



Islands Trust

Building Sustainably

A Guide for Howe Sound

& the Northern Gulf Islands

**Guide for residential construction for single family dwellings
including additions, renovations and accessory buildings**



What's this Guide for?

This Guide helps you build while protecting the islands' natural ecosystems. It also includes information about financial incentives and other resources that can help you protect your environment. The decisions you make at the planning stages of your building project can dramatically reduce any negative impacts and help to create a truly environmentally friendly community.

What makes the Gulf Islands special?

The Howe Sound and Northern Gulf Islands are part of the Islands Trust, which has a mandate to preserve and protect the Islands Trust area's unique environment. Most of the Northern Gulf Islands are in the Coastal Douglas-fir ecosystem, one of the most endangered ecosystems in the world.

The Islands Trust, the Sunshine Coast Regional District, Metro Vancouver, Regional District of Nanaimo and the Comox Valley Regional District have all signed the provincial government's Climate Action Charter, which requires communities to reduce greenhouse gas emissions.

Who should use the Guide?

This Guide is for all current and prospective landowners who are preparing to build a new house, a cottage, or an accessory building, or planning to remodel or add to an existing dwelling, alter the land or to build or reroute a driveway.

When should I use the Guide?

Consult the Guide early in your planning process so that the ideas can be incorporated at the outset. Review the guide with your architect, designer and contractor. Consulting the guide after the working drawings are finished may result in lost opportunities and additional costs if you decide to make last-minute changes.

Where to find Maps

All of the maps you need showing your property, sensitive ecosystems and permitted land uses are located on the Islands Trust website using the MapIT application.

The *Guide to Environmentally Friendly Building in the Northern Gulf Islands* is downloadable at www.islandstrust.bc.ca

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Ecosystem Approach to Planning

- .. Maintain as much of your property as a natural, undeveloped area where only native species grow. Conserving existing natural areas is by far the most effective way to conserve plant and animal biodiversity on our islands.
- .. Identify environmental and archaeological values, including habitat for threatened or endangered species and First Nation sites before considering access, site clearing and design.
- .. Where possible, plan to locate your driveway, septic system, house and outbuildings away from areas with high environmental values like shorelines, streams, rare plants, and wildlife trees. Place natural buffers such as vegetation between the development and sensitive features.
- .. Cluster development in one area of the property to minimize site disturbance.
- .. Register a covenant on your property to protect ecological values in perpetuity. A covenant under the Natural Area Protection Tax Exemption Program (NAPTEP) will reduce your property taxes. Contact Islands Trust Fund staff or the Islands Trust Fund website for more details on this program.
- .. Limit the number of trees to be cut and otherwise minimize the ecological impact of your building through good site design. Our islands' trees and soils have ecological value and represent important carbon sinks, critical in addressing climate change. When land is cleared for development, its ability to sequester carbon is lost.
- .. Check your property for raptor, heron or osprey nests; these are protected by British Columbia legislation and on some islands, bylaws regulate development around these trees.
- .. Retain and protect significant trees like Garry Oaks, Arbutus, Pacific Dogwood, Pacific Yew and older growth Douglas-fir and cedar.
- .. Identify invasive plant species for your island and learn how best to remove them from your property. When landscaping, try to plant native plants as much as possible.
- .. Provide for deer movement through or around your property by using fencing setbacks or fencing parts, rather than all, of your property.

Water Management: Fresh Water is Precious

- .. Design your project to minimize risks to water supplies. Find out if your property is located near a community water system's well, upon an unconsolidated aquifer, or within the watershed of a drinking water lake. If so, you are responsible to prevent contamination of the drinking water supply by malfunctioning septic systems, phosphorus release from soil disturbance, runoff and erosion, and fuel and chemical spills.
- .. If your property has a stream, a wetland, or lake frontage, plan to protect trees and vegetation within 30 m of the water. If the stream supports fish, the Provincial Riparian Area Regulation applies and you must discuss your proposal with a Qualified Environmental Professional before beginning work. On any stream, check with the Islands Trust planning office before beginning construction as special setbacks or development permit areas may be in effect.

FIRST NATIONS TIPS

Certain types of First Nations sites are protected under federal and provincial law and must not be disturbed. Avoid the accidental destruction of an ancient burial site and costly delays or fines by walking the land with an archaeologist before work begins. Please contact planning staff to find out if there may be First Nation archeology sites on your property

ECOLOGY TIPS

Plan ahead: walk the land with your contractor and a local biologist to find environmental benefits and cost savings.

Clustering buildings and planning short driveways helps the environment and saves money.

A small patch of skunk cabbage or bulrushes in an otherwise dry environment indicates a wetland — an important habitat for amphibians and birds, and a potential carbon sink.

Conservation covenants are registered on title and protect the special aspects of the land that you wish to preserve. They can also give you significant tax benefits.

TREE TIPS

Very few old growth cedar or fir trees remain on the Gulf Islands. The dominant coastal Douglas-fir ecosystems are rare in the rest of the province. The islands' Garry oak meadows are a rare subset of these shrinking ecosystems. Valued wildflowers such as camas, seablush, blue-eyed mary and satinflower depend for their survival on the conservation of Garry Oak meadows. These trees have both heritage and ecological value.

Standing dead trees provide important wildlife habitat. Leave them standing unless they pose a hazard. You can create views by limbing taller trees instead of removing them. If you must remove trees to open up a view, cut trees selectively to create a viewcape framed by trees.

On some islands, development permits may be required in sensitive areas. Consult an Islands Trust planner before removing trees and vegetation. Special restrictions apply to land alteration in development permit areas.

ECOLOGICAL PLAN REVIEW TIPS

Take time to get to know your land before choosing your house site. Protect existing drainage patterns, trees and understory by siting buildings and driveways to avoid sensitive areas and minimize disturbance.

SITE MANAGEMENT TIPS

Good site management significantly reduces the amount of construction waste to be recycled or landfilled.

Avoid outdoor burning because of the impact on local air quality. Find out about bans on outdoor burning from local volunteer fire departments and at <http://bcwildfire.ca/hprscripts/wildfirenews/bans.asp>

Branches may be piled densely in alternating layers with other clean wood debris to form a long narrow mound or berm. The material will gradually decompose to form rich soil. Woody berms can be used to slow runoff from a sloping site and to create raised planting beds.

If you have had to cut down large trees, consider keeping them on site as habitat and to renew soil nutrients. If you must remove them, consider milling them on site to use in your project. Wood unsuitable for construction should be cut, split and stored under cover for at least one year before using as firewood.

WATER MANAGEMENT TIPS

The Gulf Islands typically have wet winters and dry summers. Good water management involves retaining the winter rains to recharge groundwater supplies, lakes and ponds. Forested slopes, fractured bedrock, and deep organic soils hold moisture. Bare rock, hard/compacted soils and pavement do not. Ensure sufficient topsoil remains on the property and that soil is not compacted during or after construction.

Removing trees can increase runoff and damage properties below. Landowners can be found liable for damages caused to a neighbour's property. Plan stormwater retention ponds, drainage swales and wetlands to retain stormwater on site, and maintain existing drainage patterns.

- The Northern Gulf Islands experience dry summers and groundwater aquifers are stressed during these months. The use of rain barrels, cisterns or swales will help to protect groundwater aquifers.
- Observe the way water flows over your property and design your landscaping and development in response. Design your landscaping to encourage water ponding and evaporation as a means to reduce runoff and associated erosion.

For oceanfront property, provincial licenses of occupation are required to construct docks, boat ramps and breakwaters. On some islands, development permits may be required in sensitive areas. Permits may be required to place fill, or to remove larger trees close to the shoreline. Plan to locate buildings well back from the high water mark and retain trees and vegetation within 15m of the ocean. Check with Islands Trust planning staff before clearing or beginning work near the shoreline.

Landscaping: Go Native

- Landscape using native, drought hardy vegetation rather than water-dependent lawns and ornamentals.
- Use permeable surfacing rather than conventional asphalt or concrete.
- Avoid the use of synthetic pesticides, herbicides and fertilizers.
- Have a plan to control alien invasive species such as Scotch broom, Scotch thistle, periwinkle, holly, English ivy, tansy ragwort, spurge laurel, rabium, and blackberry.
- Start an organic fruit and vegetable garden.

Passive Solar Design

- Use passive solar designs, such as orienting the building towards the sun, using natural ventilation and appropriate window size and location. Passive solar designs will reduce heating needs in winter and reduce cooling needs in summer.

Construction Management

- Avoid outdoor burning of slash and wood debris by composting and/or chipping. If you must burn slash, dry it first to reduce the amount of CO₂ released into the atmosphere.



- .. Have a construction waste recycling plan and a no-burn policy on site.
- .. Protect trees and other natural features during construction by identifying them and erecting protective fencing or other measures to prevent accidental damage by construction activity.
- .. Have a plan to reduce erosion and sedimentation during construction.

House Design

- .. Design your house so that it is compact and resource-efficient to reduce the building's ecological footprint.
- .. Set performance objectives for your house (e.g. annual consumption targets for water, electricity, firewood and/or propane, or third party industry standard such as BuiltGreen Platinum or EGH 85 rating).
- .. Use Hot-2000 or similar software to optimize your design for energy performance.
- .. Build a net zero energy house; a net zero energy home produces as much energy as it consumes annually.

Building Materials

- .. Use foundation options that will provide good thermal performance, water resistance, and efficient resource use.
- .. Use resource efficient framing and wall options that optimise structural and thermal performance and reduce environmental impact.
- .. Use more insulation than required by the BC Building Code, insulation with recycled content, and windows with a higher energy rating than required.

Mechanical and Electrical Systems

- .. If heat loads justify, use heat pump technologies for space heating such as ground, water, or air source heat pumps, including air source ductless systems.
- .. Install a central heat recovery ventilator system.
- .. If you would like a fireplace, install a high efficiency wood burning appliance, pellet stove, or efficient propane gas fireplace rather than a conventional fireplace.
- .. Purchase EnergyStar appliances.

Water Conservation

- .. Harvest rainwater from roofs and store it in tanks, cisterns, and/or swales.
- .. Install dual flush toilets, low flow fixtures and faucet aerators to reduce water consumption.
- .. Install greywater separation and treatment for irrigation or reuse.
- .. Use metal roofs to better collect rainwater. Metal roofs have an added benefit of being fire smart.

BC's Provincial Riparian Area Regulation requires that a Qualified Environmental Professional (QEP) review any plans to develop near a fish bearing or potential fish bearing stream or its tributary.

ECOLOGICAL LANDSCAPING TIPS

Avoid non-native plants that spread into and alter our natural ecosystems. The highly invasive Scotch broom started with 12 seeds brought from Scotland more than a century ago. Your local Conservancy has information on invasive species, and how best to control them, or check E-flora BC online for a list of alien invasive species.

If a lawn is to be installed or grass seeding to be undertaken, reduce area as much as possible. Consider using native ground cover instead of turf grass. Keep surfaces as porous as possible.

Pesticides, herbicides and chemical fertilizers decrease the biological diversity of the soil and reduce the health of the landscape. Many plant "pest" problems can be addressed by feeding the soil with organic material such as compost.

FINISHING MATERIALS TIPS

Local materials, such as stone, sustainably harvested wood, and locally sourced natural earth plasters, are nontoxic, have low embodied energy, and often are very attractive.

Natural, non-toxic and low volatility organic compound (VOC) paints and coatings are now widely available.

Many products are available with recycled content, for example, roofing, interior doors, ceramic tiles, and carpets. Ask your building supplier.

Natural linoleum, bamboo and cork are three of many greener alternatives to vinyl flooring.

Metal roofs allow for rainwater collection.

RENEWABLE ENERGY TIPS

The clothesline is one of the simplest technologies and a good way to save energy.

A solar hot water system needs an unshaded south-facing roof and space for a solar preheat tank. A solar water heater can supply up to 60% of your annual domestic hot water energy needs. Provincial grants are currently available to offset some of the initial costs.

If your micro hydro, PV, or wind energy system is connected to BC Hydro, whenever the system generates excess electricity you can “run the meter backwards,” to reduce your electricity bill. Contact BC Hydro, or a qualified installer, for details on net metering.

HOME OPERATING TIPS

Careful use can typically reduce energy and water consumption in a home by 10% to 20%. Use programmable thermostats to set back the temperature at night and when the house is unoccupied. Remind family members and guests about energy and water conservation, and “turn it off”. Smart meters are available to help people track energy consumption.

An “operating manual” or binder with equipment and materials information, along with a photographic record of construction and contractors used, will be very helpful long after construction.

Schedule regular servicing activities, such as filter cleaning or replacement, and chimney and eavestrough cleaning, into the household calendar. Filters include air filters on furnaces and heat recovery ventilators and screens on air intakes, and filters on home water purification systems.

Schedule maintenance projects, such as exterior painting and septic tank pump out, well in advance. Postponing these tasks can lead to serious problems and major, expensive repairs.

Baking soda and vinegar work just as well as commercial cleansers for many household cleaning jobs and are better for the environment.

Plan to drive less. Automobiles are a major source of local air and noise pollution on the Gulf Islands, and are the largest single contributor to islands’ greenhouse gas emissions.

Interior and Exterior Finishes

- Use a roofing material suitable for rainwater harvesting for potable use.
- Source local wood and stone where possible to reduce transportation energy.
- Use low maintenance exterior cladding and trim to reduce the need for paint and stain.
- Use environmentally friendly, water soluble low-volatile organic compound (VOC) paints and finishes.
- Use materials with recycled content.

Renewable Energy

- Install a clothesline as an alternative to relying on an electric clothes dryer.
- Install a solar heating system.
- If your property has a seasonal creek, install a micro hydro generator (check regulations in the Water Act or the Riparian Areas Regulation).
- Install a roof-mounted photovoltaic (PV) system. A PV system can provide enough electricity from the sun to run an energy efficient home or cottage during summer months. A single panel can pump water from a pond to a garden irrigation system, or power a computer and emergency lights.
- Inspect the outside of your home during, or just after, heavy rain to check for any drainage problems such as blocked eavestroughs.
- To maintain maximum efficiency, schedule regular maintenance, inspection and cleaning for chimneys, mechanical equipment, water treatment equipment, septic system and plumbing systems.

“Green” Shorelines

- If your property is on the oceanfront, design your site plan to reduce impacts of your development on nearshore ecosystems and the foreshore and to protect your development from potential shore-front erosion. For ideas, please visit greenshores.ca to learn more about the Green Shores development credit rating system.
- For any development within 30m of the natural boundary of the sea, you should contact planning staff as land use regulations may prohibit or regulate certain structures or clearing of land.

Geological Hazards

- Geological hazards are natural events that could damage property, and include such things as flooding, mud flows, debris torrents, erosion, land slips, rock falls, subsidence, tsunamis or wildfires. Check your title for notification of geological hazards, check mapping or check with the building inspector to identify any geological hazard areas on your property. Development should avoid such hazard areas.
- Are there any large boulders on your property? If so, it is likely that they came from an unstable slope and you should obtain professional geological advice before beginning construction.

Resources

Home Labelling Programs

If you would like assurance that your house meets current green building standards, you can get your home certified by an independent third party.

Several home labelling systems are currently used in Canada, including Energy Star, LEED® Canada for homes, R-2000, and BuiltGreen™. These labels all use the same “Hot-2000” software for energy analysis. These are currently the available options in BC:

New Home Labelling Programs

R-2000 CHBA-BC

www.chba.ca/R-2000 1-800-933-6777

BuiltGreen™ BC CHBA-BC

www.chbabc.org 1-800-231-1336

LEED® Canada for Homes

www.cagbc.org 866-941-1184

Home Retrofit Labelling Programs

EcoEnergy for houses CityGreen

www.citygreen.ca 1-866-381-9995

Grants and Rebates

Some provincial and regional district grants are available for energy and water conservation. The following were current at time of publication, check for additional grants at www.homeperformance.com.

BC Hydro Power Smart Rebates

See BC Hydro’s website for current incentives and discount coupons.

www.bchydro.com/powersmart

LiveSmart BC

Renovation rebates and incentives.

www.livesmartbc.ca/incentives

Comox Valley Regional District

Rebates for low-flush toilets, smart control irrigation, and water leak repair on Denman and Hornby Islands. First come, first served based on funding.

www.comoxvalleyrd.ca

Regional District of Nanaimo

Green building incentives for Gabriola Island.

www.rdnrebates.ca 1-877-607-4111

Metro Vancouver

Wood Stove Exchange program.

www.metrovancouver.org 604-432-6200

DESIGN TIPS

Good passive solar design is the key to an environmentally sustainable home. By taking the ‘House as a System’ approach and by setting energy and water consumption targets, your designer can create a healthy, comfortable and efficient sustainable home.

Match south-facing window areas with interior mass (e.g. concrete or tile floors, masonry feature walls, plaster or thick drywall) to store passive solar gains and reduce temperature swings. Avoid large areas of non-south glazing and large skylights; they cause overheating and glare during the summer and heat loss during the winter.

Use of Hot-2000 or equivalent modeling software at the preliminary design stage can result in major energy and cost savings. Re-running the program at the draft drawing stage can help fine-tune your plans.

A near net zero energy house is feasible using current technology. CMHC found that in this climate it is theoretically possible to retrofit a 1969 bungalow to become a net zero energy home by adding insulation (R-50 ceiling, R-26 walls and R-10 slab), high-performance windows, high efficiency lighting and appliances, and a rooftop solar electric (PV) system.

BUILDING MATERIALS TIPS

The building code is a minimum standard. Adding insulation reduces operating energy costs and increases comfort.

Various techniques and materials may be used to reduce a home’s ecological footprint, but determining the best option is not always straightforward. Depending on the circumstances, a ‘high-tech’ wall system using fossil fuel derived products may, or may not, score better than a conventional well-insulated wall, or a wall system built of natural materials. Ask your designer which techniques are appropriate for your home and local climate. Materials must be compatible with the design and with other building systems, plus meet performance objectives.

Foundation options include fabric forms, foundation drainage membranes, insulated concrete forms (ICF), and Portland cement substitutes such as fly ash.

Above grade, raised heel trusses, advanced framing techniques (e.g. 24" centres, elimination of non-bearing double headers), sustainably harvested certified wood, structural insulated panels (SIPS), and insulated natural building designs may be appropriate choices, depending on the building design.

Provide a continuous air barrier. Air leakage through cracks, e.g. around beams and trim, significantly reduces energy performance. A blower door test towards the end of construction will identify unintentional air leakage paths, and is required if the house is to be rated or for an incentive program

WATER CONSERVATION TIPS

In some situations, rainwater collected from the roof can be more than sufficient to meet annual household needs.

Rainwater may be used for toilet flushing, laundry and garden irrigation. After treatment, rainwater may be used for all household needs, including drinking water. To use rainwater for potable water, check with your Regional District for current regulations.

No more than six litre per flush toilets are required by law; dual flush toilets give the option of using only three litres per flush. Some manufacturers offer 4.8 litres per flush.

Low flow shower heads vary in water consumption from about two litres per minute to six litres per minute. Read the fine print before you buy.

Greywater from laundry, showers and baths can be filtered and treated and used to flush toilets or water gardens. Commercial systems are approved for use in BC.

A waterless composting toilet is permitted and is the ultimate water saving device, but a septic system must still be installed to handle wastewater from kitchen sinks, and to meet regulatory requirements (check with your Regional District). A registered practitioner is required to design and install residential wastewater systems in BC.

Information

Energy and Buildings

CMHC www.cmhc-schl.gc.ca/en/

Natural Resources Canada www.oee.nrcan.gc.ca

CityGreen www.citygreen.ca 1-866-381-9995

BC Sustainable Energy Association www.bcsea.org

Lighthouse Sustainable Building Centre sustainablebuildingcentre.com

Regional District Green Building Resources

Sunshine Coast Regional District Planning Services (Gambier, Keats, and Associated Islands) www.scrd.ca/land-use

Comox Valley Regional District Building Services - Green Building page (Denman and Hornby Islands) www.comoxvalleyrd.ca

Regional District of Nanaimo - Energy & Sustainability pages (Gabriola Island) www.rdn.bc.ca

Water & Watersheds

Regional District of Nanaimo - Drinking Water & Watershed Protection Program www.rdn.bc.ca

Sunshine Coast Regional District - Water Services www.scrd.ca/Water-Conservation

Comox Valley Regional District - Water Services www.comoxvalleyrd.ca/Water

Islands Trust Fund

Rainwater Harvesting on the Gulf Islands, a series of publications, including project schematics and links. www.islandstrustfund.bc.ca/initiatives/privateconservation/land-stewardship/rainwater-harvesting

Land Development

BC Ministry of Environment

Develop with Care 2012 online manual www.env.gov.bc.ca/wld/documents/bmp/devwithcare2012

Archaeology Sites

Archaeology Branch

Property Owners and Developers Frequently Asked Questions www.for.gov.bc.ca/archaeology/property_owners_and_developers

Conservation Covenants

Islands Trust Fund www.islandstrustfund.bc.ca/covenants

TLC-The Land Conservancy of BC www.conservancy.bc.ca



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