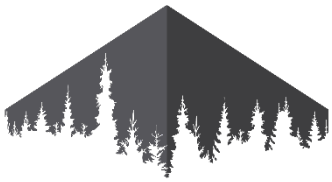
Town of Labrador City
Municipal Development Standards



LABRADORCITY

Revised:

June 15, 2017

Municipal Development Standards

The Town Council of Labrador City hereby adopts the following Municipal Development Standards.

Made and adopted by the Town Council of Labrador City on 11th day of September 2017.

Town Clerk

Mayor, Deputy

Foreword

The "Town of Labrador City Municipal Development Standards" provides information to contractors, developers and engineers who require a working knowledge of the Town of Labrador City standards and procedures as they relate to the design and construction of municipal infrastructure that will be owned and maintained by and for the Town.

It is recognized that errors, omissions and inconsistencies may have occurred during the preparation of this manual and that technological changes will continue to occur. The Town of Labrador City appreciates any comments and supplemental information which may be submitted to the Town for consideration and incorporated into future revisions of this manual. Please contact the Town Engineer at (709) 944-2621.

Approved by:

Gary Wensman, P.Eng.
Town Manager

Amendments to Municipal Development Standards

Amendment #	Description of Revision	Date of Revision
XX-XXXX	Original adoption	Oct XX, 201X

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1.0 POLICY / PROCEDURES

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1.1 DEFINITIONS

1.1.1 Town of Labrador City Municipal Development Standards

"Town of Labrador City Municipal Development Standards" shall be defined as the latest issue of this document. Any words found in this standard, which are not referenced in this section, shall be defined according to the latest revision of the Municipal Plan & Development Regulations.

1.1.2 Construction Completion Certificate (CCC)

The document by which the Town of Labrador City confirms that the Developer has installed and completed a municipal improvement in accordance with the terms outlined in the Development Agreement, and has complied with all other items outlined in the Development Agreement. Each phase of construction requires a CCC.

1.1.3 Construction Permit

Gives the Developer approval to proceed with construction work as per development agreement.

1.1.4 Consulting Engineer

A professional engineer, registered in the Province of Newfoundland and Labrador, retained by the Developer to be responsible for design, layout, and site supervision of the work.

1.1.5 Co-ordinate Monument

Any marker established for the Provincial Co-ordinate Survey System.

1.1.6 Developer

A person or company who has applied for and has been granted approval to subdivide or service an existing parcel of land.

1.1.7 Approval in Principle

Gives the Developer approval to proceed to the final design stage of project.

1.1.8 Final Acceptance Certificate (FAC)

The document by which the Town of Labrador City confirms that the Developer has fulfilled the warranty obligations and all other items outlined in the Development Agreement. Each phase of construction requires a FAC.

1.1.9 Maintenance Period

One year, or the duration from issuance of the CCC to the FAC, whichever is longer.

1.1.10 Municipal Water, Sewer and Roads Master Construction Specifications

Municipal improvements shall be designed and constructed in accordance with the latest edition of the Government of Newfoundland "Municipal Water, Sewer and Roads Master Construction Specifications" (herein referred to as the "Master Specifications"), as supplemented in Section 3.0 of this document.

1.1.11 Newfoundland and Labrador Provincial Co-ordinate Survey System

A system established for referencing land surveys and is based on 3 (degree) transverse mercator projection.

1.1.12 Phase I Work

Phase 1 Work consists of all work relating to installation of water, sanitary, and storm sewer systems, construction of all street right of ways including sidewalks/curbs, and development of open space areas and accesses to these areas.

1.1.13 Phase II Work

Phase II Work consists of all work relating to the construction of above ground work including but not limited to surface course asphalt, landscaping of areas other than open space areas, sidewalks, walkways / trails, lighting, and signage.

1.1.14 Survey

The determination of any point or the direction or length of any line required in measuring, laying off or dividing land for the purpose of establishing boundaries or title to land.

1.1.15 Test Results

Documented results of a particular test or tests taken to verify that a municipal improvement is installed in accordance with Town of Labrador specifications. A qualified testing agency, approved by the Town, shall perform all tests.

1.1.16 Water System

A system of pipes, fittings, control valves, pumping stations, reservoirs, and appurtenances which convey water from its source to water service pipes and hydrants.

1.1.17 Water Service Pipe

A pipe that conveys water from a water system to the inner side of the wall through which the pipe enters the building.

1.1.18 Sewer System

A system of pipes, fittings, manholes, lift station, and appurtenances which convey sewage from building service pipes to its eventual discharge.

1.1.19 Storm System

A system of pipes, fittings, catch basins, ditches, culverts, pumping station, and appurtenances which convey storm water flows from ground surfaces to eventual drainage discharge locations.

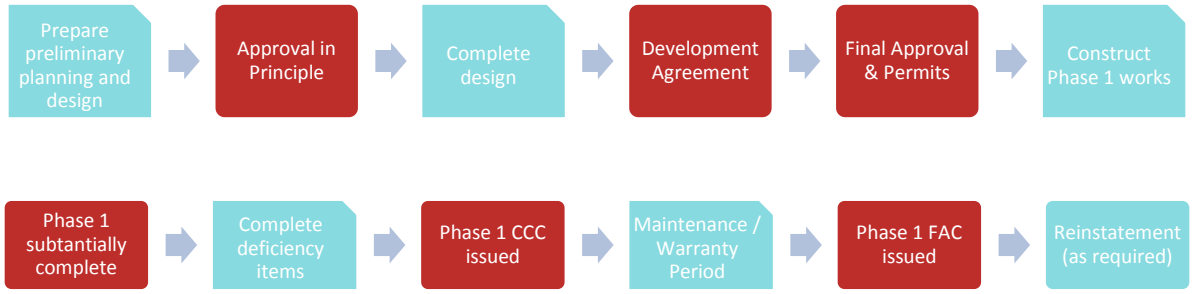
1.2 REVISIONS

The procedures and requirements herein are subject to change without notice, and the onus lies with the user to ensure that they are in possession of the latest revision.

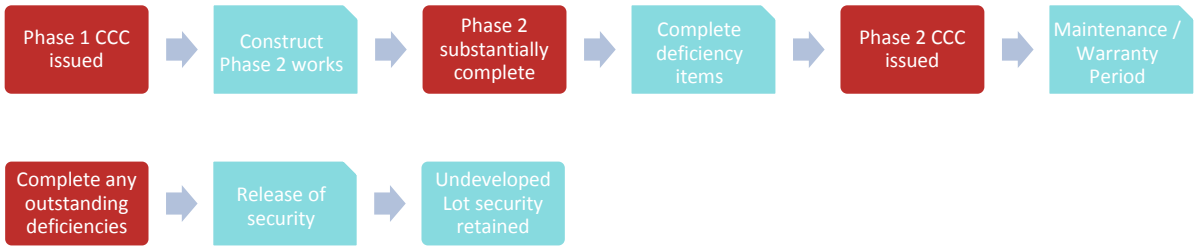
1.3 PROCESS

The process for development of a municipal improvement is outlined below, and is summarized in the following flow chart. No construction shall commence until the receipt of Final Approval and execution of a Development Agreement. A sample form of the Development Agreement is included in Appendix A.

Phase 1:



Phase 2:



1.4 APPROVAL IN PRINCIPLE

1.4.1 Submission Requirements

The Developer is required to submit the following:

- Two copies of the proposed subdivision / development plan showing the street and lot layout, water courses, buffers, and public open space. This plan should be a 1:500 scale and have contours at one metre intervals. A location plan (1:2500 scale) shall also be submitted.
- Capacity assessment of off-site water, sanitary and storm systems to determine the impact of the proposed development (unless waived by the Town).
- For developments with over 100 units, a Traffic Impact Assessment conducted in accordance with the Institute of Transportation Engineers' "Traffic Access and Impact Studies for Site Development – A Recommended Practice"

1.4.2 Approval

All costs associated with the approval process shall be the responsibility of the applicant. A maximum of 30 days will be required for the review process, after which the Town will consolidate and forward comments to the Developer / Consulting Engineer.

The subdivision plan will be reviewed for the following:

1. Access

   The plan will be evaluated for impact on traffic flows and ease of access to and from the subdivision.

2. Water Supply

   The water supply to the subdivision will be evaluated to determine if adequate pressures and flows exist in the Town's system.

3. Sanitary Sewer Generation

   The Town's system will be evaluated to determine if the current configuration has the capacity available to accommodate the calculated flows to be generated.

4. Storm Sewer Generation

   The Town's system will be evaluated to determine if the current configuration has the capacity available to accommodate the calculated flows to be generated.

5. Internal Street Layout

   The street layout will be reviewed for general conformance to the design criteria as given in the Municipal Plan. Approval at this stage is preliminary and will not prohibit further changes that may become necessary during the detailed design. Ease of snow removal and pedestrian/cyclist access will also be considered.

6. Public Open Space

   The Town may require the applicant to convey to the Town for a nominal consideration of one dollar ($1.00) a parcel of land for public recreation purposes not to exceed 10% of the total subdivision area. The Town may also require a strip of land to be reserved and remain undeveloped along the banks of any significant river, brook, pond or wetland and this land may, at the discretion of Council, constitute the requirement of land for public open space.

If upon review of the above a deficiency is determined to exist, then:

The application may be recommended for rejection.

The applicant may be required to undertake further studies to determine the extent of any problems and corrective action required.

The application may be recommended for Approval in Principle subject to the applicant taking any necessary corrective action as determined by the Town.

If there have not been any problems noted during the review, then the application will be recommended for Approval in Principle.

Approval in Principle shall be valid for one year only from the date of granting by the Town, during which time an application for Final Approval shall be submitted.

1.5 FINAL APPROVAL

1.5.1 General

Municipal improvements are to be designed and constructed in accordance with the Town's Regulations, the Government of Newfoundland's "Municipal Water, Sewer and Roads Master Construction Specifications" (the "Master Specifications").

1.5.2 Requirements

The application for Final Approval should be made within one year of the granting of Approval in Principle and must be accompanied by the following:

1. Subdivision Plan - The Plan should be drafted as per Section 2 with the following items shown:
   a. Water, sanitary and storm sewer layout;
   b. Street alignment information;
   c. Lot metres, bounds, area and number;
   d. Right of ways, easements and carriageways;
   e. Open space area;
   f. Direction of flow for sanitary and storm sewer systems.
2. Geotechnical Report and Engineer's Site Validation (Appendix E)
3. Engineering Drawings - Plan and profile drawings showing all streets, water mains and sewers to be constructed. Detail drawings are required for any items not covered by the Standard Drawings in the Master Specifications.

4. Sanitary Sewer Calculations - Calculations are to be submitted on standard forms and accompanied by a detailed drainage plan.
5. Storm Sewer Calculations - Calculations are to be submitted on standard forms and accompanied by a detailed drainage plan.
6. Water Distribution System Model
7. Federal Fisheries and Oceans - Copies of any approvals required for works under the jurisdiction of Fisheries and Oceans.
8. Provincial Environment and Lands - Copies of any approvals required for works under the jurisdiction of Environment and Lands, both the civil sanitary and water resources divisions.
9. Newfoundland Hydro - Legal plan and description for Newfoundland Hydro easements.

1.5.3 Approval

The detailed subdivision design will be reviewed for conformance with the Town's Regulations. A maximum of 30 days will be required for the review process, after which the Town will consolidate and forward comments to the Developer / Consulting Engineer.

If any problems are noted the applicant will be required to make necessary revisions and resubmit the drawings for approval.

