



## **SAMPLE SPECIFICATION**

### **HYDRAULIC PROFILING TOOL (HPT) LOGGING.**

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#### SECTION 1: NOTES FOR USERS OF THE SAMPLE SPECIFICATION.

Sections 1-3 of this document contain notes for users of the sample specification. The sample specification for HPT Logging is contained in Section 4.

HPT is a commonly used direct push logging technique. HPT is used by site owners, consultants and regulators as a high resolution site characterization (HRSC) tool to assess stratigraphy and permeability. HPT logs are used to compare stratigraphy from location to location, to guide soil and groundwater sampling efforts, to guide monitoring well design, and to estimate hydraulic conductivity. The HPT system is simple in design and application relative to other direct push logging techniques, requires minimal training to operate, and measures multiple parameters on a single probe.

As the developer and manufacturer of the tools to perform this logging, Geoprobe Systems® has a vested interest in the proper and efficient use of HPT logging. We have reviewed HPT data from many sites, most of it from properly performed logging, some of it not. HPT logs are typically collected when a site owner or consultant contracts with a service company to perform direct push logging.

The purpose of the Sample Specification is to help a site owner or site consultant complete a successful project when using contractors to perform HPT logging. These specifications are in Word format. They are intended to be incorporated into specifications that are typically assembled when contracting for field services. These specifications may be excerpted, modified, and used as the end user sees fit.

#### SECTION 2: NO WARRANTY

Only specifications pertaining directly to HPT logging activities are included in the sample specification document. No provisions are included for related activities such as utility locates, pre-drilling of holes, site safety, or hole abandonment; these topics being site and client specific and routinely covered in site services agreements.

Geoprobe Systems®/Kejr, Inc. makes no warranty as to the completeness or suitability of this sample specification for any particular project and assumes no liability for the use of this document. These sample specifications are for guidance purposes only.

#### SECTION 3: DISCUSSION OF INCLUDED SPECIFICATIONS:

Site owners and consultants should be warned that this sample specification calls for the HPT service contractor to submit a graph for each HPT log at the end of the work day. This graph is specified to include a graph of piezometric profile and estimated K (both parameters derived from the log and from dissipation tests performed during the log). While this is a good (and common) field practice and serves as a quick check on the quality of the field work, the consultant should be aware that the service provider is making an interpretation of data (picking correct and fully dissipated pressures from pressure dissipation curves). The consultant should be aware of this and should check this work or better still, review and evaluate dissipation curves and pick piezometric pressure points for themselves.

#### Section 4: SAMPLE SPECIFICATION FOR HPT LOGGING SERVICES.

The Contractor shall perform HPT logging at the site using direct push tooling and instruments specifically designed for performing HPT logging. All logging will be performed in accordance with the most current SOP for HPT logging as posted on the Geoprobe Systems® website ([www.geoprobe.com](http://www.geoprobe.com)).

HPT logs shall be performed at the site at locations specified by the consultant's on-site representative (Site Consultant). Anticipated logging depth at this site is \_\_\_\_\_ (e.g. 50 ft.). Final depth of logging at each location will be specified by the Site Consultant unless probing refusal is achieved during the log. Probing refusal for this project shall be considered achieved when the HPT probe is no longer able to be advanced at a speed greater than 1 ft. per minute (0.30m per minute).

The Contractor shall provide all equipment required to perform HPT logging. Equipment shall include a Geoprobe® FI6000 series Field Instrument and K6300 series HPT Controller. The Contractor shall provide a laptop computer that has been equipped and tested with the most current version of Geoprobe® DI Acquisition Software and DI Viewer Software available from the Geoprobe Systems® website ([www.geoprobe.com](http://www.geoprobe.com)). The HPT system shall be assembled, operational, and able to pass HPT pre-log QA tests prior to the contractor's arrival at the site.

HPT Logging for this project shall be performed using a Model K6050 (alternate: K8050) HPT probe advanced into the soil using either 1.5 in. or 1.75 in. rods (alternate: 2.25 in. rods). Contractor shall provide sufficient rods and appropriate HPT trunkline to perform HPT logging to depths up to \_\_\_\_\_ ft. (e.g. 75 ft.).

The Contractor shall be equipped with all tools needed to perform QA testing of the HPT system, including EC Probe Test Jig (MN214237), EC 3 position test load (MN208075), and an HPT Reference Test Cylinder of the appropriate size.

The HPT system shall be powered by an electrical generator of at least 2,000watt continuous power output. The generator shall be capable of running the HPT system without imparting electrical noise to detector signals and shall be equipped with a safety grounding plug for powering the HPT system. All extension cords and plug adapters used in the system shall be equipped with operable safety grounding plugs and the HPT system shall be equipped with a continuous safety ground from the instrumentation to the generator.

In addition to bringing the operational HPT system to the site, the Contractor shall bring spare parts required for efficient and continuous operation of the HPT system on this project. At a minimum these spare parts should include parts and quantities listed in Table 1.

**Table 1: HPT Spare Parts Minimum Quantities.**

<b>Part Description</b>	<b>Quantity</b>
HPT Probe K6050	1
HPT Trunkline (150 ft.)	1
HPT Sensor (MN 210091)	1
HPT Screen (MN 205558)	5
HPT Service Kit (MN 205599)	1
Connection Tube (MIP/HPT)	1
Adapter Drive Head	1
HPT Trunkline Seal	2
Slotted Drive Cap	1
Stringpot (either 80 or 100 inch)	1
Stringpot Cable	1

The contractor shall be trained in the use of HPT and in the maintenance and troubleshooting of the HPT system. The contractor shall be experienced in HPT logging and shall have successfully completed a minimum of \_\_\_\_\_ (e.g. 10) HPT logs prior to working on this project.

The Contractor shall be equipped to perform all pre and post log QA tests of EC and HPT pressure as specified in the HPT SOP and as prompted by the HPT Acquisition Software. The contractor shall not proceed with logging unless the HPT system passes the pre log QA test of EC and HPT pressure. If the HPT system fails in a pre-log QA test, for either EC or HPT values, then the Contractor will perform troubleshooting and corrective measures to restore the system to operation and pre-log QA tests must be repeated.

HPT pressure dissipation tests are required to determine the water table position on the HPT log and to estimate hydraulic conductivity. During each log, the Contractor shall perform a minimum of \_\_\_\_\_ (e.g. 2) HPT pressure dissipation tests at selected intervals below the water table. The contractor shall make these tests in zones of high permeability as indicated by HPT pressure or in zones designated by the Site Consultant. In the case of HPT logs performed in low permeability soil profiles it may not be possible to obtain a fully dissipated test in a reasonable time period. In this case at least one (1) dissipation test will be attempted per log at the depth directed by the Site Consultant. Test duration shall not exceed \_\_\_\_\_ (e.g. 15) minutes under these circumstances.

At the end of each day of HPT logging activity, the contractor shall deliver to the site consultant the following materials in electronic format:

1. A single page graph of log data for each HPT log in .pdf format. This graph shall include the following data in vertical profile: EC, HPT Pressure, HPT Flow, Absolute Piezometric Pressure (if available), and Estimated K (if available).
2. The data file for each HPT log in .zip format.

These data shall be delivered to the site consultant on USB type jump drive or through a designated internet share site.