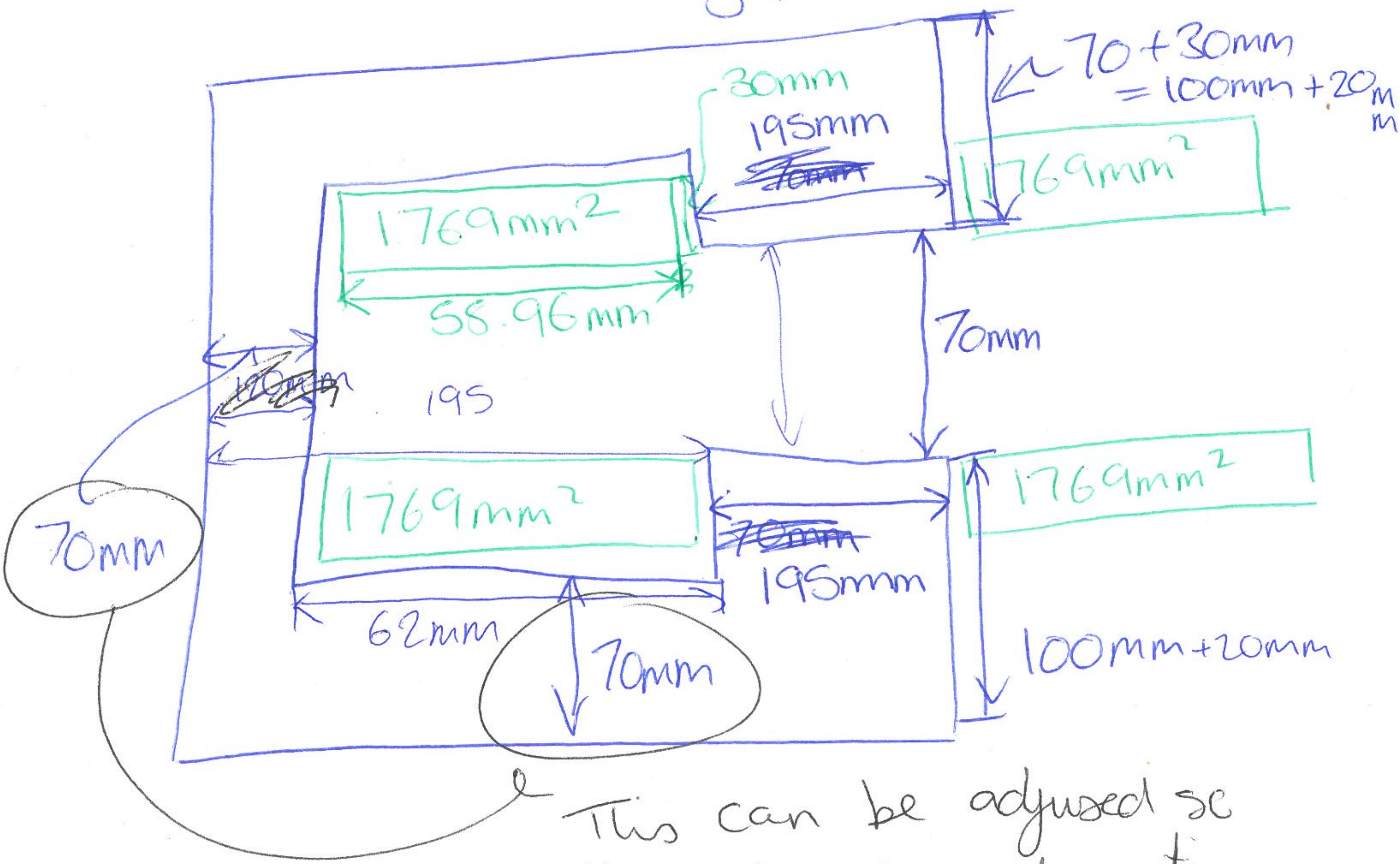
The Area of the conducting surface is then determined by the current density.

$$A_{conductor} = \frac{\text{Ampere turns}}{\text{current density}}$$

$$= \frac{3537\ [A]}{2 \times 1\ [A/mm^2]} = 1768 mm^2 = 1,769 mm^2$$

- As stray flux extends 1 gap either side

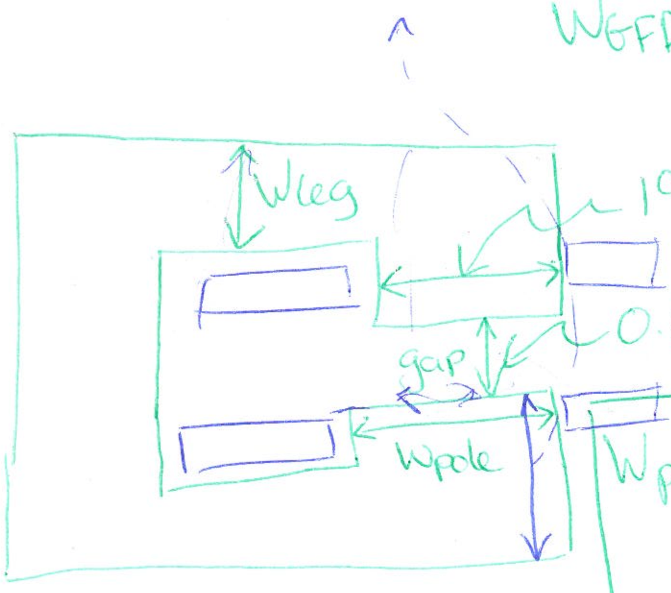


This can be adjused so that the flux density in the yoke isn't too large

Magnet design

$J = 1\ A/mm^2$

$W_{GFR} = 20mm = 0.02m$



$W_{pole} = W_{GFR} + 2.5 \times gap$

$= (0.02 + 2.5 \times 0.07)m$

$= 0.195$

$B_{leg} = \frac{B_{gap} \cdot (W_{pole} + 1.2 \times gap)}{W_{leg}}$

(B_{gap} = 0.06T)

Total Ampere turns $= \frac{0.06T \times 0.07(m)}{0.95 \times \mu_0} = \frac{B_{gap} \cdot gap}{efficiency \times \mu_0}$

$= \frac{0.0042 [TM][A]}{0.95 \times 1.25 \times 10^{-6} [TM]}$

$= \frac{0.0042}{1.1875 \times 10^{-6}}$

$= 3536.8 = 3537$ Ampere Turn

Note this is the total turns, so for each pole the Ampere turns are $\frac{3537}{2}$