

DEEP BAY MARINE FIELD STATION FINAL REPORT TO ISLAND COASTAL ECONOMIC TRUST NOVEMBER 30, 2011



The Deep Bay Marine Field Station will:

1. Cluster scientific, environmental, economic and public engagement programming into one facility thereby creating a centre of excellence and innovation to support sustainable shellfish aquaculture development.
2. Achieve LEED platinum green building designation with special purpose venues that can accommodate the simultaneous delivery of multiple shellfish-related programs.

"BC needs regionally relevant, internationally competitive, leading edge applied research produced by world-class academics in partnership with various stakeholders"
Premiers Technology Council

"...I would like to take this opportunity to congratulate Vancouver Island University (VIU) as you celebrate excellence, imagination creativity and commitment demonstrated by your researchers, faculty and funding partners. The CFI is a proud supporter of the Centre for Shellfish Research and the Deep Bay Marine Field Station."
Dr. Giles Patry, President and CEO, Canada Foundation for Innovation.

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OVERVIEW OF PROJECT

On a waterfront lot adjacent to the CSR's operational shellfish farm, we propose to build leading edge multi-use facility, with purpose built venues in a flexible design that will accommodate the delivery of a range of innovative and creative programs to achieve our overall goals. The outcome will be increased industry economic viability and social acceptability that will enhance coastal community economic development through sustainable shellfish aquaculture.

The facilities proposed, and including the operational shellfish farm, will be designed to support the following programs and activities:

Research. The Field Station will complement the core CSR laboratory in Nanaimo by taking its research into the real-world environment for proof-of-concept application and commercialization.

Training. The Field Station will include classrooms and seminar rooms to deliver on-site training. In addition to university programs, training offered through the Field Station will include: the Coastal Citizen's Shellfish Aquaculture Training program; leadership camps for First Nations seeking to establish sustainable economic development ventures in their communities; and First Nations Youth Shellfish Leadership programs for young adults, plus others.

Community Outreach. By employing sustainable building design technology and practices including LEED certification¹, the Field Station will serve as a model of how various coastal and marine activities can coexist harmoniously. Through kindergarten to grade 12 learning experiences and community outreach (including culinary seafood seminars), the Field Station will promote sustainable development, food production and the integrated use of a healthy marine environment.

Tourism and Marketing. Culinary and Eco tourism are quickly becoming two of the fastest growing niche markets in the tourism industry. Field Station tourism and marketing activities will serve to reinforce that shellfish farming is dedicated to producing safe, healthy food for the world's expanding population. The activities will also serve to expand markets for BC shellfish by increasing the public's interest in - and appetite for - shellfish products.

¹ The Leadership in Energy and Environmental Design (LEED) Green Building Rating System™ encourages and accelerates global adoption of sustainable green building and development practices through the creation and implementation of universally understood and accepted tools and performance criteria.

Deep Bay Marine Field Station – Original Artist’s Concept



Project Objectives

This project seeks funding to design and construct the Deep Bay Field Station, a unique multipurpose facility that will support the development and diversification of a sustainable shellfish aquaculture industry fully integrated into the social and economic fabric of coastal British Columbia.

Specific objectives include:

- Provide programs to enhance the skill level and expand the pool of trained workers available to support the industry;
- Provide information/education support for First Nations and others seeking to establish sustainable aquaculture operations in their communities;
- Enhance acceptance of the industry and its products by providing a place for community dialogue, promotion and community outreach programs with respect to sustainable development, food production and integrated use of the marine environment;
- Provide a revenue stream via a tourism venue catering to eco and culinary tourists;

- Create a Field Station that will enhance regional cooperation and communication among researchers, the industry, workers and the community;
- Provide a real-world site for proof-of-concept studies that will facilitate commercialization of research and adoption of innovative technologies; and
- Serve as a model for “green” building technology, landscape design, and the sustainable coexistence of mixed activities in an ecologically sensitive area.

