

## Watermain Replacement and Connection Procedure

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## **TS 7.70.01            Scope**

The work involves the procedure for making watermain replacement and connection to an existing watermain system. All work shall be done to the satisfaction of the Contract Administrator. Instructions for making a connection are based on the scenarios in Figure 1 and Figure 2.

## **TS 7.70.02            New Watermain System**

- 1** Pressure test, flush, swab and chlorinate new watermain. Pressure testing and chlorination of new watermains will be in isolation from the existing water distribution system.
- 2** Service connections larger than 50 mm in diameter shall be installed to street line. The service connection will be pressure tested, flushed, chlorinated and water sampled as part of the watermain system.
- 3** Contractor will use a portable field test kit to check for residual chlorine and turbidity. If the sample passes, then the two consecutive sampling procedures can begin.
  - The residual chlorine should be better or equivalent to the source sample.
  - Turbidity should be less than < 1 nephelometric turbidity units (NTU). Engineering & Construction Services division Contract Administrator to discuss with Toronto Water operations representative to accept if non-health related.
- 4** Take two consecutive samples at sampling stations S1, S2, S3, S4 and S5 as shown on Figure 1 and according to TS 7.30 *Procedure for Disinfecting Watermains*.
- 5** If samples pass at all five sampling stations, then the new watermain can be connected to the existing watermains.
- 6** All valves which are part of the isolated section of new watermain shall remain closed until Contractor's bacteriological sample from the filler spool piece has passed. The Contractor shall notify the Contract Administrator with an e-mail message that the sample results indicate a pass. Contractor shall request valving 48-hours in advance. After valving is scheduled, Toronto Water can then begin to open the valves.
- 7** The new watermain pipe permitted to be dewatered is from the isolation valve on the new watermain to the connection point on the existing watermain which shall be less than 6.1 m in distance.
- 8** After all branch connections to side streets are connected, the Contractor shall begin reconnecting all existing water services from the existing live watermain to the newly installed watermain.

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**TS 7.70.03****Connecting to Branch Connections**

The following is a typical procedure for the connection of a replacement watermain to an existing watermain on street B as shown in Figure 1.

- 1** Contractor to restrain valve V\_3 to anchor tee and valve ATV\_1 to ensure the valve does not blow-off. Toronto Water to close valves V\_E, V\_C, V\_D and V\_J on the existing watermain system.
- 2** Toronto Water to open fire hydrant on street B so as to depressurize existing watermain system.
- 3** Contractor to cut into watermain pipe before valve V\_E, that is to say the left side of valve V\_E on Figure 1 and install mechanical cap on existing water main. Contractor to pump out water and ensure all discharge water in excavation is below open ends of existing pipes.
- 4** Valve V\_3 is to remain closed. Contractor shall ensure valve V\_3 is properly restrained. Contractor to remove blow-off used as a sampling point S\_2 for the two samples.
- 5** Contractor to manually swab and disinfect filler piece which makes up pipe B if length is less than 6.1 m. If length of filler piece is greater than 6.1 m, then standard disinfection methods apply.
- 6** Contractor to install filler piece of watermain pipe between valve V\_3 and V\_E.
- 7** Contractor to install 25 mm corporation stop and new 25 mm copper sampling pipe to grade with blow-off on watermain pipe between V\_3 and V\_E.
- 8** Contractor to open valve ATV\_1 and then open valve V\_3.
- 9** Toronto Water to open valve V\_J. Valve V\_E to remain closed.
- 10** Contractor to flush main in one direction through new 25 mm copper sampling pipe. Contractor then to close valve V\_3.
- 11** Contractor to take a water sample from new copper sampling pipe. Contractor shall notify the ECS Contract Administrator whether the water sample results passed. ECS Contract Administrator to advise Toronto Water of sample results. For water samples with passing results, Toronto Water to advise ECS Contract Administrator when Contractor can proceed with removal of 25 mm copper sampling pipe and backfilling of access pit.
- 12** Contractor to reopen valve V\_3 and Toronto Water to reopen valve V\_E after pipe segment water sample has passed.
- 13** Existing valve V\_E will remain in place in an open position. Existing valve box shall be removed or existing valve chamber to be broken down one metre below subgrade according to TS 510. Toronto Water to confirm valve V\_E is in the open position. In the event of failing water sample results, Contractor to coordinate with Toronto Water for operation of valve V-3 for any additional sampling.
- 14** Valves V\_C and V\_D to remain in the closed position.

