PART 2, Sub main cable size and V drop

$I_b = \frac{268.34\,A}{3} = 89.47\,A$ (per Ph)

$I_n = 100A > 89.47\,A$

$I_t = \frac{I_n}{C_a} = \frac{100A}{1.02} = 98.04A$ (BS 7671, table 4B1)

$I_z = 16mm^2$. (max. capacity 99A) (table 4E4A)

Seems just just with CCC, and leaving no future demands, plus volt drop probably will be to high, so we go with next up.

$I_z = 25mm^2$ (max. capacity 131A) (table 4E4A)

$V_d = 1.65\,mV/A/m$ (table 4E4B)

Act. $V_d = \frac{1.65 \times 40 \times 89.47}{1000} = 5.9V < 20V$

Volt drop still looks pretty high. For the final lighting circuits the V drop max aloud is 6.9 V, so taking away the V drop of submain cable, it leaves us only 1V to play with. So in this case We will choose the cable one size up.

$I_z = 35mm^2$ (max. capacity 162 A) (table 4E4A)

$V_d = 1.15\,mV/A/m$

Act $V_d = \frac{1.15 \times 40 \times 89.47}{1000} = 4.12V$

Min. Size of armour for earthing

Act CSA of armor = $80mm^2$ (GN 1, AP x D)

Line S = $35\,mm^2$

$k_1 = 143$ (table 43.1)

$k_2 = 46$ (table 54.4)

Min. req. $= \frac{k1}{k2} \times \frac{S}{2} = \frac{143}{46} \times \frac{35}{2} = 54.4\,mm^2 < 80\,mm^2$ (of our cable)