If there have not been any problems noted, then Final Approval will be recommended. The Developer will then submitted three sets of approved drawings and specifications to the Town.

Final Approval is valid for a period not exceeding one year, but may be renewed once for a further period not exceeding one year.

Revisions to the approved Subdivision Plan or Engineering Drawings shall not be made without the prior approval of the Town.

1.6 FINANCIAL REQUIREMENTS

1.6.1 Assessments

1. Capital Recovery Assessments - All outstanding assessments on the property to be developed as recorded by the Town must be paid prior to the Subdivision Development Agreement being executed. The assessments may be for items such as:
   - Water, sanitary and storm sewer systems;
   - Street improvements;
   - Sidewalks;
   - Over-sizing;
   - Recreational or as otherwise required by Town.
2. Trunk Sewer Assessments - If the subdivision is within the drainage area of a Sanitary Trunk Sewer, for which there is an assessment registered, then the assessment must be paid prior to the execution of the Subdivision Development Agreement. This assessment is an area assessment and is a fixed rate per hectare serviced.

1.6.2 Development Fee

This fee is to be addressed with the Town Clerk prior to obtaining development approval.

1.6.3 Securities

The amount of any securities required will be determined by the Town. All securities must be in the form of cash, certified cheque, bond or letter of credit from an approved surety company. Cost estimates used to determine development security shall be prepared by the Consulting Engineer or by a quantity surveyor registered with the Canadian Institute of Quantity Surveyors.

1. Phase I Security – This security will be equal to 50% of the estimated cost of Phase 1 Work, and must be in place prior to the start of construction.
2. Lot Reinstatement Security – The amount of this security shall be determined by the Town and shall be held to cover the cost of preparing and hydro-seeding serviced lots that remain undeveloped Town of Labrador City Subdivision Development Standards. The security shall be provided to the Town prior to the acceptance of the Phase I Work and shall remain in effect until lots are developed or adequately prepared and hydro-seeded.
3. Phase I Warranty Security - This security will be equal to 15% of the value of Phase I Work and must be in place prior to the acceptance of Phase I Work (CCC), and shall remain in effect for the Maintenance Period.
4. Phase II Security - This security will be equal to 100% of the estimated cost of Phase II Work and must be in place prior to the start of construction.
5. Phase II Warranty Security - This security will be equal to 15% of the value of Phase II Work and must be in place prior to the acceptance of Phase II Work (CCC) and remain in effect for the Maintenance Period.

$1,000 of the Phase II security will be retained for each undeveloped lot (at the time of Phase II FAC) to cover possible damages to the curb and sidewalk and surface course asphalt. Any review of securities held shall be initiated by the Developer.

If the Developer is undertaking a building project on a previously-developed parcel of land with only site work proposed, the security requirements for Phase II shall apply.

1.7 Phase I Work

1.7.1 Schedule

Phase I Work shall not commence until Final Approval has been issued, all financial requirements have been met, and the Development Agreement has been executed.

All work shall receive site supervision by the Consulting Engineer, who must certify that all work was completed in accordance with the Master Specifications and this document.

1.7.2 Design Changes

Any major design change proposed by the Developer during construction must be submitted to the Town for approval, and drawings updated accordingly.

1.7.3 Acceptance of Phase I Work

Phase I Work will be accepted by the Town when all work has been completed and the following submitted and approved:

- As-built Engineering Drawings as per Town standards;
- Subdivision Plan;
- House service information forms;
- Test results as required for the water, sanitary and storm sewer systems;
- Inspection of the water, sanitary and storm sewer systems by the Town;
- Phase I warranty period security;
- Reinstatement security;
- Correction of all deficiencies noted;
- Fire flow test results as required by the Town;
- Concrete test results for curb and sidewalk works;
- Compaction test results for sub-grade works.

Phase I security will not be released until the Town has received all required documentation and test results, complete and satisfactory, from the Developer. Penalties for test results that do not meet the required standard or are not submitted shall be as per Section 2.9.

1.7.4 Building Permits

Building permits will not be approved until Phase I Work have been accepted by the Town; however, if the deficiencies noted are of a minor nature or security has been provided to cover the cost of the Phase I and Phase II Works, then the building permits may be approved. The Developer is cautioned that no occupancy permits will be issued until completion and acceptance of Phase I Work.

1.7.5 Warranty Period

The Developer shall at his/her own expense rectify and make good any defect or fault, however caused, appearing within the Maintenance Period of the Phase I Work.

The Phase I warranty security will be released at the end of the warranty period when the Final Acceptance Certificate is issued, providing all noted deficiencies have been corrected.

1.8 Phase II Work

1.8.1 Schedule

Phase II Work shall not commence until Phase I Work has been accepted (Construction Completion Certificate issued). Asphalt and sidewalk/curb must be placed prior to the Town undertaking any snow clearing operations. The Town will not accept responsibility for damage to and maintenance of any Phase I Work until all Phase II work has been completed and accepted by the Town.

Surface course asphalt shall not be placed without the prior written approval of the Town. Approval will not normally be granted until eighty percent (80%) of the lots have been built upon and rough grading completed.

1.8.2 Survey Monuments

Benchmarks shall be installed as per the requirements detailed in Section 2.

1.8.3 Acceptance of Phase II Work

Phase II Work will be accepted by the Town when all work has been completed and the following submitted and approved:

- Concrete test results for sidewalk;
- Asphalt test results for surface course asphalt;
- As-built information for bench mark installations;
- Legal plans and descriptions for all lands to be transferred to the Town (i.e., street right of ways, easements and open space);
- Phase II warranty period security;
- Inspection of Phase II Work by the Town;
- Correction of all deficiencies noted;
- Master survey of development, both plan and description.

Phase II security will not be released until the Town has received all required documentation and test results, complete and satisfactory, from the Developer. Penalties for test results that do not meet the required standard or are not submitted shall be as per Section 2.9.

1.8.4 Warranty Period

The Developer shall, at his/her own expense, rectify and make good any defect or fault, however caused, appearing within the Maintenance Period of the Phase II Work.

The Phase II Warranty security will be released at the end of the warranty period when the Final Acceptance Certificate is issued, providing all noted deficiencies have been corrected.

1.9 CONSTRUCTION COMPLETION AND FINAL ACCEPTANCE CERTIFICATES GUIDELINES

1.9.1 Application for Construction Completion Certificate

When each phase of work is completed with no outstanding deficiencies, the Developer will apply for a Construction Completion Certificate (CCC) by completing the CCC form in Appendix F. The Town will then schedule an inspection with the Developer.

1.9.2 Application for Final Acceptance Certificate

As each CCC warranty period approaches the expiry date, the Developer shall apply in writing for a Final Acceptance Certificate (FAC) by completing the FAC form in Appendix F. The Town will then schedule an inspection with the Developer.

The Developer shall ensure the roadway is clean and water flushed (in the case of asphalt), and any other appurtenance is clean and free of debris just prior to the inspection.

All warranty deficiencies must be rectified prior to the FAC being issued. Prior to the FAC being issued the Developer must fulfill all requirements outlined in the Development Agreement.

1.9.3 Issuance of Final Acceptance Certificate

Upon the Town so accepting the municipal improvement, the Developer shall transfer all right, title, and interest therein to the Town, of all the municipal improvements which are not on private property, without any cost to the Town. The said municipal improvements, which are located on public property, shall thereafter become the property of the Town of Labrador City

1.9.4 Requirements

The following inspection requirements must be met prior to Construction Completion or Final Acceptance:

1. General
    a. All items to be inspected be clean and free of debris.
    b. All equipment required for functional testing must be connected and present.
    c. A deficiency list shall be provided in advance of the inspection.
2. Water System
    a. Water main shall be under flow condition.
    b. All valves will be operated and checked for binding or difficulty.
    c. All hydrant will be operated and checked for binding or difficulty, leaks, and damage.

3. Sewer System
    a. All manholes will be checked for: mortar is intact and free of cracks; no cracks or warping has occurred on frame or cover; infiltration; proper benching; ladder rungs.
    b. All catch basin will be checked for: mortar is intact and free of cracks; no cracks or warping has occurred.
4. Roads
    a. All roadways will be checked to ensure cross-section is within acceptable limits and for the following deficiencies: poor riding quality; coarse and open texture; water ponding (> 5 mm); abnormal cracking; valve or manhole covers not level with finished grade.
5. Concrete
    a. All concrete will be checked for the following deficiencies: cracks (>2 mm); crossfall; curb ramps; vertical displacement; joint separation (>5 mm); appurtenances not level; water ponding (>5 mm); diagonal or multiple cracking.
6. Landscaping
    a. Maintenance guarantees have been met.
    b. Turf and naturalized areas have reached "second stage" cut.
    c. Shrubs and trees have reach full leaf-out the season following planting.

2.0 DESIGN GUIDELINES

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2.1 SURVEYING

2.1.1 Survey Plan

A Survey Plan shall be drawn in accordance with Sub-Section 2.2 Drafting and shall include:

1. The name of the owner of all abutting lands;
2. The length and bearing of each line of any transverse which connects any point on the boundary of the subdivision with a Provincial Co-ordinate Monument;
3. Each street, walkway and easement;
4. Each lot and its number;
5. The length, bearing and internal angle of each line of the boundary of, and the area in square metres of:
    a. The land being subdivided;
    b. Each street, walkway and easement;
    c. Each lot;
    d. The land, if any, which is reserved for park, playground and public purposes;
6. The geometry of connections between existing streets and streets of the subdivision;
7. The location of any existing structure which is to remain;
8. Every water course and its direction of flow;
9. All information necessary for the calculation and laying out of any curved line;
10. The date of compilation;
11. The date of revision, if any;
12. The name of the subdivision;
13. All existing streets, roads, lanes and intersections in the immediate area and their official names as designated by the Town;
14. The location and extent of rock outcrops;
15. The location and results of any test borings;
16. At least two (2) centre line points of known chainage related to the Provincial Co-ordinate Survey System;

The Survey Plan shall be of a size within the following limits:

1. Maximum: B1 (707 mm wide and 1000 mm long)
2. Minimum: A1 (594 mm wide x 841 mm long)

A Survey Plan shall be to a scale as indicated in Sub-Section 2.2 Drafting. A survey plan shall show a Key Plan to locate the subdivision as it relates to adjacent streets of the Town with the scale being as indicted in Sub-Section 2.2 Drafting.

The radius, central angle, the length of arc, the point of curve and the point of tangency shall be given for each curved line and clearly indicated on the survey plan.

A survey plan shall be certified by a Newfoundland Land Surveyor.

2.1.2 Survey Details and Accuracy

All traverses are to be plotted by either the actual calculated Latitude (lats) and Departures (deps) method or by the Tangent Off-set Method.

All boundary line dimensions to be shown to at least two decimal places with all angles shown to the nearest 30 seconds or better.

"More or less" distances shall only be accepted along a water boundary.

Contours shall be shown to determine the proper elevations for all streets, roads, easements, and walkways in relation to the proposed lot layout.

For proposed streets, the existing vertical alignment conditions (contours) shall be obtained from actual field surveys.

All Vertical Control shall be related to the Province of Newfoundland Approved Datum.

Information shown on a survey plan shall be sufficiently detailed to permit any point on any surveyed line to be accurately located in the field.

The accuracy of closure shall be not less than 1 metre in 10,000 metres.

