
Qual

Ra-226

55 (+/- 14)

0

46.8

117

67-120

P

Carr: BARIUM

12770

15760

81

40-110

LCSD Sample ID: RE201209-1

Units: pCi/l

Analysis Date: 12/19/2020 12:13

Client ID:

Run ID: RE201209-1B

Prep Date: 12/9/2020

DF: NA

Analyte

Result

ReportLimit

SPK Val

SPK Ref
Value

%REC

Control
Limit

Decision
Level

DER Ref
Value

DER
DER

DER
Limit

DER
Qual

Ra-226

36.4 (+/- 9.1)

0.2

46.8

77.9

67-120

55 1.11 2.13

P

Carr: BARIUM

15250

15760

96.7

40-110

12770

MB Sample ID: RE201209-1

Units: pCi/l

Analysis Date: 12/19/2020 12:13

Client ID:

Run ID: RE201209-1B

Prep Date: 12/9/2020

DF: NA

Analyte

Result

ReportLimit

SPK Val

SPK Ref
Value

%REC

Control
Limit

Decision
Level

DER Ref
Value

DER
DER

DER
Limit

DER
Qual

Ra-226

ND

0.3

Y1,U

Carr: BARIUM

16820

15760

107

40-110

Y1

The following samples were analyzed in this batch:

2012005-1

Client: ALS Environmental
Work Order: 2012005
Project: 20112217

QC BATCH REPORT

Batch ID: **RA201211-1-1**Instrument ID: **LB4100-C**Method: **Radium-228 Analysis by GFPC**

LCS Sample ID: RA201211-1				Units: pCi/l		Analysis Date: 12/21/2020 07:37				
Client ID: RA201211-1A					Prep Date: 12/11/2020			DF: NA		
Analyte	Result	ReportLimit	SPK Val	SPK Ref Value	%REC	Control Limit	Decision Level	DER Ref Value	DER DER Limit	DER Qual
Ra-228	21 (+/- 4.9)	0.7	23.05	91.3	70-130					P
Carr: BARIUM	32330		33380	96.9	40-110					
LCSD Sample ID: RA201211-1				Units: pCi/l		Analysis Date: 12/21/2020 07:37				
Client ID: RA201211-1A					Prep Date: 12/11/2020			DF: NA		
Analyte	Result	ReportLimit	SPK Val	SPK Ref Value	%REC	Control Limit	Decision Level	DER Ref Value	DER DER Limit	DER Qual
Ra-228	24.6 (+/- 5.7)	0.7	23.05	107	70-130			21	0.48	2.13
Carr: BARIUM	32690		33390	97.9	40-110			32330		
MB Sample ID: RA201211-1				Units: pCi/l		Analysis Date: 12/21/2020 07:37				
Client ID: RA201211-1A					Prep Date: 12/11/2020			DF: NA		
Analyte	Result	ReportLimit	SPK Val	SPK Ref Value	%REC	Control Limit	Decision Level	DER Ref Value	DER DER Limit	DER Qual
Ra-228	0.8 (+/- 0.42)	0.74								B3
Carr: BARIUM	32480		33380	97.3	40-110					

The following samples were analyzed in this batch:

2012005-1

Low-Flow Test Report:

Test Date / Time: 10/24/2020 9:54:40 AM

Project: Holland BPW PZ-1

Operator Name: B Stachkunis

Location Name: PZ-1 Well Diameter: 2 in Casing Type: PVC Screen Length: 5 ft Top of Screen: 8.52 ft Total Depth: 13.52 ft Initial Depth to Water: 9.92 ft	Pump Type: Peristaltic Tubing Type: Poly Tubing Inner Diameter: 0.25 in Tubing Length: 25 ft Pump Intake From TOC: 11.5 ft Estimated Total Volume Pumped: 19856.666 ml Flow Cell Volume: 130 ml Final Flow Rate: 200 ml/min Final Draw Down: 0 ft	Instrument Used: Aqua TROLL 600 Vented Serial Number: 455880
--	--	---

Test Notes:

Low-Flow Readings:

