



OVAM Mortsel: Bi-weekly report

Soil remediation by Electric Resistance Heating

October 12 – October 27, 2023

Former Electra Site, Statielei 111 Mortsel

HMVT-number: 231027-476662-Report ERH Mortsel_wk2.docx

Date report: November 3, 2023

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1 Introduction

This letter report contains a brief description of the Electrical Resistance Heating (ERH) remediation system operations performed at the former Electra Site at Statielei 105 – 113 in Mortsel. The time period addressed in this report is from October 12 to October 27, 2023. **Figure 1.** contains a site map displaying the locations of the thermal treatment area, electrodes, temperature monitoring points (TMPs) and other pertinent Site features.

2 System Operation Activities

Vapor extraction started on October 10, 2023. ERH started on October 12 at 16:00 hr. HMVT personnel were onsite performing system maintenance and optimization. The following work was performed:

- ✓ Voltage surveys and step & touch tests
- ✓ Maintenance of equipment
- ✓ PID measurements ambient air and process treatment
- ✓ Temperature measurement
- ✓ Site walks and inspections
- ✓ Reconfiguration GEN III and Beyke (October 25)

After the reconfiguration of the XFMR's a fire occurred in the GEN III. The ERH system was shut down and the fire was extinguished. Vapor recovery, PLC and alarm systems remain operational.

3 ERH Application Summary

The ERH system operational parameters from the current reporting period are presented in **Table 1** below.

Table 1. ERH System Parameters

ERH System Parameters	Estimated	Up to October 27	Percentage of total
Operation Time (days)	137	15	11%
Cumulative Energy Applied (kWh)	3.800.000	181.944	5%

4 Temperature Monitoring

During the reporting period, the site average subsurface temperature increased from a baseline temperature of 16,1 degrees Celsius (°C) to 29,2°C, an increase of 13,1°C. This represents an average heat up rate of approximately 0,94 °C/day. The highest individual temperature measurement within the treatment volume was 76°C at TMP K10 at 7,5 meters below ground surface (bgs). Average subsurface temperatures per TMP location over time are presented in **Figure 2.**

The site is heating slower than projected due to low performance of GEN III and shut down because of the fire in GEN III.

In total 4 shallow RTD are installed near utilities (Statielei 109 front and Statielei 113 back) to measure the temperature close to the utilities. The average temperature at the utility RTDs is 17,2°C, the maximum temperature is 18,1°C in RTD T4.

5 Vapor Recovery

During the reporting period, the average vacuum applied to the vapor recovery piping system (as measured at the condenser inlet) was approximately 63 millibar (mbar). All field piezometer pressure measurements show negative values. The vapor stream flow rate, as measured after the vapor recovery blower, averaged circa 980 m³/hour.



Vapor monitoring

During every site visit HMVT performs PID vapor measurements of the ambient air and the vapor stream. The most recent round of chlorinated volatile organic compounds (CVOC) vapor PID screening results, collected on October 26, was 37 ppm. During the reporting period, the highest recorded influent CVOC concentration was 230 ppm, at the beginning of vapor recovery (before ERH started, test phase).

6 Vapor treatment

The extracted soil vapors are treated with granular activated carbon (GAC). The emission limit, as defined in the tender document, for PCE and TCE is 100 mg/m³ if total mass is higher than 2.000 g/hr.

HMVT performs PID vapor measurements of the vapor treatment on a regular base. The most recent round of CVOC vapor PID screening results, collected on October 26, are below. During the reporting period, the PID reading of the effluent was 0 ppm.

- ✓ Influent GAC filter 1: 37 ppm
- ✓ Effluent GAC filter 1: 0,0 ppm
- ✓ Effluent GAC filter 2: 0,0 ppm

Currently, 2 VGAC vessels are installed in series. TEC will take vapor samples from the influent and effluent of each vessel.

7 Condensate and water treatment

During the reporting period, 6,3 m³ of water was recovered via condensed steam by the vapor recovery system. A total of 6,3 m³ of condensate has been produced since the start-up of the ERH system.

The condensate produced from the steam condensers is collected in treated in 2 liquid granular activated carbon vessels, before being discharged to the sewer. The discharge limit for PCE and TCE in groundwater is 10 µg/l. TEC will take samples from the water treatment system.

8 Mass removal (by PID)

The mass removal is based on the PID measurements in the influent of GAC1. We use a 10,6 eV bulb, so the correction factor for PCE is 0,57. During the reporting period, the total mass removed from the subsurface was approximately 113 kg. The total mass recovered from the subsurface since the start of the project is circa 113 kg (Figure 3.)

9 Health & Safety

We had 1 major incident that occurred during the reporting period. The GENIII XFMR experienced an overcurrent condition and caught fire. The root cause analysis is ongoing, the results will be discussed with OVAM on October 31. During this investigation ERH will not be operational.