2.1.3 Street, Walkway and Lot Identification

When the roadway and street (street line to street line) have been constructed and the subdivision or area involved is ready for acceptance, each public lot, easement, walkway, and street shall be identified by an iron or steel pipe driven into the ground at each corner, beginning of curve and end of curve, unless these points fall upon solid rock. In such cases, an "X" shall be cut into the rock.

2.1.4 Survey Information

Prior to Phase I work acceptance, a copy of all information, regarding permanent subdivision survey monuments, street lines, boundary lines, easements, and walkway locations shall be presented to the Town.

Survey information shall be clear, concise, neat, and accurate, properly labelled and signed by a registered Newfoundland Land Surveyor.

2.1.5 Benchmarks

The Developer shall supply brass plugs and wedges or other markers to be used as Benchmarks.

The plugs with wedges shall be placed in the concrete curb flush with the concrete. Prior to setting, the plug hole will be filled with quick-set cement. Then, with the use of a mallet and a wooden block, the plug and wedge will be driven into the hole.

All bench marks shall be intervisible and coordinated using the 3 degree Modified Transverse Mercator Projection. The traverse closure shall be a minimum of 1:10,000. Crown land reference monuments and their coordinates shall be listed when running the traverse.

The maximum distance between bench marks shall be 300 metres.

Benchmarks must be established from Geodetic Benchmarks and end at the same or different Geodetic Benchmarks that have acceptable elevation values. All lines beginning and ending in existing Benchmarks with known elevations and all lines forming self-closing loops will be levelled one way. All Benchmarks must be turning points and form part of the levelling loop.

2.1.5.1 Establishment

Bench Marks must be established by spirit levels done to third order standards with a minimum accuracy 24 mm/k where k = the distance in kilometres between Benchmarks measured along the levelling route. If the misclosure or discrepancy exceeds the allowable, the line shall be re-levelled.

The method used will be three wire method (mean of the reading for the three wires). The difference of elevation is the mean of the two running where:

Mean = [(F) - (B)] / 2

The Contractor/Surveyor will perform all necessary adjustments of the level loops.

2.1.5.2 Notes and Plans

The original field notes for the horizontal, vertical control and completed description sheets shall be submitted to the Town. Notes must be bound together with a cover sheet showing the name of the firm, date, name or observer, and recorder.

The Developer shall use description sheets based upon a template description sheet supplied by the Town. The description sheet shall be prepared in a fashion that will produce clear and legible copies. A minimum of three ties shall be shown to reference the Benchmark. The reference plan should be digitally prepared and annotated. All Benchmarks and Benchmark information shall be shown on the subdivision plan.

If the work does not meet the above criteria, the contractor/surveyors work shall be returned for corrections.

2.2 DRAFTING

2.2.1 CADD Drawings

Except as provided in Section 2.1.2, computer-aided design and drafting (CADD) shall be used in the preparation of construction and as-built drawings for all developments.

2.2.2 Manually Drafted Drawings

Where CADD drawings are unavailable, or are cost prohibitive due to the nature of the development, the Town may at its sole discretion accept manually drafted drawings. Manually drafted drawings shall adhere to the same standards as CADD drawings.

2.2.3 Drawing Size

A standard drawing size of A1 (594 mm wide x 841 mm long) will be used, unless prior approval has been granted by the Town.

All drawings in any one development shall be the same size. The prime consultant shall coordinate the drawing size with any/all sub-consultants, including surveyors.

2.2.4 Scales

The following scale shall be used:

1.	Location plan or key plan	1:2500 preferred (smaller may be accepted to suit)
2.	Survey Plan/Subdivision Plan	1:500
3.	Site Services plan/profiles	horizontal 1:500 vertical 1:50
4.	Site drainage plan	1:500 OR 1:1000
5.	Site grading plan	1:500
6.	Cross-section	horizontal 1:100 vertical scale to suit
7.	Detail plans shall be at a scale that will fully illustrate the subject matter	

Plan/profile sheets shall have the plan at the top of the sheet and profile on the bottom section.

2.2.5 Grid Reference

Drawings shall be prepared using NAD 83 (North American Datum 1983). Grid lines at 200 metres shall be shown and northings and eastings indicated.

2.2.6 North Arrow

A north arrow shall be placed in the upper right corner of each drawing.

2.2.7 Plan Orientation

Survey plans shall be drawn using the development(s) actual coordinates based upon NAD 83. Title blocks, borders and plots shall be rotated such that the top of the sheet is approximately north and text can be read left to right and/or bottom to top.

2.2.8 Symbols and Line Types

Standard drafting symbols and line types shall be used on all drawings. Where symbols other than the standard ones are used, they shall be shown in the legend.

2.2.9 Lettering CADD

Except as noted below, all drawing notes and dimensions shall be roman simplex font and the minimum lettering size shall be a plotted height of 2.54 mm. For the purpose of annotating existing grades, text at forty-five degree angle to the bottom of the drawing sheet should be used. This text shall be at a plotted height of 1.524 mm. With the exception of text for existing grades, it is recommended that no more than three lettering heights be used on any one drawing.

2.2.10 Layering

Data on each drawing shall be layered according to standard engineering practice.

2.2.11 Reserved Area

An area at least 21.5 cm high shall be reserved above the title block for the key plan, notes, legend, engineers' stamp, revision data, etc.

2.2.12 Cover Sheet

A cover sheet shall be provided for each drawing set and shall contain the following information:

1. Project name;
2. Key plan;
3. Name of consulting engineer and sub-consultants;
4. Name of developer;
5. List of drawing names and numbers;
6. Date of issue;
7. As-Built or Record Drawing if/when applicable.

2.2.13 Submission of Drawings

1. Design and construction drawings shall be submitted as follows:
    a. 2 each - white prints
    b. 1 only - Electronic copy in .PDF format (on CD or USB key)
2. As-built drawings shall be submitted as follows:
    a. 1 only - White Print
    b. 1 only - Electronic copy in .PDF format (on CD or USB key)
    c. 1 only – CD or USB key of Autocad 2007 compatible files or DXF files suitable for same (AutoCAD Civil3D files shall be provided if available)
    d. 1 only - Listing of screen colour/pen designations

2.2.14 General Conditions

2.2.14.1 Street Names

All streets shall be identified and printed within street lines. All names to be submitted to the Town prior to incorporating. The Town will review the names and upon approval, will notify the Developer of the approved names.

2.2.14.2 Intersection Identification

At intersection streets or where the continuation of the streets are on other plans, the following note shall be shown on the Plan: "For Continuation see Plan No. _____"

2.2.14.3 Traverse Plotting:

All traverses shall be plotted by either:

1. the Tangent Off-Set Method; or
2. the calculated Latitude (Lats) and Departure (Deps) Method.

2.2.14.4 Percent (%) Grade

Percent (%) grades (slopes) shall be shown for all appropriate services to two decimal places.

2.2.14.5 Accuracy of Measurements

All distances shall be measured to the nearest centimetre.

2.2.14.6 Geodetic Datum:

Elevations shown on any plan shall be referred to the Provincial Geodetic Datum and the reference Benchmark (BM) along with its location and description shall be shown in the area above the Title Block.

2.2.14.7 Irregular Boundary Line Measurements

More or less distances shall not be accepted except along a water boundary or other irregular boundaries in which case a tie line between the adjoining boundary end points shall show the bearing and the distance.

2.2.14.8 Revisions to Plan

If plans are revised, amended or altered, the date and drafters initial shall be noted in the revision area of the Title Block. All corrections and changes shall be shown in permanent fashion, i.e., with ink.

2.2.14.9 Signing and Sealing of Plan

All drawings shall be signed and sealed by a professional engineer licensed in the Province of Newfoundland and Labrador.

2.3 EASEMENTS

2.3.1 General

Easement means an incorporeal right, distinct from ownership of the soil, vested in the Town (or appropriate Utility) and consisting of a use of another's land for any public service or utility.

When sewers, surface drainage or water system pipes are to be installed other than in a street or walkway, an easement shall be provided over such installations. The Developer shall grant to the Town by deed and plan, at their cost, title to the easement.

The owner of the easement land shall not construct any type of structure over such easement area.

2.3.2 Design

The width of any easement shall be based upon the type and number of services proposed to be installed.

The minimum width of an easement shall be 6.0 m, and its location shall be approved by the Town.

The alignments for any easement shall be dependent upon the type of service to be installed.

2.3.3 Acceptance

Acceptance of services within an easement shall be carried out as outlined under the requirements for Phase I acceptance.

All easements shall be covered by legal agreement as approved by the Town's solicitor.

2.3.4 Restoration

When the Town carries out work within an easement, it shall be responsible for restoring the area as close as practical to its original condition or as otherwise stipulated in the Easement Agreement.

2.4 STORM SEWERS

2.4.1 Design Drainage Area

The drainage area may be determined from contour plans and shall include any fringe areas not provided for in adjacent storm drainage areas, as well as other areas which may become tributary by reason of regrading or pumping.

2.4.2 Drainage Plan

Plan of the drainage area shall show:

1. Streets;
2. Lots;
3. Water courses and direction of flow;
4. Proposed storm sewers with manholes, indicating the tributary area to each manhole, size of the area in hectares and the runoff coefficient clearly shown therein;
5. Contour lines having an interval not exceeding one metre (original and proposed);
6. Existing elevations on adjacent properties, proposed finished lot corner elevations, and proposed lot grade;
7. Proposed surface drainage flows;
8. Surface drainage structures, retention structures, outfall structures;
9. Easements.

2.4.3 Runoff

Storm sewers shall be designed as a separate system from sanitary sewers and shall be of sufficient capacity to carry storm sewer runoff. Computations shall be based on the Rational Method Formula:

$$Q = R*A*I*N$$

where:

Q	= maximum rate of runoff (L/s)
R	= runoff coefficient
A	= area tributary to the point of design (ha)
I	= average rainfall intensity, having duration equal to the time of concentration of drainage area or as specified below (mm/hr)
N	= Constant = 2.778

Standard design forms shall be used for all calculations (See Appendix A). Computer modelling shall be used for areas greater than 10 Ha. Any storm models created shall become the property of the Town.

2.4.4 Runoff Coefficient

The value of the coefficient shall be obtained by correlating the ratio of impervious to pervious surfaces. The coefficients for fully developed areas shall be as follows; where a range of values if given, the higher value shall be used unless engineering analysis supports the use of a lower value.

1.	Parks and undeveloped areas;	0.10 - 0.30
2.	Single family residence;	0.35
3.	Semi-detached;	0.50
4.	Row housing;	0.70
5.	Apartments;	0.70
6.	Parking lot areas (paved);	0.90
7.	Light industrial;	0.65
8.	Heavy industrial;	0.70
9.	Hospitals;	0.70
10.	Light commercial;	0.65
11.	Commercial core;	0.75
12.	Heavily developed areas	0.80 - 0.95

2.4.5 Rainfall Intensity

The rainfall intensity shall be based on a 1 in 10 year return period and a duration of ten minutes for suburban residential areas. Trunk sewers, bridges and other critical structures as determined by the Town shall be based on a 1 in 100 year return period with a duration equal to the time of concentration. The design intensity must be obtained from the most up-to-date data available from Environment Canada for the Labrador West area.

2.4.6 Capacity of Pipe

Storm sewer capacity shall be determined using Manning's Formula. The following maximum roughness coefficients "n" shall be used:

- Concrete box culverts 0.013
- CSP Refer to CSP manual

2.4.7 Minimum Size

- Storm sewer mains 300 mm
- Catch basin leads 200 mm single / 300 mm double
- Building storm service 150 mm (where allowed)

2.4.8 Velocity

Velocity for design flow shall be calculated using Manning's Formula.