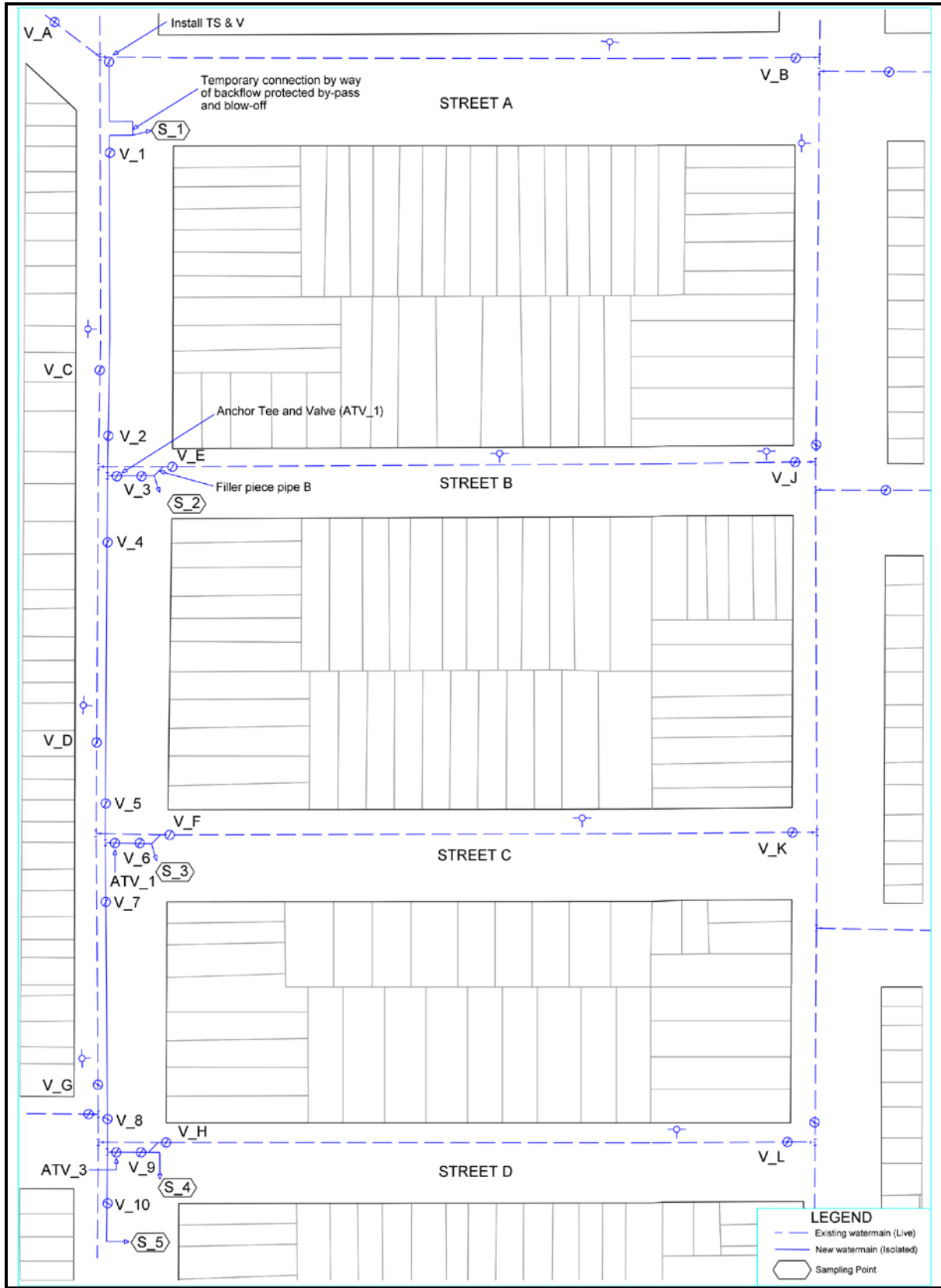


Figure 1: Scenario one – connecting to branch connections

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**TS 7.70.04****Connecting to Source Feeder Watermain**

Procedure for connecting new watermain system to existing watermain system. For this example the connection will be for a permanent connection on street A as shown on Figure 2.

- 1** Toronto Water staff to close valves V\_A, V\_B and V\_C on the existing watermain system.
- 2** Contractor to close TS&V only on new watermain system. The Contractor may need to close valve V\_1 and release pressure in the main by partially opening blow-off through the temporary bypass to avoid blowing out valve V\_1 if there is insufficient installed pipe lengths between valve V\_1 and the connection. Also ensure valve V\_1 is properly restrained to avoid blowing-out and injuring a worker should valve V\_2 fail.
- 3** Depressurize existing watermain through fire hydrant on street A. If there is no fire hydrant between the valves, tapping in a blow-off on the existing watermain may be necessary.
- 4** Pump out excess water from trench.
- 5** Remove temporary backflow protected by-pass and blow-off connection.
- 6** Manually swab and disinfect filler pieces of watermains
- 7** If length of filler piece is greater than 6.1 m, then standard disinfection methods apply.
- 8** Install filler piece.
- 9** Contractor to install 25 mm corporation stop and new 25 mm copper sampling pipe to grade.
- 10** Toronto Water to open fire hydrant on street A.
- 11** Toronto Water to open valve V\_A and flush main in one direction.
- 12** Toronto Water to close valve V\_A and open valve V\_B and flush main in one direction through hydrant on street A.
- 13** Contractor to take a water sample from copper sampling pipe. Sample must first pass before Contractor proceeds with removal of 25 mm copper sampling pipe and backfilling of access pit.
- 14** Toronto Water to open valve V\_1.