Project Description

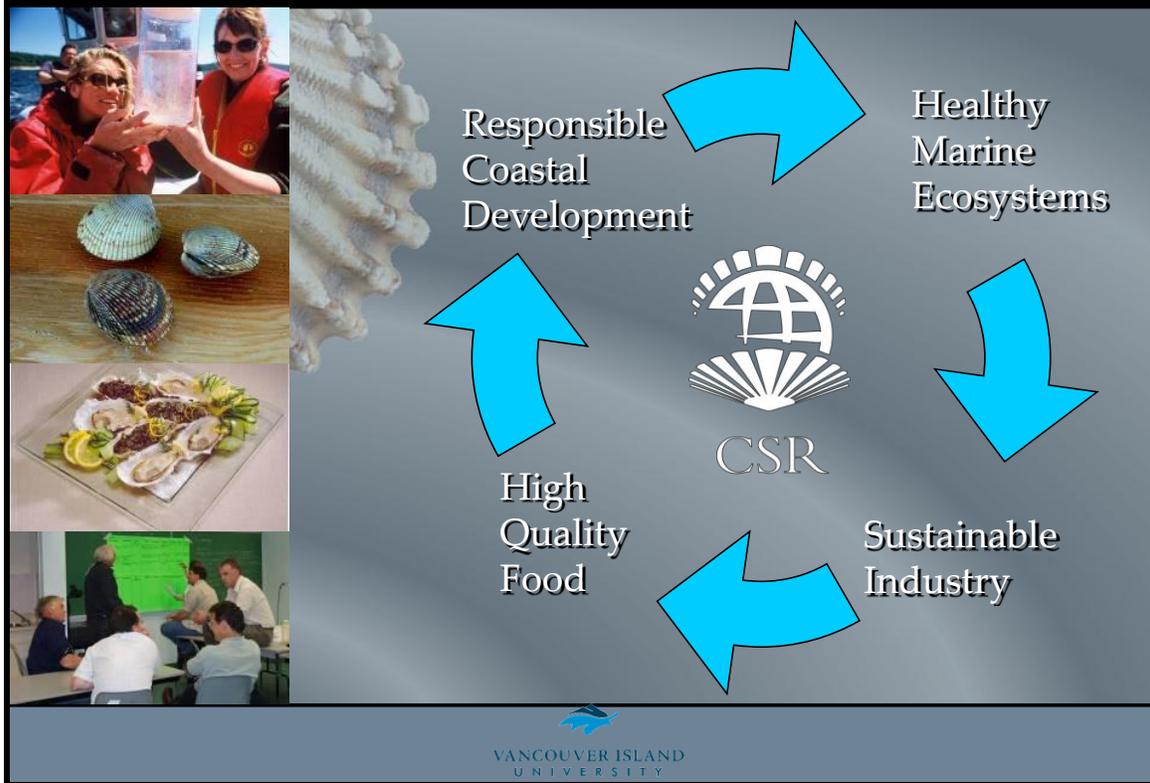
The Deep Bay Field Station is unique in Canada through its innovative grouping of several strategically designed activities including: First rate scientific research on technology and environmental interactions; capacity development through training and demonstration; exploration of new approaches to tourism; innovative community dialogue. This cluster of activities will enhance the regional aquaculture industry by providing:

- University and industry hands-on training opportunities in a real-world setting;
- Information/educational support for new shellfish aquaculture developments;
- Community outreach, tourism and marketing programs designed to expand markets for BC shellfish and to increase understanding and social acceptance of the industry; and
- A venue for focused translational research directly applicable to shellfish aquaculture.

Project Goals

- To demonstrate how to create pathways through which shellfish aquaculture can play an important role in enhancing the economic vitality, social cohesiveness and ecological sustainability of BC’s coastal regions.
- To create linkages between responsible coastal developments, preservation of marine water quality, sustainable shellfish farming and high quality seafood production – as illustrated in the diagram below.

Communities of Engagement – Drawing Linkages



BUDGET AND FUNDING PARTNERS

The total budget for the overall project including the Field Station building and associated shellfish farm was \$10,662,414. This included construction, materials and equipment; engineering and design; project management; landscaping, roads and parking, and; gifts in-kind (land, leases, equipment). Funding was contributed from the following programs, agencies, organizations and companies:

- Knowledge Infrastructure Program
- BC Ministry of Advanced Education
- Island Coastal Economic Trust
- Vancouver Island University
- Canada Foundation for Innovation
- Western Diversification/Community Futures (WestCAPP)
- Marine Harvest Canada
- Fund-raising

VIU is indebted to our funding partners for the vision, leadership and commitment they made to this world class facility.

