Ms. Amy Hadiaris
Minnesota Pollution Control Agency
520 Lafayette Road North
St. Paul, Minnesota 55155-4194

Arcadis U.S., Inc.
430 First Avenue North
Suite 720
Minneapolis
Minnesota 55401
Tel 612 339 9434
Fax 612 336 4538
www.arcadis.com

ENVIRONMENT

Subject:
Area C Groundwater Sampling Work Plan
Ford Twin Cities Assembly Plant, St. Paul, Minnesota
MPCA VIC Project Number VP23530
MPCA PBP Project Number PB3682

Date:
April 24, 2018

Contact:
Ryan Oesterreich

Phone:
612.373.0225

Email:
Ryan.Oesterreich@arcadis.com

Our ref:
MN000653.0006

Dear Ms. Hadiaris:

This *Area C Groundwater Sampling Work Plan* (work plan) provides details for an interim sampling plan for monitoring wells surrounding Area C (the Site) at the former Twin Cities Assembly Plant (TCAP) in St. Paul, Minnesota. The permanent monitoring wells are within two geologic units: unconsolidated soils and the St. Peter Sandstone. The objective of this work is to continue to evaluate groundwater quality as it relates to the Minnesota Pollution Control Agency (MPCA) Class 2B water quality standards in and around the Site.

SITE LOCATION

Area C is located on the river parcel of the Ford TCAP property (west of Mississippi River Boulevard) on top of alluvial deposits at the base of a bluff west of South Mississippi River Boulevard and south of the steam plant (**Figure 1**).

Eleven permanent monitoring wells intersecting groundwater are located throughout Area C (**Figure 1**). All monitoring wells are screened within the unconsolidated soil groundwater, except AMW-07, which is screened within the St. Peter sandstone bedrock formation. Well construction details for each well are provided in **Table 1**.

METHODOLOGY

Field logbook/documentation procedures and the field quality assurance program will be implemented in accordance with the approved May 2016 Site-Wide Monitoring Well Sampling Work Plan (Arcadis 2016).

Each monitoring well will be gauged prior to groundwater sampling field activities using an electronic water level indicator. The water level indicator will be cleaned between each well using a detergent solution and rinsed with clean distilled water prior to deploying into the next monitoring well. The water level data will be used to calculate purge volumes, evaluate groundwater gradients and flow directions, and create potentiometric surface maps.

All eleven permanent monitoring wells surrounding Area C will be sampled using the low-flow sampling method in accordance with the United States Environmental Protection Agency (USEPA) Low-Flow (Minimal Drawdown) Ground-Water Sampling Procedures (USEPA 1996). Sampling equipment will be inserted into each monitoring well to the approximate center of the screened interval. Groundwater will be purged at a rate less than or equal to 300 milliliters per minute (mL/min) using a peristaltic pump and/or submersible pump. If the monitoring well or sampling equipment cannot maintain low-flow rates or limited drawdown in accordance with USEPA guidance, monitoring wells will be sampled using a down-hole pump or bailer after removing three well volumes (standard purge method). A YSI 556 multi-sensor meter will be used to monitor the groundwater conditions while purging. The parameters monitored will include: dissolved oxygen (DO), specific conductance, temperature, pH, and oxygen reduction potential (ORP). Once indicator parameters have stabilized, groundwater samples will be containerized in laboratory supplied sample jars and submitted on ice under chain-of-custody protocols to the TestAmerica Canton, Ohio laboratory on a standard 10-day turnaround time.

Investigation-Derived Waste (IDW) generated during the course of the groundwater sampling will include purge water, personal protective equipment (PPE) and disposable sampling equipment (i.e. filters, tubing, PVC).

- Purge water generated during groundwater monitoring activities will be containerized and labeled as non-hazardous for off-site disposal after review of laboratory analysis.
- PPE and disposal sampling equipment will be segregated and disposed of upon review of subsurface investigation results.

SCOPE OF WORK

Groundwater Sampling

As noted above, all eleven permanent monitoring wells around Area C will be sampled for groundwater quality, see **Table 1** and **Figure 1**. The wells proposed for sampling were selected based on previous analytical results, location and/or previous MPCA-approved work plans. A summary of the analytes that will be collected from each well are shown below.

- VOCs using USEPA Method 8260B,
- SVOCs using USEPA Method 8270C,
- Dissolved TAL metals using USEPA Method 6010B,
- Cyanide using USEPA Method 9012A,
- Polychlorinated Biphenyls USEPA Method 8082
- GRO using WI Modified Method WI-GRO,
- DRO using WI Modified Method WI-DRO, and
- Thallium using USEPA Method 6020A.

