

Appendix A

Additional Tables and Figures

OCR=1	m=12.8					Clay layer	Permeability		k lower sd				
							k average	[m^2/år]					
4 m dry crust	10 kPa reduction below hydrostatic porepressure	30	Total	Settlement [m]	M [Mpa]	Cv [m^2/år]	Cv 1 sd up	0.092	0.020	Cv fixed=4	k not fixed [m/year]	k not fixed [m/s]	Cv fixed=4
			Depth [m]	10	0.03	1.34	7.47	12.28	2.66	0.030	9.48E-10	8.19E-05	
			20	0.04	2.30	12.82	21.09	4.56	0.017	5.52E-10	4.77E-05		
4 m dry crust	30 kPa reduction below hydrostatic porepressure	30	Depth [m]	Settlement [m]	M [Mpa]	Cv [m^2/år]	Cv 1 sd up	30.48	6.60	k not fixed [m/year]	k not fixed [m/s]	k not fixed [m/day]	
			10	0.08	1.40	7.82	12.86	2.78	0.029	9.05E-10	7.82E-05		
			20	0.13	2.36	13.18	21.67	4.69	0.017	5.37E-10	4.64E-05		
4 m dry crust	60 kPa reduction below hydrostatic porepressure	30	Depth [m]	Settlement [m]	M [Mpa]	Cv [m^2/år]	Cv 1 sd up	30.48	6.60	k not fixed [m/year]	k not fixed [m/s]	k not fixed [m/day]	
			10	0.15	1.50	8.36	13.74	2.98	0.027	8.47E-10	7.32E-05		
			20	0.25	2.46	13.72	22.55	4.88	0.016	5.16E-10	4.46E-05		
1 m dry crust	30 kPa overpressure reduction	30	Depth [m]	Settlement [m]	M [Mpa]	Cv [m^2/år]	Cv 1 sd up	31.36	6.79	k not fixed [m/year]	k not fixed [m/s]	k not fixed [m/day]	
			10	0.17	1.09	6.11	10.04	2.17	0.037	1.16E-09	1.00E-04		
			20	0.19	2.05	11.47	18.85	4.08	0.019	6.17E-10	5.33E-05		
		30	0.20	3.01	16.83	27.66	5.99	0.013	4.21E-10	3.64E-05			

Figure A.1: Table with average stiffness modulus M , coefficient of consolidation C_v and permeability k for clay calculated in excel for different Δu and depths.

