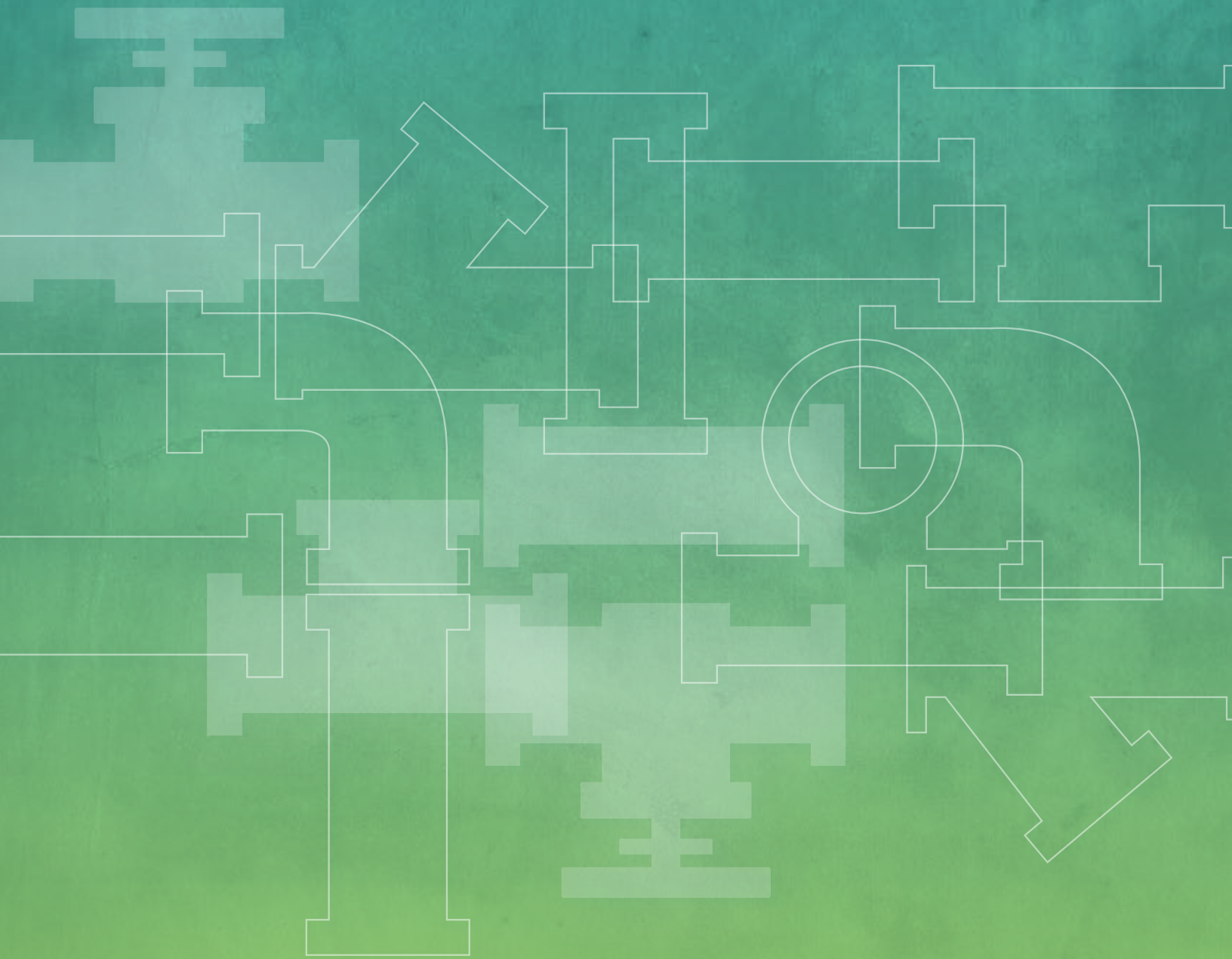
Reference Guideline #2
Site Assessment



BRITISH COLUMBIA

Ministry of
Community, Sport and
Cultural Development

Reference Guideline #2
Site Assessment

It would be advisable that all subdivision applications proposing the use of onsite sewerage systems for servicing of new parcel(s) be accompanied by a thorough site assessment. The site assessment would determine the suitability (site suitability) of the parcel for an onsite sewerage system. The site suitability category table describing the characteristics of each suitability category is provided in Appendix 4, Table 2 of the Best Practice Guideline (BPG). The parcels created could be in areas where community sewer is not planned or viable, and they would meet the Subdivision Sewerage Regulation Standard Practice Manual (SPM) criteria for site and soil evaluation for Type 1 systems.

