



## **Site Service Installation - Rational Sampling Program**

### **RE: Building Permit And Field Review Requirements For The Installation Of Sanitary, Storm And Water Works \***

\* **Typically** these systems are installed on properties which are not directly covered under Subdivision Control Agreements made under the authority of the Planning Act

#### **Introduction:**

Installation of sanitary sewers, storm sewers and water piping requires the issuance of a Building Permit prior to commencement of installation.

Site Plan Approval Process should not be confused with the Building Permit Issuance Process, both are separate and address different requirements. For example, Site Plan addresses storm water management planning and the Building Permit process addresses specific requirements for installation of underground piping.

The installation of any water service pipe 100mm (4") in size or larger, must meet the requirements set out in attachment "D".

Section 18 of the Ontario Building Code Act and Division "C" — 1.2.1.1. of the Ontario Building Code provides for general review of the construction of buildings in accordance with the performance standards of the Association of Professional Engineers of Ontario and forwarding copies of written reports arising out of the general review to the Chief Building Official by a Professional Engineer retained to undertake the general review of the project.

Section 78 of Regulation 941 made under the Professional Engineers Act prescribes the performance standards with respect to general review of the construction, alteration or enlargement of a building by a Professional Engineer as provided for in the Building Code under the Building Code Act.

## REQUIREMENTS FOR ISSUANCE OF BUILDING PERMIT:

A Professional Engineer undertaking to provide general review of the construction of site services as required by the Ontario Building Code shall:

1. **Prior to permit issuance**, submit to the Chief Building Official a completed Commitment Form signed by a Professional Engineer who has been retained to carry out field review and also signed by the owner. (See attachment "A")
2. **Prior to Permit issuance**, the Professional Engineer retained to carry out the field review shall submit to the Chief Building Official a written letter outlining the proposed rational sampling program to be undertaken to confirm construction is completed in accordance with the Ontario Building Code requirements and any other Ministry guidelines. (See attachment "B")
3. **Prior to Permit issuance**, the Chief Building Official reviews and if required revises proposed rational sampling program to be undertaken for field review. This is then signed and returned to the Professional Engineer. The Professional Engineer shall in turn give the owner/client a copy of the reviewed and accepted rational sampling program.
4. **After permit issuance**, written reports arising from the field review shall be submitted outlining progress of work, observed deficiencies and the status of their rectification.
5. **Upon completion of the work and prior to putting the system into use** (as per Division C — 1.3.3. of the Ontario Building Code) provide to the Chief Building Official confirmation that the general review has been carried out in accordance with the Professional Engineers Act, the requirements of the Ontario Building Code and the requirements regulating water quality testing for 100mm and larger water services (See attachment "C")

If you have any questions about the above mentioned information please do not hesitate to contact the Building Department at 519.740.4613.



**Attachment "A"**  
**Commitment to General Review**  
**Architect and Professional Engineers**  
**As required under Div. C-1.2.1.1 of the Ontario**  
**Building Code**

Planning and Development,  
50 Dickson St., 3rd Floor,  
P.O. Box 669,  
Cambridge, Ontario  
N1R 5W8

**Permit No.** \_\_\_\_\_

Phone – (519) 740-4613;

TTY - (519) 623-6691

**This Form shall be filled out and returned to our office. We cannot issue Permit until this Form is received by this office.**

**Project:** \_\_\_\_\_ **Location:** \_\_\_\_\_

**Re: Field Review of the Building by an Architect and/or Professional Engineer during the Course of Construction**

The owner hereby warrants that:

1. The building has been designed by an Architect and/or Professional Engineer as required by Subsection 1.2.1 of the Building Code, Ontario Regulation 403/97, as amended.
2. The building, during construction, will be under the field review of the Architect and/or Professional Engineer in accordance with Subsection 1.2.2 of the Building Code.
3. If the Architect or Professional Engineer named herein ceases to provide the field review, another Architect or Professional Engineer will be retained immediately so that the field review will continue uninterrupted and the Chief Building Official will be notified accordingly.
4. Written reports arising out of the general review shall be forwarded immediately to the Chief Building Official by the Architect, Professional Engineer or both in accordance with Sentence 1.2.2.1(1) of the Building Code.
5. The newly constructed building or building addition (whichever is applicable) will not be occupied before a final inspection has been conducted and approval for occupancy has been granted by the Chief Building Official.
6. Construction will not proceed until a permit is issued by the Chief Building Official.