Date Time	Elapsed Time	pH	Temperature	Specific Conductivity	RDO Concentration	Turbidity	ORP	Depth To Water	Flow
		+/- 0.1	+/- 0.5	+/- 3 %	+/- 0.3	+/- 1	+/- 10	+/- 5	
10/24/2020 9:54 AM	00:00	7.82 pH	51.61 °F	2,455.8 µS/cm	3.52 mg/L	0.80 NTU	-67.4 mV	302.36 cm	200.00 ml/min
10/24/2020 9:57 AM	03:00	8.02 pH	54.21 °F	2,134.5 µS/cm	1.38 mg/L	0.00 NTU	-216.3 mV	302.36 cm	200.00 ml/min
10/24/2020 10:00 AM	06:00	8.12 pH	54.97 °F	2,145.4 µS/cm	1.08 mg/L	0.03 NTU	-249.4 mV	302.36 cm	200.00 ml/min
10/24/2020 10:03 AM	09:00	8.18 pH	55.37 °F	2,145.6 µS/cm	1.08 mg/L	0.00 NTU	-265.1 mV	302.36 cm	200.00 ml/min
10/24/2020 10:06 AM	12:00	8.26 pH	55.13 °F	2,033.7 µS/cm	1.01 mg/L	0.00 NTU	-278.8 mV	302.36 cm	200.00 ml/min
10/24/2020 10:09 AM	15:00	8.32 pH	55.54 °F	2,012.7 µS/cm	1.05 mg/L	0.00 NTU	-289.1 mV	302.36 cm	200.00 ml/min
10/24/2020 10:12 AM	18:00	8.38 pH	55.91 °F	1,960.2 µS/cm	1.04 mg/L	0.00 NTU	-297.1 mV	302.36 cm	200.00 ml/min
10/24/2020 10:15 AM	21:00	8.41 pH	55.75 °F	1,872.0 µS/cm	1.02 mg/L	0.00 NTU	-301.1 mV	302.36 cm	200.00 ml/min
10/24/2020 10:18 AM	24:00	8.46 pH	55.99 °F	1,864.8 µS/cm	1.05 mg/L	0.00 NTU	-308.6 mV	302.36 cm	200.00 ml/min
10/24/2020 10:21 AM	27:00	8.50 pH	56.03 °F	1,806.7 µS/cm	1.06 mg/L	0.00 NTU	-313.4 mV	302.36 cm	200.00 ml/min
10/24/2020 10:24 AM	30:00	8.53 pH	55.92 °F	1,792.9 µS/cm	1.08 mg/L	0.00 NTU	-320.0 mV	302.36 cm	200.00 ml/min
10/24/2020 10:27 AM	33:00	8.56 pH	56.00 °F	1,780.0 µS/cm	1.11 mg/L	0.00 NTU	-322.9 mV	302.36 cm	200.00 ml/min
10/24/2020 10:30 AM	36:00	8.54 pH	56.12 °F	1,813.3 µS/cm	1.13 mg/L	0.00 NTU	-323.4 mV	302.36 cm	200.00 ml/min
10/24/2020 11:33 AM	01:39:17	8.80 pH	38.13 °F	0.09 µS/cm	4.70 mg/L	0.00 NTU	-225.6 mV	302.36 cm	200.00 ml/min

Note that dates were incorrectly updated in equipment software by rental company. Sampling date should be 11/24/2020.

Low-Flow Test Report:

Test Date / Time: 10/24/2020 1:02:43 PM

Project: Holland BPW MW-01

Operator Name: B Stachkunis

Location Name: MW-01 Well Diameter: 2 in Casing Type: PVC Screen Length: 5 ft Top of Screen: 11.88 ft Total Depth: 16.88 ft Initial Depth to Water: 5.9 ft	Pump Type: Peristaltic Tubing Type: Poly Tubing Inner Diameter: 0.25 in Tubing Length: 25 ft Pump Intake From TOC: 14.88 ft Estimated Total Volume Pumped: 4800 ml Flow Cell Volume: 130 ml Final Flow Rate: 200 ml/min Final Draw Down: 0 ft	Instrument Used: Aqua TROLL 600 Vented Serial Number: 455880
---	---	--

Test Notes:

Low-Flow Readings:

Date Time	Elapsed Time	pH	Temperature	Specific Conductivity	RDO Concentration	Turbidity	ORP	Depth To Water	Flow
		+/- 0.1	+/- 0.5	+/- 3 %	+/- 0.3	+/- 1	+/- 10	+/- 5	
10/24/2020 1:02 PM	00:00	6.99 pH	51.01 °F	1,533.2 µS/cm	0.15 mg/L	0.05 NTU	-237.7 mV	179.83 cm	200.00 ml/min
10/24/2020 1:05 PM	03:00	6.97 pH	51.14 °F	1,577.3 µS/cm	0.08 mg/L	0.00 NTU	-243.7 mV	179.83 cm	200.00 ml/min
10/24/2020 1:08 PM	06:00	6.95 pH	51.70 °F	1,641.9 µS/cm	0.06 mg/L	0.20 NTU	-247.7 mV	179.83 cm	200.00 ml/min
10/24/2020 1:11 PM	09:00	6.94 pH	52.24 °F	1,704.6 µS/cm	0.04 mg/L	0.44 NTU	-249.8 mV	179.83 cm	200.00 ml/min
10/24/2020 1:14 PM	12:00	6.94 pH	52.45 °F	1,800.1 µS/cm	0.04 mg/L	1.14 NTU	-252.0 mV	179.83 cm	200.00 ml/min
10/24/2020 1:17 PM	15:00	6.93 pH	52.40 °F	1,845.5 µS/cm	0.03 mg/L	4.43 NTU	-253.4 mV	179.83 cm	200.00 ml/min
10/24/2020 1:20 PM	18:00	6.94 pH	52.63 °F	1,850.1 µS/cm	0.02 mg/L	2.43 NTU	-254.0 mV	179.83 cm	200.00 ml/min
10/24/2020 1:23 PM	21:00	6.94 pH	52.96 °F	1,878.3 µS/cm	0.02 mg/L	3.99 NTU	-254.1 mV	179.83 cm	200.00 ml/min
10/24/2020 1:26 PM	24:00	6.95 pH	52.90 °F	1,886.9 µS/cm	0.02 mg/L	9.25 NTU	-255.2 mV	179.83 cm	200.00 ml/min

Samples

Sample ID:	Description:
------------	--------------

Low-Flow Test Report:

Test Date / Time: 10/24/2020 2:32:08 PM

Project: Holland BPW MW-02

Operator Name: B Stachkunis

Location Name: MW-2 Well Diameter: 2 in Casing Type: PVC Screen Length: 5 ft Top of Screen: 11.12 ft Total Depth: 16.12 ft Initial Depth to Water: 3.24 ft	Pump Type: Peristaltic Tubing Type: Poly Tubing Inner Diameter: 0.25 in Tubing Length: 25 ft Pump Intake From TOC: 14.12 ft Estimated Total Volume Pumped: 3000 ml Flow Cell Volume: 130 ml Final Flow Rate: 200 ml/min Final Draw Down: 0 ft	Instrument Used: Aqua TROLL 600 Vented Serial Number: 455880
---	---	--

Test Notes:

Low-Flow Readings:

Date Time	Elapsed Time	pH	Temperature	Specific Conductivity	RDO Concentration	Turbidity	ORP	Depth To Water	Flow
		+/- 0.1	+/- 0.5	+/- 3 %	+/- 0.3	+/- 1	+/- 10	+/- 5	
10/24/2020 2:32 PM	00:00	6.92 pH	49.60 °F	2,653.0 µS/cm	0.09 mg/L	11.12 NTU	-211.9 mV	98.76 cm	200.00 ml/min
10/24/2020 2:35 PM	03:00	6.93 pH	49.31 °F	2,664.6 µS/cm	0.05 mg/L	12.42 NTU	-216.3 mV	98.76 cm	200.00 ml/min
10/24/2020 2:38 PM	06:00	6.93 pH	49.64 °F	2,670.3 µS/cm	0.04 mg/L	11.74 NTU	-217.2 mV	98.76 cm	200.00 ml/min
10/24/2020 2:41 PM	09:00	6.93 pH	49.98 °F	2,658.2 µS/cm	0.03 mg/L		-218.7 mV	98.76 cm	200.00 ml/min
10/24/2020 2:44 PM	12:00	6.94 pH	50.05 °F	2,635.5 µS/cm	0.03 mg/L		-221.2 mV	98.76 cm	200.00 ml/min
10/24/2020 2:47 PM	15:00	6.94 pH	50.09 °F	2,628.6 µS/cm	0.02 mg/L		-221.7 mV	98.76 cm	200.00 ml/min

Samples

Sample ID:	Description:

Low-Flow Test Report:

Test Date / Time: 10/24/2020 4:18:32 PM

Project: Holland BPW MW-03

Operator Name: B Stachkunis

Location Name: MW-3 Well Diameter: 2 in Casing Type: PVC Screen Length: 13.2 ft Top of Screen: 5 ft Total Depth: 18.2 ft Initial Depth to Water: 3.15 ft	Pump Type: Peristaltic Tubing Type: Poly Tubing Inner Diameter: 0.25 in Tubing Length: 25 ft Pump Intake From TOC: 16.2 ft Estimated Total Volume Pumped: 3000 ml Flow Cell Volume: 130 ml Final Flow Rate: 200 ml/min Final Draw Down: 0 ft	Instrument Used: Aqua TROLL 600 Vented Serial Number: 455880
--	---	--

Test Notes:

Low-Flow Readings:

Date Time	Elapsed Time	pH	Temperature	Specific Conductivity	RDO Concentration	Turbidity	ORP	Depth To Water	Flow
		+/- 0.1	+/- 0.5	+/- 3 %	+/- 0.3	+/- 1	+/- 10	+/- 5	
10/24/2020 4:18 PM	00:00	6.90 pH	50.06 °F	988.23 µS/cm	2.85 mg/L		-149.5 mV	96.01 cm	200.00 ml/min
10/24/2020 4:21 PM	03:00	6.78 pH	53.06 °F	948.61 µS/cm	0.12 mg/L		-143.0 mV	96.01 cm	200.00 ml/min
10/24/2020 4:24 PM	06:00	6.78 pH	53.80 °F	934.80 µS/cm	0.07 mg/L		-147.3 mV	96.01 cm	200.00 ml/min
10/24/2020 4:27 PM	09:00	6.78 pH	54.49 °F	936.55 µS/cm	0.05 mg/L		-151.9 mV	96.01 cm	200.00 ml/min
10/24/2020 4:30 PM	12:00	6.78 pH	54.63 °F	938.77 µS/cm	0.04 mg/L		-156.9 mV	96.01 cm	200.00 ml/min
10/24/2020 4:33 PM	15:00	6.77 pH	54.94 °F	943.49 µS/cm	0.03 mg/L		-160.7 mV	96.01 cm	200.00 ml/min

Samples

Sample ID:	Description:

Low-Flow Test Report:

Test Date / Time: 10/24/2020 5:43:16 PM

Project: Holland BPW MW-3A

Operator Name: B Stachkunis

Location Name: MW-3A Well Diameter: 2 in Casing Type: PVC Screen Length: 10 ft Top of Screen: 6 ft Total Depth: 11.03 ft Initial Depth to Water: 2.44 ft	Pump Type: Peristaltic Tubing Type: Poly Tubing Inner Diameter: 0.25 in Tubing Length: 25 ft Estimated Total Volume Pumped: 1200 ml Flow Cell Volume: 130 ml Final Flow Rate: 200 ml/min Final Draw Down: 0 ft	Instrument Used: Aqua TROLL 600 Vented Serial Number: 455880
--	--	--

Test Notes:

Low-Flow Readings:

Date Time	Elapsed Time	pH	Temperature	Specific Conductivity	RDO Concentration	Turbidity	ORP	Depth To Water	Flow
		+/- 0.1	+/- 0.5	+/- 3 %	+/- 0.3	+/- 1	+/- 10	+/- 5	
10/24/2020 5:43 PM	00:00	6.68 pH	48.92 °F	1,360.4 µS/cm	0.05 mg/L	0.00 NTU	-180.0 mV	74.37 cm	200.00 ml/min
10/24/2020 5:46 PM	03:00	6.69 pH	48.85 °F	1,353.5 µS/cm	0.05 mg/L	0.02 NTU	-185.9 mV	74.37 cm	200.00 ml/min
10/24/2020 5:49 PM	06:00	6.69 pH	48.88 °F	1,359.4 µS/cm	0.05 mg/L	0.00 NTU	-189.4 mV	74.37 cm	200.00 ml/min

Samples

Sample ID:	Description:

Low-Flow Test Report:

Test Date / Time: 10/24/2020 11:45:42 AM

Project: Holland BPW MW-4

Operator Name: B Stachkunis

Location Name: MW-4 Well Diameter: 2 in Casing Type: PVC Screen Length: 5 ft Top of Screen: 4.5 ft Total Depth: 9.5 ft Initial Depth to Water: 3.4 ft	Pump Type: Peristaltic Tubing Type: Poly Tubing Inner Diameter: 0.25 in Tubing Length: 25 ft Pump Intake From TOC: 7.5 ft Estimated Total Volume Pumped: 6000 ml Flow Cell Volume: 130 ml Final Flow Rate: 200 ml/min Final Draw Down: 0 ft	Instrument Used: Aqua TROLL 600 Vented Serial Number: 455880
--	--	---

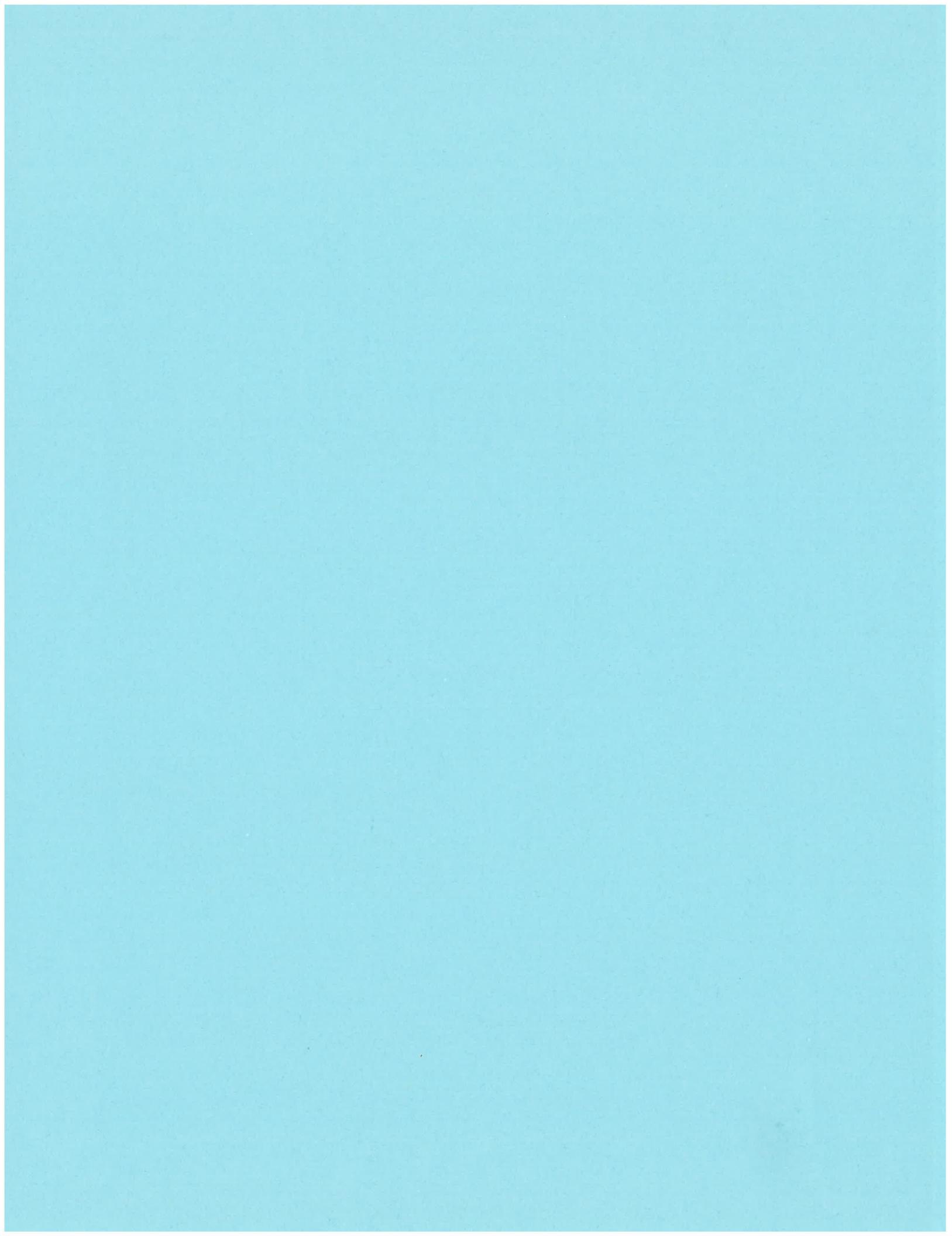
Test Notes:

Low-Flow Readings:

Date Time	Elapsed Time	pH	Temperature	Specific Conductivity	RDO Concentration	Turbidity	ORP	Depth To Water	Flow
		+/- 0.1	+/- 0.5	+/- 3 %	+/- 0.3	+/- 1	+/- 10	+/- 5	
10/24/2020 11:45 AM	00:00	7.26 pH	41.23 °F	4.26 µS/cm	4.22 mg/L	0.44 NTU	-235.1 mV	103.63 cm	200.00 ml/min
10/24/2020 11:48 AM	03:00	7.20 pH	47.27 °F	3,713.3 µS/cm	0.13 mg/L	38.03 NTU	-255.7 mV	103.63 cm	200.00 ml/min
10/24/2020 11:51 AM	06:00	7.21 pH	47.88 °F	3,708.7 µS/cm	0.06 mg/L	31.51 NTU	-250.9 mV	103.63 cm	200.00 ml/min
10/24/2020 11:54 AM	09:00	7.20 pH	47.95 °F	3,698.0 µS/cm	0.04 mg/L	25.26 NTU	-240.7 mV	103.63 cm	200.00 ml/min
10/24/2020 11:57 AM	12:00	7.20 pH	48.25 °F	3,697.2 µS/cm	0.03 mg/L	22.45 NTU	-236.9 mV	103.63 cm	200.00 ml/min
10/24/2020 12:00 PM	15:00	7.20 pH	48.57 °F	3,690.3 µS/cm	0.03 mg/L	18.87 NTU	-238.5 mV	103.63 cm	200.00 ml/min
10/24/2020 12:03 PM	18:00	7.21 pH	48.60 °F	3,686.8 µS/cm	0.02 mg/L	16.05 NTU	-240.3 mV	103.63 cm	200.00 ml/min
10/24/2020 12:06 PM	21:00	7.20 pH	48.76 °F	3,690.8 µS/cm	0.02 mg/L	12.88 NTU	-242.9 mV	103.63 cm	200.00 ml/min
10/24/2020 12:09 PM	24:00	7.21 pH	48.88 °F	3,679.5 µS/cm	0.02 mg/L	9.43 NTU	-243.6 mV	103.63 cm	200.00 ml/min
10/24/2020 12:12 PM	27:00	7.21 pH	48.91 °F	3,681.5 µS/cm	0.02 mg/L	4.98 NTU	-248.1 mV	103.63 cm	200.00 ml/min
10/24/2020 12:15 PM	30:00	7.22 pH	49.17 °F	3,678.3 µS/cm	0.01 mg/L	4.71 NTU	-248.2 mV	103.63 cm	200.00 ml/min

Samples

Sample ID:	Description:
------------	--------------





23-Jul-2020

Karen Okonta
NTH Consultants, Ltd.
41780 Six Mile Road
Northville, MI 48168

Re: **Holland Board of Public Works**

Work Order: **20070974**

Dear Karen,

ALS Environmental received 3 samples on 15-Jul-2020 08:00 AM for the analyses presented in the following report.

The analytical data provided relates directly to the samples received by ALS Environmental - Holland and for only the analyses requested.

Sample results are compliant with industry accepted practices and Quality Control results achieved laboratory specifications. Any exceptions are noted in the Case Narrative, or noted with qualifiers in the report or QC batch information. Should this laboratory report need to be reproduced, it should be reproduced in full unless written approval has been obtained from ALS Environmental. Samples will be disposed in 30 days unless storage arrangements are made.

The total number of pages in this report is 12.

If you have any questions regarding this report, please feel free to contact me:

ADDRESS: 3352 128th Avenue, Holland, MI, USA
PHONE: +1 (616) 399-6070 FAX: +1 (616) 399-6185

Sincerely,

A handwritten signature in black ink, appearing to read "Chad Whelton".

Electronically approved by: Chad Whelton

Chad Whelton
Project Manager

Report of Laboratory Analysis

Certificate No: MI: 0022

ALS GROUP USA, CORP Part of the ALS Laboratory Group A Campbell Brothers Limited Company

Client: NTH Consultants, Ltd.
Project: Holland Board of Public Works
Work Order: 20070974

Work Order Sample Summary

Lab Samp ID	Client Sample ID	Matrix	Tag Number	Collection Date	Date Received	Hold
20070974-01	TW-1	Groundwater		7/14/2020 13:28	7/15/2020 08:00	<input type="checkbox"/>
20070974-02	TW-2	Groundwater		7/14/2020 14:29	7/15/2020 08:00	<input type="checkbox"/>
20070974-03	MW-3A	Groundwater		7/14/2020 15:40	7/15/2020 08:00	<input type="checkbox"/>

Client: NTH Consultants, Ltd.
Project: Holland Board of Public Works
Work Order: 20070974

Case Narrative

Samples for the above noted Work Order were received on 07/15/2020. The attached "Sample Receipt Checklist" documents the status of custody seals, container integrity, preservation, and temperature compliance.

