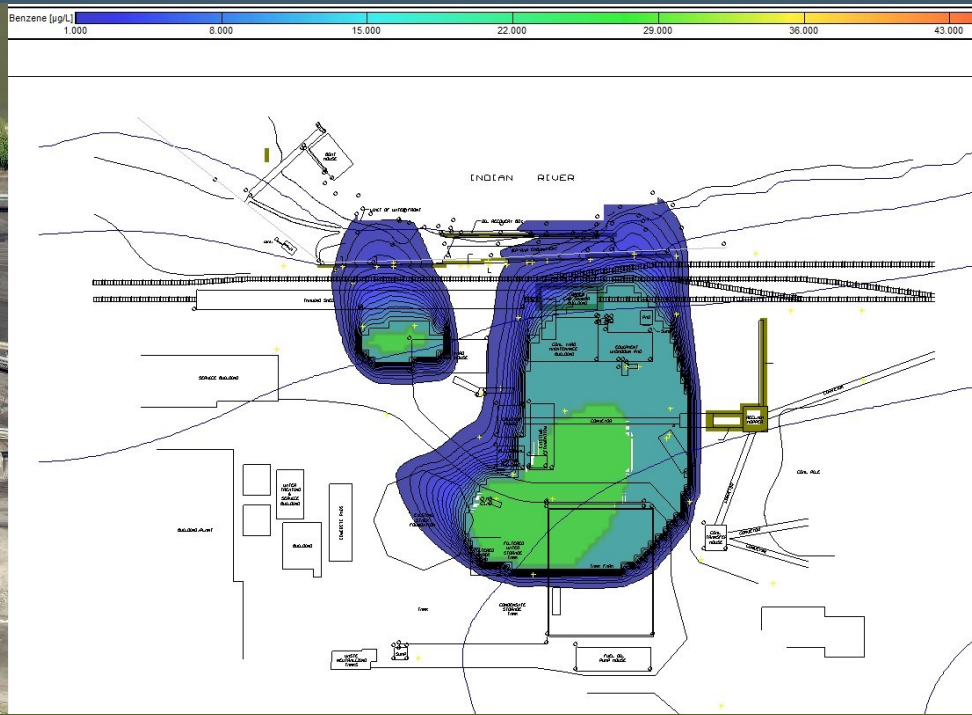


Scientific Research & Problem Solving

Groundwater Modeling, Predictive Fate and Transport Assessment



Client: Fate and Transport Assessment for Site Closure, DE

Brownfield Science & Technology, Inc. (BSTI) was hired to develop a robust and defensible finite difference groundwater flow model to assess the future transport of dissolved petroleum constituents from a large and complex LNAPL remediation site to a nearby river.

BSTI evaluated the site history, existing data and prior fate and transport modeling efforts in order to develop an effective methodology. Modeling presented unique challenges due to tidal influence on the site, numerous sub surface structures and a paucity of monitoring data under natural site conditions. BSTI was able to meet an aggressive project timeline by implemented model development iteratively. The first step was creating an updated flow model incorporating new subsurface structures and existing recent monitoring data.

Regulatory review of the modeling effort provided a window of opportunity to further refine and calibrate the model by addressing several known areas of uncertainty which could not be addressed within the timeframe of the initial effort. These activities included characterizing aquifer properties on the periphery of the model domain, resurveying a number of monitoring wells where damage to casings prevented the use of hydraulic head data in the modeling effort, developing a methodology for tidally correcting groundwater elevations site wide and collection of an additional six months worth of monitoring data.

With the collection of this data, BSTI was able to further refine and calibrate the model and clearly illustrate the limited sensitivity of findings to model uncertainty. Refined modeling efforts addressed all regulatory concerns and conclusively demonstrated that existing conditions were near equilibrium and residual impacts to groundwater quality should have no substantial affect on surface water quality.

Objective: Evaluate fate and transport of dissolved petroleum constituents from an LNAPL cleanup site to a nearby river.

Services

- Synthesized over a decade of remedial and environmental monitoring data to derive model conditions
- Lead technical meetings with regulators on methods and findings
- Developed plan to address regulators concerns through supplemental data collection and model calibration
- Conducted aquifer testing to characterize extended model domain
- Characterized tidal influence and tidal correction to observed hydraulic head

Applied Science

- Visual MODFLOW
- Aquifer testing
- Model calibration and sensitivity testing

