cornelsen ltd.

Pumping from Wells (Options)

	Advantages	Disadvantages	Comments
Electric centrifugal pumps	Pumps can be specified for any flow rate the user may require	Not ideal for pumping NAPL and water combinations	
Suction Pumps (diesel, centrifugal, diaphragm, or peristaltic	Can be inexpensive with lower control cost	Not very efffective at LNAPL recovery. The suction pipe can be installed too low (only pumps groundwater leaving NAPL on the surface) or too high (sucks in water and NAPL and then air. Sucking in air causes vacuum (suction) loss and can lead to total loss of recovery from one or all wells	
	Ideal for groundwater abstraction		
Pneumatic Skimmer Pumps	LNAPL Only - No groundwater. Can pump to storage tank, no water treatment required	No groundwater pumping = no lowering of water level in well = no drawdown, cone of depression or hydraulic control	Only suitable where a lot of NAPL is present and recharges fast
		Only recovers whatever LNAPL is in the well	
2" Pneumatic Total Fluids Pumps (top filling)	Simultaneous recovery of LNAPL and groundwater	Oil/Water separator and water treatment plant required	Flow rate is so low that these are only suitable for relatively low permeability formations or where hydraulic control is not required
	Can lower the water level in the well and so create cone of depression and therefore draw LNAPL into well.	Very low flow rate (max. circa 300 litres/hr)	
	Can maintain hydraulic control in low permeablity formations.		
4" Pneumatic Total Fluids Pumps (top filling)	As above	As above	
	Higher flow rate than 2" pump	Flow rate is still low (circa 1m3/hr)	If the limited flow rate (<1m3/hr) is not sufficient to draw down the water level enough to draw product in and create some kind of hydraulic control then these is not suitable
Combined Skimmer Pump and electric submersible pumps (in the same borehole)	Can achieve significant hydraulic control and product recovery together. Can specify whatever groundwater abstraction rate is required	Water treatment plant required (though not an OWS)	Ideal for higher permeability formations
	No OWS required	Minimum 8" well required	
		Control systems more expensive and complex	