

### 1. Laboratory testing

#### **Selected sand backfill**

1. Thermal resistivity wet (10% +/- 2%)
2. Thermal resistivity dry (fully dried at 105C – Pass 2.7 Km/W)
3. Contamination
4. Particle size analysis (% passing the 5 mm sieve)
5. Dry relative density (Pass 1.6 Mg/m<sup>3</sup> in the lab., 1.45 Mg/m<sup>3</sup> in the trench).
6. Cohesion

#### **Gravel/sand backfill**

General Selected sand for gravel/sand backfill and gravel for gravel/sand backfill

1. Particle size of gravel/sand backfill
2. Thermal resistivity wet (10% +/- 2%)
3. Thermal resistivity dry (fully dried at 105C – Pass 1.2 Km/W)
4. Dry relative density (Pass 1.8 Mg/m<sup>3</sup> in the lab., 1.7 Mg/m<sup>3</sup> in the trench).

#### **Cement-bound backfill**

1. Particle size analysis of cement-bound sand
2. Thermal resistivity wet (10% +/- 2%)
3. Thermal resistivity dry (fully dried at 105C)
4. Voids ratio (Pass <= 0.54)
5. Dry relative density (1.6 Mg/m<sup>3</sup> in the trench)

#### **Soils and solid rock cores**

1. Thermal resistivity wet
2. Thermal resistivity dry (fully dried at 105C)
3. Dry relative density

### 2. On site testing

1. Natural ground - Initial thermal survey to 1.5 m depth using boreholes or pits
2. Natural ground - Trench thermal survey testing of soft peat to hard rock
3. On site density testing of natural ground or backfill materials
4. Gravel backfill or CBS thermal testing in trenches
5. Bentonite testing in ducts

### 3. Experimental work

Selected sand mixes or sand types (eg high or low quartz) can be trialed.