Samples were analyzed according to the analytical methodology previously transmitted in the "Work Order Acknowledgement". Methodologies are also documented in the "Analytical Result" section for each sample. Quality control results are listed in the "QC Report" section. Sample association for the reported quality control is located at the end of each batch summary. If applicable, results are appropriately qualified in the Analytical Result and QC Report sections. The "Qualifiers" section documents the various qualifiers, units, and acronyms utilized in reporting. A copy of the laboratory's scope of accreditation is available upon request.

With the following exceptions, all sample analyses achieved analytical criteria.

Metals:

No other deviations or anomalies were noted.

Wet Chemistry:

No other deviations or anomalies were noted.

Client: NTH Consultants, Ltd.
Project: Holland Board of Public Works
WorkOrder: 20070974

**QUALIFIERS,
ACRONYMS, UNITS**

<u>Qualifier</u>	<u>Description</u>
*	Value exceeds Regulatory Limit
**	Estimated Value
a	Analyte is non-accredited
B	Analyte detected in the associated Method Blank above the Reporting Limit
E	Value above quantitation range
H	Analyzed outside of Holding Time
Hr	BOD/CBOD - Sample was reset outside Hold Time, value should be considered estimated.
J	Analyte is present at an estimated concentration between the MDL and Report Limit
ND	Not Detected at the Reporting Limit
O	Sample amount is > 4 times amount spiked
P	Dual Column results percent difference > 40%
R	RPD above laboratory control limit
S	Spike Recovery outside laboratory control limits
U	Analyzed but not detected above the MDL
X	Analyte was detected in the Method Blank between the MDL and Reporting Limit, sample results may exhibit background or reagent contamination at the observed level.

<u>Acronym</u>	<u>Description</u>
DUP	Method Duplicate
LCS	Laboratory Control Sample
LCSD	Laboratory Control Sample Duplicate
LOD	Limit of Detection (see MDL)
LOQ	Limit of Quantitation (see PQL)
MBLK	Method Blank
MDL	Method Detection Limit
MS	Matrix Spike
MSD	Matrix Spike Duplicate
PQL	Practical Quantitation Limit
RPD	Relative Percent Difference
TDL	Target Detection Limit
TNTC	Too Numerous To Count
A	APHA Standard Methods
D	ASTM
E	EPA
SW	SW-846 Update III

<u>Units Reported</u>	<u>Description</u>
mg/L	Milligrams per Liter

Client: NTH Consultants, Ltd.
Project: Holland Board of Public Works
Sample ID: TW-1
Collection Date: 7/14/2020 01:28 PM

Work Order: 20070974
Lab ID: 20070974-01
Matrix: GROUNDWATER

Analyses	Result	Qual	Report Limit	Units	Dilution Factor	Date Analyzed
METALS BY ICP-MS						
Lithium	0.042		0.010	mg/L	1	7/21/2020 10:13 PM
METALS BY ICP-MS (DISSOLVED)						
Lithium	0.039		0.010	mg/L	1	7/20/2020 08:00 PM
TOTAL SUSPENDED SOLIDS						
Total Suspended Solids	121		A2540 D-11 4.00	mg/L	1	7/17/2020 12:24 PM

Note: See Qualifiers page for a list of qualifiers and their definitions.

Client: NTH Consultants, Ltd.
Project: Holland Board of Public Works
Sample ID: TW-2
Collection Date: 7/14/2020 02:29 PM

Work Order: 20070974
Lab ID: 20070974-02
Matrix: GROUNDWATER

Analyses	Result	Qual	Report Limit	Units	Dilution Factor	Date Analyzed
METALS BY ICP-MS						
Lithium	0.059		0.010	mg/L	1	7/21/2020 10:15 PM
METALS BY ICP-MS (DISSOLVED)						
Lithium	0.044		0.010	mg/L	1	7/20/2020 08:05 PM
TOTAL SUSPENDED SOLIDS						
Total Suspended Solids	824		A2540 D-11 24.0	mg/L	1	7/17/2020 12:24 PM

Note: See Qualifiers page for a list of qualifiers and their definitions.

Client: NTH Consultants, Ltd.
Project: Holland Board of Public Works
Sample ID: MW-3A
Collection Date: 7/14/2020 03:40 PM

Work Order: 20070974
Lab ID: 20070974-03
Matrix: GROUNDWATER

Analyses	Result	Qual	Report Limit	Units	Dilution Factor	Date Analyzed
METALS BY ICP-MS						
Lithium	ND		0.010	mg/L	1	7/21/2020 10:17 PM
METALS BY ICP-MS (DISSOLVED)						
Lithium	ND		0.010	mg/L	1	7/20/2020 08:07 PM
TOTAL SUSPENDED SOLIDS						
Total Suspended Solids	49.0		A2540 D-11 3.00	mg/L	1	7/17/2020 12:24 PM

Note: See Qualifiers page for a list of qualifiers and their definitions.