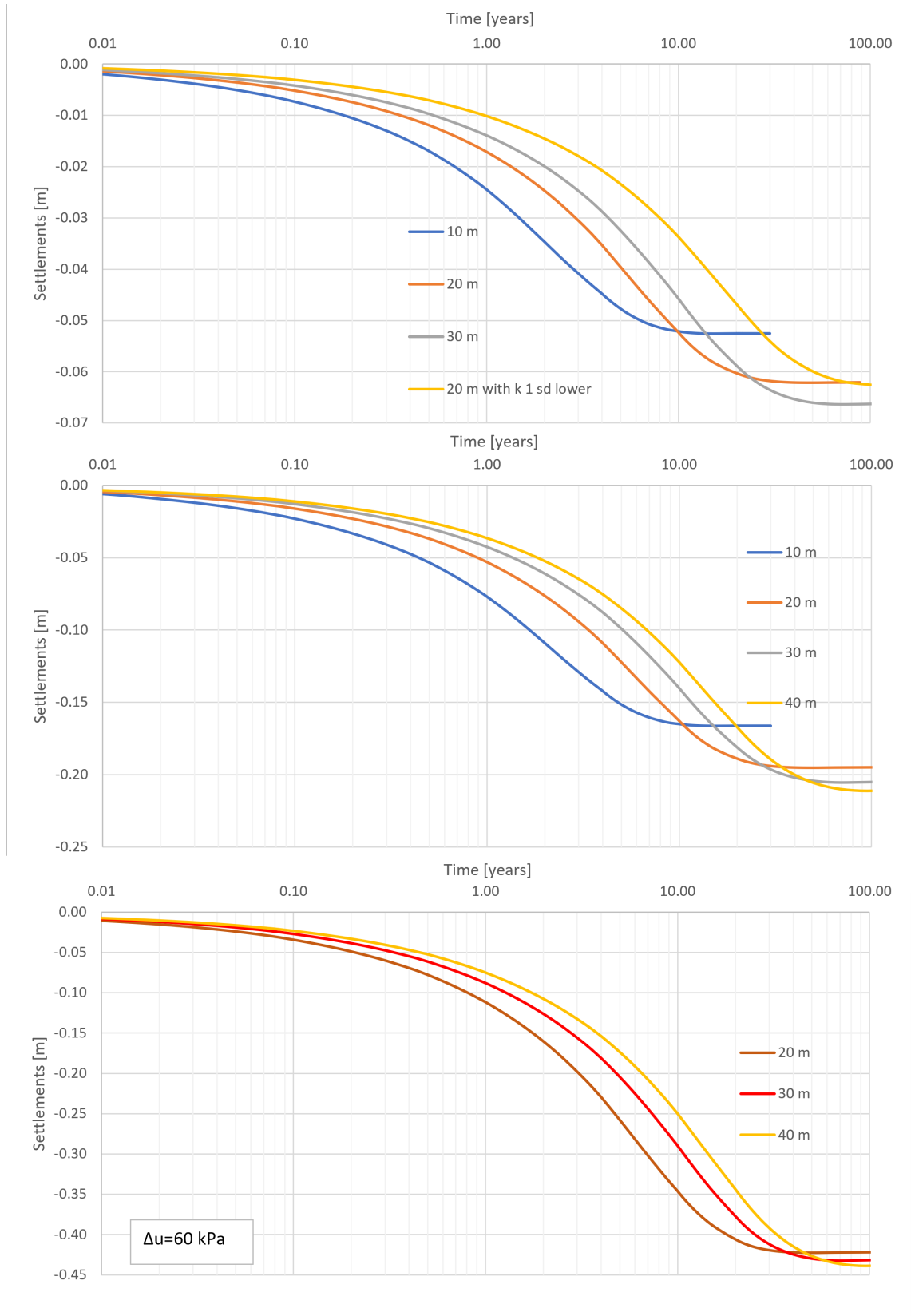


Figure A.2: Time (logarithmic) vs. settlements u_y for overpressure to hydrostatic for $k=1.53E-4$ and $k=5.5E-4$ m/day

