S2C2 inc.

Streamlined Site Characterization & Closure

October 31, 2014

Mr. Gregory B. MacLean, P.E.
Environmental Engineer II
New York State Department of Environmental Conservation
Division of Environmental Remediation - Region 8
6274 East Avon-Lima Road
Avon, New York 14414

RE: Supplemental Remedial Investigation Activities at Carlson Park in Rochester, NY. (NYSDEC VCP Number V00514-8)

Dear Greg:

This letter addendum is intended to provide a description of additional supplemental Remedial Investigation (RI) activities that 100 Carlson Road, LLC proposes to conduct prior to the winter of 2014/15 as part of ongoing RI activities being implemented at the Carlson Park Site (Site). The proposed supplemental RI activities addressed herein have been discussed with you during recent telephone conversations. These activities represent an expansion of the Scope of Work outlined in the Supplemental Work Plan for Initial Bedrock Evaluation Activities dated February 28, 2010 (Supplemental Work Plan), and other supplemental Work Plan Addendum letters dated September 2010, August 2011, November 2011, June 2012, June 2013, June and September 2014. The Supplemental Work Plan, and subsequent addendum letters, are all addenda to the original Voluntary Cleanup Program Remedial Investigation Work Plan for Carlson Park, dated October 2004 (RI Work Plan). Accordingly, we request that this letter be considered an additional attachment to the Supplemental Work Plan.

The remainder of this letter provides an explanation of the rational for, and description of, the additional on-site RI activities currently being proposed. It is hoped that information obtained from these activities will help better define hydraulic conditions within the water-bearing zones underlying the Site.

Rational for Proposed Supplemental RI Activities:

Information obtained during the completion of Supplemental RI activities to date have provided a significant amount of information regarding groundwater quality conditions within the saturated overburden and bedrock water-bearing zones underlying the Site. Such information has been very useful in assessing the types of groundwater quality impacts present, the magnitude and distribution of such impacts, and the general pattern of groundwater pressure gradients across the Site.

The primary purposes for conducting the currently proposed supplemental RI activities are to: better define the hydraulic relationship between the overburden and bedrock water-bearing zones; confirm the identification and evaluate the lateral continuity of individual water-bearing zones within bedrock; evaluate the degree of hydraulic connection between bedrock water-bearing zones; identify the potential influences on groundwater flow; evaluate the potential to control groundwater flow in the vicinity of the Site; and to estimate various hydraulic properties within these water-bearing zones.

In order to accomplish these objectives, it is proposed that three activities be conducted at the Site. These three activities include the following:

- **Continuous Water Level Monitoring;**
- **Short-Term Pumping Tests; and**
- **In Situ Hydraulic Conductivity Tests**

Description of supplemental RI activities:

Continuous Water Level Monitoring

For a period of approximately one week, water levels will be continuously monitored in select groundwater monitoring wells and piezometers, and in the Building 10 sump. These locations are listed in Table 1 and are depicted on Figure 1. This monitoring will be conducted by temporarily installing pressure transducers equipped with automatic data loggers (e.g., In Situ Mini-TROLL® or equivalent) at these locations. The automatic data loggers will be set to record water levels from the pressure transducers every five (5) minutes for the monitoring period (approximately one week). A manual water level meter will also be used to measure water levels in these selected monitoring wells, and in other monitoring wells, at the beginning and end of the monitoring period (refer to Table 1).

Hourly barometric pressure data and precipitation data for the monitoring period will be obtained from the National Oceanic and Atmospheric Administration (NOAA) meteorological measurement station located at the Greater Rochester International Airport. This station is located approximately six miles from the Site, and thus, the data should be generally representative of Site conditions. Additionally, barometric pressure will be measured on-site every five (5) minutes using a pressure transducer and automatic data logger configured to measure and record barometric pressure (e.g., an In-Situ BaroTROLL® or equivalent). Note that the collection of barometric pressure and precipitation data as described here will also be conducted during the short-term pumping test activities described below.