This document sets out a common methodology for site evaluation to gather information that supports the subdivision application. This assessment guide is not intended for discharges captured by the Municipal Wastewater Regulation (MWR). Discharges under the MWR have to be registered by Qualified Professionals (Engineers) as such they can determine what is required, looking at acceptable discharge and cumulative effects. For those sites that fall under the MWR, there would be no reference to the Subdivision Sewerage Regulation SPM, except perhaps for determining flow rates.

OVERALL SITE EVALUATION

Process Steps for Overall Site Evaluation

- Identify limiting characteristics affecting system placement on the parcel.

Information to be Collected:

- Take pictures of overall site
- Take pictures of particular soils and any anomalies
- Note slope, direction of slope and possible drainage courses
- Note position of system on slope (crest, upper slope, etc.)
- Note the dominant vegetation and proximity and type of trees
- Note the existence of any structurally deficient soils subject to major wind or water erosion events (e.g. slide zones and dunes)
- Report the existence of any designated flood plains
- Note the location of any existing encumbrances (e.g. wells, water sources, surface water, outcrops of bedrock or restrictive layers, buildings, property lines, lines of easement, interceptors or drainage ditches, cuts, banks, fills, driveways or parking areas, existing onsite sewerage systems, or underground utilities).

SELECT TEST PIT/BOREHOLE LOCATION

Once a potential location has been chosen for a sewage system, an onsite investigation of soil properties is undertaken. Before any disturbance of the ground is conducted, it is necessary to have buried utility lines located and marked. The area of ground to be disturbed should be marked with flags so the area under investigation is clearly delineated.

To ensure that all underground utilities and structures are located, the proponent should complete the following:

a. Contact BC One Call.
b. Contact the local gas company and find out if there are any pipelines or service lines at your location (or ask your private locator to do this).
c. Have a private line location company conduct a survey for underground utilities and structures in the area where you plan to dig.
d. It is recommended that anyone conducting ground disturbance activities complete a ground disturbance training course.

Process Steps for Selecting Test Pit/Borehole Location(s)

- Pick site(s) near, but not under proposed onsite system
- The depth of investigation should be based on the depth below the infiltration layer to limiting features required for the proposed system: at least 1.0 m below for Type 2 or 3 systems and 1.5 m below for Type 1 systems.

Information to be Collected

- Location of discharge area
- Location of test hole(s)
- The reason for the depth to which the soil was assessed should be documented in the report.

EXCAVATION PIT(S)

Criteria for Excavation Pits

a. Excavate pit to maximum depth of 1.5 m for entry and examination of pit walls (follow Occupational Health and Safety Guidelines).
b. Orient pit so sunlight illuminates vertical face of pit.

Information to be Collected

- Soil profile examination depth

DRILL BOREHOLE(S)

Process Steps for Drilling Bore Hole(s)

- Push Shelby tube to 1.5 m with drill truck if soil is suitable
- Driller will set soil core on flat surface for examination (tail gate with plywood surface works well)
- Drill to 3 m to obtain deeper soil sample
- Examine soil on auger flights and take samples at appropriate depths

INTACT CORE(S)

Process Steps for Drilling Intact Cores

- Push core tube to 1.5 m with equipment if soil is suitable
- Driller will set soil core on flat surface for examination (tail gate with plywood surface works well)
- Drill to 3 m to obtain deeper soil sample
- Examine soil on auger flights and take samples at appropriate depths

ACQUIRE SOIL FROM BELOW 1.5M FOR EXAMINATION IF REQUIRED FOR PROPOSED SYSTEM TYPE

Process Steps for Acquiring Soil from Below 1.5m

- Have hoe operator bring soil from below 1.5 m to the surface for examination (do not enter a test pit that is more than 1.5 m deep without proper cribbing)

Information to be Collected

- Soil texture and structure changes
- Signs of seasonally saturated conditions

EXPOSE NATURAL SOIL STRUCTURE

Process Steps for Exposing Natural Soil Structure

- Use soil knife, blade, screwdriver or other tool to pick at area 0.5 m wide along full height of pit wall
- Use soil knife, blade etc. to cut open soil brought up from below 1.5 m by hoe bucket
- Use soil knife, blade etc. to cut open soil core
- Use soil knife, blade etc. to scrape off smeared outer layer of soil on auger

Information to be Collected

- Soil characteristics of the soil profile horizons (eg. soil texture, structure, and indicators of conditions that affect onsite system design).

