

EMERYVILLE, CA - MIXED INDUSTRIAL SITE

SITE OVERVIEW

This brownfield has a history of industrial use including rail, oil and plastics companies. The site is planned for future commercial, retail and residential development. Soil excavation in 2009 removed the majority of petroleum and metal contamination but significant concentrations of chlorinated solvents remained in the soil and groundwater. Primary contaminants of concern were PCE, TCE and associated daughter products. Soils are primarily silty clays with two coarse grained, high-permeability channels running across the site below the water table.

GOALS AND CHALLENGES

Poor buffering capacity across the western third of the site required pH adjustments and monitoring to maintain favorable dechlorinating conditions. The two high-permeability channels contained a majority of the contaminant mass and required large volumes of amendment to treat. Furthermore, data suggests an upgradient (off site) source area is likely contributing to the dissolved plume on site and elevating contaminant concentrations above water quality standards.

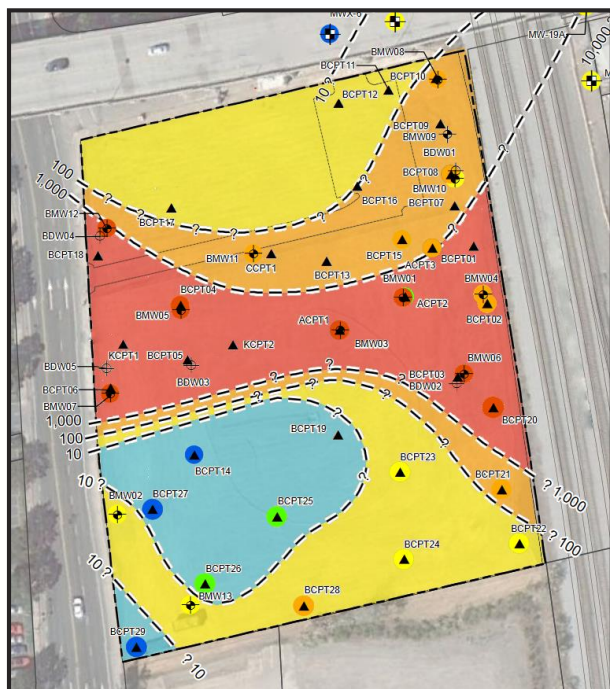
REMEDIATION APPROACH – NEUTRAL ZONE & NEWMAN ZONE EVO

Multiple competitor products were pilot tested on site. RNAS's Neutral Zone buffer and Newman Zone® emulsified vegetable oil (EVO) were determined to be the most effective products pilot tested for bioremediation of CVOCs. In 2013 site wide application of RNAS products was completed using direct push injections. Neutral Zone was necessary to maintain favorable pH and Newman Zone EVO served as an electron donor for the bacterial community. Two phases of injections were conducted, with an increased buffer concentration in the second phase, totaling 163 injection points across the treatment area.

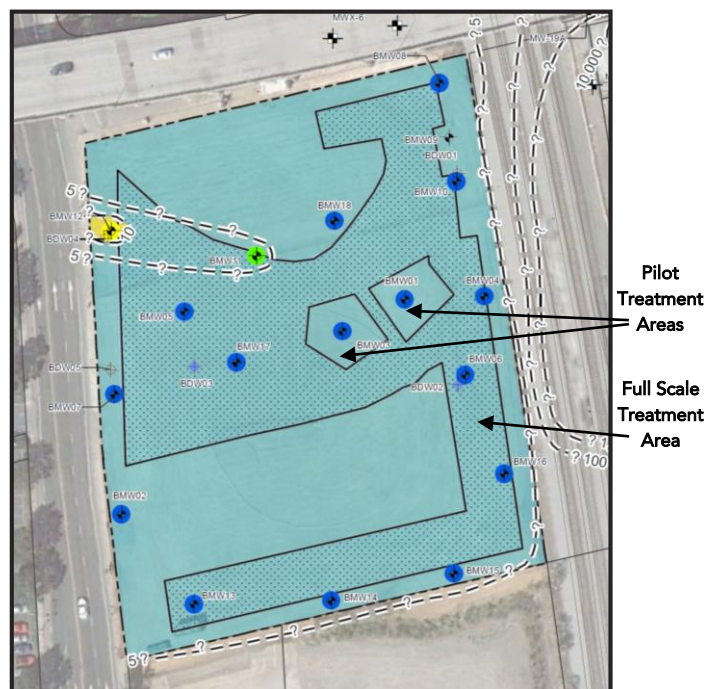
RESULTS

Poorly buffered areas had a pre-treatment pH as low as 5.6 and were expected to decrease as a result of contaminant dechlorination. Neutral Zone buffer raised and maintained the pH in problematic areas at pH 6.2 with a site wide average of pH 6.7. Newman Zone EVO injections decreased total CVOC concentrations by an average of 98% and continue to maintain favorable reducing conditions. Monitoring will continue on site until the potential upgradient source area is addressed.

TCE Distribution, Pre-treatment



TCE Distribution, Post-treatment



TCE: Above 1,000 µg/L 100 – 1,000 µg/L 10 – 100 µg/L Below 10 µg/L

0 75 150 225 feet