Not limiting the generality of the foregoing,,the **field review** of the following aspects of construction will be undertaken by:

Check	Item	Name of Professional Phone Number (Please Print)	Signature Of Professional
	Architect Prime Consultant <input type="checkbox"/>		
	Structural Engineer (Roof Drainage Declaration If Applicable) Prime Consultant <input type="checkbox"/>		
	Mechanical Engineer		
	Electrical Engineer		
	Site Services Sanitary, Storm, Water		
	OTHER		

**Owner:** \_\_\_\_\_ **Signature:** \_\_\_\_\_  
(Please Print)

Note: Personal information contained on this form is collected pursuant to the Building Code Act and will be used for the purpose of responding to your application. Questions about this collection of personal information should be directed to the City's Freedom of Information Co-ordinator in the Public Access and Council Services Department at 519.740.4680, Ext. 4079.

**Example of Rational Sampling Submission**

April 15, 2008

City of Cambridge  
P.O. Box 669  
50 Dickson Street  
Cambridge, ON N1R 5W8

Attn: Chief Building Official

**Re: Rational Sampling Program**  
**Location: 123 Somewhere Street**  
**Permit: 00-000000**

Dear Sir:

We have been retained to carry out the general review of the construction of the sanitary sewer, storm sewer and waterworks (insert what applies) for this building in conformance with Section 78 of Ontario Regulation 941, made under the Professional Engineers Act, 1990.

The scope of our review covers the sanitary sewer, storm sewer, and waterworks as shown on the drawings prepared by ABC Engineering under the professional seal of J. Doe, P. Eng. This review will be carried out in accordance with the PEO Guidelines for Professional Engineers Providing General Review of the Construction as required by the Ontario Building Code.

Attached is the rational sampling program that we propose to follow in the execution of this work. Please advise us if you have any additional requirements with respect to this review.

Yours truly,

ABC Engineering

J. Doe, P. Eng.  
JD/jd

Cc: XYZ Consultants

**Sealed with P. Eng. Stamp**

## **"B" Example of Rational Sampling Program**

The site servicing an grading works for the proposed restaurant at 123 Somewhere Street includes the following:

1. Site grading in accordance with ABC Engineering drawings ..
2. Installation of approximately XXX metres of store sewer and related apparatus,
3. Installation of approximately XXX metres of sanitary sewer and related apparatus, and
4. Installation of approximately XXX metres of water main and related apparatus.

To confirm construction is complete in accordance with the Ontario Building Code, the following rational sampling program will be implemented.

### **Pre-Construction Co-ordination**

Prior to construction, the General Contractor will arrange a site meeting with the Engineer and the City of Cambridge Plumbing Inspector to review the proposed construction schedule and provide the names and telephone numbers of all subcontractors involved in the servicing of the subject site.

### **Site Inspections**

During the course of construction the Engineer and/or his representative shall periodically inspect the site works as set out below, written reports arising out of the field review shall be forwarded immediately to the Chief Building Official for review.

1. Compaction an grading work on piping is to be inspected and tested by the Engineer  
(NOTE: State number and frequency of inspections)
2. Storm and sanitary sewers and water main to be inspected prior to backfilling trenches  
(NOTE: State number and frequency of inspections)

NOTE: If unusual circumstances or systems (i.e. frost protection, meter chambers, etc) are involved specific or additional site inspections shall be required. (Please outline them as required)

### **Services Testing Inspection**

The Engineer and/or his representative will supervise the air and water testing of the sanitary sewer and water main (including bacteriological testing) services in accordance with the latest Ontario Provincial Standards and ANSI/AWWA C651-99 standard for disinfecting water mains. NOTE: Bacteriological test results are to be submitted for review by the City of Cambridge.

### **Review and General Confirmation Certification**

Upon the completion of the work and prior to putting the system into use, the Engineer shall provide to the Chief Building Official confirmation that the general review has been carried out in accordance with the Professional Engineers Act and the requirements of the Ontario Building Codes.

**Example of a Letter of Confirmation**

April 15, 2008

City of Cambridge  
P.O. Box 669  
50 Dickson Street  
Cambridge, ON N1R 5W8

Attn: Chief Building Official

**Re: Letter of Confirmation**  
**Location: 123 Somewhere Street**  
**Permit: 00-000000**

Dear Sir:

We have carried out the General Review of the Construction of sanitary sewer, storm sewer and water main (or whatever applies to the specific case) work for this building in conformance with Section 78 of Ontario Regulation 941, made under the Professional Engineers Act, 1990.

