



Environmental
Geotechnical
Specialists



COMPREHENSIVE GEOTECHNICAL & ENVIRONMENTAL ENGINEERING SERVICES
DELIVERED USING OUR OWN DRILLING RIGS / CREWS / SOILS LAB / ENGINEERS

CASE STUDY 04

Subsidence & Failing Retaining Wall

// INVESTIGATION AIMS

To investigate ground related movement to a boundary masonry retaining wall and pre-cast concrete paving slab footpath adjacent to the full length of the side elevation of a house that was exhibiting a pronounced tilt downward towards the boundary retaining wall.

The cover and frame to the foul water drain inspection chamber to the central area of the elevation appeared to also similarly tilt down towards the boundary retaining wall.



Investigating
Ground related movement.

// METHOD OF INVESTIGATION

Prior to undertaking any works, a site visit was conducted to confirm access for our small window sampling drilling rig. Whilst access to the investigation locations identified by the client were possible with the drilling rig, right of entry to the retaining wall was restricted due to third party stipulations, and so hand digging was also undertaken.

// SITE WORKS:

We were on site for one day:

- Excavation of two trial pits (hand dug) to expose the foundations to the retaining wall to confirm the constructed form and establish the subsoil conditions at foundation level. The trial pits also determined the composition and consistency of the fill material behind the retaining wall, as well as identifying the presence of utility services in this area.
- Excavation of two boreholes and dynamic probe testing adjacent to the retaining wall to establish the subsoil conditions and consistency to depth. The boreholes were undertaken using a small window sampling drilling rig which extracted undisturbed samples in plastic liners that were returned to our soils lab for geotechnical testing and logging to BS5930. SPT's were also completed which, along with the dynamic probes, provide a strength depth profile beyond the depth of the borehole.
- Survey of the drainage serving the plot to establish the location, route and condition of the underground pipework. The drainage survey included tracing any perforated land drains behind the retaining wall stem

// LABORATORY TESTING

The samples were brought back to our soils lab for subsequent logging to BS5930 by the project engineer. A range of geotechnical testing was scheduled with our in-house geotechnical soils lab, which included a general suite of classification testing (ie. index property tests, moisture content determinations, linear shrinkage analysis)

// OUTCOME

- Interpretation of the data provided by the site investigation determined that the mode of failure in this case a layer of peat present below the clay bearing strata upon which the retaining wall foundation was placed.
- The investigation and enquiries with the client has shown that the house, which was constructed before the retaining wall, has been piled. However the retaining wall was constructed by excavating until "suitable" ground conditions were revealed by the builder/contractor. This did not reveal the underlying weak peat layer present below the firm clay on which the wall has been founded.
- In addition the retaining wall appeared to be rotating around a central point, and a line of conifers was present at one side of the wall. It was initially thought that the mode of failure was attributed to shrink/heave caused by the conifers. However after the peat was revealed it was evident that the whole length of wall was most likely subject to settlement, and that the conifers, through dewatering of the peat, were inducing differential settlement causing the wall to exhibit cracking.



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