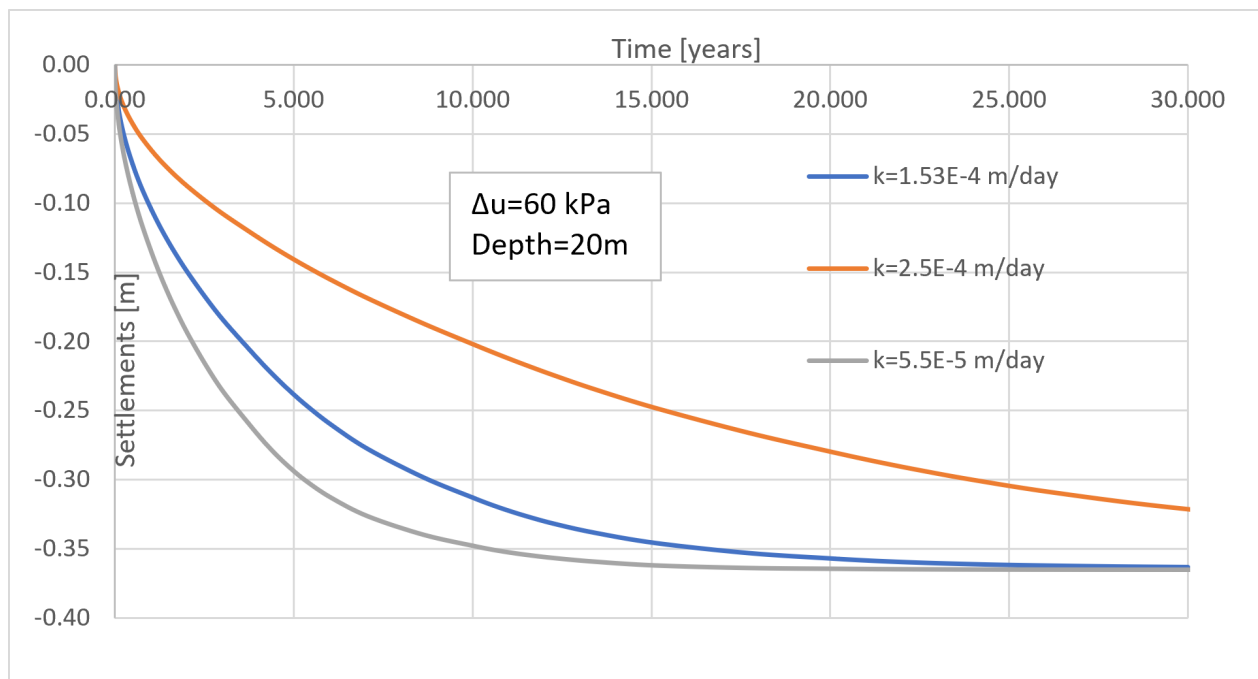


Figure A.3: Time vs. settlements u_y for 30 kpa + 30 kpa reduction (i.e. 60 kpa reduction from a 30 kpa overpressured system at bedrock depth).