Step & Touch

The highest measured voltage (step and touch) during the reporting period was 14 Volts at the fence at the door to the garden in building 111. We added preventive measures (footer and rubber matt), voltage is now < 10 Volt.

Ambient air monitoring

During the reporting period, the highest observed CVOC concentration in daily ambient air monitoring was 0,1 ppm (0,06 ppm PCE), recorded inside building SL 111 and 109. TEC will provide the measurement data from the VaporSafe.



10 Planned Activities

First of all we have to finalize the root cause analysis for the fire in the GEN III. When we know the cause and are able to take adequate measures we can restart ERH. Because of the damaged XFMR we can only start with the Beyke XFMR, in a part of the treatment area (ca. 70 - 80%). This will be discussed with the client and the safety coordinator.

Once we can restart ERH HMVT personnel will visit the site to collect operations data, optimize the system, and perform weekly maintenance. HMVT personnel will perform regular PID measurements and collect vapor and water samples.

Figures

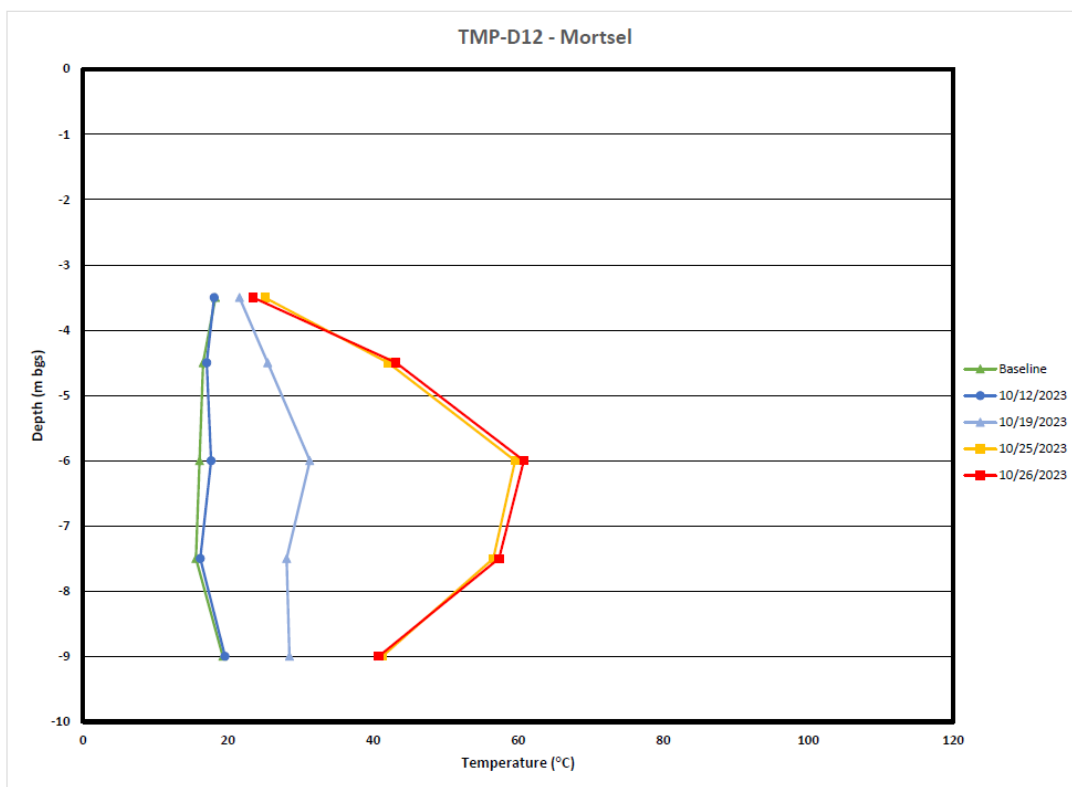
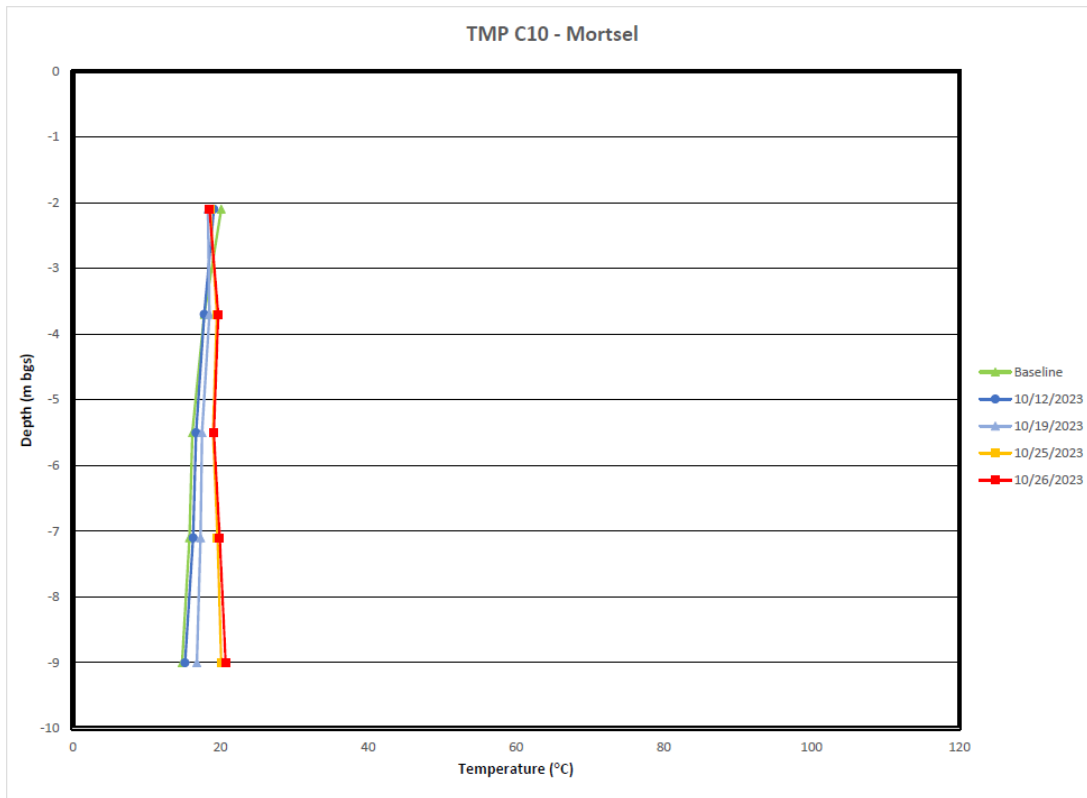
1. Site plan
2. Average Temperature vs. Time (by TMP)
3. Cumulative Mass Removed vs. Time