The sanitary sewer, storm sewer, and water main (or whatever applies to the specific case) work as shown on the drawings prepared by ABC Engineering under the professional seal of J. Doe, P. Eng., has been built in general conformity to the approved permit drawings and specifications including any amendments thereto and the review has been carried out in general conformance with the PEO Guidelines for Professional Engineers Providing General Review of the Construction as required by the Ontario Building Code.

Yours truly,

ABC Engineering

J. Doe, P. Eng.  
JD/jd

Cc: XYZ Consultants

**Sealed with P. Eng. Stamp**



## City of Cambridge Water Distribution

Please read the attached "Water Quality Testing Requirements for New 100mm and Larger Water Services on Private Property" document. This document is based on *The Region of Waterloo and Area Municipal Design Guidelines and Supplemental Specifications for Municipal Services: Part D Construction Specifications, Section D2: Watermains*. Further details for the following procedure can be obtained by contacting the City of Cambridge Public Works Division at 621-0740.

Some key points regarding the Watermain Connections policy include:

- The new watermain and the existing shall be kept physically separated until the watermain has successfully passed pressure, leakage and bacteriological tests.
- All test reports are to be on site when the Public Works employee comes to turn the water on. A copy will also then be sent to the Engineering Division, attention Chief Municipal Engineer.
- The temporary bypass connection shall be equipped with an appropriate backflow prevention device. The test reports for the backflow device shall be on site.
- Under **no** circumstances is a connection to the municipal water system to be made without the consent of the City of Cambridge Public Works. Please note, as per regulatory requirements, only certified water operators may isolate watermains or reconnect isolated watermains.
- Only City of Cambridge Public Works employees shall perform the operation of valves on existing watermains for the purpose of controlling water.

### **Failure To Comply With The Requirements Will Result In Termination Of The Water Service.**

Any questions please contact:

Public Works Department  
1310 Bishop Street  
Cambridge, ON N1R 6V5  
Phone: (519) 621-0740  
Fax: (519) 622-8032



**Water Quality Testing Requirements For  
NEW 100mm and Larger Water Services on Private Property  
(Revised March 5, 2008)**

**This policy is to be implemented immediately and applies to all new and/or replacement water services, 100mm and larger in size, on private property.** The new water service shall be kept isolated from the existing municipal water main using a physical separation until satisfactory bacteriological testing has been completed and accepted by the authority having jurisdiction (City of Cambridge Public Works department). Water required to fill the new water service for hydrostatic pressure testing, disinfection, and flushing shall be supplied through a temporary connection between the municipal main and the new water service (as detailed DGSSMS, Region of Waterloo, Design Guidelines and Supplemental Specification for Municipal Services Diagram SSMS-E2-17). The temporary connection shall include an appropriate approved cross-connection control device consistent with the degree of hazard. The Contractor must provide proof of being a certified installer of backflow preventers as well as an up to date certificate for the backflow prevention device being used (to ensure operation in accordance with CAN/Canadian Standards Association-B64 Series Manual). All work must be in compliance with OPSS (Ontario Provincial Standard Specifications) and City of Cambridge Supplemental Specifications to OPSS.

Prior to the initiation of the watermain commissioning procedures, the Contractor shall submit a Watermain Commissioning Plan to the City of Cambridge Engineering Department, Chief Municipal Engineer. The Watermain Commissioning Plan shall contain a complete description of all the steps the Contractor will undertake to ensure the watermain satisfies all the testing and sampling requirements, and must be approved and signed by the Contractor's Engineer. The Watermain Commissioning Plan shall be submitted a minimum of two (2) weeks in advance of the initiation of the watermain commissioning. This plan shall also include the specific reporting protocols as described under the particular commissioning procedures in the following sections

## **Procedures**

### **Source Water Connection**

All connection points between new watermains and the existing shall be kept physically separated until the watermain has successfully passed pressure, leakage and bacteriological tests.

A temporary connection to the existing water distribution can be made through the use of temporary jumper connection equipped with a backflow prevention device. The Contractor must keep the backflow prevention device in a clean and protected area.

The jumper connection shall be a maximum of 50 mm in diameter.