Minimum 1 m/s

Maximum 5 m/s for diameter up to and including 825 mm
6 m/s for diameters larger than 825 mm.

2.4.9 Change of Size

No decrease of pipe size from a larger size upstream to a smaller pipe downstream shall be allowed regardless of the increase in grade.

2.4.10 Clearance

A minimum of 150 mm clearance is required between outside barrels at all sewer pipe crossings.

A minimum of 450 mm in vertical direction and a minimum of 300mm in horizontal direction is required between the sewer pipe and water pipe.

2.4.11 Location

Storm sewers shall be located such that manholes are placed in the centre of driving lanes, wherever possible.

Manholes shall be located at every change of horizontal and vertical alignment, size, and material of the sewer. Maximum distances between manholes unless otherwise specified shall be 90 m.

Storm sewer mains shall be installed to provide a minimum depth of cover of 1.2 m below final finished grade at the surface.

2.4.12 Loading

Earth loads shall be calculated by using the Marston Formula. The effect of concentrated and distributed superimposed loads shall be evaluated by a generally accepted formula, such as Boussinesq's Formula.

2.4.13 Manhole Details

Standard types of manholes and their details are shown on Standard Drawings of the Master Specifications

All manhole chamber openings must be located on the upstream side of the manhole.

Special manholes shall be fully designed and detailed.

2.4.14 Catch Basins

The lead shall have a minimum 2% grade and shall discharge directly to an existing or proposed manhole located within 30 m of the catch basin.

Recess catch basins shall not be used.

Catch basins shall be located and spaced in accordance with conditions of design and shall provide for expected maximum flow.

Standard location for catch basins at street intersections shall be immediately upstream of sidewalk or pedestrian crosswalks and between intersections at all low points.

Spacing shall not exceed 95 m for road grades up to 3%. On steeper roads, this spacing shall be reduced.

Catch basins are to be depressed 30 mm with respect to the asphalt/gutter.

2.4.15 Special Structures

Inlet and outfall structures including Head walls, stilling chambers, etc. shall be fully designed and submitted in detail. In each case, topography shall be shown as well as the protective works necessary to counteract erosion of the site at the structure.

Grates shall be provided on all inlet structures and outlet structures greater than 600 mm in diameter and shall be fully designed and detailed, and approved by the Town.

2.4.16 Outfalls

All storm outfalls which empty into a ditch or water course must receive approval from Fisheries and Oceans Canada and the Provincial Department of Environment.

2.4.17 Head Walls

Head walls shall be designed for inlet control with HW/D < or = 1.0. Handrails shall be installed on all head walls / outlets; handrails shall be as per Master Specification (Section 02284).

2.5 SANITARY SEWERS

2.5.1 Design Drainage Area

The drainage area may be determined from contour plans and shall include all others areas which may become tributary by reasons of regrading or pumping.

2.5.2 Servicing Plan

Plan of the design area shall be to a scale as indicated in Schedule 2.0 - Drafting and shall show generally:

1. Streets;
2. Lots;
3. Size and grade of sanitary sewer with manholes consistently numbered;
4. Tributary areas to each manhole, size of the area in hectares and ultimate average population per hectare clearly shown therein.

2.5.3 Evaluation of Design Flows

Standard design forms (Appendix B) or standard software shall be used for all calculations. Computer modelling shall be used for areas greater than 10 Ha. Any sanitary models created shall become the property of the Town.

The design of all sanitary sewers shall be based on the Peak Wet Weather Flow.

The minimum rate of infiltration for which capacity shall be provided is 22,500 L/ha/d.

The design flows from developments of single family residence shall be based on an average population density of 80 people per hectare or the actual density proposed, whichever is greater.

Flow computations shall be based on the design criteria in Table 2.1 as follows:

Table 2.1 Sanitary Sewer Design Flows

Land Use	Average Sewer Flow
Residential	500 L/c/d
Commercial Core	90,000 L/ha/d
Light Commercial	28,000 L/ha/d
Light Industrial	39,000 L/ha/d
Heavy Industrial	168,500 L/ha/d

Average Sewer Flow is a predicted flow based on 90% percent of water consumption.

A Peaking Factor shall be applied to all sanitary sewer flows, being the ratio of the peak rate of flow on the average rate of flow. The Harmon Peaking Factor shall be used:

$$Harmon\ Peaking\ Factor, M = 1 + \frac{14}{4 + p^{1/2}}$$

where "p" is the tributary design population in thousands. For uses other than residential, "p" can be termed as an equivalent population and is computed by dividing the unit non-residential sewage flow by the average unit residential sewage flow of 500 L/c/d.

2.5.4 Capacity of Pipe

Sanitary sewer capacity shall be determined using Manning's Formula. The following maximum roughness coefficients "n" shall be used:

- Concrete pipe 0.013
- PVC pipe 0.010
- Ductile iron pipe 0.012
- HDPE 0.010

2.5.5 Minimum Size

- Sewer main 200 mm
- Building sewer service 150 mm (residential), 150 mm (commercial)

2.5.6 Velocity

Velocity for design flow shall be calculated using Manning's Formula.

Minimum 1 m/s

Maximum 5 m/s for diameter up to and including 825 mm
6 m/s for diameters larger than 825 mm.

2.5.7 Change of Size

No decrease in pipe size from a larger size upstream to a smaller size downstream shall be allowed regardless of the increase in grade.

2.5.8 Clearance

Separation between sewer mains and water mains, and separation at service connections, shall be in accordance with Section 02713 of the Municipal Water, Sewer and Roads Master Construction Specifications.

2.5.9 Location

Sanitary sewers shall be located such that manholes are placed in the centre of the road wherever possible.

Manholes shall be located at every change of grade, alignment, size or material of the sewers. Manholes shall be spaced a maximum of 60 m apart.

Mains shall be installed to provide a minimum depth of cover of 3.0 m below final finished grade at the surface, or as indicated by a thermal analysis under normally expected operating conditions. If reduced cover is used, or if thermal analysis indicates that it is required, sewer mains shall be insulated.

Sanitary sewer mains shall be installed to provide adequate sewer service connection depth at the property line, which shall be a minimum of 2.2 m without insulation.

2.5.10 Loading

Earth loads shall be calculated by using the Marston Formula. The effect of concentrated and distributed superimposed loads shall be evaluated by a generally accepted formula, such as Boussinesq's Formula.

2.5.11 Manhole Details

Standard types of manholes and their details are shown as in the Standard Drawings in the Master Specifications.

All manhole chamber openings must be located on the upstream side of the manhole.

All pipes turning at a greater angle than 45 degree in a manhole require a 150mm drop.

Special manholes shall be fully designed and detailed.

2.5.12 Building Sewer Services

Separate and independent building sewers shall be provided for every single-family house, each unit in a semi-detached, and each apartment building, office building, factory or similar building.

The minimum grade of a sewer service shall be 2.0%.

The end cap for the sanitary service shall be painted red. The location of the end cap shall be captured in surveys and shall be clearly marked using a 50x100 timber marker (painted red) extended from the end of the service connections to 600 mm above finished curb grade.

2.5.13 Storm Sewer

Storm water drains, roof drains, foundation drains, shall not be connected to any part of the sanitary sewer.

2.5.14 Force Mains

Pipe for sewage force mains shall be per Master Specifications. Flow velocity in the force main shall be between 1 and 3 m/s.

2.5.15 Sewage Lift Stations

Extension of sanitary servicing by means other than gravity flow sewer mains shall be considered only in cases where economically insurmountable constraints cannot be resolved, dictating a requirement for a wastewater pumping station. This must be justified through the reported submitted for Development Approval for the development area. This section applies only to lift stations where pumping requirements

are less than 100 HP. These requirements shall be in addition to those contained in Section 02650 of the Master Specifications.

Lift stations are to be duplex pumping systems and come pre-packaged with a concrete or wet well, unless wet well or pump capacity dictates dry well / wet well configured design. A stand-alone building will be required should the size of the pumps or the need for a standby generator and fuel tank warrant it or as requested by the Town.

All sewage lift station pumps and controls shall be new and CSA-approved, and shall be designed by the Consulting Engineer. The pumps shall be designed to meet the expected sewage inflow to the lift station and provide adequate velocity in the force main.

Alarm call-out capabilities for alarms shall be provided for the following monitoring points at a minimum:

- High Level
- Building Low Temperature
- Generator Fail
- Pump Fail

2.6 WATER SYSTEMS

2.6.1 Design of Water Distribution System

The design of water systems shall be based on the flow requirements needs to satisfy domestic, commercial, industrial and fire flow demands.

Per capita consumption shall be calculated as follows:

- Average Daily Demand (ADD) 500 L/c/d
- Maximum Daily Demand (MDD) 2 x ADD
- Peak Hour Demand 3 x ADD

The design population shall be based on 20-year projections for the area under consideration.

The evaluation of the water system shall be undertaken utilizing the Town's calibrated water model, acceptable to the Town, and the results shall be tabulated and submitted as a part of the Final Approval process. Separate analysis shall be undertaken for Average Day, Maximum Day, Peak Hour, and Maximum Day + Fire Flow. Updated water models shall become the Town's property.

The system shall be capable of providing sufficient Fire Flows at all hydrant locations under MDD conditions to meet the applicable Fire Flow requirements of the latest version of the Fire Underwriters Survey.

2.6.1.1 Pressure Requirements.

The residual pressure under all daily demand conditions shall range from min. 280 kPa (41 psi) to max. 600 kPa (87 psi) at ground level.

The minimum residual line pressure under maximum day plus fire flow conditions shall be 140 kPa (20 psi) at ground level for any point in the system.

2.6.1.2 Velocity Requirements

The minimum allowable velocity shall be 0.15 m/s, or as determined through thermal analysis.

Water main flow velocities shall not exceed 1.5 m/s during all daily demand flow conditions (including ADD, MDD, and Peak Hour). The maximum allowable velocity during MDD + Fire Flow conditions is 3.0 m/s.

2.6.1.3 Frost Protection

Adequate frost protection of water mains must be designed for and shall include a combination of the following alternatives:

- No dead-end water lines
- Insulated / heat-traced / recirculating water main (if required by thermal analysis)
- Thermal analysis shall use a minimum of 8 hours to initial ice formation (crystallization) under static conditions

The actual system required in any particular area will depend on the degree of frost penetration (as assessed in the Geotechnical Report), any systems currently in place in the area, and a cost/benefit analysis. Approval of final system design is at the discretion of the Town.

2.6.2 Criteria and Locations

2.6.2.1 Dead Ends

The water system shall be so designed to exclude any dead ended pipe, so far as is reasonably possible.

2.6.2.2 Minimum Size

All local mains shall be a minimum of 200 mm diameter.

2.6.2.3 Depth of Cover

Uninsulated water pipe shall have a minimum cover of 3.0 m in relation to the final finished street grade.

For streets not paved prior to December 1 of any year, a sufficient depth of fill shall be placed to give a minimum cover of 2.7 m.

2.6.2.4 Location of Water Pipes

All water pipes shall normally be laid on the quarter point of the street right of way and in a separate trench from the sanitary and storm sewers. A minimum of 3.0 m horizontal separation shall be maintained between a water main and any sewer main.

The low point of the water main shall correspond with a hydrant location, allowing the water main to be drained if necessary.

2.6.2.5 Location of Valves

Valves at street intersections shall be located in the roadway at street line intersection.

Four valves are required at each four-way street intersection. If there are more or less than four streets meeting at any intersection, the appropriate number of valves shall be installed to allow complete isolation of the system.

