

GEID INSPECTION REQUIREMENTS AND CONSTRUCTION STANDARDS

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BACKGROUND

For Developers works including water mains that are installed in new developments that will become GEID property. GEID requires that the developer retain a Professional Engineer licensed in good standing and insured in the Province of B.C., to conduct inspections on their behalf.

ENGINEER REQUIREMENTS

The Engineer must submit proof of current registration with APEGBC, along with proof of liability and errors and omissions coverage at a minimum level of \$2,000,000.00. The engineer is responsible to complete inspections as directed by GEID in this policy. These inspections must ensure that all water works installed meet all applicable GEID, City of Kelowna, and MMCD requirements. GEID may at their discretion conduct periodic observation to ensure that installation conforms with GEID requirements and that inspections are carried out as required.

NOTIFICATION REQUIREMENTS AND GEID MANDATORY INSPECTION MILESTONES

A mandatory on-site pre-construction meeting is required to review GEID construction standards and inspection policies prior to construction. The meeting shall include GEID, the developer's consulting engineer and engineer's site inspector, and the contractor and contractor's site foreman. The developer's engineer is to bring copies of most recent construction drawings along with an IHA construction permit applicable to the most recent drawings.

GEID requires one working day notice prior to pouring concrete for thrust blocks so that GEID can inspect pipe deflection, rebar and formwork. A minimum of three working days' notice is required for tie-in to existing GEID water main.

A substantial completion inspection by GEID is required prior to paving to inspect installed works. It is recommended that this inspection be scheduled with sufficient time to repair any deficiencies identified by GEID prior to paving. All densities, daily inspection records, and digital photos are to be delivered to GEID prior to requesting a substantial completion inspection. A final inspection is required after paving

BONDING REQUIREMENTS

For the works that will become the property of GEID, the Developer or their Contractor is required to post bonding. In the event that a water letter is issued by GEID prior to substantial completion of the works or working on public roadway, a Performance Bond must be provided to GEID by the developer in the amount of 125% of the estimated construction cost of the waterworks, which shall include 10% engineering. This bond will be released by GEID upon substantial completion of the waterworks, along with associated requirements such as registration of an SRW, receipt of a Maintenance Bond, etc.

The Developer shall provide a Maintenance Bond in the amount of 50% of the total value of the waterworks for a one (1) year period from the date of substantial completion by GEID. If there are concerns with the installation quality of the works (including failure to meet GEID documentation requirements or inspection

reporting timelines, listed below) due to the performance of the Contractor or the Developer's engineer, GEID reserves the right to refuse acceptance of the works, or to extend this maintenance period to two (2) years or more if it deems necessary.

GEID INSPECTION, OBSERVATION, AND ADMINISTRATION FEES

To cover the cost of the drawing review process and observation during construction of water works for new development, GEID will charge the Developer 3% of capital cost of the waterworks portion of project, payable prior to the issuance of Water Letter.

Additional Connection Inspection fees will be charged for each connection to the existing water system which is overseen by GEID staff, payable prior to issuance of Water Letter.

DESIGN AND INSTALLATION REQUIREMENTS

All design drawings shall meet the following standards in order of precedence: GEID policies and bylaws, City of Kelowna Subdivision, Development and Servicing Bylaw, MMCD standard conditions and specifications, and AWWA standards.

1. A soil resistivity study must be completed to determine the level of cathodic protection required.
2. Pipe bending is not permitted. Deflection is not permitted in cast fittings.
3. The minimum soil cover is 1.5m over top of pipe and the maximum soil cover is 2.2m to invert of pipe.

INSPECTION REQUIREMENTS

Specific requirements for the developer's engineer to carry out during inspection include but are not limited to these duties listed below:

A. Density Testing

The developer shall arrange and pay for an independent material testing agency to provide quality control testing for all materials supplied and incorporated into the works. Material Quality and Compaction Testing shall be conducted on aggregates, bedding, and trench backfill and shall include, but not limited to the following tests:

1. Sieve analysis
2. Density analysis of utility pipe zone and trench backfill zone, including bedding sand

Representative density tests are to be conducted on an average of 75m apart in each lift in a series of not less than three tests staggered no more than 25m apart.

The maximum backfill lift depth for each lift to be 300mm, and compaction must meet City of Kelowna specifications in City of Kelowna Subdivision, Development and Servicing Bylaw. The geotechnical engineer for the site may require reduced thickness lifts depending on their testing results.

The District may at their discretion, direct that random tests be conducted of the materials provided and work performed to ensure compliance with the specifications. The cost of failed random tests will be borne by the developer. The frequency of random tests would increase with non-compliance of the results.

Where testing reveals the materials, and or works, do not comply, and the developer's contractor is unable to provide successful test results from an independent testing agency, then all works and materials which have failed testing shall be rejected and the materials removed from the site and the works redone.