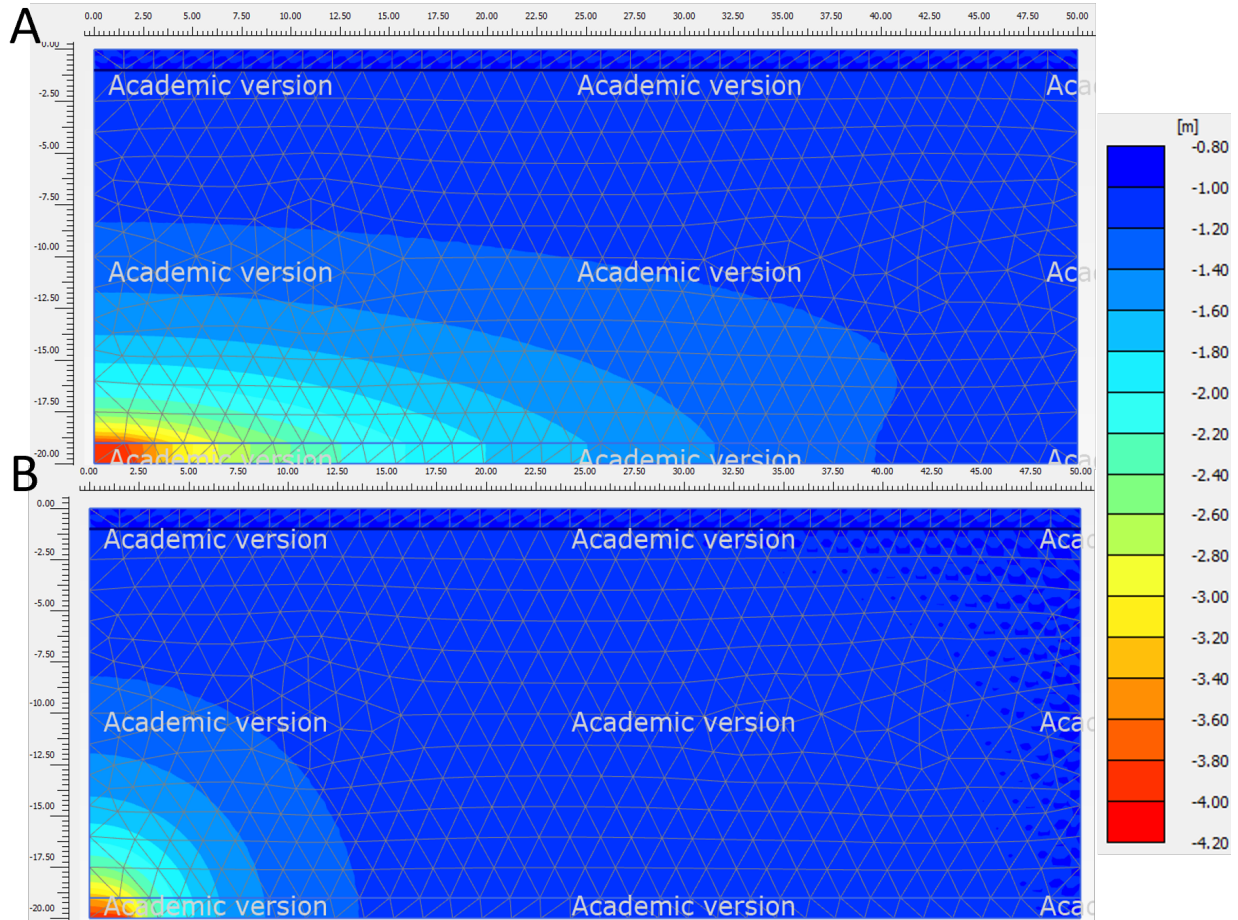


Figure A.4: Groundwater head at 20 years, approx steady state. 30 kpa below hydrostatic. Clay (A) with a lower k , $k=5.5E-5$ m/day and silt (B) instead of moraine with $k=2.5E-4$ m/day

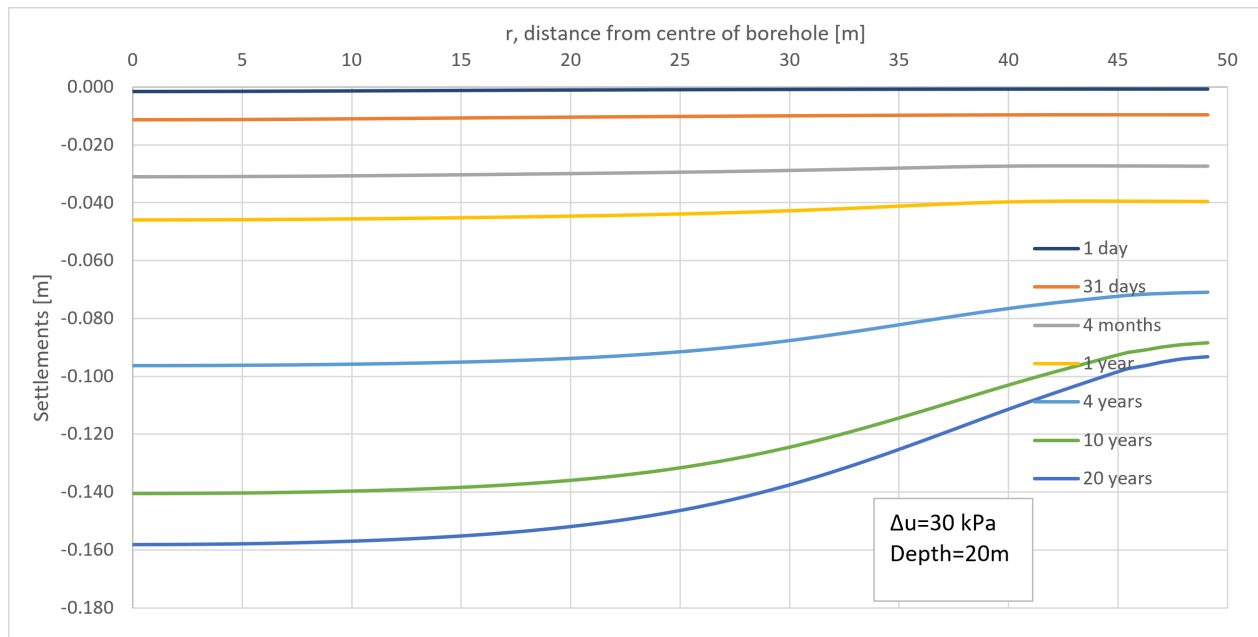


Figure A.5: Distance from centre vs. settlements u_y . 30 kPa below hydrostatic at bedrock PLAXIS output right clay boundary seepage.

