

TECHNICAL BULLETIN

November 2016

Best practice guide for excavation around buried stormwater pipes

Modern subdivisions have many services buried underground, including stormwater, electricity, telecommunications, data, sewer and gas. Subdivision design often requires services to cross around street corners, and this creates a significant potential for damage to previously installed services.

As concrete stormwater drainage pipes are generally the first services to be installed, identifying the location and depth of these pipes is key to ensuring that subsequent excavations do not cause damage to the stormwater lines.

CCTV camera surveys will detect damage to stormwater lines, and councils will require the repair or replacement of damaged stormwater lines prior to handover.



Figure 1 - Example of Service Alignment Crossover

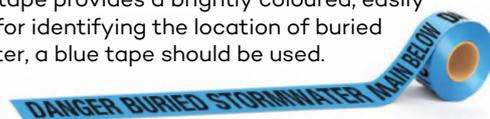
The challenge of ensuring that existing stormwater drainage lines are not damaged relies on all service contractors taking care. The key to success includes:

- Use of warning tape during stormwater drainage pipe installation
- Service contractors locating the drainage pipe accurately
- Careful excavation around the drainage pipe
- Proper backfilling and compaction of the support material around the drainage pipe

This technical bulletin has been put together to assist all stakeholders by providing best practice recommendations that will help reduce the risk of damage.

During stormwater pipe installation

Underground warning tape provides a brightly coloured, easily identifiable visual aid for identifying the location of buried services. For stormwater, a blue tape should be used.



This warning tape should be installed approximately halfway between the surface level and the top of the pipe, to provide adequate clearance to avoid damage to the pipe.



Figure 2 - Warning tape installed halfway between surface level and top of pipe

A less desirable option for shallow pipe installations, the warning tape may be placed above the select fill layer on each side of the trench, approximately 150-200mm above the pipe. Placing two runs of warning tape will help in ensuring that the warning tape is exposed before the drainage pipe is impacted when excavation is underway.



Figure 3 - Warning tape installed above select fill - preferably two runs either side of the trench.

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Excavation Preparation

Before commencing excavation of services, peg out the location of the buried stormwater pipe and determine the likely depth to the top of the pipe. If the service conduit level is above the stormwater pipe, have a laser or dumpy level available to ensure the trench is not “over-dug” into the stormwater pipe.

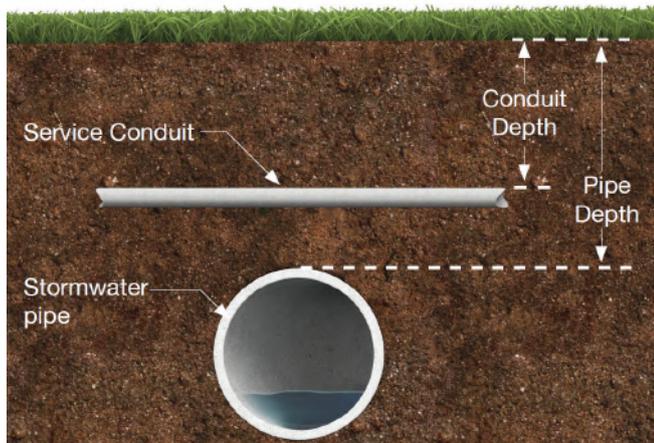


Figure 4 - Determine pipe depth

If the service trench depth is likely to interfere with the stormwater pipe, or if the service conduit passes underneath the stormwater pipe, the additional care must be taken to avoid damage to the stormwater pipe during trench excavation.

If possible, expose the top of the pipe using vacuum excavation or hand digging. If the pipe is too deep for this or vacuum excavation is not available, the following method should be used to identify the pipe location and provide awareness to the excavator operator of the need for care around a buried stormwater pipe.

Clearly mark the centre line with paint or stringline, and then ensure there is a clearly identified “CAUTION” zone, where extra care must be taken during excavation.

