TUNNELWORKS
KS4 MATHS LESSON 2 WORKSHEET
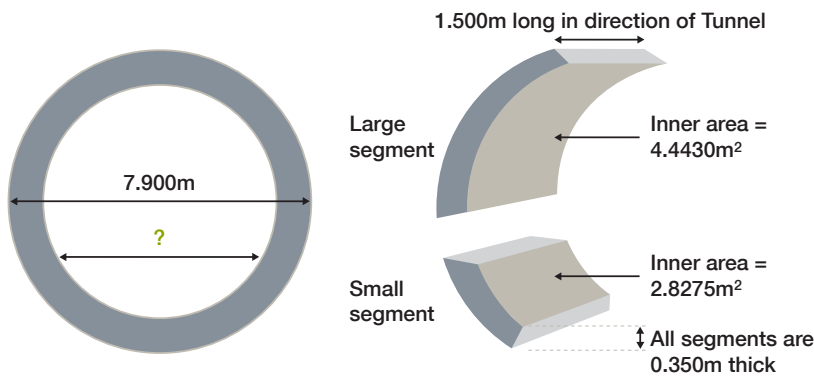# PLANNING & PREVENTION: 3D THINKING

Email
To: TBM team
From: Quantity surveyor's team
We need to know how many concrete segments will be needed for the West London section of the tunnel, and what total quantity of concrete we'll need to order to cast the segments. Could you let me know ASAP? NB Concrete has a mass of 2,400kg per m^3.

Challenge 1: What's in a ring?
The Tunnel will be made of rings of concrete segments. There is one small segment per ring, and several larger segments of equal size. How many segments make up a complete ring?

1.500m long in direction of Tunnel

7.900m

?

Large segment

Inner area = 4.4430m^2

Small segment

Inner area = 2.8275m^2

All segments are 0.350m thick

Small: _____

Large: _____

Total in one ring:

_____

Challenge 2: How many segments?
This section of the Tunnel is 5.8135km long.

How many rings of segments will be needed? _____

How many small segments? _____

How many large segments? _____

Challenge 3: How much concrete?

What volume of concrete will be needed to cast these rings? _____

What will this weigh? _____

Hint: Use your knowledge of the volume of circular prisms to help you.