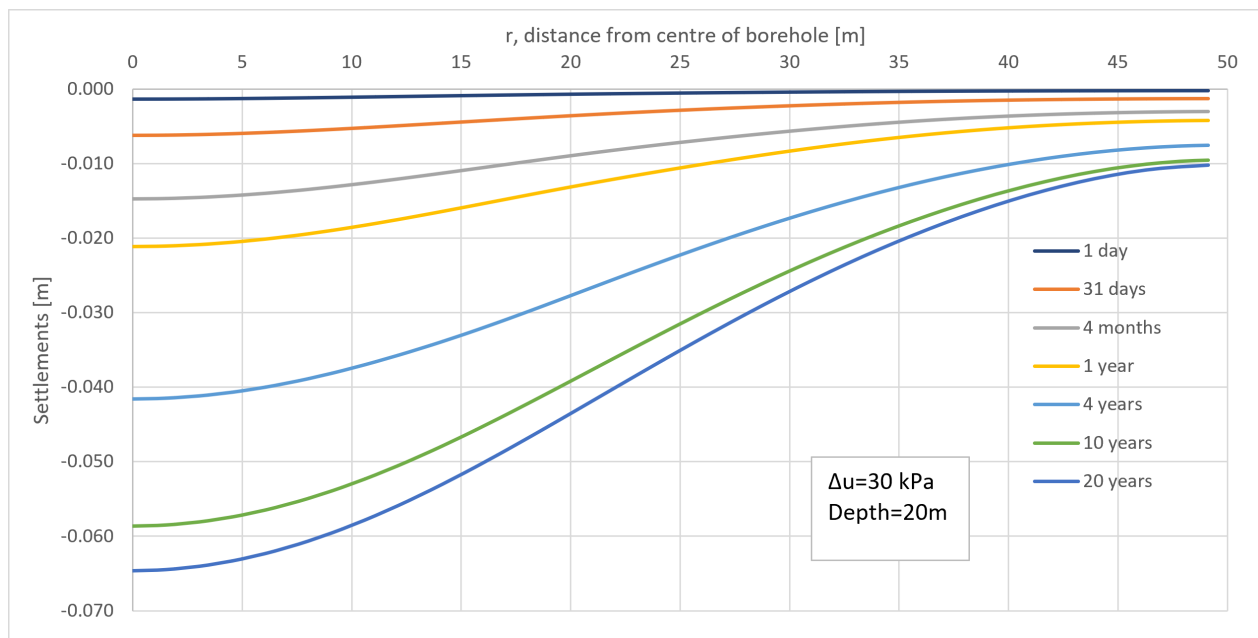


Figure A.6: Distance from centre vs. settlements u_y . 30 kPa below hydrostatic at bedrock PLAXIS output rightside head in clay=-1m.

