OPERATING PROCEDURE

SUBJECT: ACCEPTANCE OF NEW WATERMAIN CONSTRUCTION

DATE: August 25 2015

A. GENERAL:

In this Operating Procedure, these terms shall be interpreted as follows:

“BACKFLOW PREVENTION ASSEMBLY” means a testable assembly used to protect the City’s water system from contamination or pollution due to backflow or back siphonage.

"CITY" means the City of Chilliwack.

"CONTRACTOR" means the person or persons or the company undertaking the construction of works in a subdivision development, and/or on municipal property, or their employees, subcontractors or his/her duly authorized representative.

“DECHLORINATION” means the process of removing residual chlorine from disinfected water prior to discharge into the environment.

"OWNER/DEVELOPER" means the owner of land or the holder of a bona-fide interim agreement or option to purchase land, who has made application to the City for, or is engaged in undertaking the development of such land and shall include his duly authorized representative

"PROJECT ENGINEER" means the Principal Professional Engineer engaged and designated by the Owner/Developer who shall be responsible to co-ordinate the design supervision, and construction and/or preparation of drawings, specifications and estimates for the construction of works in a Subdivision, Development and/or on Municipal property, or his/her duly authorized representative.

"PROFESSIONAL ENGINEER" means a person who is registered or duly licensed as such, under the provisions of the "Engineers and Geoscientists Act" for the Province of British Columbia.

"WATER SYSTEM" means a system of waterworks approved under the Health Act and owned and operated by the City of Chilliwack.

"WATER MAIN" means any pipe that conveys potable water to any water system, building or facility with in the City of Chilliwack.

"WATER SERVICE" means any pipe that conveys potable water, on private property, to a building or structure with in the City of Chilliwack.

B. INTRODUCTION:

The following procedures apply to all water mains and water services which the City deems testing to be required prior to connection to the Water System.

C. REFERENCE STANDARDS

The following standards apply:

1. City of Chilliwack Subdivision and Land Development Bylaw (latest version).

2. AWWA standard C-600 "Installation of Ductile Iron Watermains and their Appurtenances" (latest version).

3. AWWA standard C-605 "Underground Installation of PVC, PVCO Pressure Pipe and Fittings (latest version)

4. AWWA standard C-651 "Disinfecting Watermains" (latest version).

5. AWWA standard C-655 "Field Dechlorination" (latest version).

6. AWWA Canadian Cross Connection Control Manual

D. BASIC PROCEDURES:

Step 1 – Certification of Design and Construction

A Professional Engineer must certify that the watermain has been designed and constructed in accordance with the Subdivision and Land Development Bylaw, including all specified backflow prevention assemblies.

Step 2 – Hydrostatic Testing

The water main must be pressure tested in accordance with Section E of these procedures. Once the hydrostatic testing has been successfully completed the results of the test are to be certified as acceptable by a Professional Engineer who will add his seal and signature to the test result sheets.

Test results verifying that the water main meets hydrostatic testing standards are to be provided to the City Representative prior to commencement of bacteriological testing.

Step 3 - Disinfection

All new water mains are to be disinfected in accordance with AWWA Standard C651 "Disinfecting Water Mains".

Step 4 – Bacteriological Testing

Samples are to be collected from standard sample points, which are to be installed as per the "Test Point Installation" standard drawing in the City of Chilliwack Subdivision and Land Development Bylaw (latest edition). Samples are to be taken in accordance with Section F of these procedures and AWWA standard C651 "Disinfecting Water Mains". Water Sample Request Form to be submitted for approval 48 hours prior to contractor sample date.

Water samples are to be taken as follows:

First Set – 16 hours after chlorination and final flushing

- Samples to be taken by Contractor or Contractor's Rep Only
- Sample Procedure M99S or equivalent

Second Set – 24 hours after initial set

- Samples to be taken by the City of Chilliwack
- City of Chilliwack to confirm Chlorine residual in water main does not exceed the City's current dosing rate.