CONSTRUCTION HISTORY

May 2006

- Cleared site, prepared lower building site and upper building site



- May 2006 - Installed 4 seawater intake lines and one effluent line



2007

- Field Station site in 2007 before construction begins



Thursday, May 21, 2009

- **Ground Breaking Ceremony**



Left to Right. VIU President Ralph Nilson, VIU Board Chair John Phillips, MP Dr. James Lunney; Qualicum First Nation Councilor Darlene Wells, MLA Ron Cantelon, ICET Board Chair Joe Stanhope

Oct – Nov 2009

- Poured the 18' high back wall at the Field Station
- First forms starting to come down



January 2010

- Forms are now coming off the walls and back-filling going on
- Placed the all the horizontal wood beams into place
- The pre-assembled woods slab panels are on and being tightened and fastened down



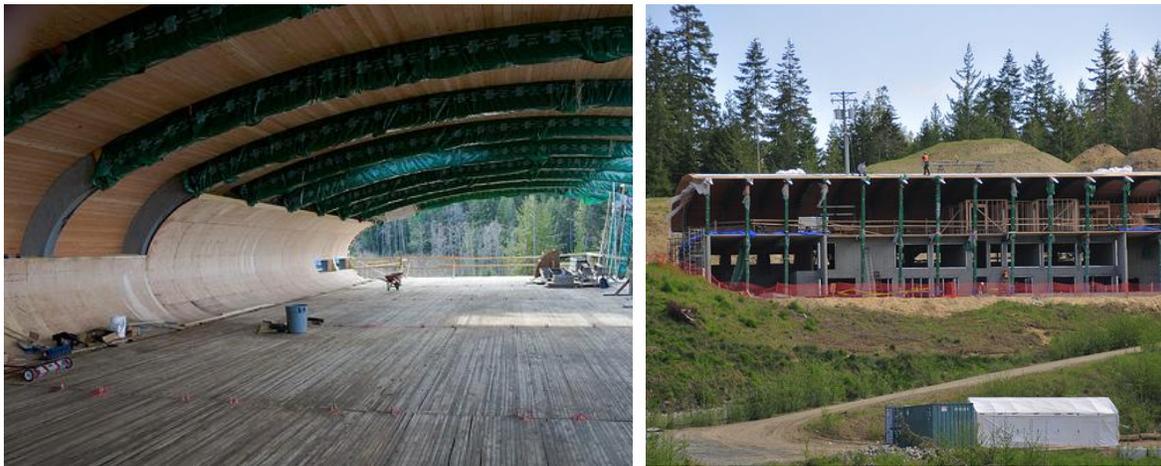
February 2010

- Installing all the roof beams and successfully placed the first of the concrete haunches
- Tongue and Groove Douglas Fir is now being mounted on the concrete haunches and glu-lam beams



March to April 2010

- The roof nears completion and preparations are made to start pouring floors in the lower sections
- Sandblasting finished down stairs, mechanical/electrical picking up, framing starting on the upper floor



May to June 2010

- First mountain of sand from the excavation has been put back in place and the final shape of the parking and entry areas
- The lower concrete slab was poured
- Sprinkler systems and electrical being installed and framing
- Outside wood finishes being applied under the curved section of the wall



July to August 2010

- Final roof assembly is going up
- Almost completed outdoor teaching area off to east side of the building with building behind
- Steel beams being installed which will support the viewing mezzanine that looks down into research labs
- New steel for outside decks going up and completed boulder walls
- Electrical rough-in is now almost complete.
- Inside – sprinkler lines are almost finished and interior wood surfaces are getting coats of water based low VOC stains



September 2010

- Outside teaching amphitheatre



October 2010

- Installing structural steel components throughout the building including mezzanine staircase
- Millwork supports being assembled to cover up conduit and fire suppression pipes in the lower section of the curved haunches.
- Framing at the west end is now finished



November to December 2010

- Install some of the final exterior glazing
- Upstairs, drywall is now being finished in all the admin and kitchen spaces
- Viewing mezzanine now in place, this is where the public will be able to look down into all the research labs



March 2011

- Building completed



Proudly Constructed By:

Centre for Shellfish Research

HEATHERBRAE

VANCOUVER ISLAND UNIVERSITY
EXPLORE. DISCOVER. EXCEL.

