

**Q1: The team outside the Survey HQ are mapping utilities. Why do you think it would be important to know where things like underground water pipes and power lines are?**

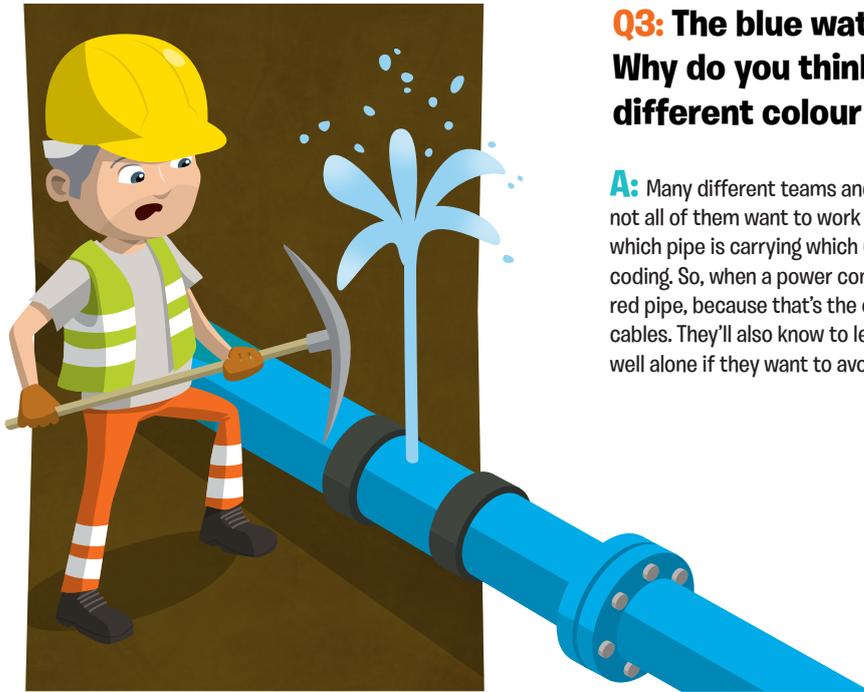
**A:** **Utility mapping** involves locating and labelling public utility mains, and underground utility mapping means to detect, position and identify buried pipes and cables beneath the ground. It is important to know the location and direction of these utilities in order to keep them working correctly. That might mean making sure that new utilities aren't installed anywhere hazardous, or it might mean protecting the safety of existing

utilities - for example, if building work was being carried out nearby, it would be good to know where power, gas and water lines were, so that none of them were accidentally dug up or damaged! Unfortunately, it looks like it's a bit late for the clumsy worker in (F,2)! Someone fetch a bucket... and a really band-aid!

**Q2: Can you spot the different types of survey equipment used to detect the position of the utilities underground?**

**A:** While a few surveyors are using Total Station scanners on yellow tripods to scan the surface of the dig sites, those can only 'see' what's above ground. The piece of technology that can scan through solid surfaces is called a **Ground Penetrating Radar**, or GPR for short. It pushes powerful sound waves deep underground, then measures the echoes as the sounds bounce back off solid objects, like water and gas pipes. There's a surveyor using a GPR unit in (G,2) - it looks like a big yellow lawn mower!



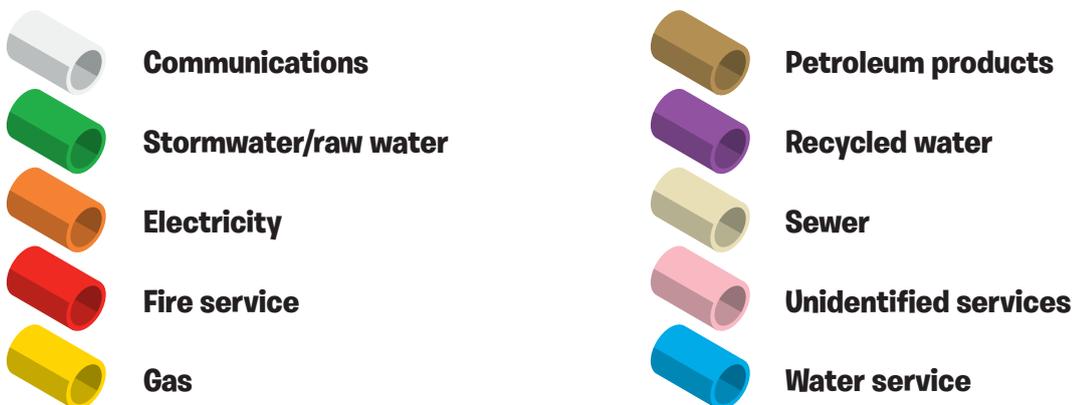


**Q3: The blue water main has sprung a leak! Why do you think it's important to have different colour pipes for each utility?**

**A:** Many different teams and companies work on underground utilities - but not all of them want to work on the same lines! As such, it's important to know which pipe is carrying which utility, and the easiest way to do this is by colour-coding. So, when a power company digs below ground, they'll be looking for the red pipe, because that's the one that carries electric power lines, conduits and cables. They'll also know to leave the blue pipe (which carries drinking water) well alone if they want to avoid a shocking surprise!

**Q4: If drinking water pipes are colour-coded blue, and electric power lines are orange, can you guess what the other colour pipes in grid (F,2) might be carrying?**

**A:** Here's the colour-coding guide for all the major utilities lines; it helps anyone working below ground to identify exactly what each pipe is carrying:



**Q5: Can you spot the LiDAR USA drone? What do you think it might be surveying?**

**A:** The LiDAR USA drone is soaring through grid (D,3), flying over the above-ground utilities (in this case, the power lines) to check them for sags, wear and tear, and what surveyors call encroachment - where trees might have fallen onto the lines. It might also be showing off its impressive wingspan to all the birds that have parked their feathery behinds on the power lines!



**Q6: There's a busy Tassie devil in (B,2) - he's trying to work out how fast the Australian continent is moving! How many centimetres do you think Australia shifts by each year?**

**A:** The Geoscience Australia Tasmanian Devil is accessing data and services from the Positioning Australia program - a network of positioning infrastructure that spreads right across Australia and New Zealand. Aside from providing access to real-time precise positioning information, one of the most interesting uses of this system is to monitor the movement of the continent of Australia, which is one of the fastest moving of all the world's continents! In fact, the whole of Australia can move between 5 and 7 centimetres every year, which means that every couple of decades it hops the same distance north-east as the height of a kangaroo! An application of the Positioning Australia program might be to track the movements of the Tasmanian devil, a species that is under threat from a genetic disease. Researchers who are working to help the Tasmanian devil population will be able to use the Positioning Australia program to keep accurate tabs on the location and movements of Tassie devil groups!



**Q7: There's a very cheeky extra-terrestrial in (G,5), who appears to be pinching power to gas up his space ship! Why might this be dangerous?**

**A:** The worker from the City Power Co. has caught the alien green-handed! He's yelling at the extra-terrestrial energy thief because the alien seems to have missed the 'DANGER - HIGH VOLTAGE' warning on the fence that surrounds the substation. Surveyors and utility workers have to be extremely careful when working near power lines, as there is a serious risk of electrocution. This is one reason why the work of surveyors is so important: they help maintain potentially dangerous utilities and keep everyone else safe from harm.

Now, can anyone translate 'DON'T TOUCH THAT!' into alien speak!?