Water must stand undisturbed in the new work throughout the testing procedure. If the water main is disturbed in any way during the testing procedure, the City will not take samples and testing must be reinitiated.

Both sets of samples need to meet the following criteria in order to allow the new water main to be connected to the City of Chilliwack's water system.

- ❖ Total Coliform (TC) less than 1
- ❖ E-Coli (EC) less than 1
- ❖ Heterotrophic Plate Count (HPC) less than 500*

**HPC counts of greater than 500 may however be accepted at the discretion of the City's Utilities Superintendent or designate.*
***The City samples are processed with 100 times dilution to achieve a greater accuracy in the sample reading.*

The City will approve the new work for tie in upon receipt of copies of two consecutive sets of passing laboratory test results, indicating acceptable water quality, which has been certified by a Professional Engineer.

However, if the results of the *City's* confirmatory sample indicate a failed test or other conditions indicate improper testing or disturbance of the water main, the City will not approve the work for tie in. Appropriate remedial action is to be taken and the bacteriological testing to be repeated at the owners expense.

Step 5 – Tie In Procedure

Upon acceptable completion of steps 1, 2, 3, and 4, the City will schedule resources to tie in the new work to the City's water system. The date and time of the tie in will be subject to staff availability. The water main is to remain undisturbed from the time of testing until tie-ins are executed. Disturbed work may result in re-initiation of the testing procedure. *Once the tie in is executed and the new water system is made "live" the City will assume responsibility for the operation and maintenance of the new water main as it will then be considered part of the City's water system. This excludes water services as defined by this procedure.*

E. HYDROSTATIC TESTING:

- **Pressurization** – After the pipe has been laid, all newly laid pipe or any valved section thereof shall be subjected to a hydrostatic pressure of at least 200 psi or 1.5 times the working pressure at the point of testing. Each valved section of pipe shall be slowly filled with water, and the specified test pressure (based on the elevation of the lowest point of the line or section under test and corrected to the

elevation of the test gauge) shall be applied using a pump connected to the pipe. Valves shall not be operated in either the opened or closed direction at differential pressures above rated pressure. The system should be allowed to stabilize at the test pressure before conducting the hydrostatic test. Hydrostatic testing should never exceed the designed pipe pressures.

- **Air Removal** – Before applying the specified test pressure, air shall be expelled completely from the section of piping under test. If permanent air vents are not located at all high points, corporation cocks shall be installed at these points to expel the air as the line is filled with water. After the air has been expelled, the corporation cocks shall be closed and the test pressure applied. At the conclusion of the pressure test, the corporation cocks shall be removed and the pipe plugged or left in place as required by the specifications.

- **Examination** – Any exposed pipe, fittings, valves, hydrants, and joints shall be examined carefully during the test. Any damage or defective pipe, fittings, valves, hydrants, or joints that are discovered following the pressure test shall be repaired or replaced with reliable material, and the test shall be repeated until satisfactory results are obtained.

- **Testing Allowance Defined** - Testing allowance shall be defined as the quantity of makeup water that must be supplied into the newly laid pipe or any valved section thereof to maintain pressure within 5 psi (34.5 kPa) of the specified test pressure after the pipe has been filled with water and the air has been expelled. Testing allowance shall not be measured by a drop in pressure in a test section over a period of time.

- **AWWA Standard -** Testing is to be done in full accordance with AWWA C600 and C605.

NOTES:

1. Testing of new water mains is to be against a temporary cap suitably restrained to prevent blowing off under test pressure. Testing must not be done against a closed valve.

2. Prior to commencing flushing, the Project Engineer must submit a flushing plan to the City for approval. The flushing plan must include the proposed date, duration, rate of flow and intended location of discharge.

