

## PETER'S PROBLEM 2014

A local authority plans to build a pedestrian bridge across a canal. The canal is 8.2 metres wide. The ground on both sides of the canal is flat and at the same level. The banks of the canal are parallel to each other.

The bridge will have 3 sections. The span will cross the canal horizontally at  $90^{\circ}$  to the canal banks. The approaches to the span will both be parallel to the canal banks.

The foundations of all supports will be at least 1.5 metres from the water's edge on either side.

The level of water in the canal is 75 cm below ground level of the bank.

The span of the bridge must be 2.3 metres above the level of the water to facilitate traffic on the canal. Allow 25cm for the thickness of the frame of the bridge below the surface of the pedestrian walkway in this section of the bridge.

The pedestrian walkway on all sections of the bridge must be wheelchair accessible and all construction must conform to the building guidelines in Part M of the Department of the Environment, Community and Local Government Building Regulations 2010, under the section 'Approach to buildings other than dwellings' which also governs the building of pedestrian bridges. ( NOTE; A stepped access route or lift as referred to on page 26 does not form part of this problem).

The width of the construction should be uniform for its entire length.

Find the minimum area of the pedestrian surface of the construction, including turning areas at access points at either end of the construction.

Give the answer in  $\text{m}^2$ , correct to two places of decimals.

If the condition that "The span will cross the canal horizontally" is withdrawn from the specification for the bridge, can you suggest the most efficient amendments that could be made to reduce the length of the walkway.

Calculate the reduction resulting from your suggestion.