DESCRIBE SOIL HORIZONS

Process Steps for Describing Soil Horizons

- Note master soil horizon layers
- Describe features of each horizon

Information to be Collected

List soil horizon features using the Canadian System of Soil Classification (CSSC) soil descriptions:

- Depth of horizon, thickness
- Name of soil horizon (A,B,C)
- Colour (hue, value, chroma)
- Identify mottling, gleying (abundance, size, distinctness)
- Size, shape, type of rock
- Texture of < 2mm fraction of horizon
- Soil structure
- Soil consistence (friable, firm, hard)
- Abundance, size distribution of roots
- Moisture content
- Volumetric percentage of rock (coarse fragments)
- Presence/absence of carbonates
- Presence/absence of precipitates (e.g. salts, iron staining)
- Parent material (lacustrine [lake deposit], fluvial [river deposit], eolian [wind deposit] or till)
- Inclusions (coal fragments, iron stones).

DETERMINE SOIL CHANGES ACROSS SITE AREA

Process Steps for Determining Soil Changes across Site

- Look for lateral changes in soil profile
- Use auger and/or compare to profile of second pit

Information to be Collected

- Determine changes, if any, in soil profile across proposed site

INTERPRET RESULTS

Process Steps for Interpreting Results

- Identify limiting depths
- Identify soil textures and structure that are the key design factors

Information to be Collected

- Check vertical separation distances
- Identify mottled layers and gleying
- Determine depth to saturated soils
- Measure depth to limiting soil layers
- Identify highly permeable layers and depth

TAKE SAMPLES FOR LABORATORY SAMPLE ANALYSIS

Process Steps for Lab Texture Analysis

- Take a sample of the soil below the infiltration depth
- Take a sample of the soil in the limiting layer
- Submit samples to an accredited lab for particle size analysis

Information to be Collected

- Document depth of samples taken
- Document results of particle size analysis

REPORT SITE EVALUATION FINDINGS

Process Steps for Reporting Findings

- Log all data in required format (Soil Log Form)
- Complete Parcel Diagram

Summarize Limiting Features of the Parcel/Site

- Depth to groundwater or seasonally saturated soils
- Soil characteristics that limit selection of treatment system types
- Render opinion of level of suitability of soils for onsite systems (see Appendix 4, Table 2 in BPG)
- Offer opinion on merits of various system types and best type of system for the site
- Develop system design, size, shape/ layout, depth, initial treatment requirements, and location and installation recommendations

SOME ADDITIONAL RESOURCES

Soil surveys have been done to provide a partial inventory of soil resources in British Columbia. The soil survey reports are available from Agriculture and Agri-Food Canada at the following website: *http://sis.agr.gc.ca/cansis/publications/surveys/bc/index.html*

They are an excellent resource for preliminary assessment of soils in an area.

- Use soil names and particle size limits found in the CSSC; and
- Use the Soils Evaluation Guide (Companion Document #3).

The site assessment report should include the following components:

- Suitability of land and planning designation; depth of undisturbed native mineral soil (if less than 2.5m); and
- Soil testing and evaluation:
  - » A minimum of 2 observation holes (min. 1.8 m deep) in each initial and replacement sewage discharge area; numbered, flagged and covered to protect wildlife, domestic animals and people from falling into the observation holes – if a lagoon is proposed, the observation holes should demonstrate at least 3.0 m of dry clay, and in any case, should be at least 1.0 m deeper than the intended depth of the lagoon;
  - » A minimum of 2 percolation test holes in each initial and replacement sewage discharge area (see the procedures and results in the SPM) – holes numbered, flagged and covered-alternatively, field saturated hydraulic conductivity (permeameter) tests can be conducted instead of percolation tests;
  - » Soils texture and structure for each observation hole;

- Soils evaluation and percolation/ permeameter test results submitted by an Engineer with soils experience, a Geoscientist, a BC Land Surveyor with soils experience, or a Registered Onsite Wastewater Practitioner (ROWP) with Planner designation; and presence of non-native soils.