On straight runs in a residential area, the maximum distance between valves shall be 180 m.

2.6.2.6 Valves

All valves larger than 300 mm diameter shall be geared.

Valves shall be suitable for bury in cold water pipelines with operating pressures of 1200 kPa.

A Valve Information Card shall be completed for each valve installed.

2.6.2.7 Hydrants

Hydrants shall be placed at the lot line between two properties, at the rear of the sidewalk. The maximum allowable spacing between fire hydrants is 140 m in single-family residential areas, and 90 m in multiple-family residential, school, hospitals, industrial-commercial, and public areas. Hydrants shall be placed on the side of the road closest to the main.

Hydrants shall be installed so that the top of the standpipe flange will be 100 - 150 mm above the finished curb grade.

The alignment of the main shall deflect in order to keep the lateral lead from the main to the hydrant to a minimum. Hydrants shall be located at high or low point of the water main whenever possible. Hydrants in residential areas are to have one gate valve adjacent to the hydrant with the other valve located so that the maximum number of lots out of service is 20. In commercial and industrial areas, two gate valves per hydrant are required. Valve arrangement shall be such that only one hydrant is out of service at one time.

Although dead-ended pipes are not desirable, if unusual conditions warrant the installation of a dead-ended pipe, a hydrant shall be installed in its proper location at the dead end.

Hydrants shall be threaded with a standard Quebec-type thread.

A Hydrant Information Card shall be completed for each hydrant installed.

2.6.2.8 Conductivity Straps

Conductivity straps can be factory installed on pipe and bolted on site or field fit to pipe with thermite welds. Two (2) straps shall be installed at every pipe joint and fitting. Conductivity of water main shall be tested before and after backfilling.

2.6.3 Connections to Existing Water Systems

2.6.3.1 Service Interruption

A connection of the Developer's water system to any part of the existing water system must be carried out to cause the least interruption to existing service and each such connection must be approved by the Town.

2.6.3.2 Scheduling of Connection

The Town will assist in the scheduling of any such connection and will install the tapping sleeve and valve at the Developer's expense. If the Developer is permitted to make the actual connection the work must be done under the supervision of the Town at the Developer's expense.

2.6.3.3 Other Connections

Whenever the existing water system is within reasonable distance from a proposed subdivision, and an interconnection is practical, the Developer shall be required, at their cost, to install the necessary pipe and interconnect the water system in their subdivision to the existing water system.

2.6.3.4 Prohibited Cross-Connections

No pipe or water service pipe, cross-connection will be made from the existing water system to a water system in a subdivision which is connected to some other source of supply.

2.6.3.5 Tapping Sleeves and Mains

Tapping sleeves and valves shall be used for all ductile iron connections to existing water mains.

2.6.4 Building Water Services

Separate and independent building water services shall be provided for every single family house, each unit in a semi-detached, and each apartment building, office building, factory or similar building.

Conductivity straps can be factory installed on pipe and bolted on site or field fit to pipe with thermite welds. Two (2) straps shall be installed at every pipe joint and fitting. Conductivity of water service shall be tested before and after backfilling.

The minimum size of service connections are as follows:

- Single-family dwelling 20 mm
- Commercial 50 mm

All water services under 150 mm are to be insulated, and services 50 mm and smaller shall have one gooseneck bend in the vertical plane near the main stop.

The location of the water service shall be captured in surveys and shall be clearly marked using a 50x100 mm timber marker (painted blue) extended from the end of the service connections to 600 mm above finished curb grade.

2.7 ROADS

2.7.1 Design Criteria

Streets shall be designed to provide the safest and smoothest traffic flow possible. The criteria in Table 2.7-2 consist of the minimum requirements for flat vertical alignments.

For specific situations not covered by this section, the latest edition of Transportation Association Canada (TAC) "Geometric Design Standards for Canadian Roads and Streets" should be used as a guide.

2.7.2 Classification

Streets shall be classified as shown in the following Tables 2.2 and 2.3.

Table 2.2 Street Classification

	Aterial	Collector	Local
Traffic Service	Traffic movement first Consideration	Traffic movement and land access of equal importance	Traffic movement second consideration
Land Service	Land access second Consideration		Land access first consideration
Parking	Some Parking	Parking	Parking
Design Volume (A.D.T.)	12,000 – 30,000	12,000 – 30,000	Less than 1,000
Characteristics of Traffic Flow	Uninterrupted except at signals and crosswalks	Interrupted flow	Interrupted flow
Vehicle Type	All types but trucks may be omitted	All types with truck limitations	Passenger and service vehicles; Large vehicles restricted
Connects to	Arterials, collectors, Freeways, and some Locals	Arterials, Collectors, locals	Collectors, locals

Table 2.3 Street Design Criteria

	Arterial	Collector	Local
Street Grade Maximum	10% (6% *)	10% (6% *)	10%
Street Grade Minimum	0.75%	0.75%	0.75%
Street right of way Width	30m	20 m	15 m
Minimum Radius	90 m	90 m	50 m
Maximum Super Elevation	0.06 m/m	0.06 m/m	0.06 m/m
Minimum Stopping Sight Distance	65 m	65 m	45 m
Pavement Widths	15 m	15 m	9 m
Minimum "K" value vertical curve Crest --------- Sag ----------	 7 11	 7 11	 7 11
Minimum Length of vertical curve	L = length in meters should not be less than Design Speed in kilometers per hour.		
Vertical curve Maximum (Length for drainage)	Crest: K = 60 Sag: K = 30		
Minimum Distance between intersections	400 m	60 m	60 m
Minimum curb radius at intersections	15 m	9 m	7.5 m
Sidewalks (sides)	Both	Both	One**
Street Lighting (min. requirement)	65 m maximum spacing; LED, autosensing voltage (120 – 277V), min. 7029 Lumens delivered		

* Maximum road grade in industrial/commercial parks to be 6%

** If a pedestrian traffic generator is in the area of the local road (eg. walkway system, school, shopping centre, church, etc), a sidewalk shall be provided on both side.

2.7.3 Cul-de-Sacs

Cul-de-Sacs should be avoided and may only be used in exceptional circumstances where approved by the Town. They shall have the following additional minimum requirements:

1. Face of curb line, turning circle, radius of 15.25 m.;
2. Maximum exit grade of +4%;
3. Sidewalk to extend around the bulb;
4. Transitional street line radius of 15.25 m into street line turning circle;
5. Maximum length - measured from connecting street right of way to end of bulb.
   230 m – with emergency vehicle access
   110 m – without emergency vehicle access

2.7.4 Intersections

Intersections shall:

1. Be of T-type design;
2. Have a vertical alignment within the intersection approach of not more than 2% grade for a minimum distance of 15 meters from the roadway intersection curb line;
3. Have an intersecting angle of 90° where possible. Angles less than 90° may be accepted at the Town's discretion. The minimum angle is 85°.

4. Have a minimum centre line distance between adjacent and/or opposite intersections:
    a. On Local Streets to Collector Street of 60 m
    b. On Collector Streets to Collector Streets 60 m

When two streets (or more) intersect, only one street may have a curved horizontal alignment; all other streets at this intersection shall have a minimum tangent section of 30.5 m as measured from the point of street line intersection to the first point of horizontal curvature of each approached street line.

2.7.5 Sidewalks

Monolithic and separate sidewalks shall be 1.5 m wide.

2.7.6 Trails and Paths

Where required, bike paths shall be at a minimum, a single 1.5 m lane from the end of the travelled lane to the lip of gutter.

2.7.7 Street Signs, Markings and Traffic Control Devices

All street signs, markings, and traffic control devices shall conform to the latest version of the Transportation Association of Canada "Manual of Uniform Traffic Control Devices for Canada", latest edition. Developer is responsible for costs of signage.

2.7.8 Traffic Impact Assessments

For developments with over 100 units, a Traffic Impact Assessment shall be conducted in accordance with the Institute of Transportation Engineers' "Traffic Access and Impact Studies for Site Development – A Recommended Practice" to determine the impact of the proposed development. This requirement may be waived at the discretion of the Town.

The costs of any required upgrades to the surrounding transportation system shall be borne by the Developer.

2.7.9 General Requirements

Tangent distances between horizontal reverse curves shall not be less than 50 m.

Horizontal alignment of streets shall be such that the centre line and curb lines shall be symmetrical with their street lines.

Vertical alignments of streets shall be considered as symmetrical about the centre line unless otherwise instructed by the Town.

All streets shall have a minimum 150 mm crowned roadway cross-section and in no case should be crowned roadway cross-section be less than 2%. Cross fall, where required, is acceptable and shall have a minimum grade of 2%.

No driveway (ramp) shall be permitted to enter onto a proposed designated limited access freeway, arterial or major street.

All streets shall have a minimum of one sidewalk. Curb shall be required on opposite side of street of any street with one sidewalk.

All streets shall have a minimum of 150 mm Class B and 75 mm Class A granulars. Streets shall have a 50 mm surface course asphalt. Additional granulars and asphalt may be specified as determined by the Town.

Curb and gutter is required in all areas serviced with storm sewers. All serviced subdivisions shall have piped storm drainage system, unless otherwise allowed by the Town.

Accessible ramps shall be provided on sidewalks at all intersections.

2.8 SERVICED LOTS

2.8.1 Grading

Serviced lots shall be rough graded to within 100 mm of the finished grades shown on the approved grading plan. Grading shall be carried out such that no ponding of water occurs within the lot boundaries. Surface drainage shall be in the direction indicated on the grading plan.

2.8.2 Finishing

The finished surface of the lot shall consist of well graded granular material, compacted to 95%, with no exposed rock or protruding edges for rock fragments larger than 300 mm.

2.8.3 Services

Municipal services shall be extended to the property boundary of all lots at a location to be approved by the Town and shall be terminated by approved methods.

2.8.4 Security & Hydro-seeding

A Lot Reinstatement Security will be required as outlined in the Town of Labrador City Municipal Development Standards.

All serviced lots whether sold or not sold and which remain undeveloped within 36 months of the sale of the first lot of that phase of the development shall be hydro-seeded by the Developer. Hydro-seeding must be completed no later than July 30th of third year following the date of sale of the first lot.

2.9 INSPECTION AND TESTING REQUIREMENTS

Test results shall be provided as outlined in this section – the documented results of a particular test or tests taken to verify that a municipal improvement is installed in accordance with the Municipal Development Standards, and Master Specifications. A qualified testing agency, approved by the Town, shall perform all tests. All testing and quality control results shall be submitted to the Consulting Engineer within 72 hours of tests being taken. All test results shall be compiled and submitted to the Town.

All submissions shall be supplied in a digital format.

2.9.1 Sanitary and Storm Sewer Systems

Prior to acceptance, a video camera inspection shall be carried out for all sewer lines. Inspections shall be completed per the Master Specifications (Section 02702) and the results provided to the Town.

2.9.2 Water Distribution System

All water mains shall be disinfected in accordance with the AWWA Specification C651, latest revision thereof. All water mains shall be hydrostatically pressure and leak tested in accordance with AWWA C600 for DI pipe, and as specified for PVC and HDPE pipe

A digital photo, prior to backfill, shall be provided of each valve installation. Each photo should be labelled with valve number and location.