Measurements or estimates of the flow rate from the pump in the Building 10 sump will be made during the monitoring period. The pumping system for the sump is equipped with a meter that measures the total amount of volumetric flow that has been pumped through the

system (i.e., a flow totalizing meter). During the period of continuous water level monitoring readings of the total flow volume will be recorded on a daily, or more frequent, basis. The date and time will be recorded for each such reading.

The data from the continuous water level monitoring will be used to:

- Assess the influence that pumping from the sump under Building 10 may have on groundwater levels and flow direction in the local overburden and/or the bedrock, and provide insight on the extent to which the operation of the sump may capture groundwater flow from the site;
- Assess the degree of hydraulic continuity and interconnection between water-bearing fracture zones within the bedrock;
- Identify if other constructed features besides the Building 10 sump (e.g., roof drains, sewer lines, etc.) may be influencing groundwater flow at the site; and
- Assess the response of groundwater levels and the sump operation to precipitation events (assuming they occur during the monitoring period).

Short-Term Pumping Tests

Several short-term pumping tests are proposed to be conducted directly after the continuous water level monitoring period. This pumping test data, including the monitoring of changes in water levels in each pumping well and the surrounding monitoring wells, will facilitate several qualitative assessments including:

- Evaluation of the continuity of water-bearing zones;
- Assessment of hydraulic characteristics of bedrock water-bearing zones;
- Assessment of the degree of hydraulic connection between the groundwater in the upper bedrock and in the overburden;
- Confirmation of which wells monitor the same water-bearing zone(s); and,
- An initial assessment of the lateral and vertical extent of groundwater capture zones that can be achieved by pumping.

Depending on the types of remedial actions which may subsequently be evaluated for this Site, the data from these short-term pumping tests may be used to develop a subsequent longer-term pumping test program to more qualitatively assess the hydraulic characteristics of the water-bearing zones (e.g., transmissivity, storativity, etc.).

Approximately three separate short-term pumping-tests will be performed by pumping from three different existing bedrock monitoring wells and by monitoring water levels in the pumping well and the associated surrounding monitoring wells (Table 1). Table 2 provides a list of three wells that potentially will be used as pumping wells for these short-term tests. Note, however, that alternate pumping wells may be selected, and/or additional short-term pumping tests may be conducted, based on field observations or findings from the continuous water level monitoring or initial short-term pumping tests. The duration of each pumping test will be up to approximately two (2) hours, followed by a period of at least as long as the pumping period during which the recovery of water levels will be monitored. Groundwater will be extracted at a rate to be determined in the field. As the pumping of groundwater begins during a test, the water level in the pumping well will be measured frequently to estimate the amount and rate of water level drawdown. The pumping rate will be measured using the bucket and stop watch method or with a flow meter. The rate will be adjusted at the beginning of the test, as necessary, in an attempt to stabilize the water level in the well at a position at, or just above, the top of the well intake (i.e., top of the well screen). The pumping rate and water level in the pumping well will also be measured and recorded periodically during the course of the test, and the pumping rate adjusted, if necessary, to maintain the target water level.

During the test, water levels will be measured using pressure transducers with automatic data loggers in the pumping well and select monitoring wells. The selected locations will be the same as those that that will be equipped with transducers during the continuous water level monitoring period described above. Prior to the beginning of the pumping test, the automatic data loggers will be reset to record water levels on a more frequent schedule (i.e., every one [1] minute). Water levels will also be measured manually in these wells and in other site monitoring wells (See Table 1) just prior to the initiation of pumping and periodically throughout the test.

Measurement of water levels, both manual and automatic, will continue during the post-pumping recovery period. The duration of the recovery monitoring period will be, at a minimum, as long as the duration of the pumping period.

The collection of barometric and precipitation data as described above for the continuous water level monitoring will continue during the course of the short-term pumping tests. These data will allow an evaluation of the degree to which water level changes measured in the wells were associated with the pumping of water from the pumping well versus other potential influences.

