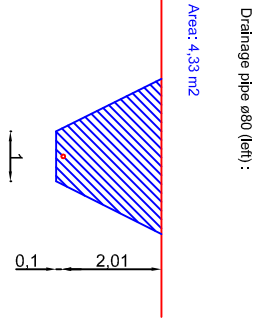
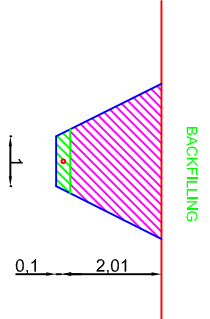


DRAINAGE EXCAVATIONS

1a

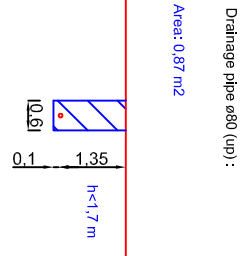


L= 32.28 m
Volumen excavation: 4.33 m² x 32.18= 141.93 m³

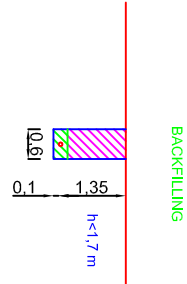


L= 32.18 m
Soil area= 4.01 m²
Soil volume= 4.01 x 32.18= 129.04 m³
Sand:
0.32 m² x 32.18 m = 10.3 m³
Volume pipe= $\pi r^2 h = \pi 0.04^2 \times 32.18 = 0.16$ m³
Total Volume sand:
10.3+0.16= 10.13 m³

1b



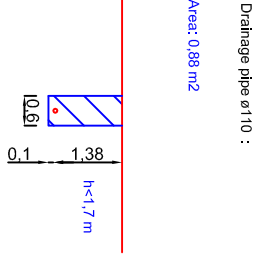
L= 35.85 m
Volumen excavation: 0.87 m² x 35.85= 31.19 m³



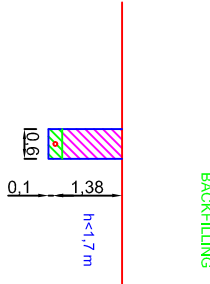
L= 35.85 m
Soil area= 0.7 m²
Soil volume= 0.7 x 35.85= 25.09 m³
Sand:
0.17 m² x 35.85 m = 6.09 m³
Volume pipe= $\pi r^2 h = \pi 0.04^2 \times 35.85 = 0.18$ m³
Total Volume sand:
6.09+0.18= 5.9 m³

1a

Road drainage

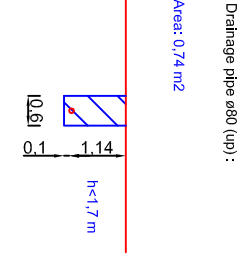


L= 44.96 m
Volumen excavation: 0.88 m² x 44.96= 39.56 m³

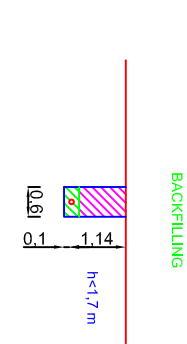


L= 44.96 m
Soil area= 0.72 m²
Soil volume= 0.72 x 44.96= 32.37 m³
Sand:
0.17 m² x 44.96 m = 7.64 m³
Volume pipe= $\pi r^2 h = \pi 0.05^2 \times 44.96 = 0.35$ m³
Total Volume sand:
7.64+0.35= 7.28 m³

1b

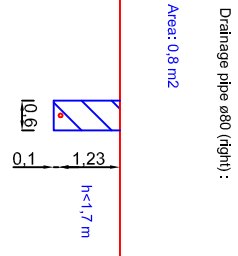


L= 12.53 m
Volumen excavation: 0.74 m² x 12.53= 9.27 m³

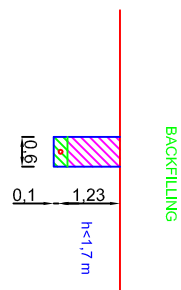


L= 12.53 m
Soil area= 0.56 m²
Soil volume= 0.56 x 12.53= 7.01 m³
Sand:
0.18 m² x 12.53 m = 2.25 m³
Volume pipe= $\pi r^2 h = \pi 0.08^2 \times 12.53 = 0.25$ m³
Total Volume sand:
2.25+0.25= 1.99 m³

1c

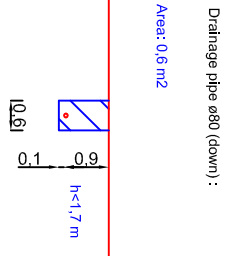


L= 29.88 m
Volumen excavation: 0.8 m² x 29.88= 23.9 m³

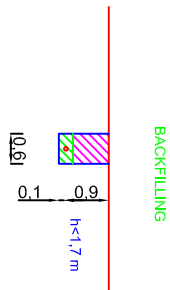


L= 29.88 m
Soil area= 0.63 m²
Soil volume= 0.63 x 29.88= 18.82 m³
Sand:
0.17 m² x 29.88 m = 5.07 m³
Volume pipe= $\pi r^2 h = \pi 0.04^2 \times 29.88 = 0.15$ m³
Total Volume sand:
4.07+0.15= 3.91 m³

1d



L= 39.01 m
Volumen excavation: 0.6 m² x 39.01= 23.4 m³



L= 39.01 m
Soil area= 0.43 m²
Soil volume= 0.43 x 39.01= 16.77 m³
Sand:
0.17 m² x 39.01 m = 6.63 m³
Volume pipe= $\pi r^2 h = \pi 0.04^2 \times 39.01 = 0.19$ m³
Total Volume sand:
6.63+0.19= 6.44 m³