2.9.3 Soil Compaction

Description	Depth	Density	Test Frequency	Lift Thickness
Pipe bedding	Varies	Per Master Spec	1 per 50 lm*	150 mm
Pipe backfill	0 – 1.0 m	Per Master Spec	1 per 50 lm*	300 mm
"	Below 1.0 m	Per Master Spec	1 per 50 lm*	300 mm
Roadway embankment	0 – 1.0 m	Per Master Spec	1 per 50 lm*	200 mm
"	Below 1.0 m	Per Master Spec	1 per 50 lm*	300 mm
Sub-grade preparation	200 mm	Per Master Spec	1 per 50 lm	N/A
Sub-base, base, and surface course	Per Master Spec	Per Master Spec	1 per 50 lm	Per Master Spec

* One test required for each metre of depth

2.9.4 Asphalt

Type of Test	Requirements	Test Frequency
Density	Per Master Spec	1 core every 1000 m2 (with one core at the specified Marshall location)
Thickness	Spec'd tolerance	1 core every 1000 m2
Marshall	As per Mix Design	1 per day

2.9.5 Concrete

Type of Test	Requirements	Test Frequency
Compressive Strength	Per Master Spec	1 cylinder per 50 m3. Min one test per day of concrete placement.
Air entrainment	5-8%	1 test per load
Slump	CSA A23.2-5C	1 test per load

2.9.6 Penalties

Should any test results not be provided to the Town, they shall be deemed to have not occurred and that the work is deficient. The Town shall then have the right to: a) retain an independent testing agency to complete the tests at the cost of the Developer (retained from security deposit), b) re-do any section of work or item for which test results have not been provided at the cost of the Developer (retained from security deposit), or c) levy a penalty relative to the value of the work performed (retained from security deposit).

Should any test results fail to meet the required performance, the relevant section of work shall be replaced or repaired by the Developer so that it meets the required performance. At the Town's sole discretion, a penalty may be assessed instead of requiring replacement or repair of the deficient item.

2.9.6.1 Asphalt Compaction

All asphalt below 95% Standard Marshall density shall be removed and replaced. If densities are less than specified, a deficiency penalty may be assessed per the following:

*Deficiency penalty = 0.05 * (Actual Density - Target Density)^2 * (Unit Price) * (Quantity)*

2.9.6.2 Asphalt Thickness

Pavements shall have the thickness specified on the Consulting Engineer's drawings or as required by the Master Specifications. Areas suspected to be deficient shall be cored, as direct by the Town. Any area that is more than 25% under specified shall be removed and replaced. If asphalt thickness is less than specified, a deficiency penalty may be assessed per the following:

*Deficiency penalty = (1 – (Average thickness / Specified thickness)^2) * (unit Price) * (Quantity)*

2.9.6.3 Concrete Strength

The following deficiency may be assessed based on the 28-day, laboratory-cured cylinders. When the concrete strength of any set exceed 95% of design strength, no deficiency penalty will be administered. If the concrete strength of any set is less than 80% of the design strength, the work related to that set of cylinders shall be replaced by the Developer. For concrete strength between 80-95% of design strength, a deficiency penalty may be assessed per the following:

*Deficiency penalty = 2 * (Specified Strength – Average Strength)/(Specified Strength) * (Unit Price) * (Quantity)*

3.0 SUPPLEMENT TO MASTER MUNICIPAL CONSTRUCTION SPECIFICATION

This Section contains modifications to the Government of Newfoundland "Municipal Water, Sewer and Roads Master Construction Specifications" that shall be applied by Developers.

TABLE OF CONTENTS

3.1 DIVISION #1

Section 01001 Definitions

ENGINEER: Shall mean Consulting Engineer registered in the Province of Newfoundland and Labrador, retained by the Developer to be responsible for design and supervision of the work.

OWNER: Owner, where used in the Master Specifications, refers to the Developer, a person or company who has applied for and has been granted approval to subdivide or service an existing parcel of land.

Section 01005 General Instructions

1.2.1 Where a Contractor is required to install storm or sanitary sewer mains beginning at an existing manhole or section of existing main, the Contractor shall install a temporary 6 mm mesh screen over the outlet pipe of the first downstream existing manhole to prevent silt and gravel from entering the existing system from the new work. If this location is not appropriate, the Town may choose a more suitable location.

Section 01570 Traffic Regulations

1.3.1 Traffic detours shall not be implemented unless the owner receives the prior written approval of the Town. The Developer shall request approval at least forty-eight (48) hours in advance of the proposed implementation of the detour.

Traffic detours shall be applicable to through traffic movements only. The owner shall provide adequate means whereby access is maintained to properties fronting on closed sections of streets.

3.2 DIVISION #2

Section 02713 Watermains

1.1.1 Curb stops shall be located behind the sidewalk within the street right of way.

2.1.1 All water mains shall be ductile iron, class 52. Delete 2.1.2, 2.1.3, and 2.1.4.

2.4 All water service pipe to be copper tubing, Type K, factory pre-insulated with 50mm of polyurethane foam. Delete all references to other pipe materials.

2.6.1 Granular bedding materials to be Type 3.

Section 02724 Sewage Forcemains

2.2.1 Change as follows: Granular bedding materials to be Type 3 for ductile iron pipe and Type 1 for all other materials.

3.3 STANDARD DRAWINGS

Drawings 4020, 4030, 4040, 4050

Cover requirements shall be deleted and replaced with requirements from Section 2.6 of this document.

4.0 SUBDIVISION AGREEMENT

Following is a sample form of the Subdivision Agreement:

THIS AGREEMENT made at the Town of Labrador City, in the Province of Newfoundland and Labrador, this_____day of _____, Anno Domino, Two Thousand and_____

BETWEEN: _____

(hereinafter called the Developer)

of the one part

AND: THE TOWN COUNCIL OF LABRADOR CITY, a statutory

Corporation, duly incorporated under The Town of Labrador City Act, 1961 (hereinafter called the Town)

of the other part

WHEREAS the Developer has applied to the Town for permission to develop _____ (hereinafter called the Subdivision) in the Municipal Boundaries of the Town, in the Province of Newfoundland and Labrador, and which development is for the general purpose of subdividing lands for the construction of _____ and which location and site is located within the Town on _____ and which development plans are specified in Sheets to and revisions, if any, detailing the above development and forming part of this Agreement, as Schedule A;

AND WHEREAS the Developer, as a condition of final acceptance of development plans for the lands is required to provide certain services and works to service the said lands;

AND WHEREAS the Town has set out in detail conditions which are to be adhered to by the Developer and which are to constitute the terms and conditions under which the Developer is granted a permit to carry out the development of the Subdivision as aforesaid;

AND WHEREAS the Town requires from the Developer a written agreement providing for the proper development of the lands and the installation of the services and works and the observance of the conditions with respect to the development of the said lands;

NOW THEREFORE THIS AGREEMENT WITNESSETH that for and in consideration of the Town issuing a development permit and in the further consideration of the mutual covenants herein contained,

the Developer covenants with the Town to carry out the development and the work on the part of the Developer in the Town in accordance with and subject to the terms and conditions of the Conditions of Permit attached hereto, Pages to , and further covenants that the Developer shall observe and perform all the said Conditions of Permit and complete the development pursuant to the Towns standards and conditions.

IN THE WITNESS WHEREOF the said parties to these presents have hereunto their hands and seals subscribed and set the day and year first before written.

THE COMMON SEAL OF

_____
was hereunto affixed in the presence of:

_____ _____
Signature Witness

_____
Position

_____ _____
Signature Witness

_____
Position

THE COMMON SEAL of the Town of the Town of Labrador City was hereunto affixed in the presence of:

_____ _____
Signature Witness

_____
Position

_____ _____
Signature Witness

_____
Position

CONDITIONS OF PERMIT

These conditions, the Subdivision Development Agreement, all associated permits and the Offer to Purchase Agreement (if applicable), shall be read together and shall attach to the development permit(s).

1. The Developer covenants and agrees, at the Developer(s) expense, to develop the lands to its external boundaries as shown on the plans attached to this Agreement and shown as Schedule A (drawing sheets to and revisions, if any) and which form part of this Agreement. The Developer covenants and agrees that the proposed work specified on Schedule A shall be executed in conformity with those plans. No other buildings or work shall be executed on the said lands other than those to be erected in conformity with Schedule A.
2. The Developer covenants and agrees, at the Developer(s) expense, to grant to the Town free from encumbrance all lands which are required for public purposes, including roads, infrastructure easements, recreational parks and lands, walkways and play-grounds, and the Developer covenants to provide to the Town all necessary Deeds of Conveyance as is required from time to time to conform title of the same into the Town.
3. The Developer covenants with the Town to provide all necessary easements and/or right of way required by utility companies for the purpose of supplying electrical and telephone services, street lighting and any other utility services within the Subdivision and the Developer shall provide all necessary conveyances to the utility companies to complete the same. Pole and power lines shall be erected at the rear of the building lots or in such other areas as are first approved by the Town or its duly authorized agent.
4. The Developer shall make any changes in the Subdivision plans as Town dictates and the Developer shall make all necessary changes as required as long as such changes do not result in substantial changes to the plans of the Subdivision as set out in Schedule A approved by Town.
5. The Developer shall be responsible for maintaining all streets in the Subdivision in reasonable driving conditions, as determined by the Town during the construction period, including all grading, dust control, snow removal and sanding, as required. In the event the Developer fails to maintain standards satisfactory to the Town, the Town shall have the right to complete the unsatisfactory works and charge the same to the expense of the Developer.
6. The Developer covenants and agrees not to carry out any Phase I or Phase II Works until grading of the entire development site has been completed in accordance with the site grading plan required for the development site. Grading must be verified by the Developer's engineer or engineering consultant and written confirmation be submitted to the Town. If site grading is not completed in accordance to

the site grading plan, the Town reserves the right to withhold the issuance of a construction permit and to take any other legal measures until such time as all identified site grading deficiencies have been corrected to the satisfaction of the Town. The Town reserves the right to issue a stop work order to which the Developer must adhere to if Phase I or Phase II Works are carried out before written confirmation the development site grading has been completed in accordance with the site grading plan as received by the Town.

7. The Developer covenants and agrees within the period specified in Clause 8 hereof to construct at the Developer(s) expense the following services and works in accordance with The Town of Labrador City MUNICIPAL DEVELOPMENT STANDARDS, and its regulations:

   a. Street, roads and walkways such to be graded, graveled, curbed and paved and completed in all respects according to the plans and in accordance with the Towns regulations.

   b. The sidewalks, easements and landscaped areas in accordance with the plans and to the satisfaction of the Town;

   c. Water mains, hydrants and ancillary works;

   d. Sanitary sewers, manholes, catch basins and ancillary works;

   e. Storm sewers, manholes, catch basins and ancillary works;

   f. Street lighting;

   g. Traffic signs;

   h. All areas between the lot lines and the limits of the development, including all common areas and any areas of disturbance outside of the lot lines including municipal easements and street right-of-ways which are disturbed shall be reinstated to the Town's satisfaction. Restoration includes, but is not limited to hydro seeding or, placement of top soil and grassing;

   i. All other public works as required by the plans and specifications and the Town's regulations.

   j. AND, all of which are to be completed to the satisfaction of the Town.

8. The Developer covenants with the Town to complete the development works for total performance of the development by no later than the . Failure to complete the Subdivision to the satisfaction of the Town by that date, shall give the right to the Town to complete all outstanding works and charge the works to the Developer all in accordance with the Performance Labour and Materials Bonds filed with the Town by the Developer pursuant to Clause 25 of these Conditions of Permit.