- If there is an existing onsite system serving an existing dwelling, a report completed by a ROWP with a Planner or Inspector designation, including an assessment of the existing sewerage system the report should answer the following questions:
  - Does the existing sewerage system meet the required setbacks with respect to Section 3.1 of the Sewerage System Regulation (BC Reg. 326/2004) and the separation distances in the BC Sewerage System SPM?
  - Is the sewerage system adequate for the existing/proposed use (properly functioning, adequately sized, etc.)? Reference should be made to the Sewerage System SPM.
  - Is there adequate replacement area for a Type 1 (preferably trench-based) discharge area on the remainder? When was the sewerage system constructed and what type of sewerage system is it?
  - Was an Application for a Permit to Construct or a Record of Sewerage System submitted to the Regional Health Authority?
- Site preparation;
- Lot slopes;
- Existing Section 219 Covenants;
- Seasonal (wet weather) assessments;
- Site drawing;
- Assumptions regarding method of treatment and ground discharge proposed (e.g. Type 1 septic tank, subsurface trenches, seepage beds, sand mounds, lagoon, etc.);
- Ground or soil conditions from soil survey reports;
- Surrounding or future planned development;
- Density and lot sizes proposed;
- Number of units;
- Topography and drainage;
- Site grading plans (plan and section);
- Indication of level of hydrogeological sensitivity (high infiltration rates);
- Depth to ground water;
- Groundwater conditions in vicinity of onsite systems (confined, unconfined, or perched aquifer(s)) and interactions with surface water; volume of sewage generated / used for calculations;
- Soil moisture and near surface ground water conditions;
- Qualification of site evaluators; and
- Site capability – see Appendix 4, Table 2 in BPG.

The site drawing should be accurate and to scale, and should clearly indicate the following: location and dimensions of onsite sewerage system:

- Setback distances;
- Location of drain fields and layout;
- Reserve area for replacement field;
- General slope and direction of land, and slope within discharge areas (in %);
- Trees;
- Floodplains;
- Wells (existing and proposed including wells on neighbouring properties to a minimum distance of 30m from subject property);

- Drinking water sources (existing and planned);
- Surface water, wet wells, and marshland;
- Drainage courses or water courses and the mean annual high water mark of lakes and rivers;
- Bedrock outcrops;
- Buildings (existing and proposed);
- Property lines, areas and dimensions for new lots;
- Ditches, and drainage works (existing and proposed);
- Banks, fills or steep slopes;
- Driveways and roadways;
- Existing onsite systems on the lot and within 30m of the subject property;
- Existing and future highway/ road right-of-ways;
- Proposed building sites, driveways, wells and water lines; existing easement lines, right-of-ways, agreements, or covenants and purpose;
- Underground utilities;
- Borehole and test pit locations;
- North arrow; and
- Legal description or civic address of the lot.

An example site assessment can be found at the following link: *http://www.Aamdc.Com/advocacy/member-bulletins/member-bulletin-archive/284-is-your-municipality-using-the-model-process*

SOIL LOG FORM

Owner Name or Job ID:	

Legal Land Location					Plan	Block	Lot	GPS Coordinates
LSD-1/4	Sec	Twp	Rg	Mer				

Aerial Photos	
General Vegetation	

Topography	
Overall Site Slope %	
Slope Position of System	

Test Hole #	Soil Subgroup	Parent Material	Drainage Class	Sample 1 Depth	Sample 2 Depth

Horizon	Depth (cm)	Texture	Colour	Gleyed	Mottled	Structure	Consistence	Moisture	%CF

Depth to Groundwater	
Depth to Seasonally Saturated Soil	
Limiting Topography	

Limiting Soil Layer Char. (describe)	
Dept to Limiting Soil Layer	
Depth to Highly Permeable Layer	

Key Limiting System Design Characteristic	

Comments

Note: Use soil names, description and particle size limits found in the Canadian System of Soil Classification (CSSC)

LOT EVALUATION DIAGRAM