B. Photo Record

A Digital Photo Record shall be taken by the inspecting engineer, clearly showing the installation of the following works:

1. All fittings (bends, tees, wyes, etc.) both before and after thrust blocks or restrainers are installed
2. Each fire hydrant, both before and after thrust blocks or restrainers are installed
3. 25% of all curb stops, and main corps, taken randomly throughout the project. Locations to be identified with a white board of service no. and location in photo
4. Pipe installation photos, to include periodic visual record of the following (minimum two photos of each of the following per site, and a minimum of one photo of each type every three days):
 - Compaction methods. Both hand tamping and mechanical methods
 - Verification of minimum 100mm sand compacted under the pipe and minimum 300mm sand over pipe (i.e., picture to include survey rod referencing depth to pipe from top of sand cover)
 - Testing procedures
 - Location of pipe
 - Pipe insertion to manufacturers maximum insertion depth
 - Pipe deflection
 - All photo locations to be identified with a white board showing, date, time, photo description, location in photo and camera operator
5. The inspecting engineer shall ensure that photos are of adequate resolution (minimum image size of 3 megapixels), and show relevant details.

C. Inspection Reports

Daily inspection reports are to be provided to GEID during construction. Reports are to be submitted via email to GEID by the following working day to ensure that GEID is updated on the progress of construction. The inspection reports shall include the following:

1. Pressure testing as per MMCD and City of Kelowna Subdivision, Development and Servicing Bylaw;
2. Bacteriological testing as per IHA requirements and to meet AWWA Standards. Samples are to be collected by the engineering consultant and submitted to the laboratory using a chain of custody;
3. Density testing results;
4. Daily inspection record (works completed during the day, etc.);
5. Daily listing of change orders and variances from GEID-approved design during construction;
6. Digital photos.

Failure to submit complete reports in a timely manner as required above will compromise GEID's ability to accept the works upon completion, delay substantial performance, or lead to refusal by GEID to tie-in the developer's works to GEID's water system. If reports are not submitted as required, GEID may, at the expense of the developer, require that one or more of the following be completed prior to accepting the works: expose buried works for inspection; remove and replace works with adequate inspection and reporting; extend the maintenance bonding period to two or more years; require payment of 10% of construction costs for GEID to retain an independent engineer to complete remaining inspections; and / or require that the contractor stop construction of water works until inspection reports are provided.

SUBSTANTIAL COMPLETION AND END OF PERFORMANCE BONDING

Stamped certification must be submitted by the Developer's Engineer that all works have been installed in accordance with approved plans, prior to release of performance bonding and start of the maintenance bonding period. In addition, a notification of substantial completion must be issued, and an inspection and review of deficiencies must be completed with the contractor, GEID, and the Developer's engineer.

Please note that no water main tie-ins will be permitted, and performance bonding will not be released until such time as any required SRWs are registered.

The Developer's Engineer shall:

1. complete new hydrant data and new hydrant service forms for hydrant registration to the Kelowna Fire Department;
2. complete forms for all new cathodic installation locations per GEID "Cathodic Protection New Installation Data Form";
3. provide certified confirmation of tracer wire continuity prior to paving or bond release.

FINAL INSPECTION AND END OF MAINTENANCE BONDING

Following the one-year maintenance period, and following remediation of all deficiencies, the maintenance bonding will be released provided that no outstanding deficiencies remain, and that GEID has no concerns regarding the quality of installation or workmanship.

Record (as-built) drawings will be provided to GEID which include all offsite works. GEID requires (1) set of prints stamped by the Developer's engineer, (1) set of drawings in digital format (Auto Cad R14 or newer) and (1) set of drawings in Adobe PDF format prior to release of the maintenance bond for the works, and final acceptance of the works. The engineer shall also provide GEID with the actual final construction cost of the works, as this information is required for asset management and annual reporting by GEID's auditors.

The developer's engineer shall prepare and submit a complete digital record of the works to GEID upon completion of the project. The digital record shall be organized using the following directory structure for consistent reference:

1. Project Name
2. As-constructed Drawings (both PDF and DWG formats)
3. Daily Inspection Reports (naming convention to be based on day in YYMMDD format, i.e. 080403insp.pdf)
4. Photos (using following naming convention):
 - Object Type – Station – Date (yy/mm/dd)
 - An example for a hydrant located at station 1+750, and taken on April 3, 2008 would be: HYD-1+750-080403.jpg
 - Object types include: HYD (Hydrant), VAL (Valve), TEE (Tee and cross fittings), BND (Bends), CRB (Curb stop / Corporation Stop), INS (pipe installation, including a minimum of one photo for every 75m of pipe length showing compaction, cover material), and CMP (compaction).