9. The Developer covenants that all refuse and debris arising from construction in the Subdivision will be removed from the site when the substantial portion of the Subdivision has been completed or when required to do so by the Town. The Developer shall ensure that all excavation carried out by individual building contractors shall be similarly removed and shall not at any stage of construction or development be pushed unto the street right of way or any adjacent properties. The Developer agrees to protect the natural ecology and covenants with the Town that no trees or natural features will be destroyed unnecessarily.

10. The Developer covenants and agrees with the Town that engineering design and full supervision of the services and works provided for in this Agreement and Conditions of Permit and development plans will be carried out by a Professional Engineer experienced in the work and retained by the Developer until final completion of development.

11. The Developer covenants and agrees:

    a. That construction of drainage works and improvements outside the area of development required to accommodate drainage from lands draining through it shall be the responsibility of the Developer.

    b. To pay to the Town any over sizing fee which may be attributable to this development.

    c. To pay to the Town any street and/or service upgrading assessment which may be attributable to this development.

12. The Developer covenants and agrees that he/she shall not permit more than two (2) adjacent houses containing identical floor plans to be constructed within the development. Where two (2) adjacent houses containing identical floor plans are constructed within the development, each house shall be built with a different architectural treatment of the facade.

13. The Developer agrees that no building permit shall be issued for this development unless in compliance with this Agreement.

14. The Developer agrees that no permit shall be issued for this Development until proof of ownership of the property is provided.

15. The Developer agrees that all surface drainage problems which appear prior to the issuance of a certificate of compliance by the Town as referred to in Paragraph 26 shall be corrected by the Developer at his/her expense.

16. The Developer covenants and agrees to indemnify and save harmless the Town and its agents from any damage resulting directly or indirectly to the Town and/or any persons lawfully upon the property

or development that is a result of the negligence of the Developer, his/her agents or servants, contractors or sub-contractors as consequence of construction taking place in the Subdivision. The Developer covenants that it shall immediately rectify to the satisfaction of the Town all works necessary to be undertaken as a result of the said negligence and to be responsible to the Town for all damages of whatsoever nature or kind flowing from the acts of negligence. The Developer further covenants that upon signing of this Agreement, it shall file with the Town standard policies of comprehensive liability insurance for a minimum of two million dollars ($2,000,000.00) and an endorsement certifying the Town of Labrador City is included under the policy as an additional insured.

17. The Developer shall be held liable for all actions of its contractors and subcontractors and guarantees a quality of material and workmanship satisfactory to the Town. Any deficiency which shall be noted from time to time shall be brought to the attention of the Developer and it shall be its responsibility to ensure that all requirements are carried out by its contractors with utmost expediency.

18. The Developer shall provide the Town with a Letter of Good Standing from WHSCC and the Registry of Companies for the Developer, all contractors and sub-contractors.

19. The Developer agrees that, it, or its consulting engineers, will provide the necessary surveys and layouts required to establish building lines and foundation elevations required by the building contractors to ensure that structures are properly located, all of which are to be completed by a Registered Land Surveyor for the Province of Newfoundland and all of which shall be required prior to the issuance of a building permit.

20. The Developer shall ensure that all contractors employed on the works are adequately covered by public liability insurance or other insurance as may be required by the Town. Proof of such insurance must be provided to the Town prior to the start of construction or upon request during construction.

21. The Developer shall ensure that any blasting required to be done shall be done in compliance with the Blasting Regulations of the Province of Newfoundland. Before any blasting is commenced, the Town shall be notified at least twenty-four (24) hours in advance of any blasting taking place and shall be provided with proof of blasting insurance satisfactory to the Town.

22. The Developer agrees to abide by inspection and testing standards set down by the Town.

23. It is hereby agreed by the Developer that the approval by the Town of the plans and specification as submitted shall not in any way make the Town liable for any errors or omissions which may from time to time become evident, nor does this Agreement or approval release the Developer from the responsibility of making all necessary changes, corrections or additions which might from time to time become necessary.

24. Failure to comply with any of the conditions in this Agreement will constitute automatic cancellation of this permit and the Developer shall be solely responsible and liable for any and all consequences, financial and otherwise, that results from such cancellation.

25. The Developer agrees that he/she shall not erect any signs, billboards or other advertising, or notices except in accordance with the Town of Labrador City Land Use, Zoning, Subdivision and Advertisement Regulations and with the approval or permit from the Town. The size, design and construction of any signs located on the property shall be to the satisfaction and prior approval of the Town and shall be in accordance with its regulations in that regard.

26. The Developer agrees to furnish with the Town an acceptable Security, as outlined in 1.4.3 of the Towns Municipal Development Standards, based upon the estimated cost of development and which has been determined by the Town to be and which amount has been determined by the Town to cover the provisions of all public works required by this Agreement. The Security shall be drafted to remain in force to the date of acceptance referred to in Paragraph 27 of these conditions or thirty (30) days after the date set out in Paragraph 8, whichever comes first. Thereafter, a Maintenance Security shall be furnished by the Developer for ten percent (10%) of the total amount of which Maintenance Security shall remain in force for twelve (12) months from the date of the Certificate of Compliance.

    a. The Developer agrees that if it fails to meet the conditions of this Agreement in any respect, the Town shall have the right to demand from the bonding agency any monies necessary to complete the public works up to the amount specified in the Bond.

    b. The Developer further agrees to furnish with the Town a Reinstatement Security as outlined in 1.4.3 of the Town of Labrador City Municipal Development Standards.

    It is understood and agreed that if the amount of security provided under 26 a) and b) is not sufficient to cover the cost of completing the public works and/or reinstatement as may be required, then any additional monies required may be recovered from the Developer by the Town as a civil debt.

27. The Developer agrees that if it fails to meet the conditions of this Agreement in any respect, the Town shall have the right to demand from the bonding agency any monies necessary to complete the public works up to the amount specified in the Bond.

28. Upon completion of the said services and works in accordance with this Agreement and payment of all accounts thereof, the Town shall issue to the Developer a Certificate of Compliance stating that all such services and works have been constructed and installed in accordance with the plans, specifications and Town Regulations.

29. Upon completion of construction, the Developer shall provide to the Town a complete set of as-built drawings, detailing the final as-built construction of all streets, curbs, water facilities, storm and sanitary sewer facilities and any other related works provided in the Subdivision. These drawings shall be provided in AutoCAD 2007 compatible files or DXF files suitable for same.

30. No occupancy permit shall be issued by the Town prior to completed installation of all underground services, curb and gutter and asphalt base course.

31. Any building construction started prior to substantial completion of underground services will be at the owner(s) risk. The owner shall supply to the Town a complete lot analysis sheet for each lot as a requirement of permit. No building construction is to be started prior to obtaining a building permit.

32. Upon the Certificate of Compliance being issued and upon the passing of a resolution by the Town giving final acceptance to the development and the services and works referred to in the said certificate, the ownership of the services and works shall vest in the Town.

33. Arbitration:

    a. Where a difference arises between the parties bound by this Agreement, and where the difference arises out of the interpretation, application, administration or alleged violation of this Agreement, and including any questions as to whether a matter is arbitrable, one of the parties may notify the other party in writing of its desire to submit the difference or allegation of arbitration and the notice shall contain the name of the person appointed to be an arbitrator by the party giving the notice;

    b. The party to whom notice is given shall within fifteen (15) days after receiving the notice, name the person whom it appoints to be an arbitrator and advise the party who gave the notice of the name of its appointee;

    c. The Two Arbitrators named in accordance with its provisions shall within fifteen (15) days after the appointment of the second of them, name a third arbitrator and he/she shall be the Chairperson of the Arbitration Board;

    d. Each party who is required to name a member of the Arbitration Board shall pay the remuneration and expenses of that member and the parties shall pay equally the remuneration and expenses of the Chairperson;

    e. The decision of the Arbitration Board shall be given within fourteen (14) days following the appointment of the Chairperson. It is understood, however, that the Arbitration Board, shall not be authorized to make any decision inconsistent with the stipulation of this Agreement, nor to delete, alter, or amend any part thereof;

f. The Arbitration shall be conducted in accordance to the rules set out under the Arbitration Act, Chapter A-14, SN 1990 as amended.

APPENDIX A

Storm Sewer Forms

Town of Labrador City

COMPUTATIONS FOR CAPACITIES OF STORM SEWER

Sewers Sheet No.________________________

For ______________________________ Date:________________________

		Manhole #			Tributary Area			Time of Concentration				Pipe Capacity					
Dwg. No. (1)	Loc. (2)	From (3)	To (4)	Length .(m) (5)	Incre-ment (6)	Total) (7)	Runoff Co-Efficient (8)	Inlet Time (9)	In Section (10)	Total (11)	Runoff (l/s) (12)	Diameter m/m (13)	Slope m/m (14)	Full Cap. l/s (15)	Vel. m/s (16)	Addit. Cap. Avail. L/s (17)	Remarks

APPENDIX B

Sanitary Sewer Forms

LABRADORCITY

Town of Labrador City
SANITARY SEWER TEST RESULTS

LOCATION (STREET)

Date	Location MH to MH	Diameter of Pipe	M of Pipe	Allowable Loss (litres)	No. Bldg. Services	M of Service Pipe	EXFILTRATION			INFILTRATION			REMARKS
							Test Duration (min,)	Meas. Loss (litres)	Pass / Ref	Test Duration (min)	Measured Inflow (litres)	Pass / Reject	
LOCATION (STREET)													
LOCATION (STREET)													

ALLOWABLE EXFILTRATION = 0.000023 L/MIN/mm,DIA/M
ALLOWABLE EXFILTARTION = 0.00000767 L/MIN/mm,DIA/M

I HEREBY CERTIFY ALL TEST HAVE BEEN CARRIED OUT ACCORDING TO CONTRACT SPECIFICATIONS AND THIS/THESE SECTION(S) OF PIPE HAS PASSED THE REQUIRED TESTS.

CONTRACTOR'S FOREMAN _____ DATE:_____

SITE REPRESENTATIVE _____ DATE:_____

LABRADORCITY

Town of Labrador City

MANHOLE TEST RESULTS

DATE: _____

MH#	LOCATION	ALLOWABLE LEAKAGE	TEST TIME	ACTUAL LEAKAGE	PASS/ FAIL	DEPTH OF TEST WATER ABV INV.	REMARKS

TOWN OF LABRADOR CITY
MANHOLE TEST RESULTS

Project: _____

Consulting Engineer:_____

LABRADORCITY

Town of Labrador City

SEWER ANALYSIS

PIPE GEOMETRY

CURRENT		CONT DOWN MH#	DESCRIPTION	GRADE	8	DIAMETER

TRIBUTARY AREAS

UPSTREAM MH #	ZONINGS								

VERTICAL & HORIZONTAL INFORMATION

UPSTREAM MH #	NORTHING	EASTING	INVERT	LENGTH (M)	INVERT DOWN	GROUND ELEVATION

LABRADORCITY

Town of Labrador City

SANITARY SEWER ANALYSIS

DESIGN CAPACITIES AND FLOWS

UPSTREAM MH #	DIAMETER (mm)	CAPACITY (l/s)	VELOCITY (part) (m/s)	SPARE CAPACITY (l/s)	INFILTRATION (l/s)	AVERAGE FLOW (l/s)	PEAK FLOW (l/s)