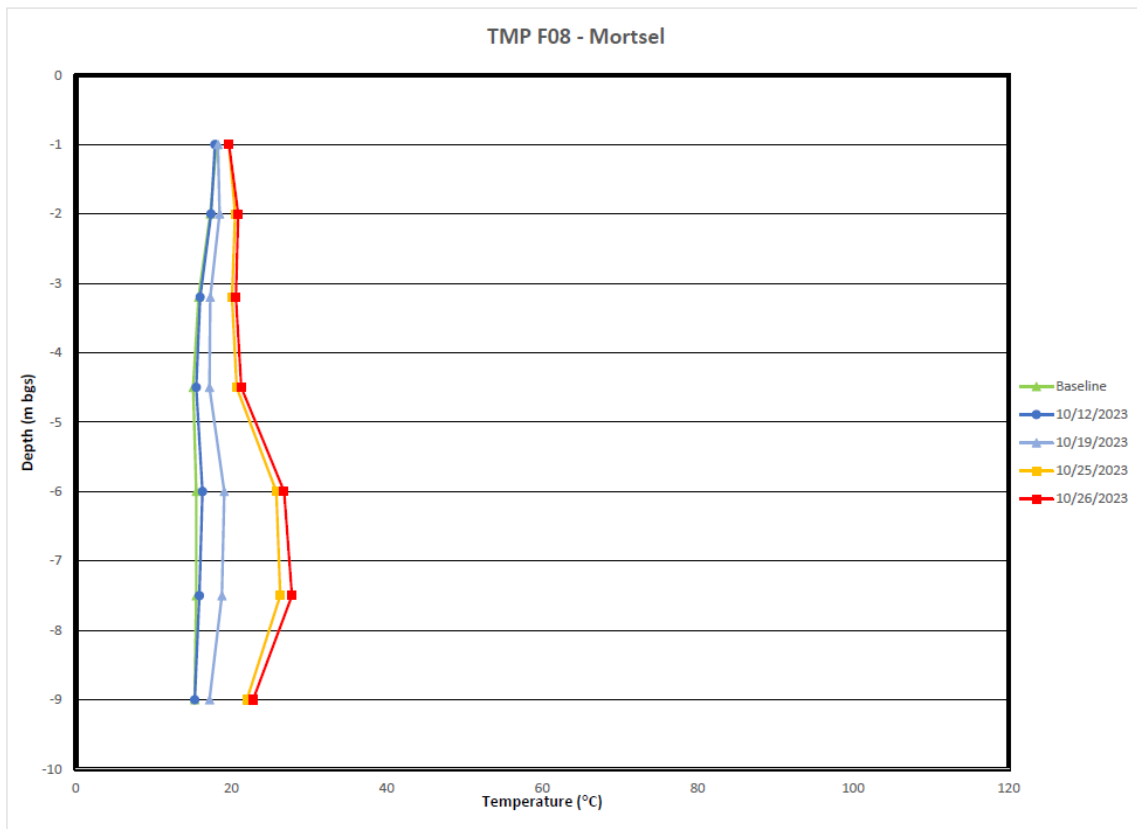
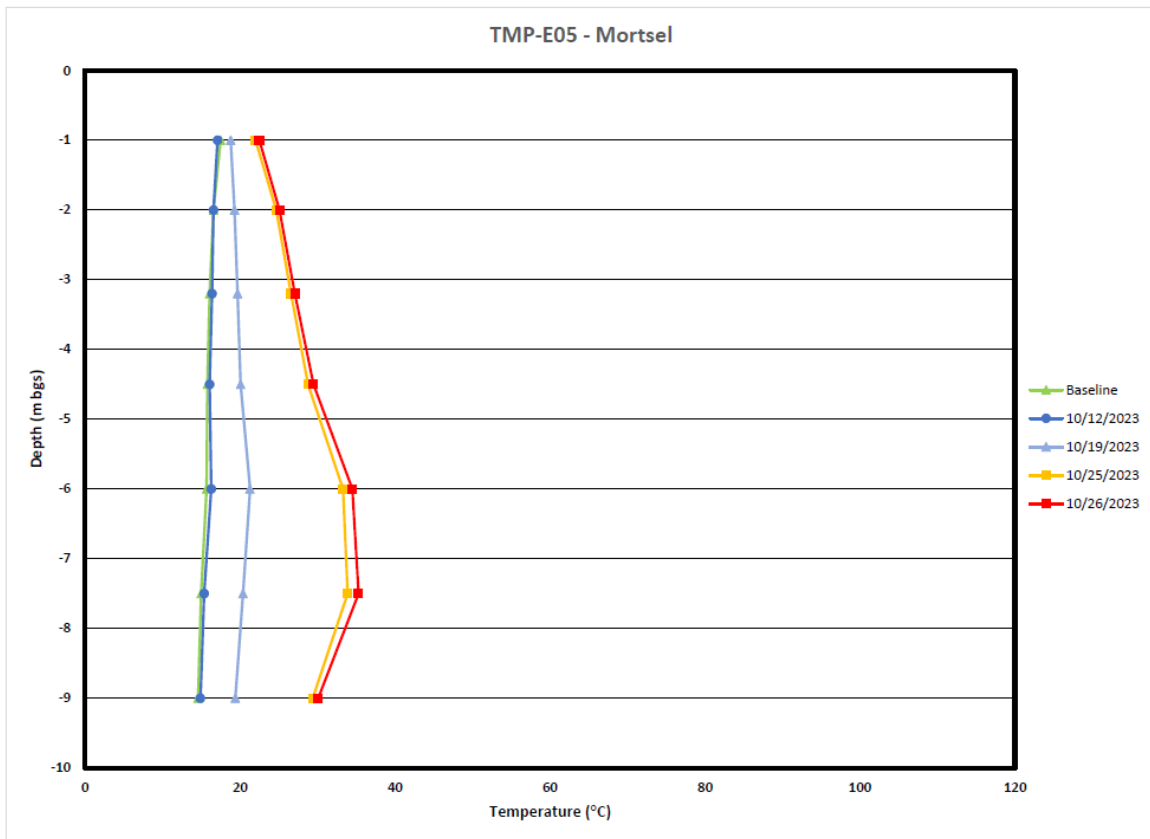