The backflow preventer shall be a double check or a reduced pressure type assembly and shall be installed, maintained, and field-tested in accordance with the latest edition of CAN/CSA-B64.10.

If a water meter chamber is being utilized, the jumper is to be placed within the chamber. Upon successful testing of the new service, the jumper is to be removed immediately and the new water meter put in its place. Once the meter has been installed, an inspection of the water meter and its chamber are required prior to the water service being turned on again. This inspection is to be made through the Building Enforcement/Public Works Department, and scheduled no later than two business days prior to completion.

If a chamber is not required, the removal of the jumper and final connection to the distribution system must be observed and approved by City of Cambridge staff. This inspection is to be scheduled with the Public Works Department no later than two working days prior to commencing. This inspection must take place prior to the water service being turned on again.

The professional engineer must verify and have available upon request the testing certification of the backflow prevention device (used on the temporary connection) and the certification of the sampler.

### **Swabbing**

To address long term bacteriological concerns, the Contractor shall charge the watermain fully with water prior to the commencement of swabbing.

In addition, the Contractor shall demonstrate how the appropriate swabbing velocity (0.5 to 1.0 m/s) will be achieved as part of the commissioning plan.

Stubs for future watermains longer than five (5) metres and/or 100mm in size or greater shall be swabbed.

Servicing stubs 150mm diameter and larger and longer than five (5) metres shall be swabbed.

### **Flushing**

Flushing shall be carried out after the swabs have exited the new watermain until all discoloured water is eliminated.

When flushing, ensure the level of any water in the trench is always below the exposed water main.

After swabbing has been completed, the Contractor shall flush every fire hydrant to remove any remaining discoloured water.

## **Disinfection and Hydrostatic Pressure Testing**

Disinfection and hydrostatic pressure testing must be carried out in accordance with OPSS 701.

After flushing is completed, liquid chlorine shall be introduced to the new piping section to provide a concentration of 50 mg/L minimum throughout the new water service and the system shall be left charged for a minimum of 24 hours.

Obtain a sample of the chlorine residual after 24 hours contact time. If this residual is less than 25 mg/L, repeat the chlorination process.

## **Dechlorination**

Upon successful disinfection, the water within the watermain must be discharged. The Contractor shall flush every part of the water system including fire hydrant leads, stubs for future watermains and services to remove all super chlorinated water.

The Contractor shall provide acceptable equipment and chemical additives to dechlorinate the water that must be wasted. Total residual chlorine in water discharged into storm sewers, drainage ditches or watercourses shall not exceed 0.002 mg/L, as required by the Ontario Water Quality Objectives. When discharging to a sanitary sewer, total residual chlorine shall not exceed 0.2 mg/L.

## **Bacteriological and Chlorine Residual Testing**

Recharge the system with city water and leave charged for a minimum of 2 to a maximum of 4 hours after flushing has been completed before taking bacteriological samples. While charging the watermain, both a "Total and Free Chlorine residual" must be taken from the source supply; this initial residual will be the benchmark that all other required chlorine residuals are compared to.

After the initial waiting period, two consecutive sets of water samples, taken at least 24 hours apart, shall be collected every 350 metres, plus from the end of the line and from each branch. Each sample collected must include a "Total and Free Chlorine residual" reading. The chlorine residuals taken during each bacteriological sample must be equal to the initial source water residual within  $\pm 0.2$  mg/L.

There shall be no flow in the water main from the time it is recharged until after the second test; to ensure this, the new main will be isolated via the service valve positioned downstream of the temporary bypass.

Note: Only certified testing personnel shall collect water samples and only an accredited lab shall be used to perform the bacteriological testing. Associated costs for testing shall be the responsibility of the project owner.

**Minimum requirements for acceptability of bacteriological tests are:**

<b>Parameter</b>	<b>Required Test</b>	<b>Acceptable Result</b>
E. Coli	Presence/absence	Absent
Total Coliform	Presence/absence	Absent
Background Colony Count	CFU (Colony Forming Units)	<b>&lt;= 25 CFU</b>

A professional engineer must interpret the water quality results to assess if the bacteriological test has passed. The professional engineer must prepare a certification letter, comprised of a copy of the bacteriological results signed by the professional engineer attesting to passing results and clear indication of the sampling locations; this letter must be provided to the Chief Municipal Engineer for approval.