This “CAUTION” zone should be clearly marked using paint or chalk to alert the excavator operator to the need to take additional care within this zone.

For more information on trench excavation and drainage pipe installation please refer to the RCPA **FRCPIPE** Installation Guide.

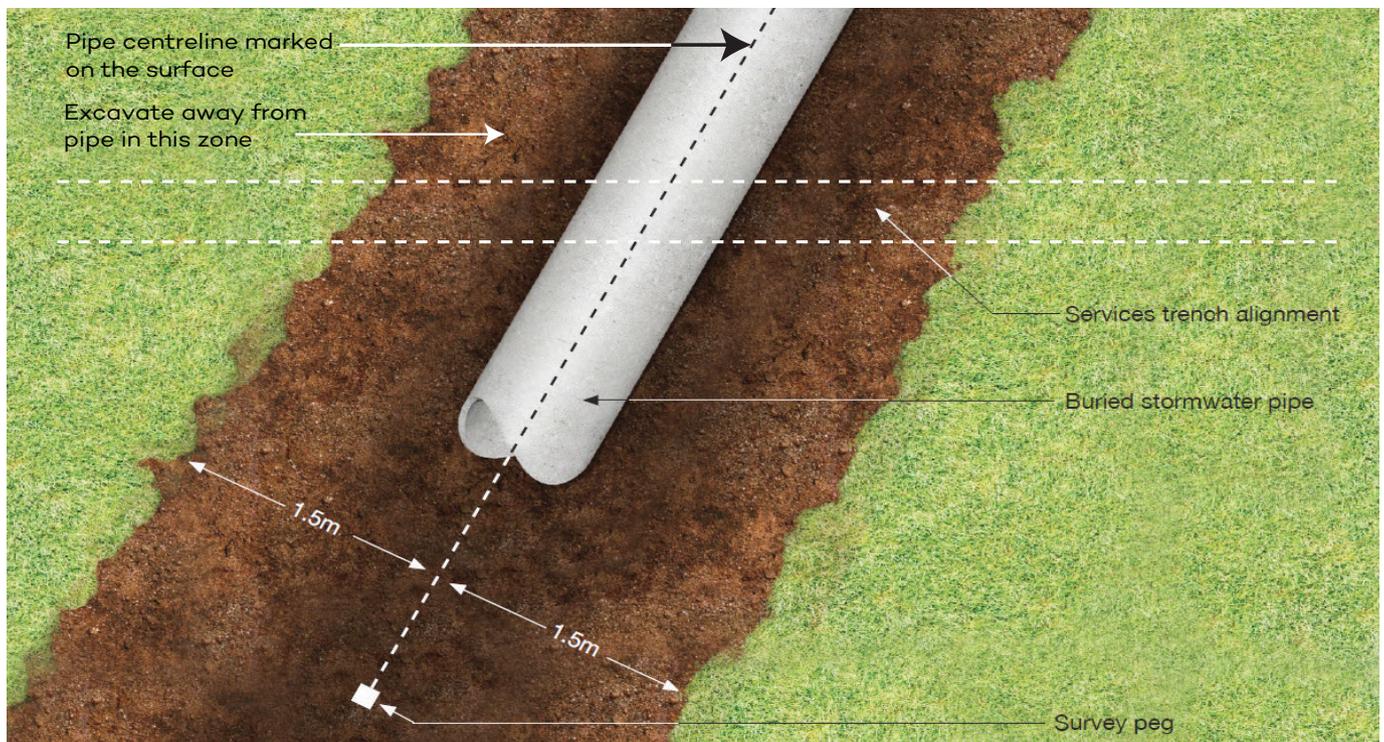


Figure 5 - Identify a “Caution” zone around the buried pipe alignment

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Excavation of Service Trenches

When excavating a trench in preparation for services installation, typically the excavator will move backwards with bucket teeth facing the direction of travel. This creates a problem for buried pipes as the first indication of the pipe presence will be a direct impact onto the pipe with the bucket teeth (see Figure 8).

