

SOP S-2

STANDARD OPERATING PROCEDURE FOR TERRAIN CONDUCTIVITY (EM-31) METHOD SAMPLING AT THE WEST KINGSTON TOWN DUMP/URI DISPOSAL AREA SITE

Woodard & Curran, Inc.

Terrain Conductivity Procedure

Terrain conductivity (EM-31) measurements are made by inducing an electromagnetic current into the ground from a transmitter coil, and recording the resulting secondary electromagnetic field at a receiver coil a fixed distance away. The strength of the secondary field depends upon the conductivity of materials in the ground. Measurements are recorded in units of conductivity called milli-Siemens per meter (mS/m).

Terrain conductivity may be affected by a number of factors including moisture content, mineralogy, and soil thickness. The conductivity of groundwater, however, is the primary factor. Large increases in conductivity may be due to increased ion concentration (total dissolved solids) in the groundwater.

In addition to conductivity readings, measurements of the inphase component of the electromagnetic field are recorded. The inphase measurement is sensitive to the presence of metallic conductors and this measurement is used for metal detection. Abrupt negative spikes in the inphase and conductivity measurements are indicative of metallic conductors

A Geonics EM-31 terrain conductivity meter will be used for this survey. The EM-31 is a one-person device containing both transmitter and receiver coils on a 3.7-meter frame. Effective exploration depth for this instrument is about 18 feet. EM-31 readings will be measured at 5-foot intervals along survey lines spaced 50 feet apart.

Equipment needed:

- Bound field logbook
- Tape measures, hip chain and compass for locating survey lines.
- Paint, pin flags and flagging for marking survey lines.
- Brush axes, and chain saws for clearing survey lines.
- Geonics EM – 31 terrain conductivity instrument
- Pentium IV laptop PC Computer for downloading and processing data.

Survey Steps:

1. Follow the sampling pattern outlined in the Work Plan
2. Locate, mark and clear survey lines.
3. Assemble instrument and follow pre-survey QA/QC procedures.
4. Walk survey lines with instrument recording data.
5. Follow post-survey QA/QC procedures.
6. Download survey data to laptop computer.

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Page 2 of 2

7. Process and interpret data.
8. Prepare map(s) and report.

Data Reduction

The downloaded terrain conductivity ASCII data will be converted into a Microsoft Excel spreadsheet and then processed and interpreted using Golden Software, Inc.'s Surfer and Grapher software. Surfer is used to construct plan views of EM data for the entire field survey area. Grapher is used to prepare data profiles of each survey line.

QA/QC

QA/QC procedures are detailed in the operating manual referenced below.

References

Operating Manual for EM31-D Non-Contacting Terrain Conductivity Meter, Geonics Limited, 1984.