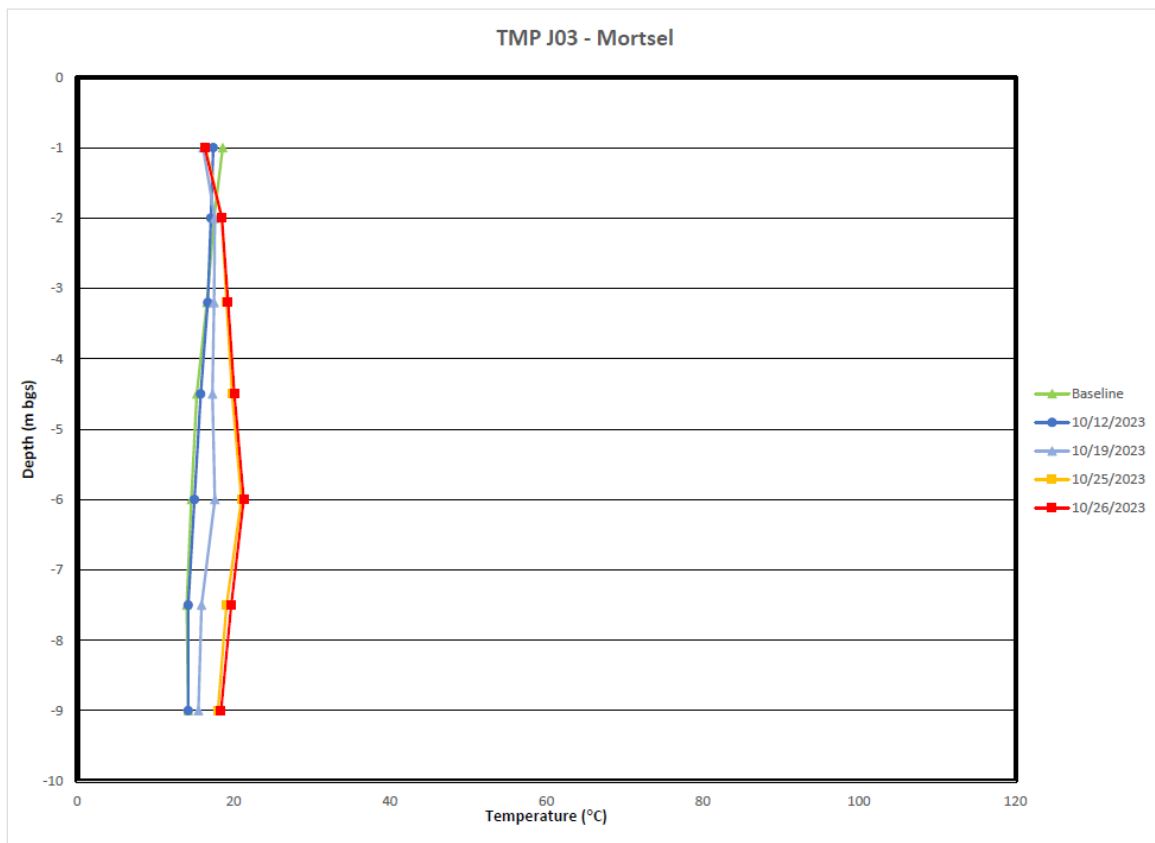
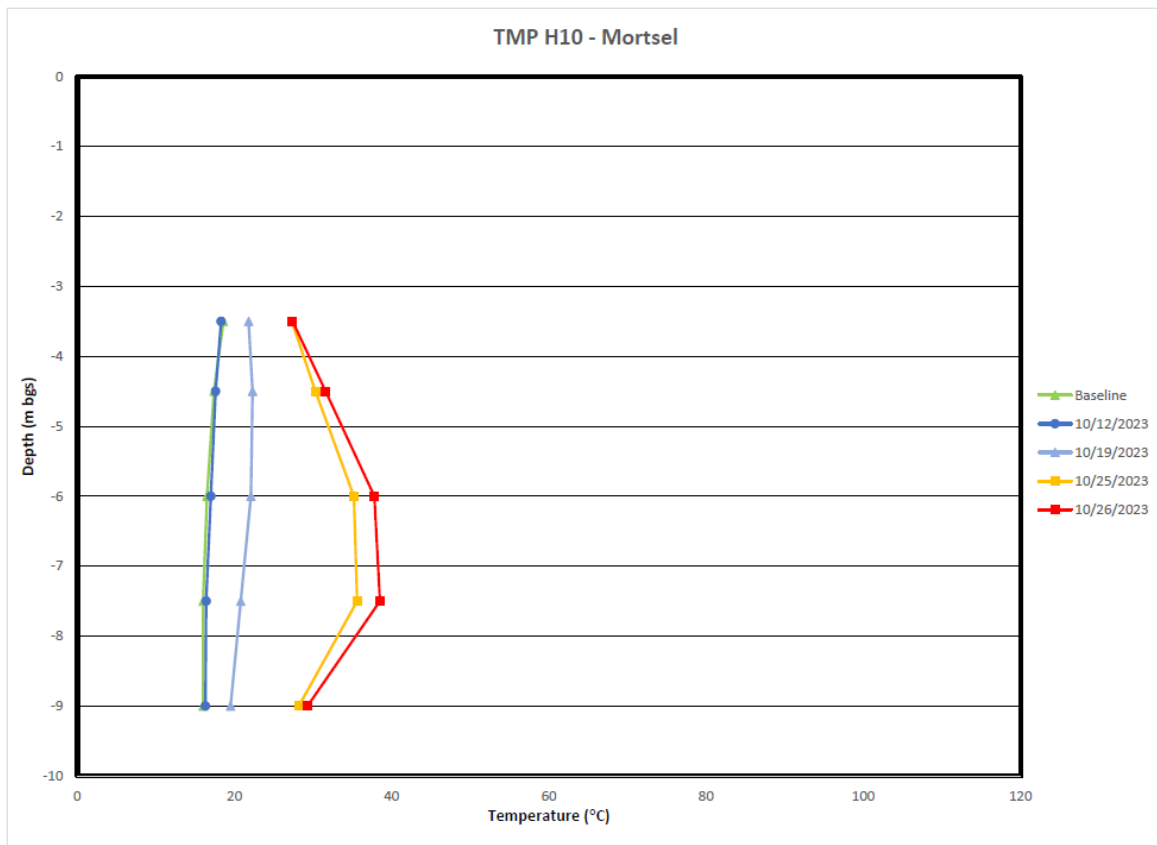
Figure 1: Site plan

