



**CONESTOGA-ROVERS
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MEMORANDUM

TO: Vicki Katko, MDEQ
Grant Trigger, RACER

REF. NO.: 17303

FROM: Beth Landale/bw/130/Det.

DATE: August 18, 2011

CC: John McCabe, MDEQ
David Favero, RACER
Amandeep Bains, CRA

RE: **Electromagnetic Survey Work Plan
Willow Run Company Vehicle Operations Site
Ypsilanti, Michigan**

DRAFT FOR DISCUSSION

Conestoga-Rovers & Associates, Inc. (CRA) has prepared this memorandum to summarize the scope of work (SOW) for further buried debris investigation activities at the Willow Run Company Vehicle Operations (CVO) RACER Property (Site) located in Ypsilanti, Michigan. Electromagnetic (EM) surveys were completed at the Site during the late summer and early fall of 2004, May 2005 and August 2005 to identify and delineate buried debris at the Site. Test pits were completed between September 2004 and June 2005 at the locations where EM surveys indicated the presence of anomalies to determine the basis of the metal detection response. Since these surveys and test pits were completed the Site has become vacant and areas that were previously not feasible to be investigated by these methods area now accessible.

The objectives of these additional investigations are to:

- Delineate buried refuse in the northwest area of the Site
- Identify potential source areas for the high concentrations of chlorinated volatile organic compounds (CVOCs) observed at the Site (particularly near and southeast of the Haulaway building)

BACKGROUND

EM surveys were previously completed using EM61 and EM31 instruments. The EM61 is a time-domain buried metal detector that consists of two rectangular transmitting and receiving coils in a stacked configuration, connected to a data logger. The coils measure approximately 1.5 by 3 feet, and are mounted to a wheeled cart. The transmitting coil emits 150 EM pulses per second into the ground at each measuring point. During the off-time between transmitted pulses, receiver coils measure the decay of the transient electrical currents induced by the pulses. Electrical currents in moderately conductive earth materials (including moist clays, mineralized soils, etc.) dissipate rapidly, leaving only the more prolonged currents due to buried metal objects. The EM61 detects and measures the prolonged transient currents, yielding a

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result in millivolts (mV) proportional to the metallic content of the buried object, and inversely proportional to its burial depth. Due to its stacked coil configuration, the EM61 is less susceptible to potential sources of interference including parked vehicles, fence lines, staged drums, power lines, etc. The effective depth of penetration of the EM61 is approximately 10 feet.

The EM31 consists of transmitter and receiver coils located at opposite ends of a 14-foot long boom. In vertical dipole mode, this coil configuration yields an approximate depth of penetration of 20 feet. The EM31 is capable of operating simultaneously in both terrain conductivity and metal detection modes. EM31 metal detection anomalies can be characterized by two types of responses. Large anomalies covering a relatively wide area are identified by elevated responses, whereas smaller anomalies are characterized by very low (negative) responses. The explanation of these results can be attributed to the 14-foot separation between the transmitter and receiver coils of the EM31. When sources of anomalies are much larger than the 14-foot coil spacing, the signal received by the EM31 becomes saturated, resulting in an elevated reading. When an object is smaller than the 14-foot coil spacing, the secondary field induced in the object opposes the primary field, yielding a negative resultant field (expressed as a percentage of the primary field.)

The results of the previous EM61 and EM31 surveys are presented on Figures 1 and 2, respectively. Both figures also show the location of test pits completed at the Site to date. Interference from metal objects such as parked cars, fence post, and concrete containing rebar are generally evident based on Site features (shown on the Site figure) or are labeled.

Forty test pits were excavated between September 2004 and June 2005 at the locations where EM survey indicated the presence of anomalies. Twenty test pits were completed in the parking lot area west and south of the catwalks, and twenty test pits were completed east and south of the catwalks in September 2004 and June 2005. Debris found in the test pits included stained soils, solidified paint sludge, ash, plastic, concrete cinders, glass, brick, wood, cardboard, metal shavings, scrap metal, steel wiring, wood blocks, concrete, cement bricks, black tar and drums or drum remnants. Soils and debris excavated during the test pitting activities were used as backfill (if visually clean) or containerized in roll off boxes for proper characterization and disposal.

SCOPE OF WORK

Additional EM61 and EM31 surveys are proposed in areas which were not previously investigated in 2004 and 2005. As identified by the EM surveys and test pitting activities in 2005, a large portion of the northwestern area of the Site has been impacted by historical filling activities. The EM surveys were not completed in the crushing area (northwestern fence line) due to the presence of significant metal objects such as parked trucks, cars and other automotive parts. This area has now been cleared of all metal objects and is accessible for the EM survey.

The EM survey was also not completed east of the Haulaway Building due to heavy traffic. Since the Site is currently not operating, the EM survey can be safely completed within this area.

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The EM survey will not be completed within the southwestern and southeastern portions of the Site. The analytical data show that soils and groundwater within these areas are not highly impacted. In addition, the historical aerial photograph review did not show showed soil disturbances in these areas.

The proposed EM61 and EM31 survey areas are presented on Figures 1 and 2, respectively. The results of these surveys will be used to direct additional intrusive investigation activities at the Site in 2012.

SCHEDULE

The EM61 and EM31 surveys will be completed in the fall of 2011.

