

# NHDOT SPR2 PROGRAM

## RESEARCH PROGRESS REPORT

<b>Project #</b> SPR 42372G	<b>Report Period</b> Year 2022 <input checked="" type="checkbox"/> Q1 (Jan-Mar) <input type="checkbox"/> Q2 (Apr-Jun) <input type="checkbox"/> Q3 (Jul-Sep) <input type="checkbox"/> Q4 (Oct-Dec)	
<b>Project Title:</b> Advancing Subsurface Investigations Beyond the Borehole		
<b>Project Investigator:</b> James Degnan <b>Phone:</b> (603) 226-7826 <b>E-mail:</b> jrdegnan@usgs.gov		
<b>Project Start Date:</b> June 30, 2021	<b>Project End Date:</b> September 30, 2023	<b>Project schedule status:</b> <input type="checkbox"/> On schedule <input type="checkbox"/> Ahead of schedule <input checked="" type="checkbox"/> Behind schedule

**Brief Project Description:**

Geotechnical site characterization sometimes fails to fully characterize the below-ground bedrock surface and hydrologic conditions using conventional borings. By combining passive Horizontal-to-Vertical Spectral Ratio (HVSr) seismic and multi-frequency electromagnetic induction geophysical methods and boring data analysis, a more thorough and accurate representation of geotechnical subsurface conditions can be produced. This effort will contribute to the overall goal of improving efficiency of the Department by reducing the disruption work plans, forced revision of designs, and cost increases from schedule delays, claims, or change orders.

**Progress this Quarter (include meetings, installations, equipment purchases, significant progress, etc.):**

A list of NHDOT Project Exploration Plans and selected priority boring plans were provided by Krystle Pelham on 2/10 with a continuing discussion about other potential test sites. An internal USGS 10% technical project review and a report outline were completed on 2/17/2022.

Field data collection began on 3/28 in Lee on SR 125 at the Little River culvert while a NHDOT traffic package and drilling were active. Seven locations were measured with an ambient seismometer (HVSr) and several electromagnetic lines were surveyed. At first glance, the HVSr data collected on the side of the road with the drill rig had a clearer signal. The shoulder on the other side of the road was closer to traffic so vibrations and wind from fast moving vehicles created more noise. With some filtering, all HVSr measurements seemed to provide useful data.

**Items needed from NHDOT (i.e., Concurrence, Sub-contract, Assignments, Samples, Testing, etc...):**

Collecting some of the data within the traffic package on a busy road seemed to provide a clearer signal. There are sites where we can collect data without a traffic package. However, ongoing communication about the drilling schedule at other priority sites will benefit the project by providing an opportunity to complete some work alongside the NHDOT crews.

**Anticipated research next three(3) months:**

Literature search and site selection work will continue. Additional field work and data processing is planned.

**Circumstances affecting project:**

We have what we need to get the project on schedule.

<b>Tasks (from Work Plan)</b> <i>add lines to table as needed</i>	<b>Planned % Complete</b>	<b>Actual % Complete</b>
<i>Task 1. Compile and assess literature and sites</i>	<i>100</i>	<b>35</b>
<i>Task 2 Collect geophysical data</i>	<i>0 to 75</i>	<i>9</i>
<i>Task 3 Conduct analysis</i>	<i>0 to 25</i>	<i>1</i>

**Barriers or constraints to implementing research results:**

None