

Bathymetric survey of a mining settlement pond for sedimentation rate and volume calculations

The Unmanned Survey Solutions' (USS) Inception class unmanned survey vessel (USV) has been developed to address a gap in the shallow water sector. This hydrographic survey vessel is composed of tough aluminium hulls, weed cutting propellers and provides bathymetric surveys in areas where access for a traditional survey vessel is not possible such as quarry lakes, lagoons, mining ponds and other shallow water zones.

Summary

The Inception provided an efficient and effective hydrographic survey for a Coal Authority mine water treatment scheme. The delivery of accurate bathymetric charts and associated data to our customers enabled them to assess sedimentation rates and conduct volume calculations of the settlement pond. The design and methodology of the Inception survey package facilitates the delivery of a complete, time-efficient and cost-effective solution for surveys in difficult environments



The Task

The Inception was tasked to undertake a bathymetric survey at the Bullhouse mine water settlement pond, South Yorkshire, of approximately 6,400m². Access for a traditional survey vessel was impossible and due to the heavily contaminated water, a USV solution was the only option. The Inception was required to gain sufficient bathymetric data of the designated site to allow for TIN modelling and volume calculations of sediment build up within the survey site.

The Solution

The USS Inception class USV can be easily transported by van or car and its quick mobilisation and deployment procedure means that online survey activities can commence almost immediately upon arrival at site. Once deployed, it is remotely piloted from shore with the aid of an additional HYPACK navigation display. The solution for this application consisted of a CEE HydroSystems CEESCOPE-USV system, a combined SBES, GNSS, Telemetry system and HYPACK survey software package.



Method

The two man survey team arrived onsite at 9am and, after an initial safety assessment, mobilised the vessel at the water's edge. The Inception's power propellers cut through all weed and vegetation encountered during survey operations. At a survey speed of ~2.5 knots, the total line coverage of 2.2km was achieved within an hour and all onsite operations were conducted within half a day. Contours and TIN models were created near real time, allowing for initial charts and onsite quality control. The data was subsequently 'tied in' to ordnance datum Newlyn (ODN) using a land surveying methodology. Alternatively, high order accuracy positioning can be achieved via RTK corrections during data acquisition. The Inception proved to be a great solution for the customers requirements.

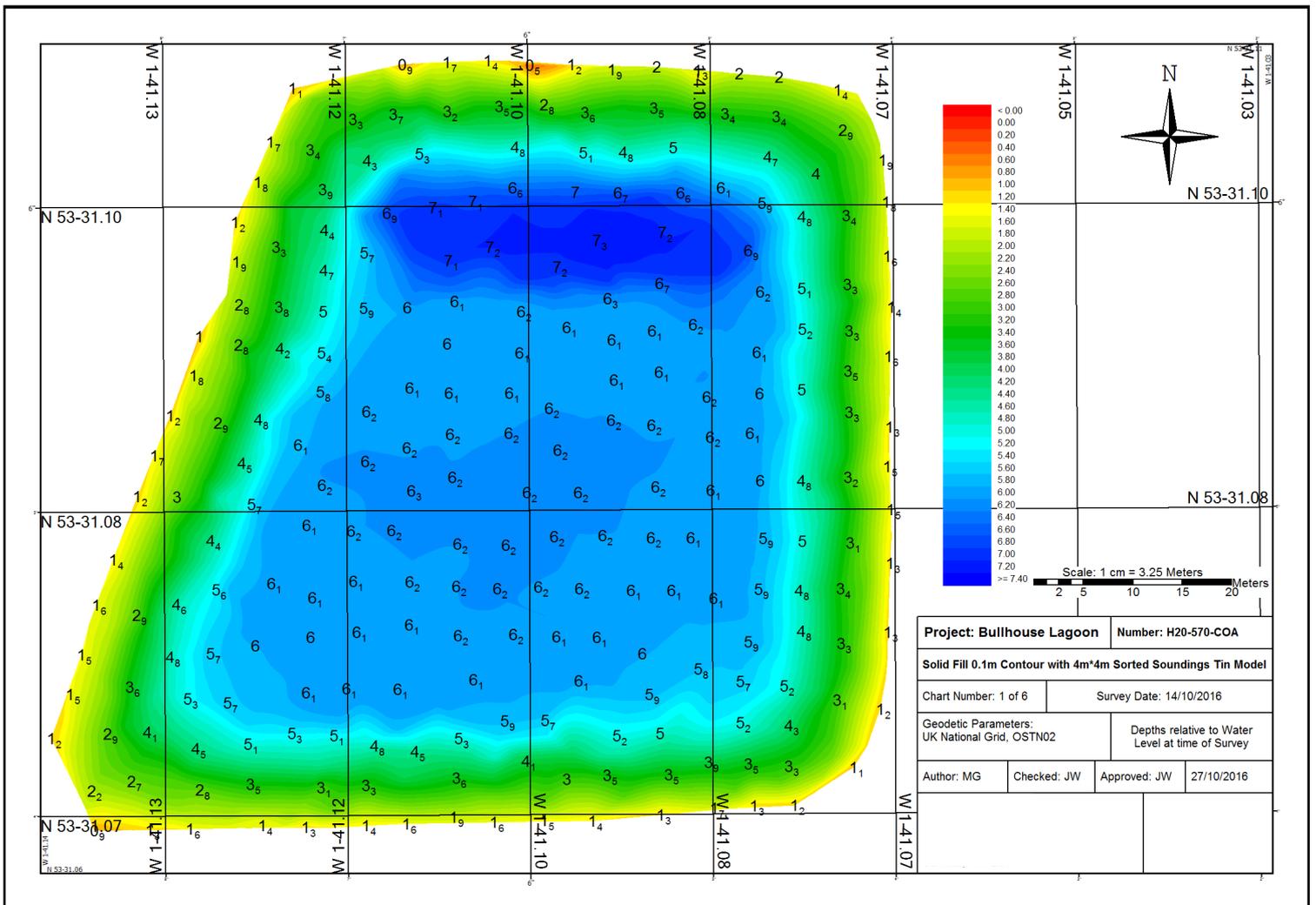
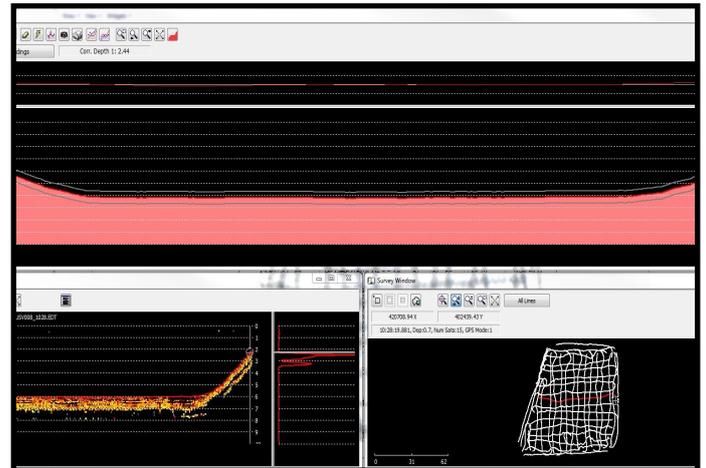


Figure 1. Sample bathymetric chart produced from the data collected with the Inception USV survey solution.