

# VACUUM ENHANCED PRODUCT RECOVERY

## OVERVIEW:

**'Conventional' product recovery systems use groundwater wells and extraction pumps to recover Light Non-Aqueous Phase Liquids (LNAPL) from the sub-surface. Vacuum enhancement introduces a vacuum into a well fitted with 'conventional' groundwater pumps or skimmers.**

**The vacuum encourages groundwater and LNAPL flow into the well, improving recovery rates.**

## OUR ADVANTAGES:

- Very effective technique to remove floating LNAPL from groundwater
- The vacuum enhances groundwater flow into the well, improving efficacy of the remediation.
- Potential for product recovery to be completed over a shorter timescale, with fewer wells and lower project costs.
- Vacuum enhancement also helps remove or reduce impact by volatile components in the vadose zone.

## TECHNIQUE:



Vacuum-enhanced recovery is achieved through use of an extraction tube situated in a recovery well. Vacuum is applied to extraction wells via a single above ground vacuum pump, manifold and pipe network. LNAPL is removed from the well via in-well pumps – these can be submersible centrifugal borehole pumps, total fluids pumps or free phase skimmer pumps.

Liquids are pumped to appropriate treatment or storage arrangements – mixed phase liquids from total fluids pumps are passed through a separation and treatment train, free phase product can be pump straight to a temporary storage tank for disposal or recycling.

Treated water can be discharged to sewer or surface water depending on site circumstances and discharge consents. Vapours are transported to an 'off-gas' treatment system, where volatile organic compounds are stripped out by scrubbers or a granular activated carbon filter. Vapour free air is released from the treatment system, spent filters are sent for regeneration.