

WATER

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Benefits of Pilot Planting New Wastewater Treatment Technologies

Impact of Domestic Greywater Diversion on a Septic Tank System and Potential Health Considerations

The Next Generation in Sewer Leak Detection

City Care has brought a revolutionary leak-finding technology to New Zealand through its new licensing agreement with California technology company, Electro Scan.

Initially deployed in Christchurch as part of the infrastructure repair work following the earthquakes, the leak-finding technology works by passing an electric current through full pipes to discover leaks with pinpoint accuracy.

A pipe which leaks water will also leak electricity, so when an Electro Scan user sends a current through a full non-metal pipe (for example brick, cement, reinforced concrete, plastic, pipe-lining resins, etc), they are able to measure the variation of electricity passing through the defects. This allows the automatic location and quantification of cracks, fractures, defective joints or faulty service connections. This is used to measure the water infiltration and outflow exfiltration in wastewater and stormwater networks and pipes of various sizes.

Electro Scan measures potential leaks (litres/second) for any section of existing, newly installed or renovated pipes – including cracks, joint defects, poorly connected service laterals and manholes.

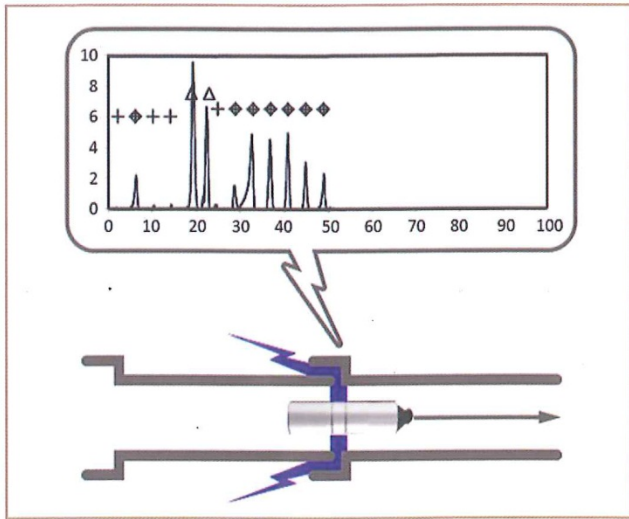


Figure 1– X-Axis = distance travelled, Y-Axis = conductivity

In addition to confirming the location of leaks, the technology also indicates the rate of leak. The bigger the electrical flow from the defect, the bigger the defect, and the bigger the leak potential. The type of defect as detailed in Figure 1 is shown by the pattern of the electric current in the graph.

Using saline water to surround its probe to transmit electricity to the pipe wall,

Electro Scan provides a 360-degree assessment of most sewer mains and stormwater and service drains. Due to its accuracy and sensitivity in locating defects, without relying on visual observations, Electro Scan is capable of establishing a condition assessment of each pipe joint, at an operating rate of up to 10 metres per minute.

Data is electronically captured by the probe, which is pulled manually or via a motorised CCTV tractor unit through the pipe. Immediate in-field analysis is available and the information is stored for more detailed analysis later off-site. Data is automatically sent to the Electro Scan Smartphone application and transmitted to a hosted cloud computing application, known as CriticalSewers.com.



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City Care's Underground Contract Manager, Hugh Blake-Manson, believes this technology will deliver significant benefits for asset owners and managers. “Infiltration is a major concern for asset owners. The increased flow immediately costs more to pump, reduces their storage time during high flow periods, and reduces the effectiveness of treatment plant. The potential for pump station overflowing into natural watercourses is also increased. Infiltration is normally an issue with high ground water levels and during winter wet-weather events.

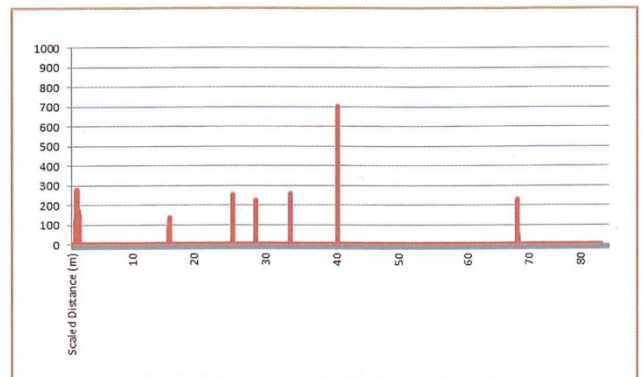
“Electro Scan will provide valuable pre- and post-rehabilitation diagnostics to local authorities, and therefore to ratepayers,” he said.

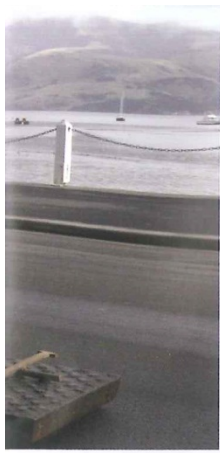
According to Blake-Manson, Electro Scan will prove a valuable complement to CCTV analysis, and in particular situations will provide the only solution, especially where pipes are permanently submerged – for example siphons.

“CCTV takes much longer, due to the necessity to send the tractor down empty pipes. Operators need to stop and camera the defect, thereby reducing the inspection rate and the job productivity.

“Based on City Care's recent trials, Electro Scan is averaging over 10:1 leak identification compared to CCTV. That's an impressive

Figure 2 – A typical Electro Scan profile showing defects, with different levels of severity along the length of the pipe measured





Left – An Electro Scan unit set up next to a manhole on Beach Road in Akaroa; Below – CCTV image of sewer pipe – many leaks are not detected using standard video inspection methods; Bottom – The Electro Scan reading can be automatically sent to a Smartphone via Bluetooth

result, and we're very enthusiastic about the technology. We'll still use CCTV where visual identification is required, for instance in assessing pipe wall condition, but Electro Scan will provide additional powerful information to the asset owners. They can then use this information to deliver very effective, targeted repairs and renewal – a key part of their long-term planning."

Figure 2 shows a typical Electro Scan profile – from a run in a wastewater network. The asbestos cement pipe was jetted and cleaned, CCTV-ed against the NZ Pipe Inspection Manual, then filled with water and Electro Scanned. The line at 40 meters showed a major defect, which CCTV operators did not pick up.

About City Care

City Care is a major provider of construction, maintenance and management services across New Zealand's infrastructure assets; maintaining over 19,000 KMs of piping networks to 24% of properties throughout the country. As one of the five contractors comprising Stronger Christchurch Infrastructure Rebuild Team (SCIRT), City Care is heavily involved in reconstructing the region's catastrophically-damaged underground services. The company's earthquake-honed construction capability is being implemented into its contracts with existing and potential clients. ■



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