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EM61 METAL DETECTION (mV)

LEGEND

DITCH, STREAM OR RIVER
FENCE LINE
TREE LINE
FORMER DIESEL FUEL LINE
SANITARY SEWER
STORM SEWER
FORMER SLUDGE LINE
OVERHEAD ELECTRICAL LINE

CB15 CATCH BASIN
MH18 MANHOLE
PAVEMENT VARIATION
UTILITY POLE
FENCE GATE POST
LOCATION UNKNOWN BEYOND THIS POINT
RESPONSE
WEAK TO MODERATE METAL DETECTION RESPONSE
METAL DETECTION ANOMALY IDENTIFIER

PROPOSED EM SURVEY AREA
COMPLETED TEST PIT

0 50 100ft

TYLER POND

ABANDONED OUTFALL #12

SHEET PILE WALL

OUTFALL #13

OUTFALL #14

HAULAWAY BLDG.

HAULAWAY YARD

TANK

GUARD SHACK

TYLER ROAD

TYLER POND OUTLET STRU

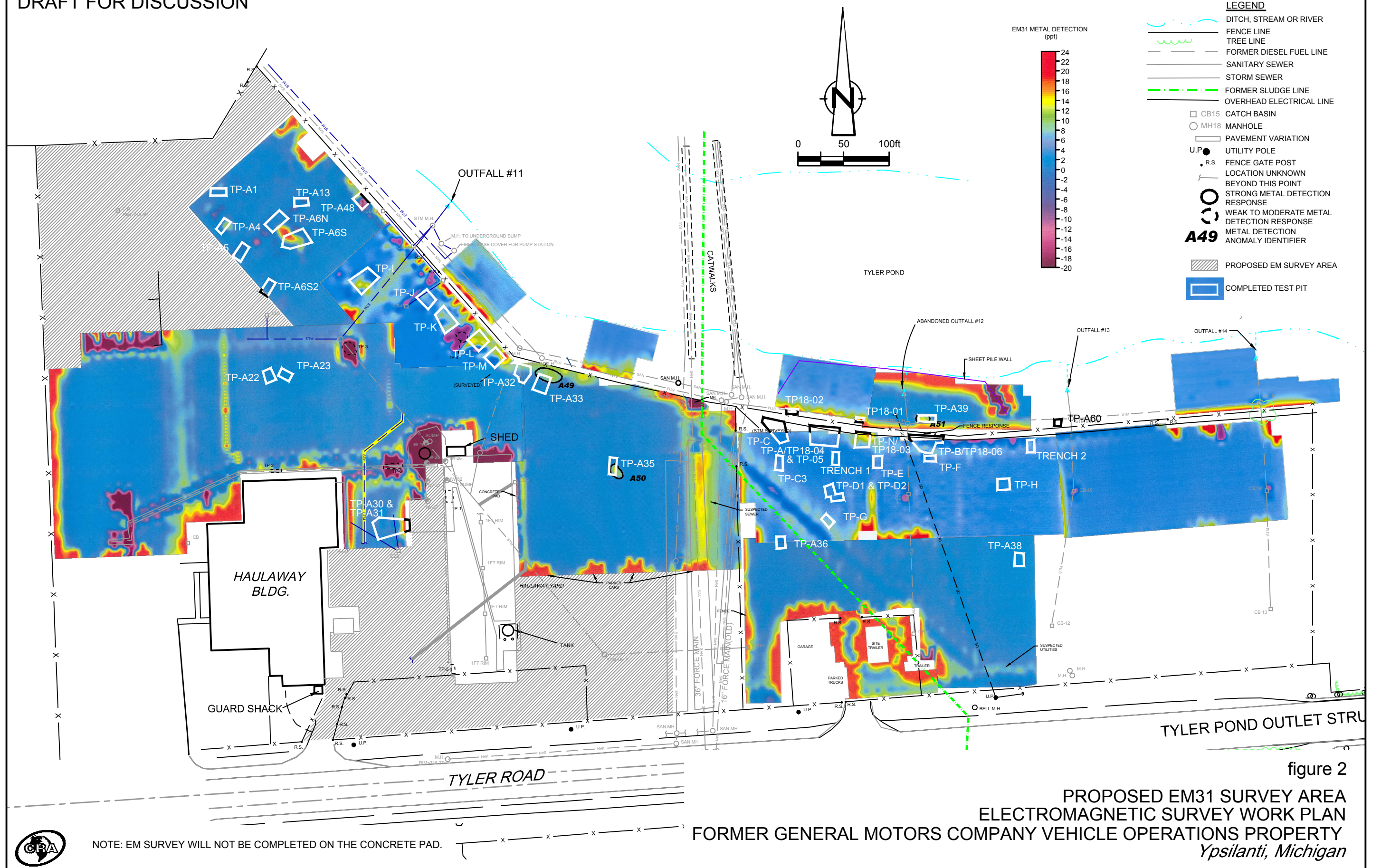
figure 1

PROPOSED EM61 SURVEY AREA
ELECTROMAGNETIC SURVEY WORK PLAN
FORMER GENERAL MOTORS COMPANY VEHICLE OPERATIONS PROPERTY
Ypsilanti, Michigan

NOTE: EM SURVEY WILL NOT BE COMPLETED ON THE CONCRETE PAD.

PROPOSED EM61 SURVEY AREA
ELECTROMAGNETIC SURVEY WORK PLAN
COMPANY VEHICLE OPERATIONS PROPERTY
Ypsilanti, Michigan

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NOTE: EM SURVEY WILL NOT BE COMPLETED ON THE CONCRETE PAD.