3. Flushing of the new water mains is to be done through an approved blow-off as per standard drawing in the City of Chilliwack Subdivision and Land Development Bylaw (latest edition), and not through a fire hydrant. The required blow-off size is defined in AWWA Standard C-651 “Disinfecting Watermains”.

The contractor is responsible for appropriate dechlorination and disposal of flushing water.

4. The operation of valves to isolate or fill lines is to be done by City operations staff. The contractor is not to operate any City owned infrastructure. If the contractor is required to provide a minimum of 3 working days notice for activities that required the assistance of City staff.

5. The contractor is advised to achieve one set of "passing" sample results prior to submitting a request for City sampling to occur.

F. SAMPLE COLLECTION

1 The Professional Engineer certifying the test results shall ensure that an adequate number of samples are taken. Requirements for the number of samples to be taken and the location of sample points are defined in AWWA Standard C-651 "Disinfecting Watermains".

2 Label sample bottle as follows (use only sterile bottles provided by the laboratory for coliform testing):

- **Water system name - City of Chilliwack**
- **Location** of water sample, and
- **Date and time** of sample collection (laboratories require the date and time to be in the following order.)

  December XX, XXXX (10:00 am)

3 Complete the bacteriological test chain of custody form. For testing purposes all samples should have minimal chlorine residual present (less than or equal to City residual level). The required tests are total coliform, fecal coliform and heterotrophic plate count for all samples.

4 Follow the sampling procedure as illustrated below.

i. Collect water samples from identified sampling locations/sample points.
ii. **Do not rinse the bottle.** Sample bottles contain a small amount of Sodium Thiosulphates to neutralize residual Chlorine that may be present in water. Do not tip out the Sodium Thiosulphate.
iii. Remove aerators, swivels, hoses or any other peripherals attached to/on tap being used.
iv. Put on sanitized gloves to avoid contamination.

v. **Disinfect the sample point** with an alcohol wipe or strong Chlorine solution (solution of 10 ppm – i.e. 10 drops of bleach in to 100ml of water).
vi. Run the sample point for a minimum of 2 to 5 minutes.
vii. Remove the cap from the sterile bottle and **take a sample from running water**, and fill just above the fill line. (Do not let your fingers come into contact with insides of the bottle or the lid.)
viii. **Replace cap immediately**.
ix. Place the completed requisition form inside a Ziploc bag and attach the bag to the bottle with an elastic band.

5 Place the water sample immediately into a cooler with ice or plastic-coated coolants to maintain a temperature of 4 degrees Celsius. The cooler must have a lid that does not allow sunlight to enter when closed.