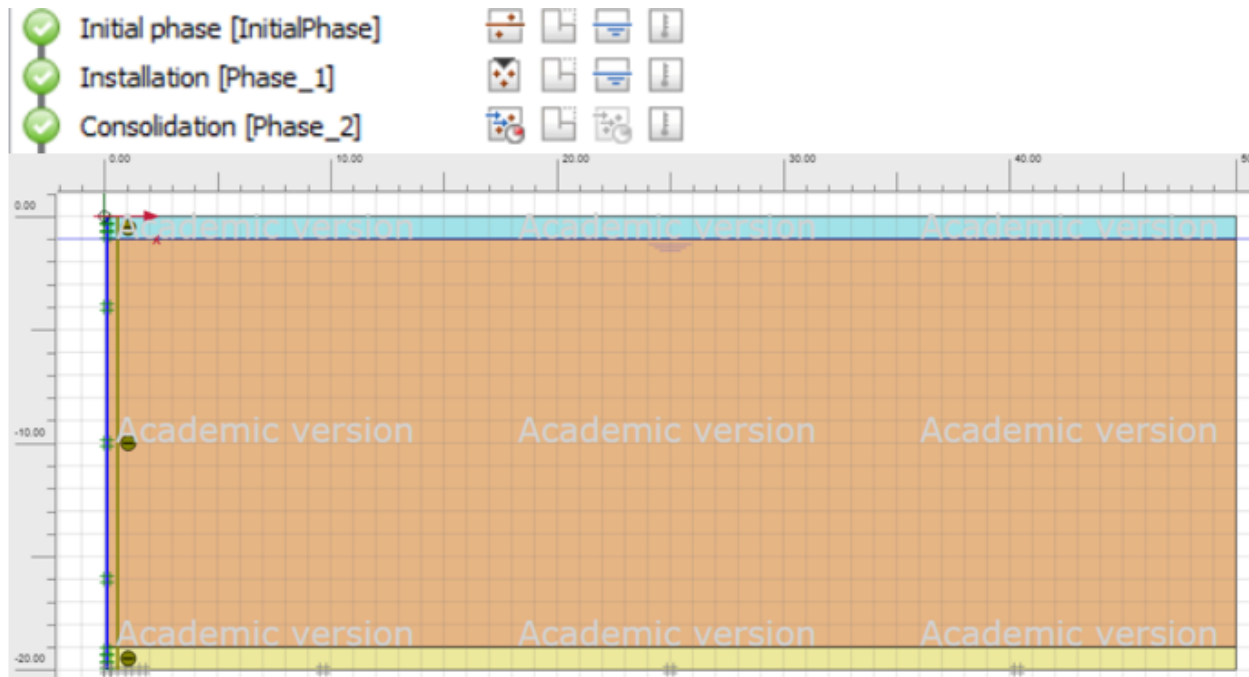


Figure A.7: Initial phase is soil setup of dry crust (blue), clay (brown) and moraine (yellow). Installation phase puts the casing at 12 cm from centre of the axisymmetrical model and consolidation phase deactivates the soil within the casing as well as defining the soil 12 cm on the outside more permeable. The heads were changed in the last phase.