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**Note 1:** Contractor shall collect the sample while the excavation is open and notify the Engineering & Construction Services division Contract Administrator whether water sample results passed. ECS Contract Administrator to advise Toronto Water of sample results. For water samples with passing results, Toronto Water to advise Contract Administrator when Contractor can proceed with removal of 25 mm copper sampling pipe and backfilling of the access pit.

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**Note 2:** As a good practice, valves V\_A and V\_1 should remain closed while valve V\_B is left open until acceptable disinfection results are obtained. If there are any existing water services between valves V\_A to V\_1 or V\_B to V\_1 or both, the valves should remain closed except for valve V\_B until acceptable disinfection test results are confirmed. Only open more than one valve at an intersection, if there is a water supply issue for the area.

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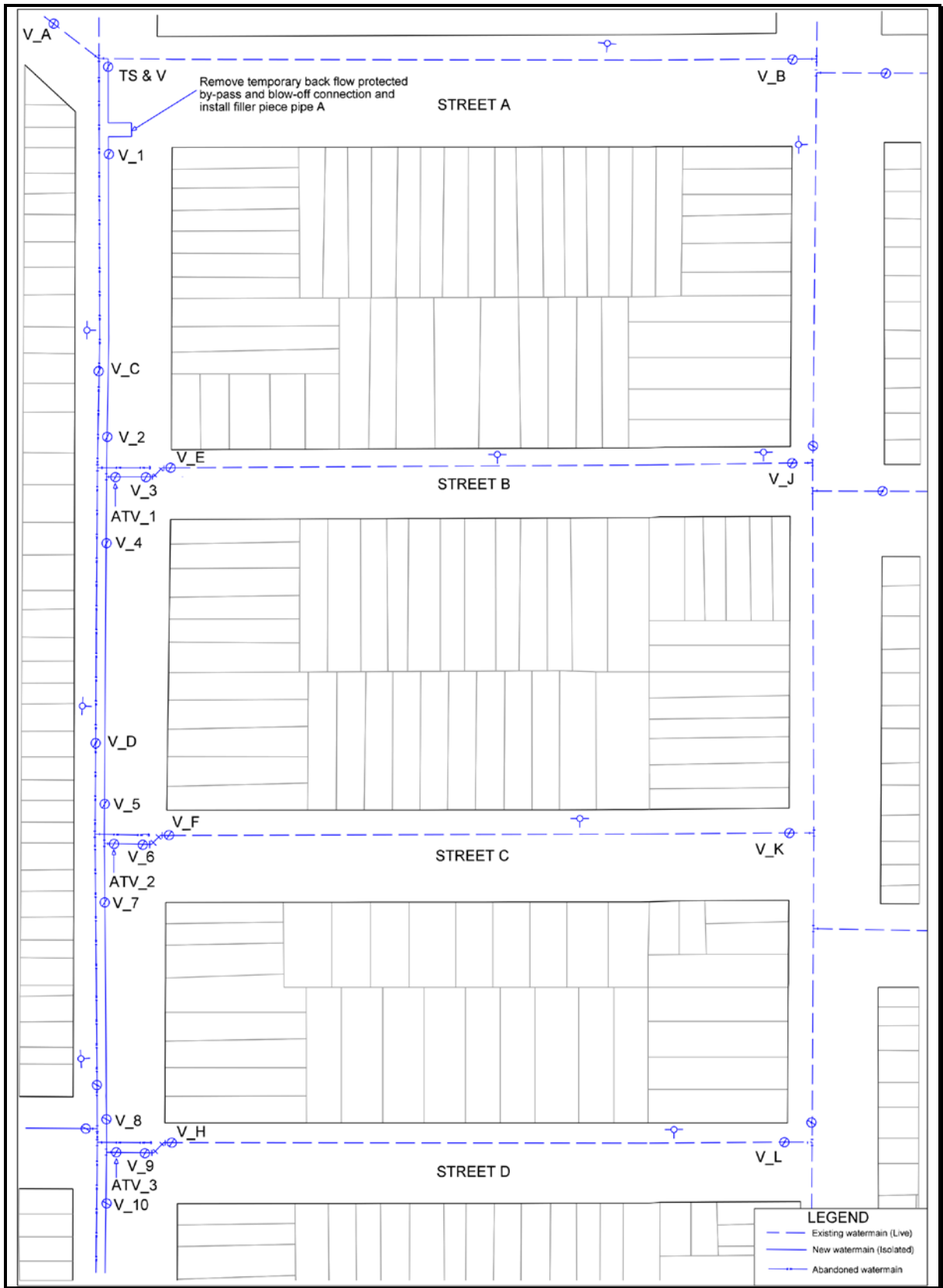


Figure 2: Scenario two – connecting to source feeder watermain