ABC
PROFESSIONAL INTERIORS

GARAVENTA LIFT

M
MECHANICAL GROUP

ADDY
CONCRETE

Arche Johnstone
ARCHITECTURE & INTERIORS

VBI Environments
2010 Developments
PR Aqua

VAN BERG
INTERIORS

Master Craft
Flooring Canada

PROBEL

DAN'S
Pre-Cast
LTD.

BRUGGMAN
CONCRETE

MARSH
CANADA LTD.

IMC Building Sciences Group Inc.
Cleanup/Environmental Systems Ltd.
A/E/C Project Management

STANCO
products

TYEE
ELECTRIC

Wilson
ROOFING & SHEET METAL

D. CHALIFOUR
CONSTRUCTION LTD.

DRILLWELL

R. Williams
WELL DRILLING

CUMBERLAND
REINFORCING LTD.

Inter-Kraft
REINFORCING

Viking
Reinforcing

Design and Construction Team

McFarland Marceau Architects Ltd	Architect
Heatherbrae Builders Ltd.	Construction Manager
Fast + Epp	Structural Engineering
Perez Engineering Ltd.	Mechanical Engineering
Cobalt Engineering LLP	Electrical Engineering
Koers and Associates Engineering Ltd	Civil Engineering
EnerSys Analytics Inc.	Energy Analysis
Victoria Drakeford Ltd.	Landscape Architect
Morris Hirschfield	Building Envelope
Stantec	Commissioning

EARLY SUCCESS

The Vancouver Island trade community was proud to work on the Deep Bay Marine Field Station because of its unique design and building challenges. Their excellent work has been acknowledged by their peers through various building awards. For example:

- Archie Johnson Plumbing and Heating Ltd. – US magazine (see Appendix 5)
- Nelson Roofing and Sheet Metal Ltd. – Metal Mag – 2011 Architectural Award – International Roof of the Year (in North America) (see Appendix 3)

Awards and Recognition

Association of Universities and Colleges of Canada (AUCC)

95 universities from across Canada benefited from \$3.2 billion in federal and provincial stimulus funding through the Knowledge Infrastructure Program (KIP). Of the 183 KIP funded projects, the Deep Bay Marine Field Station was one eleven projects show-cased by the AUCC. See Appendix 1.

Vancouver Island Construction Association Awards 2011

The Field Station earned its first award from the local construction association in their spring 2011 Awards ceremony in Courtenay.

SAB Magazine

The Field Station was one of seven award winners in prestigious Canadian Green Building Awards from The Sustainable Architecture and Building Magazine (SAB). Award winners are profiled in SAB Special Issue Number 30, (August 2011). See Appendix 2 for the full article.

- <http://www.sabmagazine.com/blog/2011/08/11/2011-sab-award-winning-project-viu-deep-bay-marine-field-station/>
- <http://viudeepbay.com/2011/04/20/award-winning-2011-sab-awards-the-national-green-building-awards/>

Metal Mag

Nelson Roofing and Sheet Metal Ltd of Cumberland BC, won the Metal Mag award for Roof of the Year in North America for their installation of the clam shell shaped metal roof on the Field Station. See Appendix 3 for the full article

- <http://www.metalmag.com/>
- <http://www.metalmag.com/award-winners/2011-metalmag-architectural-award-winners.aspx>

Events

Visit by Prime Minister Harper during construction, September 8, 2010.



Left to Right. MP Dr. James Lunney; Field Station Manager Brian Kingzett; Prime Minister Harper, VIU President Ralph Nilson



CSR Director Don Tillapaugh and Dr. Helen Gurney-Smith showing marine organisms to Prime Minister Harper.

Inaugural Event – International Seafood Sustainability Summit Shellfish Tour Banquet, January 30, 2011.



Attended by 80 delegates – food writers from around the world. See Press Release in Appendix 4

Wedding held in May 2011. 120 guests.





K- 12 educational events including touch tanks and forest trail adventures





Meetings



Shellfish Industry meeting on genomics (top left); multi-stakeholder meeting on sea cucumber aquaculture including a delegation from Dalian, China (bottom L & R). These industry meeting provide applied research information to growers to improve productivity and/or opportunities for new species diversification – both of which will increase the value of the industry and job opportunities in coastal communities.

Banquet Reception at the Field Station



The World Sturgeon Conservation Society North America Chapter, hosting 123 delegates from around the world including Russia, Iran, France, Italy, Germany and China held its banquet at the Field Station in July 2011.