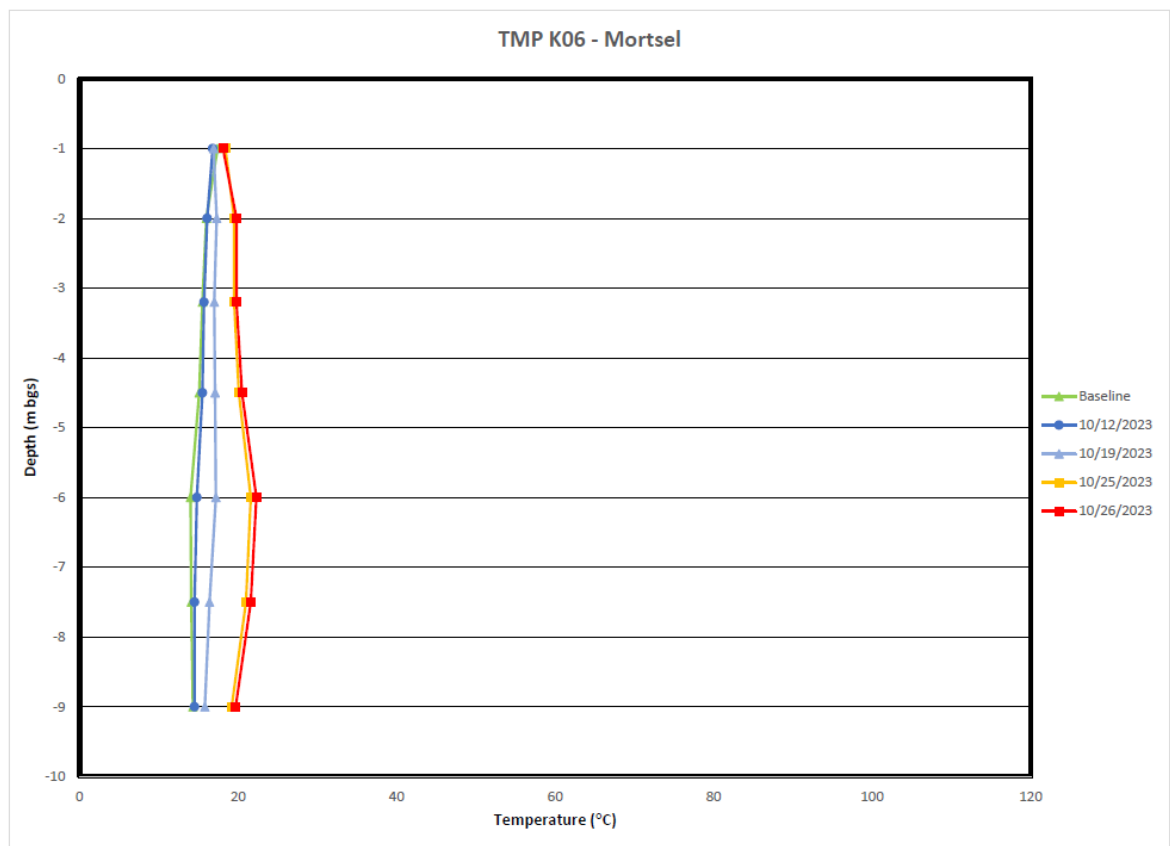
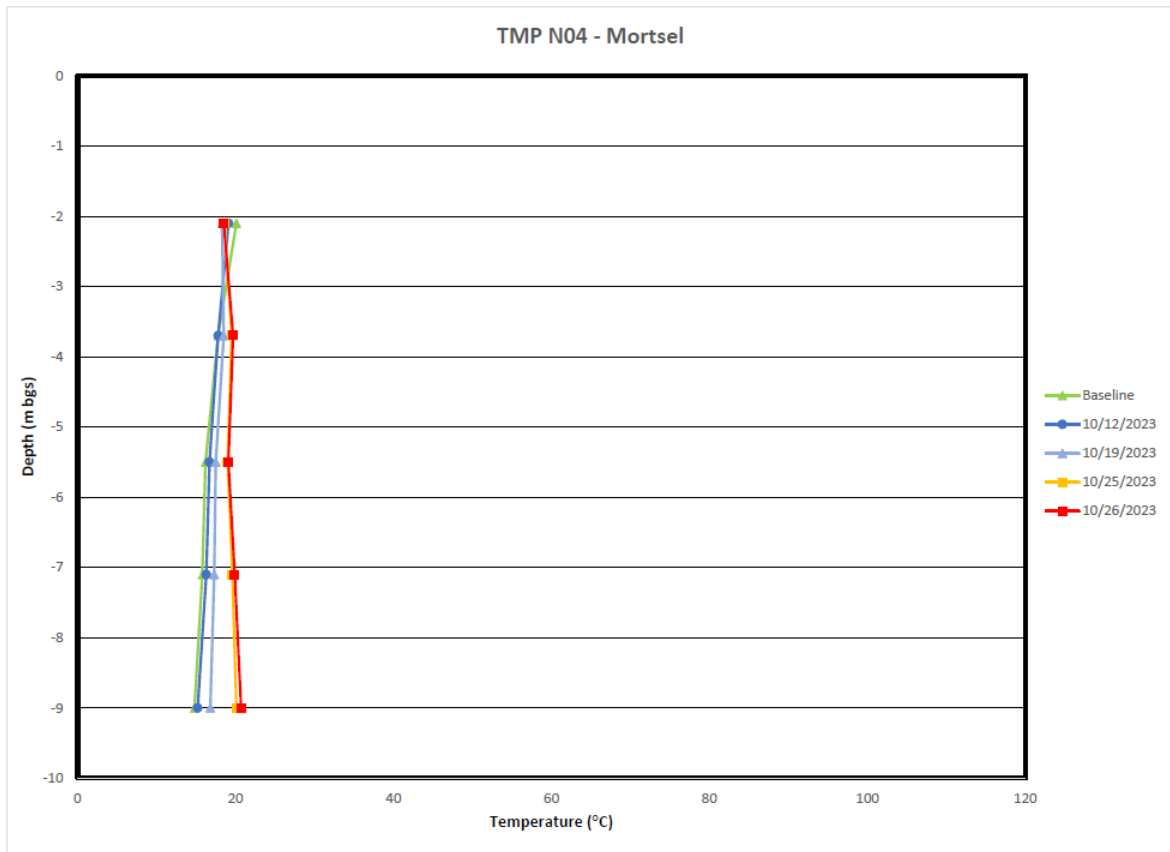
The as built site plan is attached separately