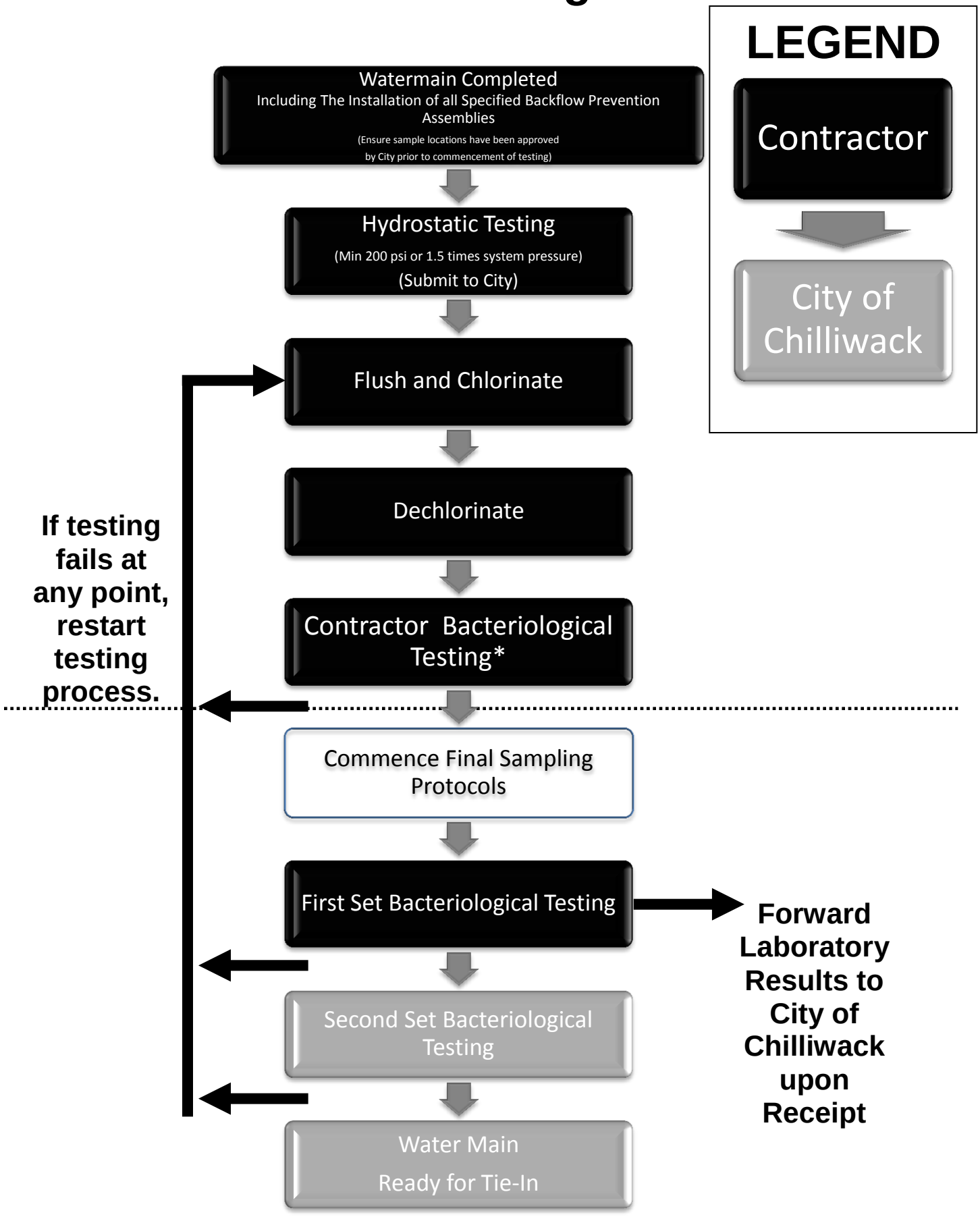
6 Transport to the nearest laboratory within the same day.