Partnership with the VIU Culinary Institute of Vancouver Island





A partnership with the VIU Culinary Institute of Vancouver Island provides opportunities to train and educate future chefs (opinion makers of the future) on sustainable seafood production and achieves one of our principal goals to connect food production from the ocean to the plate.

Grand Opening June 23, 2011



Ribbon cutting ceremony. From left to right. Brian Kingzett, Manager of the field station, Ron Cantelon, MLA for Parksville Qualicum, Darlene Wells, Councilor of the Qualicum First Nation, Stephanie Richards, CSR events co-coordinator, Joe Stanhope, Director of Island Coastal Economic Trust, Don Tillapaugh, Director of the CSR, Don McCrae, MLA for Comox and BC Minister of Agriculture, VIU President Ralph Nilson, Donna Kennedy Councilor of the Qualicum First Nation, Bruce Williams, Vice-chair VIU Foundation, Mike Brown, Chair VIU Board of Governors, Helen Lunney, wife of Nanaimo-Alberni MP James Lunney.



Dr. Ralph Nilson, President and CEO of VIU see above giving opening remarks and welcome to over 250 people who attended the Grand Opening of the Field Station.

Metrics of Early Success

The original vision for the Field Station was to “cluster scientific, environmental, economic and public engagement programming into one facility thereby creating a centre of excellence and innovation to support sustainable shellfish aquaculture development.” This vision has already become a reality after only four months of operation. Starting with the over 250 people attending the Grand Opening and largely based on “word of mouth marketing” the Field Station has hosted over 2200 people at 62 “organized” events as well as over 1200 drop-in visitors curious to see what the Field Station had to offer.

The following table lists some of the organizations using the Field Station for special meetings.

- Milner Garden & Woodland
- Aquatic Life Sciences/Syndel Labs
- Nature Trust
- Parksville Probus Club
- Community Living BC
- Biosphere Conference
- Qualicum Beach Newcomers Association
- Union Bay Credit Union
- BC Shellfish Growers Association
- Oceans of Plenty
- Chemainus Eco Tours
- Qualicum Rotary Club
- Deep Bay Developments Inc. (Jim & Theresa Crawford)
- AIMAPP
- Bowser Community Summer Camp
- Forest Park Boys & Girls Club
- Ballenas Secondary School
- GO Green First Nations Summer Camp
- Coastal Shellfish Corp
- Parksville/Qualicum Chambers
- Wen Lian Aquaculture
- VIU Foundation
- ICET
- Marine Harvest Canada
- Coastal Invasive Plants
- Deep Bay Ratepayers Association
- Taylor Shellfish Ltd
- DFO

4 month Success Metrics:

- 2000 visitors to organized events
- 1200 drop-ins

- Fisher Scientific / YSI training
- Qualicum Streamkeepers
- Genome BC
- OLDS High School
- Nanoose Naturalists
- Fanny Bay Enhancement
- Seafood Symposium
- VIU Faculties:
 - Health & Human Services; Educational Planning; Trades & Applied Technologies; International Education; Science & Technology; Tourism & Recreation; Management, and; VIU Board of Governors

Because of its award winning architectural design, stunning waterfront location and unique offerings, the Field Station has a “Power of Place” that attracts visitors from near and far. For example, more often than not, after experiencing the Field Station for themselves (perhaps through a Rotary or Probus luncheon meeting), the grandparents show up at the Field Station a few days later with their grandchildren so that they too can see and touch the marine creatures. In this way the Field Station is achieving one of its primary goals and that is connecting society with the marine ecosystem and linking coastal marine health with sustainable food production.

Donations collected indicate a latent demand for this type of attraction in the mid-Vancouver Island area and signify the emergence of the Field Station as a major destination tourist attraction in the Oceanside/Lighthouse region. Tourist visits will be a major source of revenue for the Field Station and will have significant indirect benefits to the local economy.

The international awards won by the building and more importantly by the contractors constructing the building will have direct economic benefits to those businesses. For example. “*...this (award) has put us on the architectural sheet metal map*” Chris Smith, Nelson Roofing Project Manager speaking about the Metal Mag roofing award.

The Field Station created approximately sixty full time equivalents of employment during construction. It currently employs 5 full-time staff and is expected for employ fifteen full-time staff within five years. Visiting scientists will contribute to the economic impact as well.

