

# Case Study

## Remediation of Chromium Contaminated Soil Using On-site XRF

### Client

Developer

### Remediation Value

£260,000

### Site

A historic mill complex on the outskirts of Bath, with a mixed contamination legacy. New construction and conversion of existing buildings on this highly constrained site required a tight remediation timetable and minimisation of disturbance to existing above and below ground infrastructure.

### Contaminants

Crystalline mixed chromate salts, patchily distributed in shallow soil. Secondary leach products more widely present in hotspot areas beneath this. Impacts to groundwater from continued leaching from shallow soil sources risked impacting the river forming the down-gradient site boundary.

Lubricating oils and chlorinated solvents were present in other parts of the site, and were also successfully treated by UK Remediation.

### Challenges

- Area-wide excavation not feasible due to existing infrastructure and high cost of removal.
- Potential trial pit delineation unlikely to be effective due to the very patchily distributed contamination.
- Time constraints - development critical path.

### Remediation Approach

- Real-time, on site, high density delineation/validation was therefore a very attractive option.
- Semi quantitative assay of excavated material and excavation bases, using pre-calibrated portable X-ray fluorescence (XRF) analyser was selected.
- XRF was used to rapidly obtain high density information. This enabled selective removal of chromate-impacted soils using, grid-based excavation and on-site validation, with rapid reinstatement.
- Segregation of excavated soil against reuse criteria (with/without pre-treatment), or off-site disposal.
- Site validation results were verified using a small number of fast-turnaround, accredited laboratory analyses to assure the quality of results.

### Outcomes

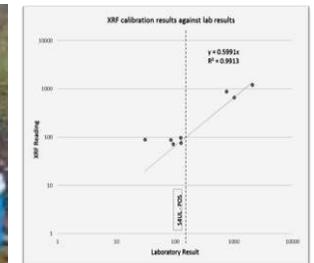
- More than 670 individual XRF results were obtained over four days. High data density equating to 0.4m<sup>3</sup> soil aliquots guided excavation and soil segregation.
- Thousands of pounds saved on laboratory costs.
- Construction programme reduced by several weeks.
- A detailed field record and completion report was provided by UK Remediation to provide client and regulator confidence in the robustness of the results.
- The UK Remediation reports were fully accepted by the Planning Authority and Environment Agency, enabling smooth discharge of planning conditions.



primary source material.

Chromate salts were very patchily distributed in shallow soil, in high density particles ranging in size from boulders to single crystals. Leached secondary deposits, invisible to the eye, were often found to be present in soil below the

Split sample duplicates were used to calibrate XRF readings with laboratory assays in advance of the main deployment.



Once vegetation was cleared, excavation could proceed in shallow strips, using a grid system, with continued digging targeted to grid squares determined by XRF results.