7 Upon arrival at the laboratory, the samples should be immediately placed in a 4 degree Celsius refrigerator.

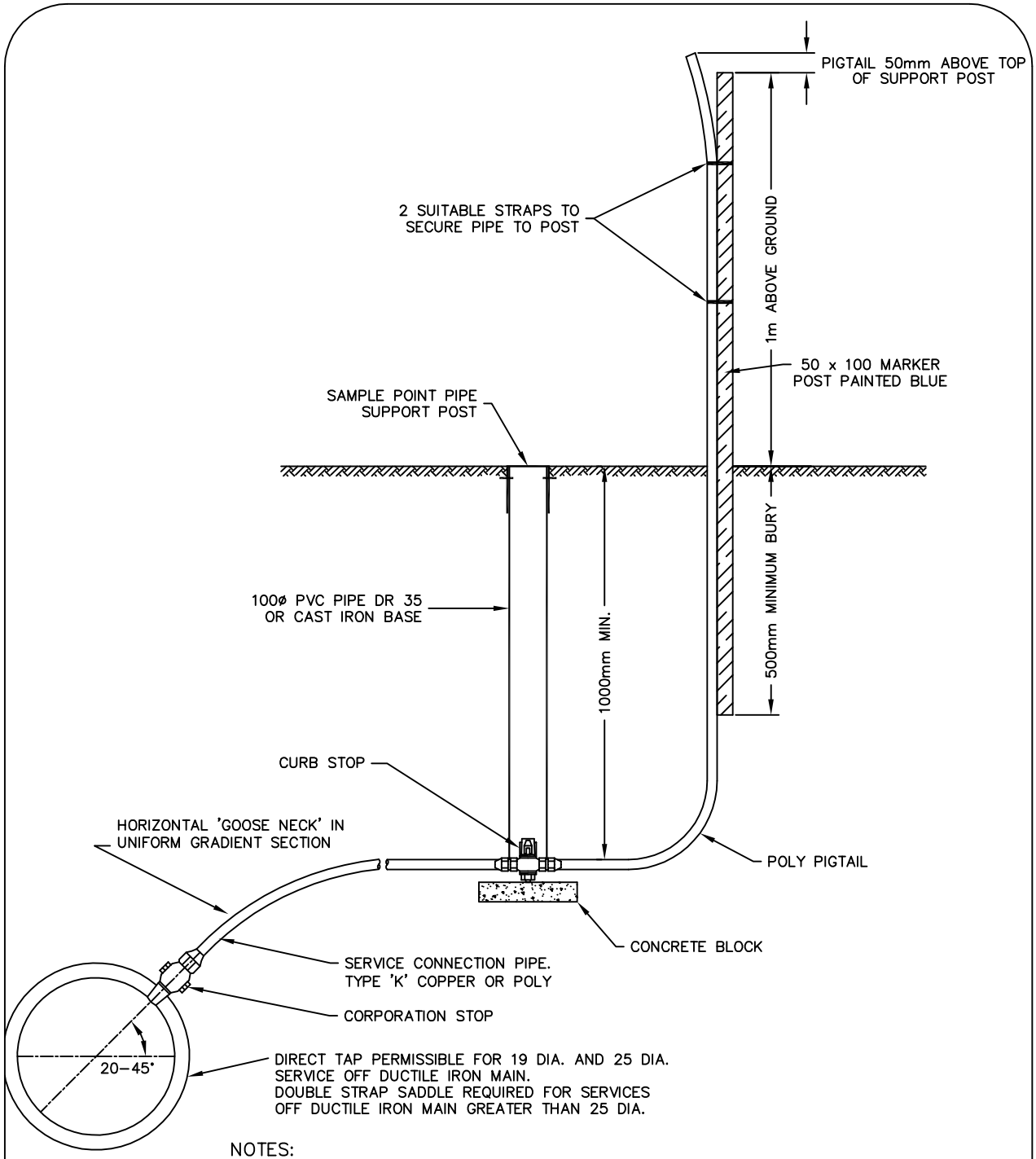
It is important to prevent any sample container from being immersed in the ice water within the cooler. Always wipe dry all bottles that have been stored in ice or have come in contact with any solids or liquids that may have been in the cooler. It is possible that these extraneous materials could contaminate the sample during analysis.

Note: Water sample labels must be accurate and in clear print to ensure correct testing by the Laboratory.

New Water Main Testing Procedures



*City suggests submitting a "passing" set of bacteriological test results completed by the contractor prior to entering final sampling protocols to avoid the cost of repeat testing.



NOTES:
1. This detail to be used only for testing during construction.
2. Test points are not to be used for water main flushing.
3. Future service connection may be used as a sample point if configured as shown on this drawing.
4. Test points are to be located outside of roadway or in boulevard. Installations in manholes or confined spaces are not acceptable.
5. If sample point needs to be provided in an alternate method, City approval must be obtained.
6. This detail for services 19 to 50mm only.

TEST POINT INSTALLATION DURING WATER MAIN CONSTRUCTION

TEST POINT INSTALLATION		
	REVISED:	APPROVED:
CITY OF CHILLIWACK	APPROVED:	DWG. NO.
	DATE: 02/14	DW–6
	DRAWN: SEH	