Thank you

On behalf of the Vancouver Island University Executive and Board of Governors, the Faculty of Science and Technology and the Fisheries and Aquaculture Department, I would like to sincerely thank the Island Coastal Economic Trust for facilitating the vision Deep Bay Marine Field Station. This facility will be instrumental in facilitating VIU's emerging vision as the "seafood university" creating sustainable wealth from the oceans to support vibrant economic activity in BC coastal communities.

Sincerely,



Don Tillapaugh
Director, Centre for Shellfish Research

Appendix 1 - Association of Universities and Colleges of Canada



Vancouver Island University Deep Bay Field Station

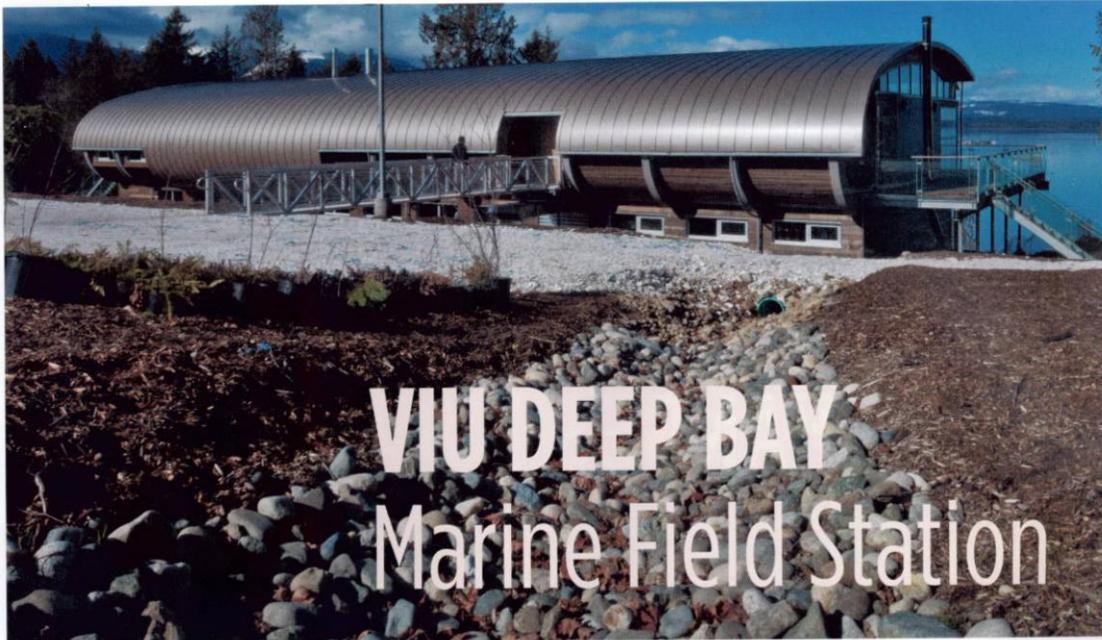
GREEN FOUNDATIONS

Universities are building green with KIP funds

Canada's first, shellfish field station is green from its foundation up. Vancouver Island University's \$8.6-million Deep Bay Field Station is an extension of VIU's Centre for Shellfish Research. The new station is a leader in sustainability – in operations, teaching, research and the community. The unique, 13,000-square foot, clamshell-like building on Vancouver Island's waterfront is built with renewable resources including wood and local, recycled materials. Wood waste is converted to topsoil; roads are crushed oyster shells and the plants are indigenous. It houses seawater labs for research, a shellfish hatchery, and a home for marine environmental studies and coastal ecosystems. KIP's \$2.1-million investment has contributed to a centre of excellence – a teaching tool for university students, island residents and aquaculture workers. It will generate jobs for Aboriginal Canadians and people living along the coast.