This can cause cracks or damage to the pipe before the operator realises there is a pipe buried in the trench alignment.

If this is not possible, then trench excavation should stop when the CAUTION zone is reached, and then digging should continue away from the buried stormwater pipe location as shown in Figure 7. This digging method has the bucket teeth facing down and towards the excavator, away from the buried pipe. This makes it easier for the operator to carefully remove material when approaching the pipe, and to snag the warning tape before contacting the pipe itself.



Figure 6 - Typical excavation direction - can cause damage before pipe is uncovered.

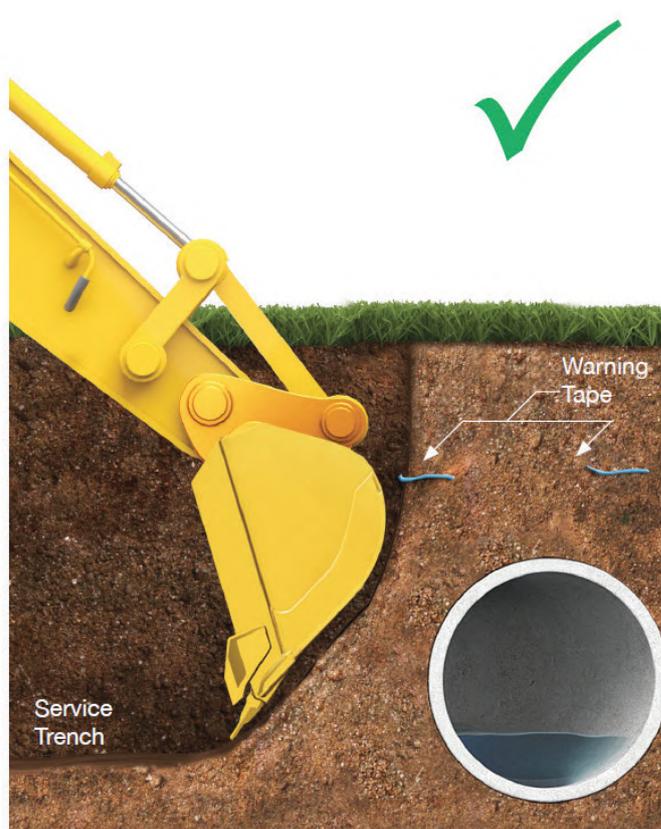


Figure 7 - Preferred excavation direction - allows identification of pipe before damage occurs.

Ideally the pipe should be positively located and exposed where the service line will cross the pipe by potholing or hand excavation prior to machine excavation of the service trench. This overcomes the risk of the excavator not exposing the warning tape prior to impacting the drainage pipe.

If possible, change excavator bucket from a toothed digging bucket to a flat cleanup bucket to reduce the likelihood of pipe damage if contact is made.

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Filling of Service Trenches

As service conduit pipes are generally plastic or PVC, the installation, backfilling and compaction should be conducted in accordance with the requirements of AS/NZS 2566.2:2002.

Where service conduits pass underneath existing stormwater pipes, careful consideration must be made of the appropriate techniques to place and compact fill material that has been removed from around the stormwater pipe.

To ensure a firm foundation is reinstated, flowable fill should be used to surround the stormwater pipe. Flowable fill is ideal in this application as it ensures that the foundation strength is restored and avoids potential cracking of the stormwater pipe as the overlay fill is placed and compacted above the pipe.

Specifications for the flowable fill (or "Controlled Low Strength Material" CLSM) are detailed Appendix A of AS/NZS 3725:2003, and is generally available from premixed concrete suppliers. Flowable fill for pipe fill should achieve 28 day compressive strength of 1 to 3MPa, which allows for excavation in future.

Further Information

Contact RCPA on 1800 88 7272 or by email at salesnsw@rcpa.com.au for more information on the installation of buried concrete pipes, or visit the website at www.rcpa.com.au.



Figure 8 - Filling of service trench with flowable fill

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