ALS Group, USA

Date: 23-Jul-20

Client: NTH Consultants, Ltd.
Work Order: 20070974
Project: Holland Board of Public Works

QC BATCH REPORT

Batch ID: 159373		Instrument ID ICPMS4		Method: SW6020B						
MBLK		Sample ID: MBLK-159373-159373				Units: mg/L		Analysis Date: 7/21/2020 09:36 PM		
Client ID:		Run ID:	ICPMS4_200721A			SeqNo:	6578764	Prep Date:	7/21/2020	DF: 1
Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
Lithium	ND	0.010								
LCS		Sample ID: LCS-159373-159373				Units: mg/L		Analysis Date: 7/21/2020 09:37 PM		
Client ID:		Run ID:	ICPMS4_200721A			SeqNo:	6578765	Prep Date:	7/21/2020	DF: 1
Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
Lithium	0.108	0.010	0.1	0	108	80-120		0		
MS		Sample ID: 20070808-02BMS				Units: mg/L		Analysis Date: 7/21/2020 09:42 PM		
Client ID:		Run ID:	ICPMS4_200721A			SeqNo:	6578768	Prep Date:	7/21/2020	DF: 1
Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
Lithium	0.1061	0.010	0.1	0.00169	104	75-125		0		
MSD		Sample ID: 20070808-02BMSD				Units: mg/L		Analysis Date: 7/21/2020 09:44 PM		
Client ID:		Run ID:	ICPMS4_200721A			SeqNo:	6578769	Prep Date:	7/21/2020	DF: 1
Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
Lithium	0.1135	0.010	0.1	0.00169	112	75-125	0.1061	6.7	20	
The following samples were analyzed in this batch:				20070974-01B	20070974-02B	20070974-03B				

Note: See Qualifiers Page for a list of Qualifiers and their explanation.

QC Page: 1 of 3

Client: NTH Consultants, Ltd.
Work Order: 20070974
Project: Holland Board of Public Works

QC BATCH REPORT

Batch ID: **R293294A** Instrument ID **ICPMS3** Method: **SW6020B**

MBLK				Sample ID: MBLK-R293294A-R293294A				Units: mg/L		Analysis Date: 7/20/2020 07:59 PM			
Client ID:		Run ID: ICPMS3_200720A		SeqNo: 6575834		Prep Date:		DF: 1					
Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual			
Lithium	ND		0.010										
LCS				Sample ID: LCS-R293294A-R293294A				Units: mg/L		Analysis Date: 7/20/2020 07:57 PM			
Client ID:		Run ID: ICPMS3_200720A		SeqNo: 6575835		Prep Date:		DF: 1					
Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual			
Lithium	0.09954	0.010	0.1	0	99.5	80-120		0					
MS				Sample ID: 20070974-01CMS				Units: mg/L		Analysis Date: 7/20/2020 08:02 PM			
Client ID: TW-1		Run ID: ICPMS3_200720A		SeqNo: 6575731		Prep Date:		DF: 1					
Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual			
Lithium	0.1469	0.010	0.1	0.03875	108	75-125		0					
MSD				Sample ID: 20070974-01CMSPD				Units: mg/L		Analysis Date: 7/20/2020 08:04 PM			
Client ID: TW-1		Run ID: ICPMS3_200720A		SeqNo: 6575732		Prep Date:		DF: 1					
Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual			
Lithium	0.1465	0.010	0.1	0.03875	108	75-125	0.1469	0.271	20				

The following samples were analyzed in this batch:

20070974-01C 20070974-02C 20070974-03C

Note: See Qualifiers Page for a list of Qualifiers and their explanation.

Client: NTH Consultants, Ltd.
Work Order: 20070974
Project: Holland Board of Public Works

QC BATCH REPORT

Batch ID: **159187** Instrument ID **TSS** Method: **A2540 D-11**

Sample ID: MBLK-159187-159187				Units: mg/L		Analysis Date: 7/17/2020 12:24 PM				
Client ID:		Run ID: TSS_200717B		SeqNo: 6570530		Prep Date: 7/16/2020		DF: 1		
Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
Total Suspended Solids	ND	0.60								
Sample ID: LCS-159187-159187				Units: mg/L		Analysis Date: 7/17/2020 12:24 PM				
Client ID:		Run ID: TSS_200717B		SeqNo: 6570529		Prep Date: 7/16/2020		DF: 1		
Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
Total Suspended Solids	101	6.0	100	0	101	70-113	0			
Sample ID: 20070066-13A DUP				Units: mg/L		Analysis Date: 7/17/2020 12:24 PM				
Client ID:		Run ID: TSS_200717B		SeqNo: 6570508		Prep Date: 7/16/2020		DF: 1		
Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
Total Suspended Solids	152	4.8	0	0	0	0-0	151.2	0.528	10	
Sample ID: 20070974-01A DUP				Units: mg/L		Analysis Date: 7/17/2020 12:24 PM				
Client ID: TW-1		Run ID: TSS_200717B		SeqNo: 6570517		Prep Date: 7/16/2020		DF: 1		
Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
Total Suspended Solids	118	4.0	0	0	0	0-0	121.3	2.79	10	

The following samples were analyzed in this batch:

20070974-01A 20070974-02A 20070974-03A

Note: See Qualifiers Page for a list of Qualifiers and their explanation.