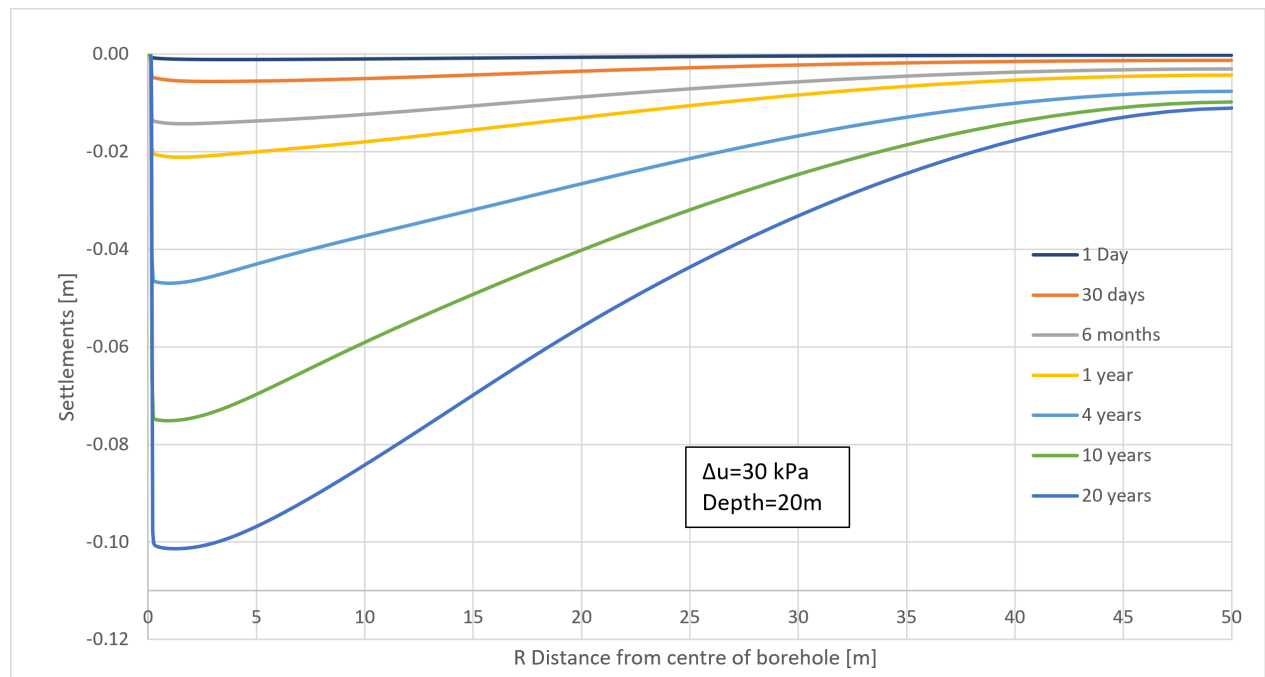


Figure A.8: Max point and steady state is difficult to approximate, and due to being so long term (40-60 years) not presented here

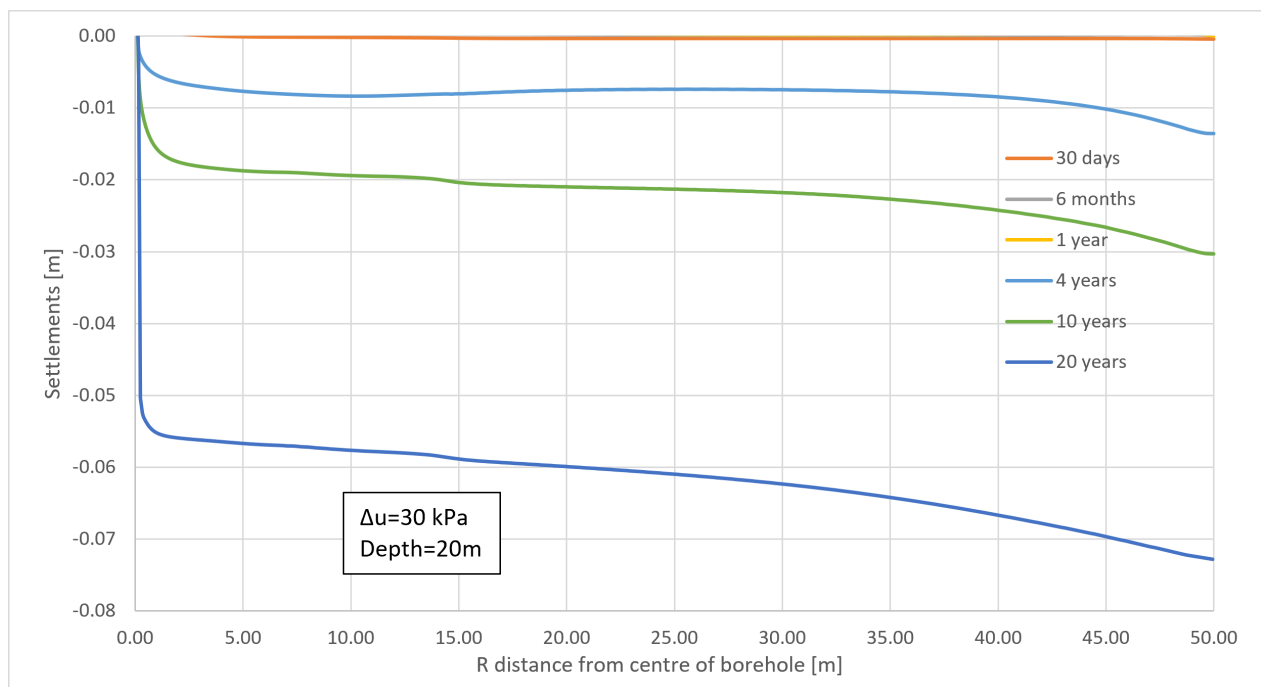


Figure A.9: All BC closed except top right dry crust, the settlements are due to overpressure dissipation through the soil rather than the more permeable layer around the casing