Prior to using the water level and pumping rate data to conduct some of the above-described assessments, the data will be reviewed to evaluate the degree to which changes in groundwater levels were influenced by pumping versus other possible influences (e.g., barometric pressure change, recharge from precipitation, naturally occurring changes/trends in groundwater level, etc.). The barometric pressure data, precipitation data and water level data collected during both the continuous water level monitoring period, the short-term pumping test periods, and the post-pumping recovery periods will be used as part of this assessment. Once the adjustments to the water level data are made, if any, the water level

data from the monitoring wells and the pumping well will be plotted on hydrographs to show changes in groundwater elevation with time. This will facilitate the evaluation of the degree of hydraulic response in each well due to pumping and will allow the above-described assessments to be conducted, including: evaluating of the continuity of water-bearing zones; assessing hydraulic characteristics of bedrock water-bearing zones; assessing the degree of hydraulic connection between the groundwater in the upper bedrock and in the overburden; and confirming which wells monitor the same water-bearing zone(s). Also, the amount of water level drawdown and groundwater elevations at the end of each pumping period will be plotted on a figure and contoured. These figures will allow for an evaluation of the area of influence of the pumping test, the anisotropy in hydraulic conductivity in the water-bearing zones (e.g., potential preferential flow directions) and the extent of groundwater capture at the end of the pumping test. In addition, the water level data and pumping rate data from the pumping wells will be used to assess the amount of water the wells can yield per foot of water level drawdown (i.e., specific capacity) which may ultimately assist in the assessment of potential remedial alternatives for the site.

Groundwater extracted during the short-term pumping tests will be containerized as it is being pumped. The extracted groundwater will be put through the on-site treatment system which is currently in-place to treat water removed from the Building 10 sump.

In Situ Hydraulic Conductivity Tests

In-situ hydraulic conductivity test, also referred to as slug tests, will be performed on existing monitoring wells with sufficient water column lengths to conduct the tests. The slug test data will be used to evaluate the horizontal hydraulic conductivity (K_h) of the formation adjacent to the well screen. Rising head or falling head slug tests will be conducted; falling head tests may only be performed where the well intake interval is entirely beneath the water table. Estimates of the K_h will be made using methods appropriate for conditions in the water-bearing zone such as Cooper, *et al.* (1967) for confined aquifers, Bouwer and Rice (1976) and Bouwer (1989) for unconfined and leaky aquifers, or Hvorlsev (1951) for unconfined or confined aquifers. The K_h estimates from these slug tests will be used to assess the spatial variability of K_h and will facilitate the interpretation of data collected during the continuous water level monitoring and short-term pumping tests.

Schedule

As recently discussed over the phone, it is currently anticipated that the subject supplemental hydraulic monitoring and testing activities will be conducted during the weeks of November 10th and 17th, 2014. The continuous water level monitoring activities will be conducted during the first week of this program. The short-term pumping tests and slug testing activities will be conducted during the second week of this program. It is anticipated that conducting the proposed field activities during this timeframe should allow these testing

activities to be completed before seasonal weather conditions become too cold. Either the presence of freezing conditions or substantial snow cover would greatly impede the successful execution of the proposed activities.

The supplemental RI activities proposed in this Work Plan addendum will be completed in a similar manner as previously conducted as part of the ongoing RI activities being completed at the Site, and will be consistent with the methodologies presented in prior Work Plans and/or addendums as previously approved by NYSDEC for this Site as applicable. Please feel free to contact me at (908) 625-3192 if you have any questions or comments concerning this matter, or if you require any additional information.

Sincerely,
S2C2 Inc.