Cincinnati, OH
+1 513 733 5336Everett, WA
+1 425 356 2600Fort Collins, CO
+1 970 490 1511Holland, MI
+1 616 399 6070

Chain of Custody Form

Page _____ of _____

Houston, TX
+1 281 530 5656Middletown, PA
+1 717 944 5541Spring City, PA
+1 610 948 4903Salt Lake City, UT
+1 801 266 7700South Charleston, WV
+1 304 356 3168York, PA
+1 717 505 5280

COC ID: 223856

Customer Information		Project Information			Parameter/Method Request for Analysis													
Purchase Order		Project Name				A	TSS											
Work Order		Project Number	62-160017-06			B	Total Lithium											
Company Name	NTH Consultants, Ltd.	Bill To Company	Holland Board of Public Works			C	Dissolved Lithium											
Send Report To	Karen Okonta	Invoice Attn	Accounts Payable			D												
Address	41700 Six Mile Road	Address	626 Hastings			E												
City/State/Zip	Northville, MI 48168	City/State/Zip	Holland, MI 49423			G												
Phone	(248) 662-2668	Phone	(616) 355-1210			H												
Fax	(248) 334-6805	Fax				I												
e-Mail Address		e-Mail Address				J												
No.	Sample Description	Date	Time	Matrix	Pres.	# Bottles	A	B	C	D	E	F	G	H	I	J	Hold	
1	TW-1	7-14-20	1:28	GW	84	3	X	X	X									
2	TW-2	7-14-20	2:29	GW	84	3	X	X	X									
3	MW-3A	7-14-20	3:40	GW	84	3	X	X	X									
4																		
5																		
6																		
7																		
8																		
9																		
10																		
Sampler(s) Please Print & Sign 			Shipment Method drop-off		Required Turnaround Time: (Check Box)					Results Due Date:								
					<input checked="" type="checkbox"/> Std 10 WK Days <input type="checkbox"/> 5 WK Days <input checked="" type="checkbox"/> 2 WK Days <input type="checkbox"/> 24 Hour													
Relinquished by:		Date:	Time:	Received by:		Notes:												
Relinquished by:		7/15/20	8:50	Received by (Laboratory): 		Cooler ID		Cooler Temp.		QC Package: (Check One Box Below)								
Logged by (Laboratory): 		Date: 7/15/20	Time: 9:15 AM	Checked by (Laboratory): 				4.6°C		<input type="checkbox"/> Level II Std QC <input type="checkbox"/> TRRP Checklist <input type="checkbox"/> Level III Std QC/Raw Data <input type="checkbox"/> TRRP Level IV <input type="checkbox"/> Level IV SW846/CLP <input type="checkbox"/> Other								
Preservative Key:		1-HCl	2-HNO ₃	3-H ₂ SO ₄	4-NaOH	5-Na ₂ S ₂ O ₃	6-NaHSO ₄	7-Other	8-4°C	9-5035								

- Note: 1. Any changes must be made in writing once samples and COC Form have been submitted to ALS Environmental.
 2. Unless otherwise agreed in a formal contract, services provided by ALS Environmental are expressly limited to the terms and conditions stated on the reverse.
 3. The Chain of Custody is a legal document. All information must be completed accurately.

Sample Receipt ChecklistClient Name: **NTH - NORTHLILLE**Date/Time Received: **15-Jul-20 08:00**Work Order: **20070974**Received by: **MJG**Checklist completed by **Matthew Gaylord**

15-Jul-20

Reviewed by: **Chad Whelton**

15-Jul-20

eSignature

Date

eSignature

Date

Matrices: **Groundwater**Carrier name: **Client**

Shipping container/cooler in good condition?	Yes <input checked="" type="checkbox"/>	No <input type="checkbox"/>	Not Present <input type="checkbox"/>
Custody seals intact on shipping container/cooler?	Yes <input type="checkbox"/>	No <input type="checkbox"/>	Not Present <input checked="" type="checkbox"/>
Custody seals intact on sample bottles?	Yes <input type="checkbox"/>	No <input type="checkbox"/>	Not Present <input checked="" type="checkbox"/>
Chain of custody present?	Yes <input checked="" type="checkbox"/>	No <input type="checkbox"/>	
Chain of custody signed when relinquished and received?	Yes <input checked="" type="checkbox"/>	No <input type="checkbox"/>	
Chain of custody agrees with sample labels?	Yes <input checked="" type="checkbox"/>	No <input type="checkbox"/>	
Samples in proper container/bottle?	Yes <input checked="" type="checkbox"/>	No <input type="checkbox"/>	
Sample containers intact?	Yes <input checked="" type="checkbox"/>	No <input type="checkbox"/>	
Sufficient sample volume for indicated test?	Yes <input checked="" type="checkbox"/>	No <input type="checkbox"/>	
All samples received within holding time?	Yes <input checked="" type="checkbox"/>	No <input type="checkbox"/>	
Container/Temp Blank temperature in compliance?	Yes <input checked="" type="checkbox"/>	No <input type="checkbox"/>	
Sample(s) received on ice?	Yes <input checked="" type="checkbox"/>	No <input type="checkbox"/>	
Temperature(s)/Thermometer(s):	4.6/4.6C <input type="button" value="SR1"/>		
Cooler(s)/Kit(s):	<input type="button"/>		
Date/Time sample(s) sent to storage:	7/15/2020 9:55:59 AM		
Water - VOA vials have zero headspace?	Yes <input type="checkbox"/>	No <input type="checkbox"/>	No VOA vials submitted <input checked="" type="checkbox"/>
Water - pH acceptable upon receipt?	Yes <input checked="" type="checkbox"/>	No <input type="checkbox"/>	N/A <input type="checkbox"/>
pH adjusted?	Yes <input type="checkbox"/>	No <input checked="" type="checkbox"/>	N/A <input type="checkbox"/>
pH adjusted by:	<input type="button"/>		

Login Notes:

Client Contacted:

Date Contacted:

Person Contacted:

Contacted By:

Regarding:

Comments:

CorrectiveAction: