

Building for the Future

Case Study: Quarter Long House in Clayoquot Sound

August 2015

Clayoquot Forest Communities Program
An Initiative of Ecotrust Canada





Table of Contents

Acknowledgements.....	3
About the Initiative	4
The Quarter Long House Model.....	5
Five Criteria for Green and Culturally Appropriate Homes	8
Criteria: Local Materials	8
Criteria: Efficient Material Use & Spatial Organization.....	8
Criteria: Water & Energy Conservation & Reuse	10
Criteria: Support Local Labour and Expertise	10
Criteria: Flexible Cultural Spaces for Evolving Family Needs	11
Additional Resources	13
Additional videos that spotlight program:.....	13
Solution Opportunities.....	14
Green and Culturally Appropriate Building Monitoring Plan.....	19
Lessons Learned.....	20
Appendix A – First Nations Home Financing (2011)	24
Background	24
Existing Financing Mechanisms: Loans and Guarantees.....	24
Existing Financing Mechanisms: Grants.....	25
Maintenance & Repairs	25
Non-traditional funding programs	26
Resources	27
Appendix B – Monitoring Plan for Green and Culturally Appropriate Building.....	28
Project Objectives	28
Basic Housing Statistics and Issues	29
Monitoring Consumption and Emissions.....	30
Monitoring Ecological Impacts.....	31
Monitoring Economic Impacts	32
Monitoring Social and Cultural Impacts.....	33
Example Contacts and Partnerships	34
Appendix C – Connecting the Dots from Standing Tree to Standing Home	36
Appendix D – Terms of Reference	37



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We are deeply grateful to the Real Estate Foundation of BC. Their support has served as the cornerstone for this process.

We also thank the Vancouver Foundation (particularly for the link to an anonymous donor for David Wong's architectural services) and Natural Resources Canada (via the Clayoquot Forest Communities Program) for funding many of the summarized reports in this document.

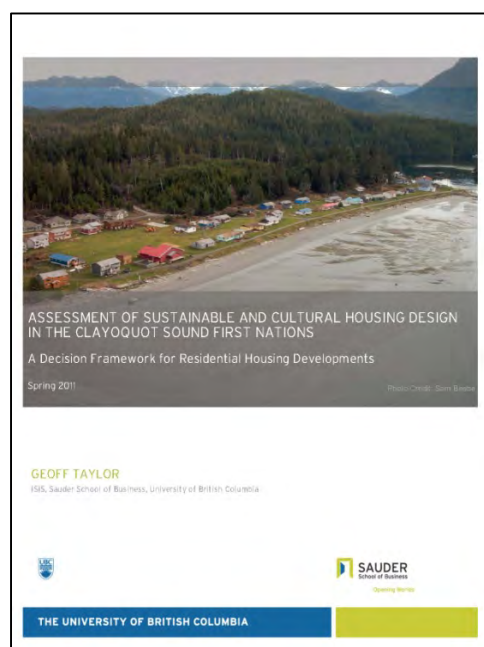




About the Initiative

In 2006 Ecotrust Canada partnered with five Nuuchahnulth First Nations (Ahousaht, Hesquiaht, Tla-o-qui-aht, Toquaht and Yuułuʔiłʔatḥ) to manage the Clayoquot Forest Communities Program (CFCP). The CFCP has been funded in part by the Natural Resources Canada Forest Communities Program, which was created to “assist community-based partnerships to develop and share knowledge, strategies and tools to adjust to forest sector transition and to take advantage of emerging forest-based opportunities.”¹ Throughout many discussions and community engagement sessions several strategies emerged from the Clayoquot region including the need for diversification of local wood products for housing and housing design that supported the use of local materials and labour.

In late 2010, Ecotrust Canada engaged various funders, including the Vancouver Foundation, to support the ‘Qwii-qwiq-sap: Standing Tree to Standing Home’ initiative (Qwii-qwiq-sap means ‘transformation’ in the Nuuchahnulth language). An anonymous donor provided additional funding support to bring Architect David Wong into the project to lead the conversation around the design and its ‘appropriateness’; such as the incorporation of regional realities of climate, materials, labour supply and cultural aspects. The other key partners involved were the UBC School of Architecture and Landscape Architecture and ICIS Sauder School of Business UBC. Reports prepared by both ISIS and David Wong have informed this document and have been summarized in the following side bars beginning with the initial assessment by the Sauder School of Business at the University of British Columbia.



Assessment of Sustainable and Cultural Housing Design in the Clayoquot Sound First Nations. A Decision Framework for Residential Housing Developments. Geoff Taylor. Spring 2011. ISIS, Sauder School of Business, University of British Columbia. Available at www.ecotrust.ca

Summary

This report examines the background and challenges of home ownership, maintenance, and building on First Nations Reserve lands. In addition to green building case studies several home design features are explored including passive house design and cultural influences. The decision-making planning framework for First Nations suggests a three stage process: 1) Inventory of housing stock and capacity, 2) Incorporation of green strategies and features, 3) Culturally appropriate design. The model home designed incorporates several features suggested in this report.

¹ Natural Resources Canada. Forest Communities Program. Source: <http://cfs.nrcan.gc.ca/pages/233>



The Quarter Long House Model

As the project team explored the options of building designs and realities of the west coast, the families that came forward expressed most interest in the Quarter Long House (QLH) Model. It suited their needs and adjustments were made to suit their budgets. In both cases, the families were to finance their home through a bank mortgage; they were to also receive Aboriginal Affairs Northern Development Canada (AANDC) and Canadian Mortgage and Housing Corporation (CMHC) grant subsidies. Further information is provided in Appendix A – First Nations Home Financing (2011). Financial details will be outlined in a future report, but the tables below indicate the ideal financial strategy of the QLH model vs. a typical housing model.

How Money is Spent in a Typical Housing Model

Distribution of the Housing Investment			
Component	Local	External	Total
Labour	\$56,750	\$43,250	\$100,000
Materials	\$0	\$100,000	\$100,000
Total	\$56,750	\$143,250	\$200,000
% Value	28.5%	71.5%	100.0%

Estimated Distribution of Investment for most First Nations Communities

Distribution of the Housing Investment			
Component	First Nation	External	Total
Labour	\$10,000	\$90,000	\$100,000
Materials	\$0	\$100,000	\$100,000
Total	\$10,000	\$190,000	\$200,000
% Value	5.0%	95.0%	100.0%

Distribution of the Housing Investment Proposed as goal for Program

Distribution of Housing Investment			
Component	First Nation	External	Total
Labour	\$100,000	\$0	\$100,000
Materials	\$25,000	\$75,000	\$100,000
Total	\$125,000	\$75,000	\$200,000
% Value	66.0%	34.0%	100.0%

Various meetings were held in Ahousaht, Tofino, Tla-o-qui-aht and Ucluelet to engage interested residents, leaders and housing experts in understanding the realities of building on the west coast of Vancouver Island. Through such meetings, two families expressed an interest in building the model home. As a result of this we were able to work closely with their builders (whom have local building experience) to more fully understand how the concept could be made into reality.

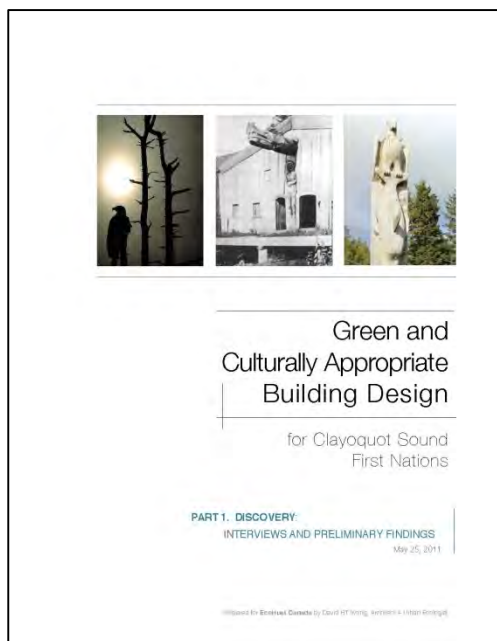


Interviews were conducted during regular community meetings to allow easy access for community members to learn about the project. The process during these meetings was an evolutionary one that incorporated feedback from the community concerning local realities into future presentations. Documents were produced and circulated and social media was used to further engage community members and the wider public.

The two documents produced as a result of these meetings are summarized on the following page. The initial findings from the interviews and the prototype home designs that were discussed were based on the concept of vernacular design – that is a style of design that learns from past practices and incorporates cultural values into the building process.

In addition to the documents based on the meetings, other documents were crucial in moving forward with the QLH model. The first is a technical assessment of design principles for QLH homes on the west coast of Vancouver Island. This assessment considers the local climate and evaluates energy conservation measures. The second report assessed the QLH project as of November 2012, identified areas where goals had been met and identified areas for increased attention.

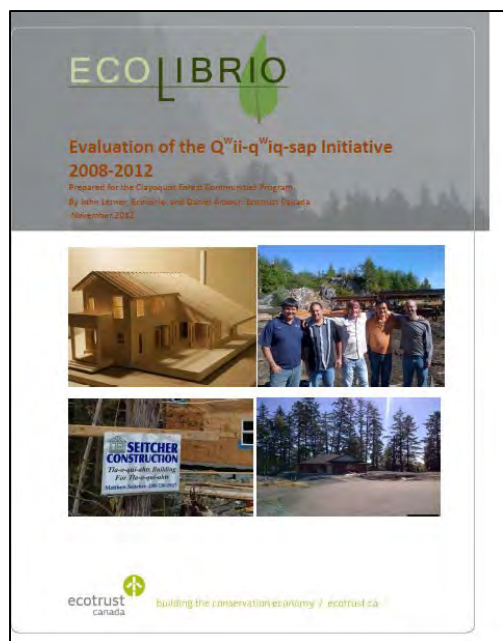
This document compliments 3 key reports commissioned by Ecotrust Canada (*Assessment of Sustainable and Cultural Housing Design in the Clayoquot Sound First Nations*, *Green and Culturally Appropriate Building Design for Clayoquot Sound First Nations. Part 1*, and *Green and Culturally Appropriate Building Design for Clayoquot First Nations. Part 2*). They are important for understanding the evolution of the model home and the processes described. Outlined in the proceeding section are five criteria vital to establishing green and culturally appropriate homes.



Green and Culturally Appropriate Building Design for Clayoquot Sound First Nations. Part 1: Discovery – Interviews and Preliminary Findings. David Wong. May 2011. Available at www.ecotrust.ca

Summary

From Nov. 2010 to April 2011, Architect David Wong conducted interviews and research in the communities related to design that is regionally relevant and green. This report examines the climatic conditions of the west coast of Vancouver Island, community observations of their existing homes and housing in general. Challenges include isolation and remoteness, food supply, flooding, mould and health, lack of multi-generational interactions, and employment. Ideas and inspirations shared by community members include: creative spaces (to make art, carving, etc.), use more local materials (i.e. stone, cedar), and elders accessibility.



Evaluation of the Q'ii-q'iq-sap Initiative 2008-2012. John Lerner and Daniel Arbour 2012. Available at www.ecotrust.ca

Summary

In 2012, John Lerner from Ecolibrio and Daniel Arbour of Ecotrust Canada, assessed the efficacy of the Standing Tree to Standing Home initiative that was launched in 2008/2009. The pair found that the initiative had partially met the initial objectives with the most success found in: 1) raising awareness about the benefits of the local housing economy; 2) engaging the local community in moving forward with a prototype home; and 3) bringing in outside stakeholders. Areas that required increased attention or where goals were not met included: 1) lack of resources for skills training and project coordination; 2) lack of buy-in from stakeholders; 3) not enough time to integrate initial objectives; 4) conflicting business interests in the areas; and 5) cost of materials.



Five Criteria for Green and Culturally Appropriate Homes

While there are various 'green' building standards and definitions, our QLH design focused on incorporating low technology, and passive design. The specific criteria that we list below are a result of our project teams' discussions and feedback from local experts and partners; they are in no order of importance:

- Encourage Local Material Use
- Efficient Material Use & Spatial Organization
- Water & Energy Conservation & Reuse
- Support Local Labour & Expertise
- Flexible Cultural Spaces For Evolving Family Needs

Criteria: Local Materials

The west coast of Vancouver Island is world renowned for its rainforests that are made up of majestic cedar, fir and spruce trees.

The QLH model contemplates that local materials will be used throughout the house, provided that costs are within budget and materials meet building standards and codes. The following list outlines some uses of local materials:

- Interior and exterior finishes will be sourced locally. Materials include, cedar as a finish, cedar products (ropes, woven blinds), stones, walls, etc.

Criteria: Efficient Material Use & Spatial Organization

The QLH has a relatively small footprint than other homes in the area. This results in a smaller concrete slab, but does not impact the ability of the roof to provide cover over the deck area. The roof can also be easily extended in three directions if there are future expansion plans.

The framing being recommended is 2" x 6" @24" on centre (o/c) for exterior walls, which saves approximately 30% in stud materials (compared to 2" x 4" o/c). Overall wall lengths and heights derived from 4' x 8' ratio to accommodate standard sheets of plywood and dimensional lumber lengths. This will create less waste and use of materials.

Other materials and building techniques being suggested include:

- Raised slab on grade to help keep floor slab dry, and above possible ponding and flooding issues. In Ty-Histanis, this is a required feature for the installation of slab heating in connection to the centralized geothermal system.





- Centralized efficient wood stove serves as heating and cultural feature. Greater heating efficiency of central location, as opposed to placing fireplace along exterior wall (and lose heat to the outdoors). In the winter, loss of electricity is common therefore a wood stove acts as a backup heat source. Even in the case at Ty-Histanis the geothermal system can be impacted by frequent power outages; note that the concrete slab floor also retains heat once the heat source has been removed.



- Roof form only has two shed slopes (compared to 4). Thus, rainwater gutters will not need to bend around corners, and present potential leakage issues. Recommended roofing material is cedar shake and shingle, or planks; traditionally planks were used. Due to price premiums of cedar on the open market, proper installation and maintenance, as well as fire issues, some homeowners and builders prefer to use metal roofing materials. The project team anticipates this to be an item to monitor and hopes that post-occupancy monitoring can assess the differences (or similarities) between metal and cedar roofing materials. Anecdotal evidence suggests that using thicker cedar roofing (e.g. 1 ½ -2" + planks or shakes) make for a more durable and longer lasting roof. The wind during the storm seasons impacts all types of materials; without the proper installation and maintenance, any material will fail. Main roof **oriented** towards south/ south west, which helps with solar gain, drying of roof, placement of 'green technologies' (e.g. solar panels, passive water heating).
- Generous roof overhangs (36" minimum). This provides additional shelter from vertical rains, yet creates an engineering challenge resulting from uplifts from strong winds; a qualified engineer should review site conditions and make proper adjustments where necessary. It also means an increase in material needed for soffits (compared to smaller, typical overhangs).
- Recommendation of rigid rainwater gutter and down-piping systems (e.g. PVC pipes) for maintenance and enduring (lasting) qualities.
- Rainwater collection units can be stored under the deck, and used as part of a grey water system or potable water system. At least one, or both, of the model homes are considering using a grey water system.
- Cover key entry locations (front door, deck and kitchen). Limits wind driven rain entering into house, and provides refuge area to take wet clothes off prior to entering house. Such areas can act as a 'wet room' for keeping wet clothes, umbrellas and footwear outside home proper – helps keep moisture away from inside of home. Space is vented to discourage fungi, mildew and mould.
- Create an outdoor space for food preparation that requires heavy water use (e.g., fish and game). Current model shows as an optional feature, which depends on home owner's budget; however, can be a feature that is added in the future.



- Minimize use of circulation corridors (hallways); where used, serves as gallery space for art. There are no “land locked” internalized spaces or rooms.
- Tiered, open concept allows for passive air flow. A home that breathes can help vent out moist air and other airborne contaminants (mould, mildew, off-gases). All major rooms have **cross ventilation** – through windows, doors, ceiling vents, and skylights. **Double height** space allows warm air to rise and circulate. **Slots** in walls allow air to circulate (master ensuite, bedroom closets). **Skylights** may be opened to allow stagnant air to escape
- Daylighting in all rooms; interior spaces awash with natural daylight. Always less than 15’ from a window, anywhere within the home.

Criteria: Water & Energy Conservation & Reuse

Both water and electrical energy are increasing in demand and cost. The QLH model proposes to allow for efficiencies and opportunities for reuse, and even production of electricity and potable water. While some of these items will depend on the costs (i.e. capital and maintenance), certain provisions in the design and construction will allow for future installation (e.g. electrical conduits in roof for solar panels). Here are some other features in the QLH design that meet these criteria:

- Efficient wood burning stove, centrally located, acts as a backup heat source and potentially main heat source.
- Insulated structure (at wall plates, and foundation walls) to discourage ‘cold joints’ (i.e. places where water may condense, creating potential mould and fungi locales)
- 2x6 exterior stud wall allows thicker batt insulation installation.
- Large, south facing roof allows for several opportunities: passive solar heated water, and photovoltaics.
- Optional ‘on-demand’ water heating wall panel. Such units provide hot water when needed, and do not require the constant heating of water in a water tank. However, capital costs of on demand tanks is typically higher than conventional hot water tanks.
- Convenient light switches using 2-way and 3-way switches to encourage, and make easy for users to access.
- Main living areas c/w lighting ‘zones’ – to encourage task or area lighting. Thus, unoccupied areas of room may be switched ‘off’.

Criteria: Support Local Labour and Expertise

The QLH depends on local labour throughout the design and build phases. This is important in providing jobs and ensuring that a greater share of jobs created through initiatives stay in the community. The



QLH design process calls for local labour in the monitoring/surveying phase, the construction phase, and the harvesting of local materials for housing purposes.

Criteria: Flexible Cultural Spaces for Evolving Family Needs

Besides the inspiration from the traditional long house, the QLH model was designed around the immediate and long term needs of Nuu-chah-nulth families. These families typically tend to be younger, with several children from immediate or extended families.

Some of the spatial and design features are explained in more detail below that directly relate to the cultural needs of Nuu-chah-nulth families:

- **Spatial** arrangement to encourage and reinforce **familial relationships**, via:
 - **Visual connections** throughout house, both horizontally and vertically.
 - Living spaces are flexible, and may be used as overflow space (i.e. dining-kitchen bar-living-outdoor deck all connected)
 - **Indoor - outdoor connection**, both visually and physically (ability to walk out to outdoor deck from dining and living areas). Outdoor space can be semi sheltered to offer use in the winter months.
 - Family **gathering** spaces - eating together (e.g. dining, living, kitchen bar, outdoor deck areas), reading together, etc.
- Surveillance. Parents and elders have visual contact of children playing on outdoor deck area, adjacent living spaces, overlook from second floor gallery
- Room at ground floor can be used for an Elder, with adjacent bathroom and the ability to have secondary access door and ramp with direct access to outside. This room may have the option of being converted into an office or family room, with separate entry.
- Food preparation area, optional exterior area for fish and game preparation.
- Welcoming pole at front entrance of home provides an opportunity for the display of family crests. This optional feature will depend on the opportunity the family has to finance such a carving; they can range from \$10,000+.
- Encourage use of local knowledge and skills to create unique features and art (e.g. carved poles in the interior or along deck under roof, cedar weavings as rain screens along underside of roof overhang).





- Create opportunities for family story/memories throughout home – e.g. art walls at second floor gallery walkway (at niche), fireplace wall, and at second floor guardrail. Some of these can be done during the construction phase (e.g. fireplace stone wall to accommodate individual family members’ rock, stone, seashell “memory item”), which adds a dimension of ownership and pride, particularly for children.
- Round window at stair landing can be used for artwork, family crest, etc.
- Home may be mirrored at courtyard/ kitchen interface to create a shared common wall duplex. This would result in a larger shared courtyard between the two homes (existing windows along common wall may be removed, as there are other windows located in adjacent walls)





Additional Resources

Below are a list of video resources ranging on topics from water conservation to climate change and improved resource management:

- Green and culturally appropriate home in Tofino, BC: <https://youtu.be/IBjQRws1F3g>
- Rain water catchment system in Tofino, BC: https://youtu.be/c_fttaFh2vA
- Water efficiency in home design: <https://youtu.be/cwxSz401nxQ>
- Grey water system in Tofino, BC: <https://youtu.be/tDUypdrBetc>
- Composting toilet system in Tofino, BC: <https://youtu.be/Fe5x2ShvFDg>
- Ty-Histanis community meeting: <https://youtu.be/5Fuj5fMXQME>
- Energy and economic development in remote communities: <https://youtu.be/DkzsGRvicnE>
- Climate change and sustainable community development: <https://youtu.be/5toEJAPfHtA>
- Using local and sustainably sourced materials: <https://youtu.be/AB8WaKEKSrY>

Additional videos that spotlight program:

- Real Estate Foundation of BC Spotlight on First Nations Housing: <http://www.refbc.com/news/spotlight-first-nations-housing#.VduZhPIVhBc>
- CBC National: Building on the Past: <http://www.cbc.ca/player/News/ID/2189975973/>



Solution Opportunities

In addition to the videos from the above section, the infographics below from the SFU/Ecotrust Canada Innovation School team indicate potential cost savings from energy, water, and moisture management strategies.

Ecotrust Green and Culturally Appropriate Building Design Project – Energy and Moisture Solutions Paper. Hayes Zirnhelt. May 2012.

Summary

The technical feasibility of the QLH model was assessed by Ecotrust Canada intern Hayes Zirnhelt. The paper focused on energy conservation opportunities from insulation, passive solar design, heat recovery ventilation, and solar hot water heating. The study indicated that electricity consumption in the prototype home would be 18 MWh with an annual cost of \$1800, nearly half of what an average home in BC consumes. Several economic simulations were performed on various technologies and materials. It was found that 8" rock wool insulation would have a capital cost of \$932, have a rate of return of 5%, and take 16 years to payback. Passive solar would have a capital cost of \$1150, have a rate of return of 6% and take 15 years to payback. Heat recovery ventilators would have a capital cost of \$5500, have a rate of return of 12% and a payback period of 5 years.



ELECTRICITY CONSUMPTION

🏠 SPACE COOLING - 1%

Since Canada is a cold country to begin with, a negligible amount of electricity is used to cool homes

The focus is on the other areas which can provide residents with opportunities to obtain some savings

💡 LIGHTING - 6%

LED & CFL light-bulbs last 10-20 times longer than incandescent bulbs. This translates to a saving of \$30 per bulb over its lifespan

1 CFL = 20 Incandescent



APPLIANCES - 16%

Look for EnergyStar labels on appliances as these are certified to be energy efficient. They use less power, and save you money



🏠 SPACE HEATING - 56%

Since it takes up so much of the electricity consumed in a home, it might be beneficial to check to see if the house is air tight. Often there are leaks & cracks in door & window frames, walls and electrical outlets.

Use wood stove heaters, these do not require any electricity and, the burning wood absorbs the moisture in a home, reducing the likelihood of mold

Installing meters in homes can be very

beneficial. STUDIES IN THE USA & GERMANY SHOW THAT RESIDENTS CAN REDUCE THEIR BILL BY 20 - 30% JUST BY MONITORING THEIR ELECTRICITY USE.



IF YOUR BILL IS:

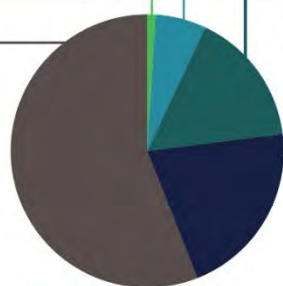
\$150/MONTH
\$200/MONTH
\$250/MONTH
\$300/MONTH

YOU SAVE:

\$30 - \$45
\$40 - \$60
\$50 - \$75
\$60 - \$90

GIVEN THAT A METER COSTS \$90 - \$150,

YOU GET YOUR MONEY BACK IN 3 - 4 MONTHS
YOU GET YOUR MONEY BACK IN 2 - 3 MONTHS
YOU GET YOUR MONEY BACK IN 2 - 3 MONTHS
YOU GET YOUR MONEY BACK IN 1 - 2 MONTHS



Breakdown of Electricity Consumption

Space Cooling - 1%
Lighting - 6%
Appliances - 16%
Water Heating - 21%
Space Heating - 56%

🔥 WATER HEATING - 21%

Installing On-Demand water heaters is a good idea when constructing a new home. However, the following steps can be taken in current homes:

Adding insulation to water heaters reduces stand-by heat loss by up to 50%

Putting a Bottom Board under the tank can prevent heat being lost to the ground and save an additional 4-9% of the water heating costs.



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WATER USAGE



Source: Environment Canada

WHAT CAN WE DO TO MINIMIZE WASTE?



SHOWER TOILET LAUNDRY KITCHEN

A MAJORITY OF THE WATER USED IN A HOME IS NEEDED BY THE SHOWER. USING LOW FLOW SHOWER HEADS CAN SIGNIFICANTLY REDUCE THE WATER REQUIRED IN A HOME.

TOILETS ACCOUNT FOR A CLOSE MAJORITY OF WATER USED IN HOMES. IT CAN BE REDUCED BY INSTALLING ULTRA LOW VOLUME (ULV) TOILETS THAT NEED LESS.

LAUNDRY ACCOUNTS FOR 1/5TH OF WATER USED IN HOMES. USING WASHERS WITH WATER LEVELS AND RUNNING WASHERS ONLY WHEN FULL CAN REDUCE WATER USED IN LAUNDRY.

SINKS AND DISHWASHERS ACCOUNT FOR 10% OF THE TOTAL WATER USE. USING LOW FLOW FAUCETS AND RUNNING THE DISHWASHER ONLY WHEN FULL CAN SAVE WATER.

REGULAR SHOWER:

3-8 gallons/min

LOW FLOW SHOWER:

<2.5 gallons/min

REGULAR TOILET:

3-7 gallons/flush

ULV TOILET:

1.6 gallons/flush

REGULAR WASHER:

40-55 gallons/load

SMART WASHER:

18-25 gallons/load

REGULAR FAUCET:

3 gallons/minute

LOW FLOW FAUCET:

2 gallons/minute

SAVINGS:

60%

SAVINGS:

65%

SAVINGS:

63%

SAVINGS:

33%



COST OF LOW FLOW SHOWER HEAD:

\$10-30

TIP: YOU CAN SAVE 8-16 GALLONS OF WATER PER SHOWER SIMPLY BY SHOWERING FOR 2 MINUTES LESS.



COST OF ULTRA LOW VOLUME TOILET:

\$350+

TIP: TO SAVE WATER, PLACE A BRICK IN YOUR CURRENT TOILETS WATER TANK.



COST OF LOW FLOW FAUCET ATTACHMENT:

\$5-20

TIP: WHEN WASHING DISHES BY HAND, PLUG THE SINK TO COLLECT THE WATER AND USE IT TO RINSE AND WASH MORE DISHES.






BY ADOPTING THESE SIMPLE STEPS, A SIGNIFICANT AMOUNT OF WATER, AND THUS, MONEY CAN BE SAVED - BOTH AT AN INDIVIDUAL LEVEL AND AT A COMMUNITY LEVEL, ULTIMATELY BENEFITING OUR OWN ENVIRONMENT.

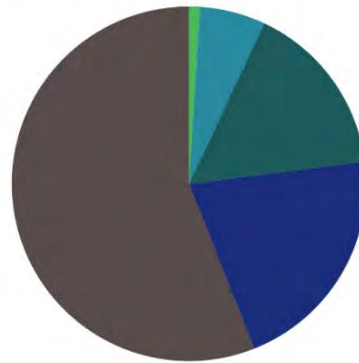


SAVE MONEY AND PROTECT THE ENVIRONMENT!

⚡ BREAKDOWN OF ENERGY CONSUMPTION:

Source: Natural Resources Canada

-  Space Cooling (1%)
-  Lighting (6%)
-  Appliances (16%)
-  Water Heating (21%)
-  Space Heating (56%)



BY ENSURING THAT OUR HOMES ARE AIR-TIGHT, WE CAN SAVE A SIGNIFICANT AMOUNT OF MONEY BY PREVENTING THE HEAT FROM ESCAPING THROUGH LEAKS & CRACKS

BREAKDOWN OF WATER CONSUMPTION:



Source: Environment Canada

SHOWER HEADS AND TOILET FLUSHES PROVIDE US WITH GOOD OPPORTUNITIES TO SIGNIFICANTLY REDUCE OUR WATER USE

BY BEING INFORMED ABOUT THESE STATISTICS, WE CAN NOW TAKE STEPS TO SAVE UP TO 60% OFF OUR BILLS!



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UNIVERSITY





Energy & Moisture Management



Green and culturally appropriate homes could use 50% less electricity than the average Canadian household.

Average Canadian Home consumes 32MWh
Green and culturally appropriate consumes 18MWh



\$1400 Savings

Moisture Control



8" Rock Wool Insulation vs.
8" BATT
Increased Cost = \$932
Payback Period = 16 years
Return on Investment = 5%



Additional 7.4 sq. m of window
area for passive solar
Increased Cost = \$1150
Payback Period = 15 years
Return on Investment = 6%



Heat Recovery Ventilator
Increased Cost = \$5500
Payback Period = 5 years
Return on Investment = 12%

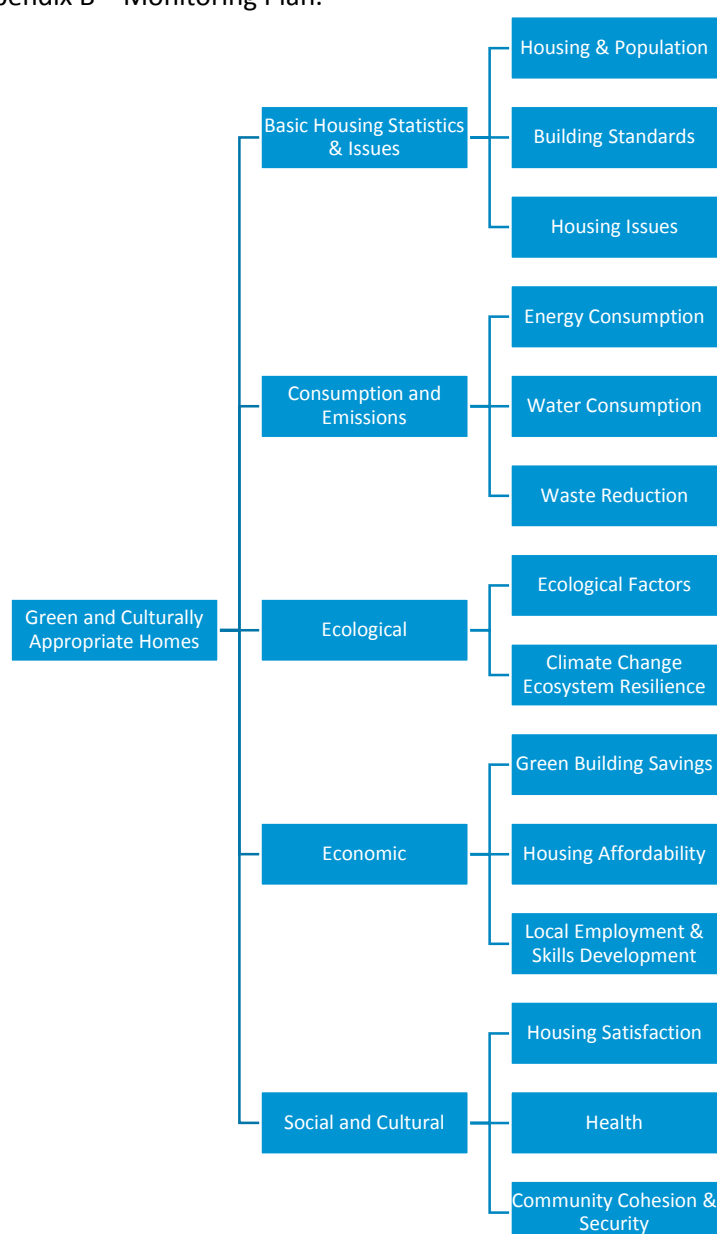
Moisture control technologies have high capital costs, but payback periods less than the average length of a mortgage.





Green and Culturally Appropriate Building Monitoring Plan

The efficacy of green and culturally appropriate homes on promoting sustainable communities can only truly be tested through rigorous monitoring. The Tla-o-qui-aht First Nation along with Ecotrust Canada developed a methodology for such a monitoring plan for a local development project, but also with the intent to serve as a template for use in other locations. *Healing Broken Lands: A Research Methodology*, was published in 2012, and was to serve as the monitoring model. However, the monitoring plan relied heavily on the long-form census which is no longer being completed in Canada. As such, the monitoring plan was revised by Julia Duchesne. The table below provides an overview of this approach with more detail provided in Appendix B – Monitoring Plan.





Lessons Learned

1. In 2008, a process to build green and culturally appropriate homes began in the Clayoquot Sound region of Vancouver Island. The Standing Tree to Standing Home program was launched by Ecotrust Canada in 2008 with the Ahousaht, Tla-o-qui-aht, Toquaht, Yuułuʔiłʔatḥ, and Hesquiaht First Nations. In 2013, Terry Dorward-Seitcher, a member of the Tla-o-qui-aht First Nation, moved into his new home that was built based on many of the principles outlined in this report. Upon review and reflection, several lessons were learned that should be applied in future projects in the region and elsewhere.
2. Input is important in the design-phase, in particular that from youth which resulted in big open spaces for acoustics in the home that was built.
3. Access to the architect/designer during planning/modification process is important in mitigating future problems. One example was the advice to place the washer and dryer on a separate floor from the living quarters to reduce noise. Another piece of advice was to enlarge the south facing windows to encourage passive solar gain.
4. Consideration of green technology upgrades is important in the design process. The ability to incorporate or upgrade future technologies would have been absent without early inclusion of this variable in the planning and design phase.
5. More input from elders during the design phase – to describe how traditional knowledge could inform modern design – was a missed opportunity
6. This first home was not able to incorporate as much local material as initially desired. This was due to the low supply of local resources was partially due to the combination of timing, availability, knowledge, access, and cost. Initially, a local mill was to be the main supplier of material, but it shut down shortly after the construction began. The belief is that these issues would be overcome with an increase in the demand for green and culturally appropriate housing. There were several aspects of the home that did incorporate local materials such as the large ceremonial poles and siding included in the construction.
7. In addition to a low supply of local material, sourcing local labour was also a challenge. Local labour did participate in the site preparation, and most of the construction. Some specialized jobs, as well as the construction foreman were filled by people from outside the local community.
8. The hand-off of the prototype from the architect to the builder was conducted poorly. The construction team hired for the build, proved to be a poor one. Costly overruns due to poor leadership on part of the lead builder, took a large financial and emotional toll before the problem was addressed. Going forward, the construction contractor chosen for a job should have First Nation experience and also a contract that all abide by to make any changes.
9. The timeline in funding decisions provided by Aboriginal Affairs Northern Development Canada required decisions to be made quickly and therefore, without careful consideration. Housing policies and greater support from knowledge Aboriginal Affairs staff would be significantly appreciated to avoid careless decisions especially since this was the first of future homes to be built using this design in the community.
10. The link between the project team and building team broke early and was never repaired. The architect and builder should have had more conversations and the architect should have been onsite to provide support to the building team – there was no money for this in the budget.



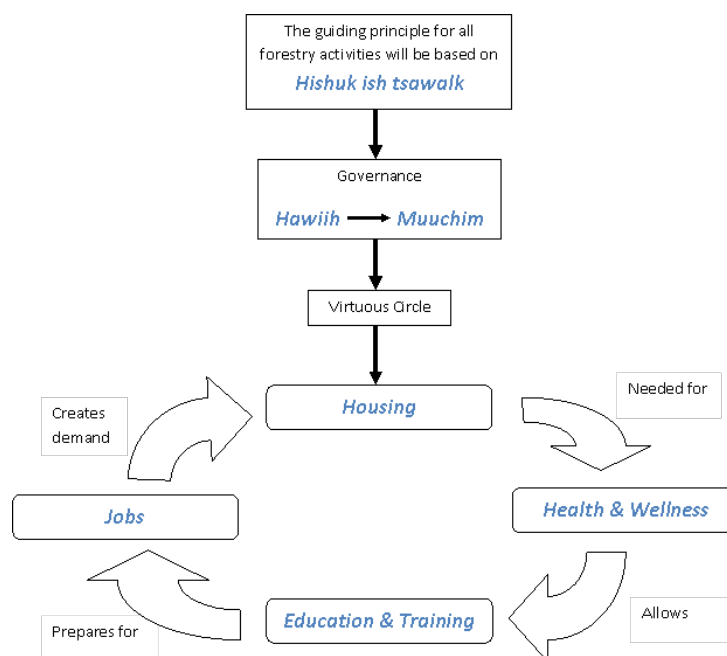
11. Lastly, future participants may have limited financial resources, or may wish to be involved in the construction process. Allowing for do-it-yourself projects as part of the overall construction process is ideal.



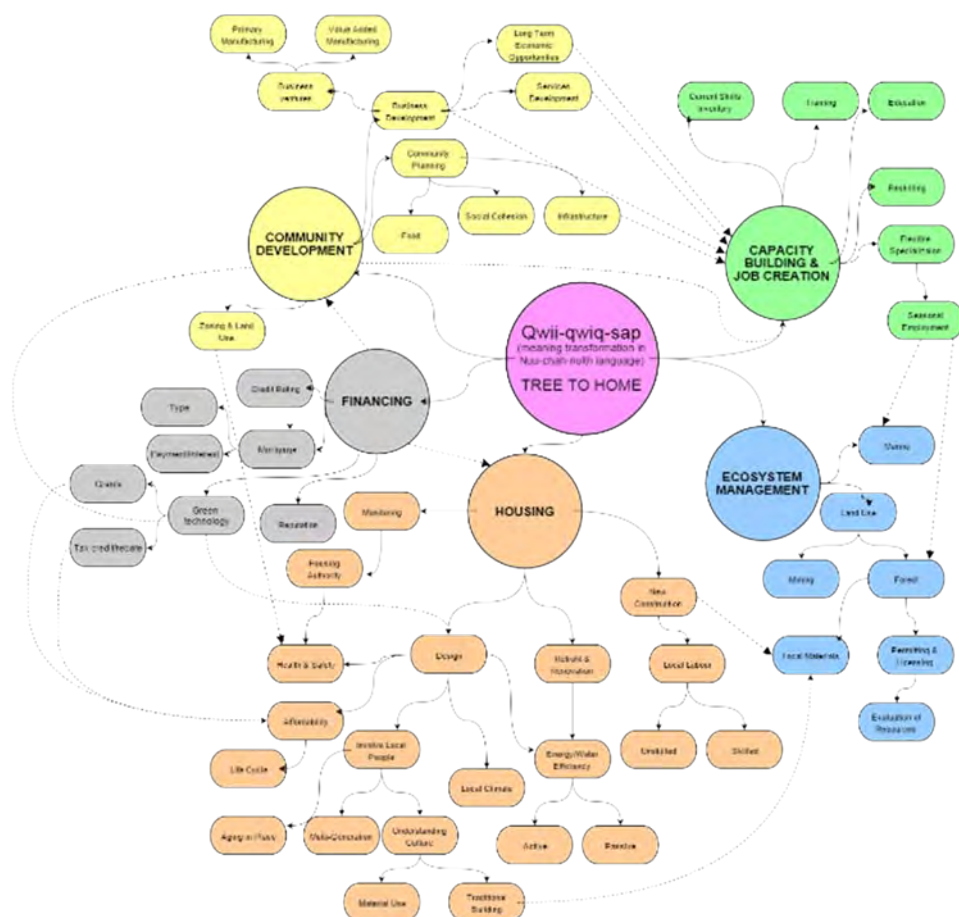
The finished home of Terry Dorward

Overall, one of the largest barriers for First Nation communities when receiving capital funding from Aboriginal Affairs and Northern Development Canada or CMHC loans, is that these contracts are very difficult for local people and businesses to be involved because of tendering rules which don't have enough flexibility.

This process was one of discovery that required adaptive management skills in confronting challenges. In beginning the project, understanding and being conscious of the inter-connected nature of the work being done was a priority. Early on the "Virtuous Circle" was the basis for thinking of how issues are related.



Over the course of the project, however, an even deeper understanding of the interconnections between housing, community development, financing, capacity building & job creation, and ecosystem management have with the Tree to Home initiative was created. The figure below shows the projection of these relationships as a mind map – visually representing the attachments between various factors. This is the culmination of the work done during this project and the various aspects of each category that were thought about throughout the project. It is important when working with communities to understand that the projects undertaken are not confined within a clearly defined box. There are relationships of feedbacks within and beyond the community that deserve careful attention and consideration. The mind map is not exhaustive, but represents a starting point for other communities to think about issues and the relationships they have with other concerns when beginning a similar project. Additionally, an understanding that policy change and development plays a vital role in how relationships change over time is essential in determining the level of success of a project and potential outcomes.



Connecting the dots for Qwii-qwiq-sap (transformation) Tree to Home (see Appendix C for larger version)

In summary, work must be based on community principles. These principles of green and culturally appropriate home design, help to inform the rest of the process. Consideration of local realities and global forces with respect to economic indicators is important to develop realistic goals such as the availability of local resources and labour. Lastly, developing partnerships and networks throughout the design and building teams is important in identifying and addressing issues that occur.



Appendix A – First Nations Home Financing (2011)

Background

- Home ownership rates at 31% for on-reserve, 69% for off-reserve Canadians (CMHC stat)
- Many on-reserve homes are in need of major repairs or are condemned due to mold; 44% on reserve need major repairs, vs 7% off-reserve
- Median income on-reserve is \$11,224
- Most common financing tools are the Ministerial Loan Guarantee (MLG), CMHC non-profit housing (Section 95), and INAC funding (Capital Facilities & Maintenance Program)
- Typical funding programs for mortgaged housing involve some funding from INAC (housing subsidy), and remainder of funding secured through a CMHC-backed loan (guaranteed either by the Band, an MLG, or the First Nations Market Housing Fund. Rental housing is funded through Section 95 (Non-Profit Housing Program).

Existing Financing Mechanisms: Loans and Guarantees

Loan Insurance with Ministerial Loan Guarantee (MLG)

- Minister of Indian and Northern Affairs provides a guarantee on behalf of the borrower, to guarantee the repayment of the housing loan. CMHC credit standards apply; borrower must have 5% down payment. Must have a certificate of possession or been granted access to land by FN. (http://www.cmhc.ca/en/ab/onre/onre_008.cfm)
- 15% down payment is required for rental properties
- This mechanism is commonly used to secure debt financing by bands.

On-Reserve Leasehold Lending in Designated Lands

- Mortgages are available on leasehold land, up to 90% of property value, and are insured through CMHC. 10% down payment must be saved over time, come from RRSP's etc. CMHC's standard leasehold agreements and conditions apply, including loan insurance premiums.
- All financial liability is on individual borrowers, who are required to form a legal entity to take out the mortgage (in some cases); lender retains leasehold in the event of a default, and can re-sell the home and leasehold.

First Nations Market Housing Fund

- The FNMHF is a fund created by the Federal government, to back housing loans for approved First Nations communities (<http://www.fnmhf.ca/english/index.html>).
- CMHC mortgages are available, providing the loan is backed by the First Nation and guaranteed by the First Nations Market Housing Fund. The First Nation must meet requirements of the FNMHF. CMHC loan premiums and credit standards apply.
- Participating lenders include BMO and Vancity.
- There are currently 10 participating First Nations communities.



Existing Financing Mechanisms: Grants

On-Reserve Non-profit Housing (Section 95)

- All First Nations are eligible to apply, however an MLG is required. Loans can cover 100% of total project costs, and a project subsidy is applied to the project, for the life of the amortization period. Subsidy is calculated as 'Project Subsidy = Loan Repayment + Operating Expenses – Revenue' http://www.cmhc.ca/en/ab/onre/onre_010.cfm
- Rent-to-own programs common; after mortgage is retired, band turns over ownership to renters.
- Subsidies covers difference between project costs and project revenues
- Managed by CMHC
- Replacement reserve is set aside for repairs and maintenance

Ongoing Housing Program (INAC) (Housing Subsidy)

- Funding distributed to first nation communities (application process), and can be used by bands for construction of new homes, renovations, or mold remediation (see below).
- Subsidy formula calculation based on remoteness of band; generally between \$30,000 and \$40,000 per house.
- Must be able to demonstrate additional funding sources (traditional lenders)
- Distributed by INAC, can be distributed either to the band or to individual members
- Recommended that not more than 10 applications for housing per year
- Supplemented by sweat equity, local labour or materials to bring down cost of mortgage

Capital Facilities & Maintenance Program (INAC)

- <http://www.ainc-inac.gc.ca/ai/mr/is/cap-mgmt-eng.asp>
- INAC, funding for lot servicing, not for home construction
- Funding is distributed to First Nation communities, based on priority and needs.

Equilibrium Communities Initiative

- Funding infrastructure for sustainable community developments across Canada
- Not First Nation specific
- <http://www.ecoaction.gc.ca/equilibrium-eng.cfm>

Maintenance & Repairs

Residential Rehabilitation Assistance Program (RRAP)

- http://www.cmhc-schl.gc.ca/en/ab/onre/onre_015.cfm
- Loans up to \$24,000 (location-dependant) for repair of basic structural elements to the home

Emergency Repair Program

- http://www.cmhc-schl.gc.ca/en/co/prfinas/prfinas_005.cfm
- Grants for emergency repairs to rural, low-income homes

Mold grants (INAC)

- Approx. \$40,000 per home
- Meant for non-cosmetic issues, but some \$\$ usually allocated for cosmetic issues



Non-traditional funding programs

Many non-traditional and recent programs link capacity and skills building on-reserve with home construction, allowing First Nation communities to develop local knowledge on house construction, while at the same time addressing the shortage of on-reserve housing.

Standing Tree to Standing Home

- Training program to build homes, on reserve - <http://www.frontiersmb.ca/training.html>
- Similar program, BC based, pending approval - <http://ecotrust.ca/five-first-nation-communities-join-forces-45-million-grant-application>

Local sourcing and labour example

- <http://www.winnipegfreepress.com/local/garden-hill-sawmill-creates-housing-buzz-115625424.html>

Aboriginal Capacity Development

- http://www.cmhc-schl.gc.ca/en/ab/onre/onre_003.cfm
- Funding for training in home maintenance, financial planning, housing management

Table 1 – Source: CMHC report, 'Preconditions leading to market housing on-reserve', http://dsp-psd.pwgsc.gc.ca/collection_2009/schl-cmhc/NH18-23/NH18-23-109-011E.pdf

Program Type	Program Details
Loan guarantees	<ul style="list-style-type: none">■ Provide security to financial institutions■ Loans backed by First Nations in most instances■ Financial instruments include First Nation accounts held in trust and loan insurance secured by Ministerial Loan Guarantees
Financing assistance	<ul style="list-style-type: none">■ Contribute to making homeownership an affordable option■ Assist in leveraging financing■ Financing sources include First Nation's own source revenues and INAC funding
Rent-to-own housing	<ul style="list-style-type: none">■ Options allowing renters to overcome possible poor credit situations and put money towards the equity of their home■ Contributes to promoting homeownership in the community while providing the First Nation with control over asset management■ Financing sources include rental revenues, First Nation's own source revenues, INAC funding and CMHC's On-Reserve Non Profit Housing Program
In-kind contribution	<ul style="list-style-type: none">■ Subsidies for carpentry and electrical work offering prospective home owners a set amount of work towards the construction of their new homes■ Helps reduce construction costs, contributes to providing employment opportunities locally and keeps a pool of certified trades workers in the community
Homeownership training	<ul style="list-style-type: none">■ To prepare prospective homeowners for the responsibilities associated with paying for and maintaining their homes■ Provided significant benefits to communities for implementing, managing and sustaining their homeownership programs



Resources

Aboriginal Funding Tool – 30 total for housing and infrastructure

- <http://www.aboriginalcanada.gc.ca/acp/site.nsf/eng/funding.html>
- Down payment assistance, grants for lot servicing, etc.

First Nations National Building Officers Association - <http://www.fnnboa.ca/>

National Aboriginal Lands Managers Association - <http://www.nalma.ca/>

Managerial Loan Guarantees - <http://www.ainc-inac.gc.ca/ih/fnh/amm-eng.asp>

CMHC - <http://www.cmhc.ca/en/ab/onre/index.cfm>

BMO Aboriginal Loan Programs - <http://www4.bmo.com/vgn/aboriginal/en/loan.html>

Vancity Resources

- Poverty - <https://www.vancity.com/MyCommunity/NotForProfit/Partnerships/FacingPoverty/>
- First Nations - <https://www.vancity.com/MyCommunity/OurVision/GrowingTheSocialEconomy/InvestingInTargetedCommunities/FirstNationsAndAboriginal/>
- Springboard Home Ownership Program - <https://www.vancity.com/MortgagesRenos/CustomFit/SpringboardHomeownership/>

Jerry Boyko - jboyko@ahousatholistic.org 604-250-5281



Appendix B – Monitoring Plan for Green and Culturally Appropriate Building

Updated by Julia Duchesne from Healing Broken Lands Project by Satnam Manhas and Marcie Dewitt

Project Objectives

Designed to be a long-term research project/monitoring program focusing on whether or not sustainable development makes a difference.

Can good practice in land development, based on principles of sustainable planning and design, provide affordable infrastructure and housing that promotes good human health and positive economic development and, at the same time, rehabilitate and re-naturalize a damaged eco-system?

The preparation of a monitoring and assessment plan and methodology to determine:

- General community population health and well-being before and after occupancy. Prepare a draft of a comprehensive survey that will produce comparative values of general population health.
- The energy, water and resource efficiency and performance of the community systems, individual houses and community buildings.
- The positive or negative impact of the development activities on the natural ecosystems common to the area, such as: re-establishing salmon populations in the stream, the re-naturalization of flora and fauna to the overall site, and specific areas where previous development activities have damaged the previously existing conditions.

The following tables have been adapted from the work with Tla-o-qui-aht Nations “Healing Broken Lands” project as an example for other communities to use.



Basic Housing Statistics and Issues

Indicator Type	Indicator	Measurement type	Data source			Difficulty of measuring indicator
			HBL	Alberni-Clayoquot Region	General	
Housing and population indicators	Single and multifamily homes	# of each	2006 census baseline; annual monitoring via community data or survey	ACRD	Statistics Canada, CMHC	Low
	Dwellings constructed 10+ years ago/in last 10 years	# of each	2006 census baseline; annual monitoring via community data or survey	ACRD	CMHC	Low
	New housing units	# built over past year	Annual monitoring via community data or survey	Building permits, housing starts, sales (bcstats.gov.bc.ca)	CMHC	Low
Building standards and practices indicators	'Green' homes (LEED-certified, EQ-designed, passive, etc.)	As % of total housing stock	Community data	ACRD	CaGBC	Medium
	'Green' homes	As % of new builds over past year	Community data	ACRD	CaGBC	Medium
Housing issues	Dwellings requiring major repair	% of houses with problems (in general housing stock vs. new green builds)	2006 census baseline	ACRD	HiCO (CMHC, 2011) – housing conditions in various areas	Low
	Dwellings with minor repair needs	% of houses with problems (in general housing stock vs. new green builds)	Community data	ACRD	CMHC	Low
	Household moisture problems (e.g. mould, mildew)	% of houses with problems (in general housing stock vs. new green builds)	Community data	ACRD	CMHC	Low



Monitoring Consumption and Emissions

Indicator Type	Indicator	Measurement type	Data source			Difficulty of measuring indicator
			HBL	Alberni-Clayoquot Region	General	
Energy consumption indicators	Energy consumption (regular grid)	Based on residential type; (kWh/household/year)	Via BC Hydro Smart Meter	<i>ACRD</i>	<i>Utilities</i>	Medium
	Energy consumption (additional community-scale systems, e.g. geo-exchange, solar, wind)	kWh/household/year	Monitoring with community utilities	<i>ACRD</i>	Community utilities	Medium
	Energy consumption (supplemental, household-based, e.g. woodstoves or other household-scale renewable)	kWh/household/year	Monitoring via household outreach	<i>ACRD</i>	Household or community level outreach; renewables-focused NGOs	Medium
	GHG emissions	Tonnes CO ₂ e (conversion from total energy consumption)	Conversion calculation	CEEI for ACRD	For BC: CEEI shows energy consumption and GHG emissions from community activities in buildings, transportation, and solid waste	Low
Water consumption indicators	Average potable water consumption	Litres per household per day	Water meters	<i>BC Hydro; Alberni Valley Drinking Water Reference Guide</i>	Water utilities	Low
	Water recovery	% of water recovered from non-potable water in households with recovery systems	Comparing water bills in households with and without these systems	Household or community outreach	Household or community outreach	Medium
Waste reduction indicators	Recycling and compost	Kg per household; tonnes per community	Municipal data	<i>ACRD</i>	Municipal data	Low
	Solid waste	Kg per household; tonnes per community	Municipal data	<i>ACRD</i>	Municipal data	Low

NB: Energy and water monitoring: collect data monthly, compile annually, analyze every 3-5 years; or for lower-cost option, collect random sample every 3-5 years (HBL)



Monitoring Ecological Impacts

Indicator Type	Indicator	Measurement type	Data source			Difficulty of measuring indicator
			HBL	Alberni-Clayoquot Region	General	
Ecological factors	Carnivore (bears, cougars, wolves) movement and possible hazards/attractants	Evaluate: road crossings for conserving movement corridors; community design and operation in preventing problems; local monitoring/reporting process	Community + Parks Canada support; cameras, track pads, sign surveys, observation database	CBT (<i>Clayoquot Sound Monitoring Program</i>)	Parks Canada and local organizations	Based on existing Pacific Rim National Park Reserve program
	Streams and water quality, fish	Stormwater management (esp. sediment transfer) and how it is affecting fish habitat; fish passage structures assessment; seasonal water quality monitoring program; how improvements to liquid waste treatment are affecting local environment	See above	West Coast Aquatic Coastal Plan monitoring; Alberni Valley Drinking Water Reference Guide; CBT	See above	High
	Other wildlife, Species at Risk	Location-specific	See above	CBT	See above	High
	Vegetation (old growth forest, prevention of damage from invasive plants)	Maintenance of old growth forest, prevention of invasive plant establishment	See above	CBT	See above	High
Climate change ecosystem resilience	See extensive report on community-based adaptation in Clayoquot Sound, Lerner 2011					High



Monitoring Economic Impacts

Indicator Type	Indicator	Measurement type	Data source			Difficulty of measuring indicator
			HBL	Alberni-Clayoquot Region	General	
Green building savings	Initial, operating and maintenance costs	Construction, repairs, water, power, etc. costs (as compared to non-green buildings, or by payback period, for building owner)	<i>Household data</i>	<i>Cascadia GBC or ACRD</i>	<i>CaGBC data</i>	Medium
Housing affordability indicators	Mortgage or rent plus energy costs as % of pre-tax household income	By residential type, for existing and new builds	<i>First Nation community data available but needs calculation</i>	Vital Signs CSBRR	<i>CMHC</i>	Low
	Households with mortgage or rent equal to or lower than the area average	%, by residential type	<i>First Nation community data available but needs calculation</i>		<i>CMHC</i>	Low
Local employment and skills development	Monitoring/surveying		Local outreach	<i>ACRD</i>	Local outreach	Medium
	Construction		Local outreach	<i>ACRD</i>	Local outreach	Medium
	Harvesting (e.g. housing materials)		Local outreach	<i>ACRD</i>	Local outreach	Medium



Monitoring Social and Cultural Impacts

Indicator Type	Indicator	Measurement type	Data source			Difficulty of measuring indicator
			HBL	Alberni-Clayoquot Region	General	
Housing satisfaction	Occupant satisfaction with housing quality	Scale of satisfaction for indicators including location, price, build quality, monthly cost, efficiency, size, etc. (compared over time or between neighbourhoods)	Housing surveys	For CSBRR, 2014 regional survey asks residents if region provides a good quality of life for the cost of living (Vital Signs CSBRR)	Local community housing organizations	Medium
Health	Housing-related health complaints	Incidence of health complaints in various types of housing (e.g. respiratory, falls/accidents)	Local medical service or resident surveys; <i>First Nations Health Authority</i>	Alberni-Clayoquot Health Network	Local health authorities	Medium
Community cohesion and security	Occupant and community-member perceptions of community activity, engagement, cohesion	Compared over time (before and after green-built, community-designed housing additions) or between neighbourhoods	Surveys	Surveys	Surveys	Medium
	Crime rates	Compared over time or between neighbourhoods	<i>First Nation community data</i>	ACRD, police department	Local police department; Statistics Canada	Low

Note: Italics indicates potential/suggested data source, rather than confirmed.



Example Contacts and Partnerships

Local partnerships:

- Clayoquot Biosphere Trust
 - Clayoquot Sound Monitoring Program, CSBRR Vital Signs report
 - Coordinating regional monitoring of ecosystem health
- West Coast Aquatic – Tsawalk Partnership
 - Coastal Plan working on identifying monitoring needs and indicators for the region; much of this will be exactly what is needed to begin setting up baselines for long term ecosystem monitoring to detect climate change effects
- Marcie DeWitt at Coastal Family Resource Coalition

Regional:

- First Nations:
 - Huu-Ay-Aht First Nation
 - Yuułu?it̓at̓ First Nation
 - Toquaht First Nation
 - Uchucklesaht First Nation
 - Hesquiaht First Nation
 - Tla-o-qui-aht First Nation
 - Ahousaht First Nation
- Alberni-Clayoquot Regional District
 - Including smaller communities Bamfield, Beaufort, Long Beach, Sprout Lake, Beaver Creek, Cherry Creek
- Port Alberni, Alberni Valley
 - Patty Edwards (Alberni Valley housing and homelessness plan update)
 - Wes Hewitt (Port Alberni Shelter Society)
- Tofino
 - Ongoing housing study
- Ucluelet
 - Ongoing housing feasibility study

Federal:

- Arlene at Parks Canada
 - Monitoring; Keystone Environmental did initial monitoring
 - <http://keystoneenvironmental.ca/projects/government/first-nation/esowista>

Universities and Research

- Universities: UBC, SFU, VIU (universities are often eager for research projects especially in climate change)
- BC Stats and StatsCan

Utilities and Services:

- BC Hydro and local water providers



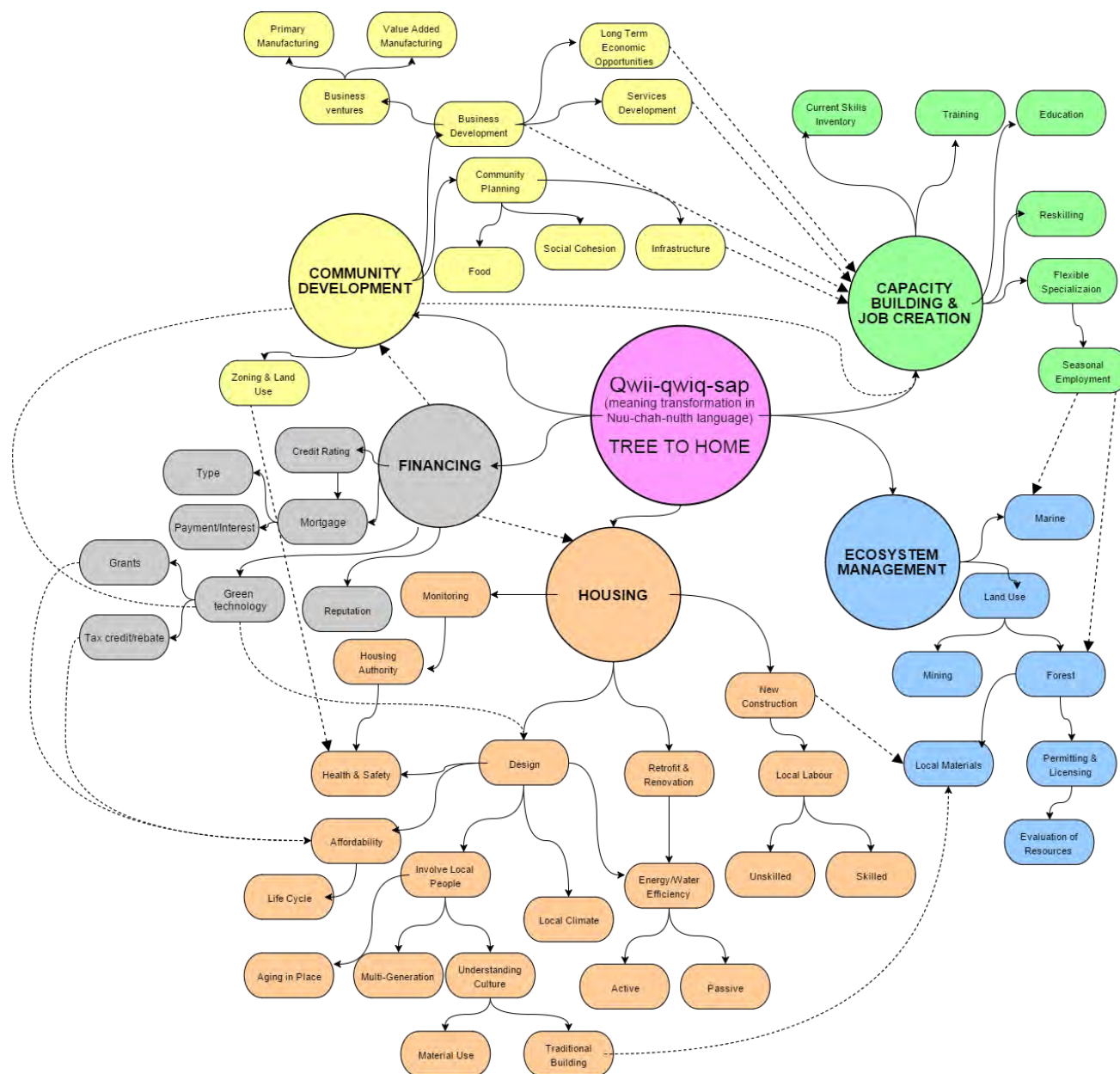
- Fortis
- Alberni-Clayoquot Health Network and other health authorities
- Police and justice departments

Housing:

- CMHC
- Canada Green Building Council; Cascadia Green Building Council



Appendix C – Connecting the Dots from Standing Tree to Standing Home





Appendix D – Terms of Reference

Green & Culturally Appropriate Building Design Project

Purpose

The purpose of this Terms of Reference document is to outline the expectations and commitments between Clayoquot Forest Communities Program and the families and or communities interested in building a model home resulting from the project: Green & Culturally Appropriate Building Design.

Project Backgrounder: Green & Culturally Appropriate Building Design

The Clayoquot Forest Communities Program is a jointly managed program between Ecotrust Canada and the five Central Region Nuuchah-nulth First Nations (Ahousaht, Hesquiaht, Tla-o-qui-aht, Toquaht and Yuułuʔiłʔatḥ). One of the initiatives from the CFCP is the Qʷii-qʷiq-sap (pronounced Quay-quick-sup in the Nuuchah-nulth language, meaning 'transformation') or 'Standing Tree to Home', which seeks to examine and support the 'circle of wealth' whereby natural resource development and conservation can support local values, economies and skills. An identified need by all the 5 Nations is on improved housing, therefore the CFCP has partnered with the UBC Sauder School of Business (ISIS), and the UBC School of Architecture and Landscape Architecture (SALA) on a project called 'Green and Culturally Appropriate Building'. The objectives of the project are to:

- 1) Increase awareness of green and sustainable housing, including the benefits and challenges
- 2) Research and develop green and culturally appropriate building designs for the west coast Vancouver Island region that are scalable and replicable throughout the region
- 3) Work with partners and locals to identify opportunities and challenges with building affordable green housing
- 4) Identify financing and investment options and innovations for building affordable green housing

The term of the project is from September 2010 to March 2012. After several meetings, interviews and discussions with community members, housing staff and members Ecotrust Canada and partners, several materials have been produced as a result of the project including:

- *Assessment of Sustainable and Cultural Housing Design in the Clayoquot Sound First Nations. A Decision Framework for Residential Housing Developments.* ISIS, Sauder School of Business, UBC. Geoff Taylor 2011.
- *Green and Culturally Appropriate Building Design for Clayoquot Sound First Nations. Part 1: Discovery. Interviews and Preliminary Findings.* May 25, 2011. Prepared by David HT Wong, Architect.

These materials were shared with the communities and comments/revisions were made to address any issues or additions.

Ecotrust Canada has facilitated several meetings between partners to identify families that are interested in investing their time and money in building the model home resulting from this project. There may be more families and or First Nations in the region that are interested in the project and building homes based on the designs resulting from this project. In such cases, this document may require revisions or form part of other future agreements.



Terms

The following Terms of Reference will be the agreed upon framework for outlining expectations, responsibilities and limits between Ecotrust Canada, its project partners and the families interested in building the model home resulting from the project:

- A) Ecotrust Canada is administering the funds for the project, which have been provided through the Clayoquot Forest Communities Program, in addition Ecotrust Canada wrote proposals and have been funded by the Vancouver Foundation and the Real Estate Foundation. The project has clearly defined deliverables and objectives, noted earlier; the funds received to date do not include funds for the actual construction of the model homes being developed.
- B) The project involves the research and creation of design options for building affordable green and culturally appropriate homes for the west coast region of Vancouver Island. These design options are meant to be scalable and replicable within the region for housing built on private lands, Indian Reserve Lands, Treaty Settlement Lands or other land ownership system.
- C) The 'culturally appropriate' aspects of the house designs have been focused on Nuu-chah-nulth cultural needs, as defined by the Nuu-chah-nulth people interviewed or that have commented on the designs. Ecotrust Canada will make all reasonable efforts to have the design reviewed by as many Nuu-chah-nulth people as possible.
- D) The resulting designs will be owned by Ecotrust Canada and attributed to the Nuu-chah-nulth people and the lead architect (David Wong). However, Ecotrust Canada will seek to work with the 5 Central Region Nuu-chah-nulth First Nations (Ahousaht, Hesquiaht, Tla-o-qui-aht, Toquaht and Yuułu?iŋ'at̓h) to determine a long term agreement on the intellectual property rights and copyrights of the housing design options that result from the project.
- E) The housing design options will conform to the BC Building Code, and a list of criteria for 'green and culturally appropriate' design elements that will be developed by Ecotrust Canada and its partners in the project. Families and or communities interested in using the design options should continue to use this list of criteria if they choose to customize the design to suit their needs.
- F) The families and or communities interested in using the design options resulting from the project, do so with the understanding that the original designs were intended to meet general needs and criteria, but they can be customized to suit their own needs and budgets.
- G) Ecotrust Canada will not be directly involved in the identification of builders, contractors, trades peoples, construction materials suppliers, or other expertise required for the building of the designs resulting from this project. Families and or parties intending on using the designs are responsible for identifying the experts required for building their home(s).
- H) Ecotrust Canada will facilitate the awareness building of green housing through workshops, meetings, reports and or briefings that will be available to the partners, regional and local governments and the Nuu-chah-nulth communities.
- I) Ecotrust Canada has retained the services of an architect (David Wong) to assist with developing the criteria for green and culturally appropriate housing design for the west coast of Vancouver Island, as well as to prepare designs that meet the criteria.
- J) The criteria for the housing design can be found in a separate document that will be agreed upon by all the partners involved in the project. They may be periodically adjusted from time to time.



- K) Ecotrust Canada is committed to seeking further funding, partners and solutions to ensuring that this project is sustainable and benefits the communities and region in the short and long term.