Steven B. Gelb
Project Manager

CC: Jim Goff

MW-01
MW-02
MWBR-09 A
MW-15
MW-03
MWBR-14 A
Building 14
MW-05
MWBR-14 OB
MW-04
Building 5
MW-06
Building 6
MWBR-12 A
MWBR-12 B
MWBR-15 A
MWBR-15 B
MWBR-08 A
MWBR-13 A
Building 8
MWBR-10 A
Building 7
Building 1
Building 2
Building 3
Building 4
Building 9
Building 10A
Building 10
MW-09D
MW-09
MW-10
MWBR-01 A
PZ-03
PZ-02
PZ-01
MWBR-03 OB
MWBR-02 A
MWBR-03 A-I
MWBR-07 A
MWBR-05 B
MWBR-04 A
MWBR-06 A
MWBR-03 A
PZ-177HA
MWBR-05 A
PZ-163HA
MWBR-05 OB
MWBR-11 OB
PZ-HA2
PZ-167HA
PZ-HA1
MWBR-11 A

0 60 120 240 360 480 Feet

Legend

- Bedrock Monitoring Well
- Monitoring Well - OB
- Piezometers

Features

- Roads
- Railroad
- ConcretePads
- Buildings
- Property Boundary

W:\Projects\Rochester\ArcMap\2014utilityEval\BedrockWellLocationMap2014.mxd

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CARLSON PARK FACILITY
CARLSON ROAD
ROCHESTER, NEW YORK

TITLE
Groundwater Monitoring Well and Piezometer Locations
October 2014

FIGURE 1

SCALE 1:2,000

TABLE 1
PROGRAM FOR CONTINUOUS WATER LEVEL MONITORING
CARLSON PARK FACILITY
ROCHESTER, NEW YORK

Well ID	Casing Diameter (inches)	Total Depth (ft bgs)	Continuous Water Level Monitoring Wells (a)	Manual Water Level Measurements Only Monitoring Wells (b)
MWBR-01A	2	22	x	
MWBR-02A	2	24	x	
MWBR-03A	2	35	x	
MWBR-03A I	2	13.5	x	
MWBR-04A	2	25	x	
MWBR-05A	2	29	x	
MWBR-05B	2	54	x	
MWBR-06A	2	37	x	
MWBR-07A	2	31	x	
MWBR-08A	2	23	x	
MWBR09A	2	40		x
MWBR-10A	2	34		x
MWBR-11A	2	56	x	
MWBR-12A	2	20	x	
MWBR-12B	2	38	x	
MWBR-13A	2	28	x	
MWBR-14A	2	31	x	
MWBR-15A	2	13	x	
MWBR-15B	2	47	x	
MWBR-03OB	2	8.5	x	
MWBR-05OB	2	17	x	
MWBR-11OB	2	28	x	
MWBR-14OB	1.5	11		x
MW-06	1	13.6		x
MW-09	1	13.5	x	
MW-10	1	15	x	
MW-15	2	17.5		x
PZ-01	1	7	x	
PZ-02	1	7	x	
PZ-03	1.5	9.5	x	
PZ-163HA	0.75	7.6		x
PZ-167HA	0.75	9		x
PZ-177HA	0.75	13.5		x
Bldg 10 Sump	NA	**TBD**	x	

Notes:
(a) - Water level will be measured with automatic data loggers. Select wells will also be monitored manually during pumping test.
(b) - Well to be monitored only manually with a water level meter during pumping tests.
TBD - To be determined.
NA - Not applicable.

TABLE 2
POTENTIAL PUMPING WELLS
FOR SHORT-TERM PUMPING TESTS
CARLSON PARK FACILITY
ROCHESTER, NEW YORK

Pumping Well ID [(a)]	Casing Diameter (inches)	Total Depth (ft bgs)	Test [(b)]
MWBR-06A	2	37	Test 1
MWBR-13A	2	28	Test 2
MWBR-04A	2	25	Test 3

Notes:
(a) Alternate pumping wells may be selected based on field observations or findings during continuous water level monitoring or initial short-term pumping tests. Also, additional pumping tests may be conducted based on field observations or findings from initial short-term pump tests.

(b) Tests are not required to be conducted in numbered sequence.