APPENDIX C

Benchmark Location Forms

LABRADORCITY

Town of Labrador City
STANDARD BENCH MARK LOCATION FORM

VERTICAL CONTROL SURVEY

BENCH MARK

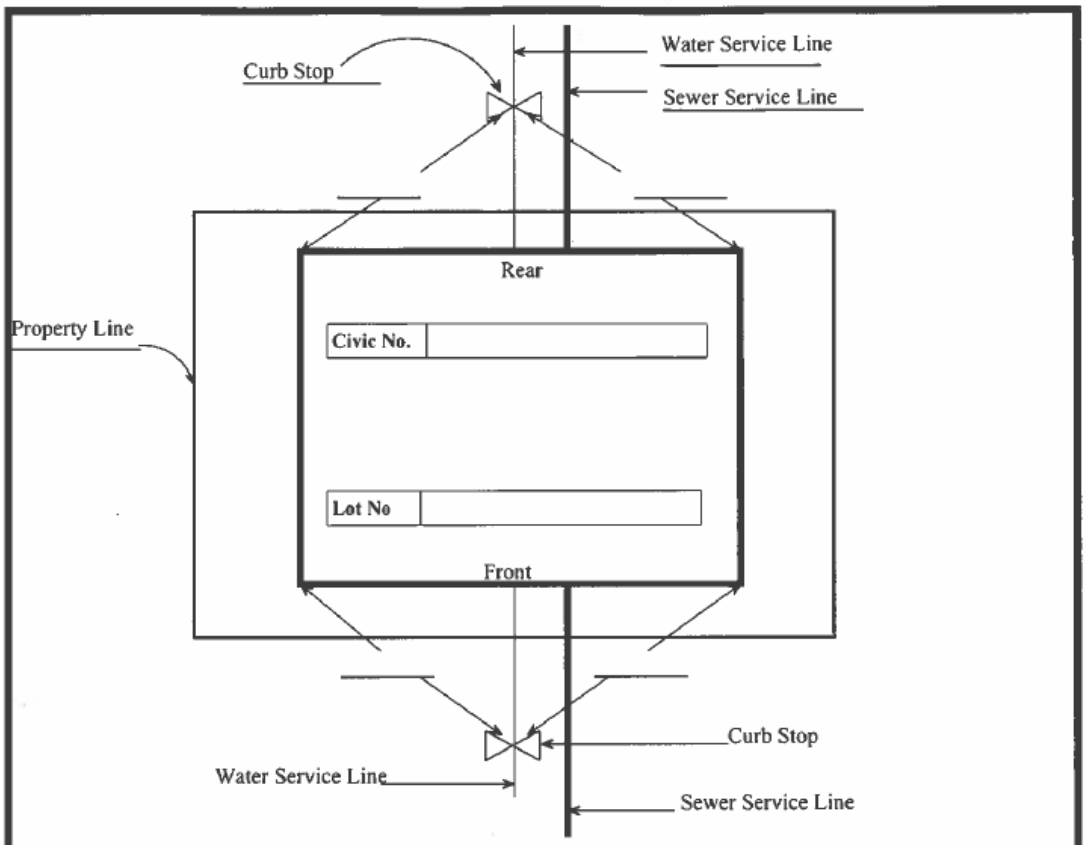
KEY PLAN:	REFERENCES:
VICINITY:	VERTICAL:
INSPECTION DATES:	
TYPE:	ELEVATION:

APPENDIX D

Water, Service Information Form

LABRADORCITY

Town of Labrador City | Service line Locations



SIDEWALK/CURB

Street Name:	

Development Name:	
Developer:	
Prepared By:	
Comments:	

Signature | Date

CC: PERMITS OFFICE

LABRADORCITY Town of Labrador City
SUBDIVISION DEVELOPMENT STANDARDS

CAMERA INSPECTION REPORT

SUBDIVISION:_____

STREET NAME:_____

MANHOLE #:_____ TO MANHOLE #:_____

DISTANCE:_____ GRADIENT: _____

PIPE LENGTH: _____ PIPE SIZE: _____

PIPE MATERIAL: _____

DATE: _____ REF.DWG #:_____ SHEET #:_____

TAPE NUMBER	LINE FOTTAGE	PHOTO NUMBER	COUNTER REF. NO	OBSERVATIONS

LABRADORCITY

Town of Labrador City

SUBDIVISION DEVELOPMENT STANDARDS
HYDROSTATIC PRESSURE TEST RESULTS

DATE	STREET NAME	CHAIN STA TO STA	PRESSURE (KpA)		LEAKAGE (L)		TEST TIME MIN	TYPE OF PIPE	DIA. OF PIPE	LENGTH OF TEST SECTION	REMAKRS
			WORKING	TEST	ALLOW	ACCT					

I HEREBY CERTIFY ALL TESTS HAVE BEEN CARRIED OUT ACCORDING TO CONTRACT SPECIFICATIONS AND THIS SECTION OF PIPE HAS PASSED THE REQUIRED TESTS ON _____

_____ CONTRACTOR'S FOREMAN

_____ SITE REPRESENTATIVE

TOWN OF LABRADOR CITY
HYDROSTATIC PRESSURE TEST RESULTS

Project: _____

Consulting Engineer:_____

LABRADORCITY

Town of Labrador City
HYDRANT INFORMATION CARD

Proj # _____
Hydrant # _____

LOCATION OF HYDRANT

Street _____ Alignment _____
Ave _____ Alignment _____
Side/Corner _____

CONNECTION TO MAIN

Lot No. _____ Block No. _____ Address _____
Size _____ Pipe Type _____

HYDRANT LATERAL

Size _____ Pipe Type _____
Valve position to hydrant _____
Valve number _____ Valve make/model _____
Method of connection to main _____

HYDRANT

Make _____ Type _____
Barrel Size _____
Connections/Fittings _____
Bollards _____

OTHER INFORMATION

Date in-service _____
Remarks (any additional data, such as use/position of special fittings, variances, etc):

_____
_____
_____

Sketch

Contractor _____ Signature _____

Consulting Engineer _____ Signature _____

LABRADORCITY

Town of Labrador City
VALVE INFORMATION CARD

Proj # _____
Valve # _____

LOCATION OF VALVE

Street _____ Alignment _____
Ave _____ Alignment _____
Side/Corner _____
Lot No. _____ Block No. _____ Address _____

MAIN INFORMATION

Size _____ Pipe Type _____

VALVE

Make _____ Type _____
Size _____ To open, turn: CCW CW
Operator _____ *(circle one)*
Used for: ☐ Main Control ☐ Hydrant Control (# _____) ☐ Service Control ☐ Other:_____
Connections/Fittings _____

OTHER INFORMATION

Date in-service _____
Remarks (any additional data, such as use/position of special fittings, variances, etc):

_____
_____
_____

Sketch

Contractor _____ Signature _____

Consulting Engineer _____ Signature _____

APPENDIX E

Engineering Site validation Form

LABRADORCITY Town of Labrador City

ENGINEER'S SITE VALIDATION FORM
Subdivision Development Standards

TO: TOWN OF LABRADOR CITY
P.O. Box 280, 317 Hudson Drive
Labrador City, NL A2V 2K5

RE: Approval in Principle Permit # _____

Project _____

Location _____

Developer / Client _____

This shall acknowledge that the undersigned has reviewed Permit #_____and conditions as provided in the Letter of Approval and makes representation that:

*(a) the proposed area for development has been inspected for sub-surface conditions; and
*(b) the recommendation(s) has/have been made to the client; and
*(c) the recommendation(s) has/have been incorporated into the Subdivision Plan in accordance with good engineering practice, the National Building Code and local conditions; and
(d) the development area is suitable for construction of Phase I and Phase II Works with allowable bearing pressure; and
(e) the undersigned is a duly qualified engineer practicing at_____in the Province of_____; and
(f) the undersigned's professional liability policy is carried by_____, Policy Number:_____and is in full force and effect.

Dated at_____, in the Province of _____

this_____day of_____, 20_____.

_____ _____
Signature Witness

Affix Seals

IMPORTANT
* A written report must accompany this form providing details with respect to actions taken in (a), (b) and (c)

APPENDIX F

CCC, FAC Forms

LABRADORCITY

Town of Labrador City
CONSTRUCTION COMPLETION CERTIFICATE DEVELOPMENT PROJECTS

Development Area: XXXXX

Developer: XXXXX

Development Agreement Date: XXXXX

Contractor: XXXXX

Municipal Improvement: XXXXX
(As specified in the Agreement)

Boundaries of Development Area: XXXXX

Date of Application: XXXXX

PURSUANT TO THE TOWN OF LABRADOR CITY DEVELOPMENT AGREEMENT DATED XXXXX
WE, XXXXX OF XXXXX
"GOVERNMENT AGENCY / CONSULTING ENGINEER" HEREBY CERTIFY THAT THE MUNICIPAL IMPROVEMENT NOTED HEREIN MEETS ALL THE REQUIREMENTS FOR A CONSTRUCTION COMPLETION CERTIFICATE AS SPECIFIED BY THE SAID DEVELOPMENT AGREEMENT MENTIONED ABOVE, AND CONSTRUCTED, AS FAR AS CAN BE PRACTICALLY ASCERTAINED, ACCORDING TO THE TOWN OF LABRADOR CITY MUNICIPAL DEVELOPMENT STANDARDS WITH THE REQUIREMENTS OF THE SAID LETTER OF UNDERSTANDING, I, HEREBY RECOMMEND THIS MUNICIPAL IMPROVEMENT FOR APPROVAL OF THE CONSTRUCTION COMPLETION CERTIFICATE.

Project Engineer (Consulting Engineer) or Government Agency Date

Signing Officer (Consulting Engineer Firm) or Government Agency Date

Developer Date

Authorized City Inspector Date

Consulting Engineer's Seal or
Government Agency's Seal

Approved on City Engineer

Rejected on City Engineer

Causes for Rejection: (See Attached Report)

I hereby certify that the items listed as reasons for rejection have been corrected.

Project Engineer (Consulting Engineer Firm) Date

Approved:

City Engineer Date

Development Officer Date

Date maintenance period to start: XXXXX

Date maintenance period to end: XXXXX

LABRADORCITY

Town of Labrador City
FINAL ACCEPTANCE CERTIFICATE
DEVELOPMENT PROJECTS

Development Area:	XXXXX
Developer:	XXXXX
Development Agreement Date:	XXXXX
Contractor:	XXXXX
Municipal Improvement: (As specified in the Agreement)	XXXXX
Boundaries of Development Area:	XXXXX
Date of Application:	XXXXX

PURSUANT TO THE TOWN OF LABRADOR CITY DEVELOPMENT AGREEMENT DATED XXXXX
WE, XXXXX OF XXXXX
"GOVERNMENT AGENCY / CONSULTING ENGINEER" HEREBY CERTIFY THAT AS OF THE ABOVE DATE, THE SAID MUNICIPAL IMPROVEMENT MEETS ALL THE REQUIREMENTS FOR FINAL ACCEPTANCE AS SPECIFIED BY THE SAID DEVELOPMENT AGREEMENT, AND I HEREBY RECOMMEND THIS MUNICIPAL IMPROVEMENT FOR FINAL ACCEPTANCE BY THE TOWN OF LABRADOR CITY.

_____
Project Engineer (Consulting Engineer) or Government Agency Date

_____
Signing Officer (Consulting Engineer Firm) or Government Agency Date

_____
Developer Date

_____
Authorized City Inspector Date

Consulting Engineer's Seal or Government Agency's Seal

Approved on _____ City Engineer

Rejected on _____ City Engineer

Causes for Rejection: (See Attached Report)

I hereby certify that the items listed as reasons for rejection have been corrected.

_____
Project Engineer (Consulting Engineer Firm) Date

Approved:

_____
City Engineer Date

_____
Development Officer Date

Date maintenance period to end: XXXXX