Figure 2. Average Temperature vs. Time (By TMP)









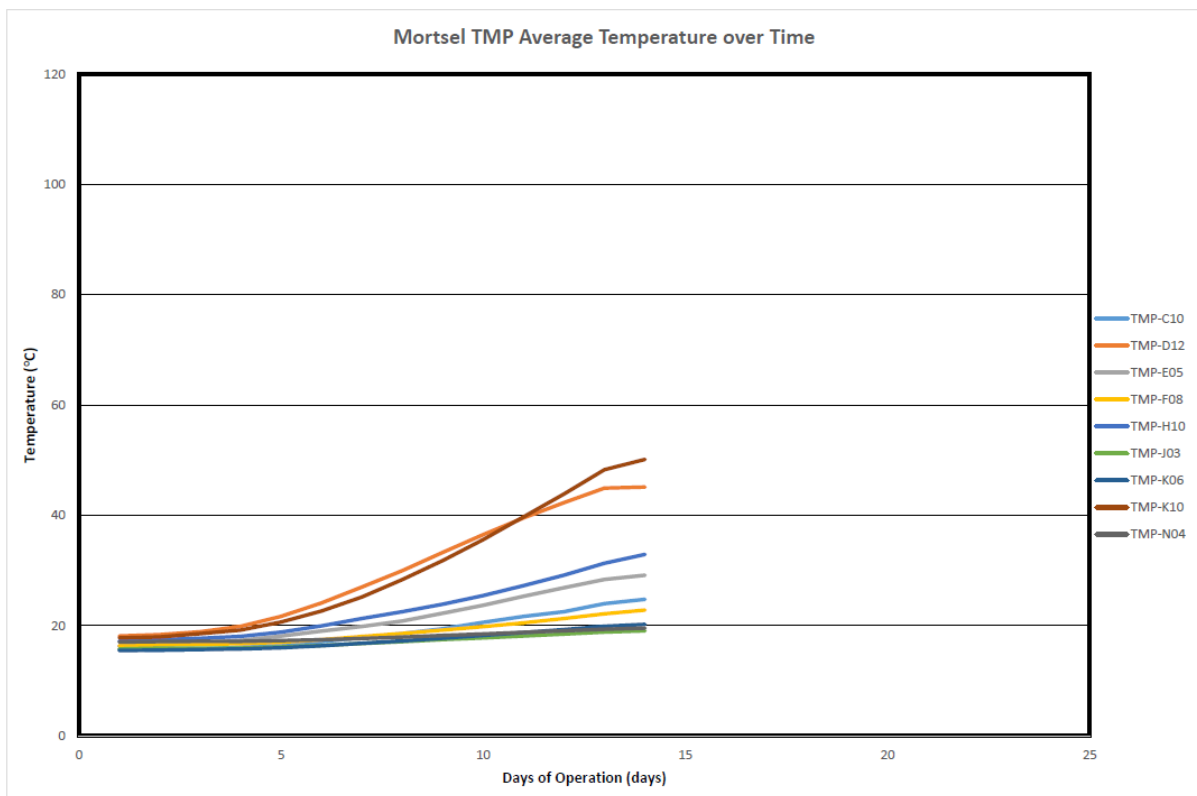