All groundwater samples analyzed for metals will be field filtered using a 0.45-micron disposable filter prior to sample collection. All TAL metals samples will include speciation for hexavalent and trivalent chromium.

Transducer Deployment

Transducers have been deployed in four unconsolidated monitoring wells (MW-19, MW-21, MW-25 and MW-26), and one St. Peter Sandstone monitoring well (MW-29) on the Main Parcel to better understand how the water table fluctuates in response to changing river conditions and seasonal fluctuations (see **Figure 1**). The transducers record data at 1-hour intervals. Data will be retrieved as part of the quarterly sampling event, with continuous hydrographs included in the data report.

REPORTING

Results of the sampling will be summarized in a quarterly report. The quarterly report will include a potentiometric surface map, a site figure showing analytical exceedances of applicable screening criteria, a comprehensive figure showing transducer data and lab analytical reports.

SCHEDULE

Groundwater sampling activities for Area C will be initiated immediately upon receipt of approval of this workplan and will continue on an approximately quarterly basis through 2018 on a voluntary basis.

I appreciate your assistance with this project. If you have questions or need additional information, please call Ryan Oesterreich of Arcadis at 612.373.0225 at your convenience.

Sincerely,

Ryan Oesterreich, PE, PG

Project Engineer

Arcadis U.S., Inc.

Copies:

Shanna Schmitt, MPCA

Chuck Pinter, Ford Motor Company

Enclosures:

Tables

1 Permanent Monitoring Well Construction Summary

Figures

1 Well Locations

REFERENCES:

Arcadis. 2007. Field Sampling Plan. Ford Motor Company, Twin Cities Assembly Plant, St. Paul, Minnesota. August 30.

Arcadis. 2016. Work Plan for Installation and Sampling of Bedrock Monitoring Wells. Ford Motor Company, Twin Cities Assembly Plant, St. Paul, Minnesota. January 7.

USEPA. 1996. Low-Flow (Minimal Drawdown) Ground-Water Sampling Procedures. Ground Water Issue, Publication Number EPA/540/S-95/504. April. Available online at: http://www2.epa.gov/remedytech/low-flow-minimal-drawdown-ground-water-sampling-procedures.

Table 1
Permanent Monitoring Well Construction Summary
Ford Motor Company - Twin Cities Assembly Plant
966 South Mississippi River Boulevard
St. Paul, Minnesota

ARCADIS Design & Consultancy for natural and built assets

Well ID	Unique Well Number	Date Installed	Top of Screen (ft bgs)	Bottom of Screen (ft bgs)	Surface Completion Type	Screened Geology
AMW-07	751338	7/4/07	35	45	Flush Mount	St. Peter Sandstone
AMW-19	784743	11/3/11	14.3	24.3	Above Ground	Overburden (Area C Floodplain)
AMW-20	784744	11/3/11	13.5	23.5	Above Ground	Overburden (Area C Floodplain)
AMW-21	814811	12/8/15	46	56	Above Ground	Overburden (Area C)
AMW-22	814812	12/10/15	16	26	Above Ground	Overburden (Area C Floodplain)
AMW-22B	814816	12/15/15	33	43	Above Ground	Overburden (Area C Floodplain)
AMW-23	814813	12/10/15	16	26	Above Ground	Overburden (Area C Floodplain)
AMW-23B	814817	12/15/15	36	46	Above Ground	Overburden (Area C Floodplain)
AMW-24	814814	12/11/15	13	23	Above Ground	Overburden (Area C Floodplain)
AMW-25	814815	12/11/15	12	22	Above Ground	Overburden (Area C Floodplain)
AMW-26	812963	9/16/15	77	87	Flush Mount	Overburden (Area C)

Acronyms and Abbreviations:
AMW = Arcadis monitoring well
ft bgs = feet below ground surface

LEGEND:

- Monitoring Wells
- Well ID = Locations where transducers are deployed
- Abandoned Unconsolidated Soils Monitoring Well
- Former Buildings
- Ford Property Boundary

NOTES:

AMW = Arcadis Monitoring Well

Imagery Source: MnGeo WMS service, 2016 color 7-county http://geoint.lmic.state.mn.us/cgi-bin/wms?

0 400 800 Feet

1 inch = 400 feet

Twin Cities Assembly Plant
Ford Motor Company
St. Paul, Minnesota

Well Locations

ARCADIS

FIGURE 1

CITY: Minneapolis, MN DB: MGress PM: Bryan Zinda
Project MN000593
Path: Z:\GISProjects_ENV\Ford\Ford Ranger\ArcMap\2018\2018-04\Well_Locations_20180423.mxd