If the samples taken do not show acceptable bacteriological quality, the service must be re-chlorinated and additional samples taken until acceptable results are obtained (2 consecutive tests are required - see requirements above).

All original sampling locations must be re-sampled even if the location had passing results during the first sampling round. The possibility exists that water can migrate and the contamination can spread. The Public Works Department may require additional sampling locations.

**Water Meter Requirements**

All water meter requirements and standards must be completed and approved prior to the final connection to the water distribution system. In the case where a meter chamber is being used, the installation of the meter will serve as the final connection.

A Water Demand Calculation form must be completed and submitted to the City of Cambridge Engineering Department prior to the water meter being issued. This form will document all fixtures within the facility; this will be used by City staff to determine the appropriate water meter size. This form may be obtained from the Engineering Department.

**If a water meter has not been installed, final connection will not be permitted. If it has been determined that a final connection has been made without a water meter being installed, the water service will be shut off until such time that an approved water meter has been installed. Connecting to the water supply without a meter in place is in violation of City of Cambridge Water Use By-Law 146-03.**

**Final Connection to Existing Water System**

Once the Contractor's professional engineer provides his final certification letter to the Chief Municipal Engineer (and such approval is granted) and the Planning Department has no outstanding issues, the temporary bypass may be removed and the final connection made, as detailed in DGSSMS (Region of Waterloo, Design Guidelines and Supplemental Specification for Municipal Services) Diagram SSMS-E2-17. If a temporary water system has been installed, it shall not be removed until after the Chief Municipal Engineer has accepted the final connection of the new watermain to the existing municipal system and has authorized the removal of the temporary water system.

Prior to making the final connection, the interior of all new pipe, couplings and sleeves being installed must be first swabbed and sprayed with a 1% to 5% sodium hypochlorite solution. Note that all disinfectants used must be NSF Standard 60 certified; use of uncertified disinfectants is strictly prohibited.

Final connection is to be inspected by the Building Dept and requires 48 hours advanced notice for the appointment. The Contractor is required to arrange an appointment 48 hours in advance with Public Works to turn the water on once final connection has been made.

Prior to the water being turned on, the Contractor will be required to present the Certification Letter to Public Works Water Utilities staff. When the water is turned on by the City of Cambridge, flush the affected area using existing valves and hydrants to eliminate any discoloured water, contamination and air that may have been introduced. Should contamination occur, the entire cost of disinfecting the contaminated mains will be at the owner's expense.

The City of Cambridge reserves the right to implement a third round of bacteriological testing at the Contractor's expense if it is suspected that contamination of the new watermain has occurred.

#### **Additional Notes**

\* Operation of valves on existing watermains for the purpose of controlling water shall be performed solely by authorized personnel (City of Cambridge). No one other than authorized personnel shall shut down or charge any section of watermain or operate any valve for the purpose of controlling water from existing City watermains. The Contractor shall provide the Public Works Department with at least two working days advance notice when control of the water is required. All necessary water supply interruptions shall be scheduled during the hours of 7:30 a.m. and 2:30 p.m. on working days.

If a water service line serves **only** a fire hydrant(s) and is less than 20 feet in length, it only requires adequate flushing.

#### **For additional information regarding this policy, please contact:**

Public Works Department - (519) 621-0740

Engineering Department – (519) 740-4682

**Checklist -**

<b>Step #</b>	<b>Requirement</b>	<b>Additional Notes</b>	<b>Date Completed</b>
1.	Watermain Commissioning Plan	Submit to Engineering Dept minimum 2 weeks prior to commissioning	
2.	Complete Water Demand Form	Submit to Engineering Dept.	
3.	Make Source Connection w/ backflow device	As per Diagram SSMS #2-17	
4.	Swab Piping	Fully charge main prior to swabbing	
5.	Flush (post swabbing)	Flush until water is clear	
6.	Disinfect/Pressure Test	As per OPSS 701	
7.	Flush/Dechlorinate piping	Ensure dechlorination is used	
8.	Chlorine/Bacti Sampling	Samples to be taken 24 hours apart	
9.	Install Water Meter	Verify correct size w/Engineering	
10.	Certification Letter preparation/Submission	To be completed by a Professional Engineer and submitted to Public Works	
11.	Certification Letter Acknowledgement	Public Works will sign and return Certification Letter	
12.	Make Appointment with Public Works for Final Connection	Appointment must be made at least 48 hours in advance; charges may apply	