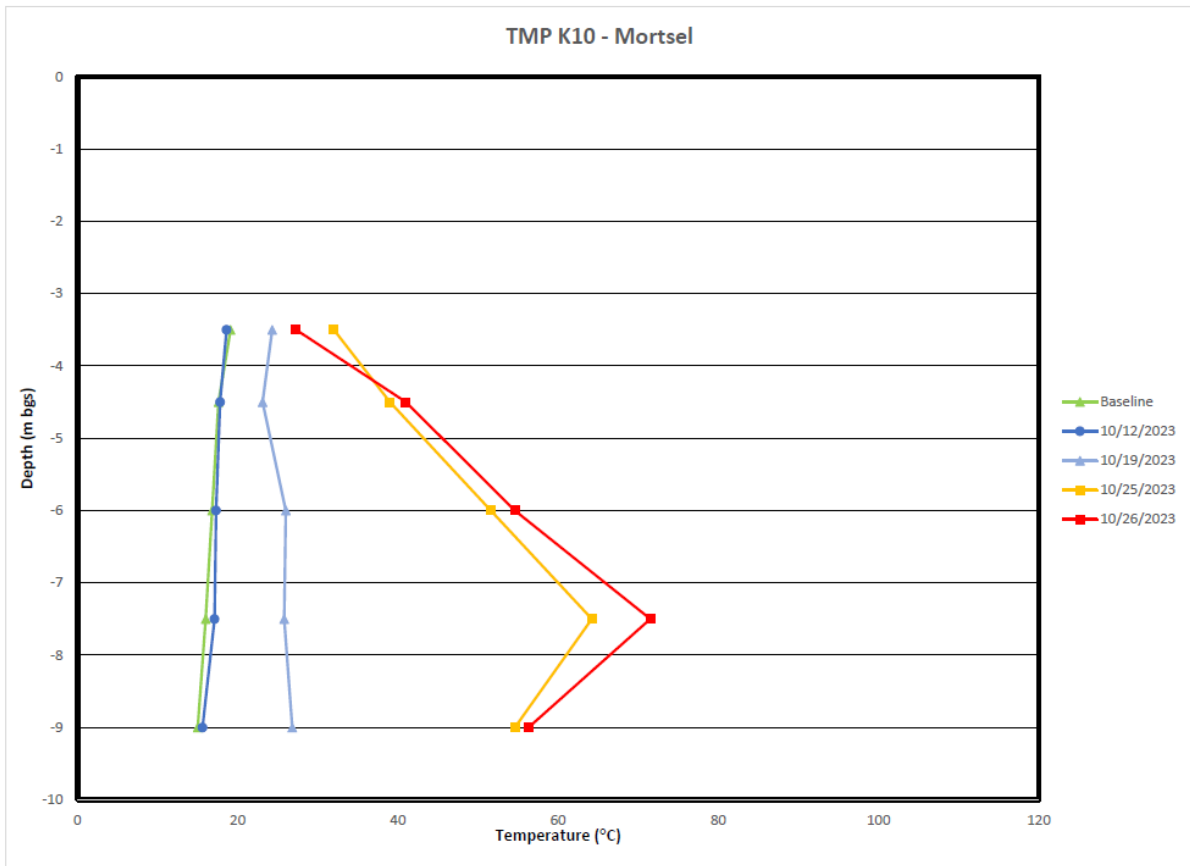


Figure 3. Cumulative Mass Removed vs. Time