 AUCC

Appendix 2 – Sustainable Building Magazine Award

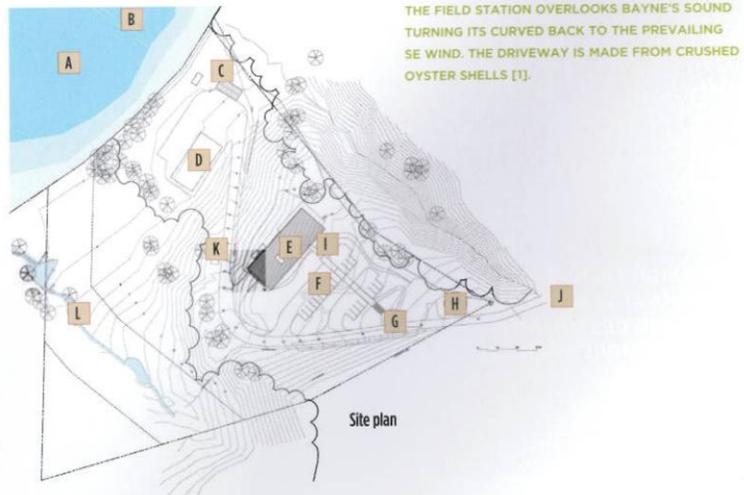


VIU DEEP BAY Marine Field Station



The Vancouver Island University's [VIU] Deep Bay Marine Field Station is a new 1,200 m² facility located on a three hectare unserviced waterfront site at the south end of scenic Bayne's Sound, 65 km north of Nanaimo on Vancouver Island. As an extension of VIU Centre for Shellfish Research Nanaimo Campus, the new Field Station will accommodate research and educational programs devoted to the development of a sustainable shellfish aquaculture industry on Vancouver Island. The new facility will also support the public educational objectives set by the Centre.

- A Bayne's Sound [straight of Gerogia]
- B Seawater intakes
- C Pump house
- D Future tank building
- E VIU Field Station
- F Oyster shell parking
- G Bus drop-off
- H Grey water reservoir
- I Swale
- J Access to Chrome Point Rd
- K Tertiary sanitary treatment system
- L Riparian area restoration



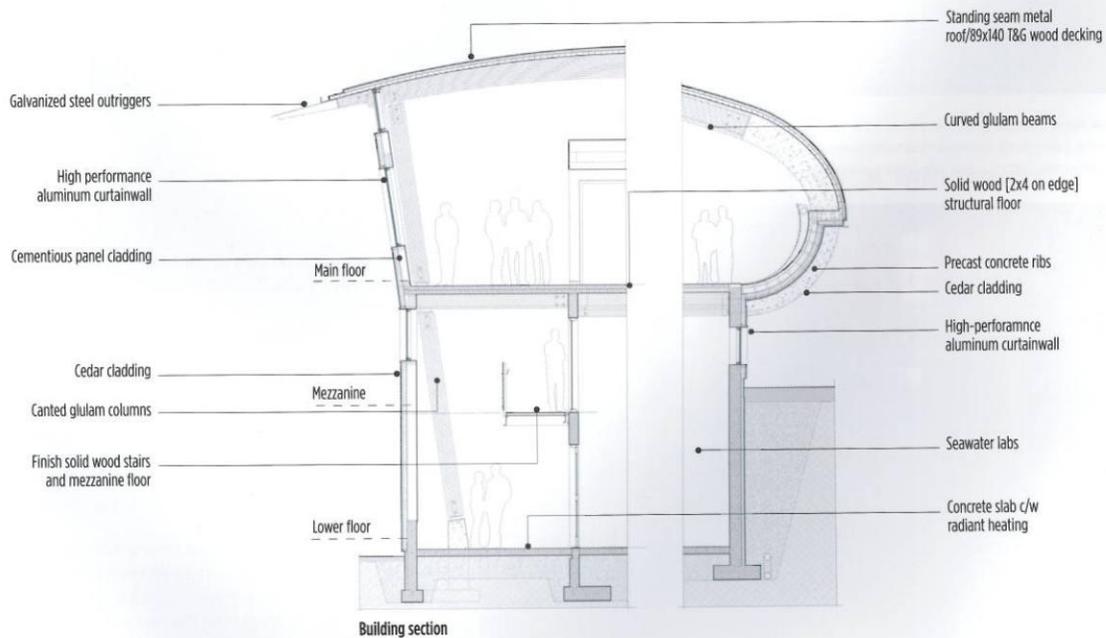
Jury Comments: *The education and research centre's beautiful shellfish-inspired form marries the inner and outer shell in a dynamic section. The building is designed to achieve LEED Platinum using readily available technologies, and delivers an impressive energy performance that is 65% superior to a base building of the Model National Energy Code.*

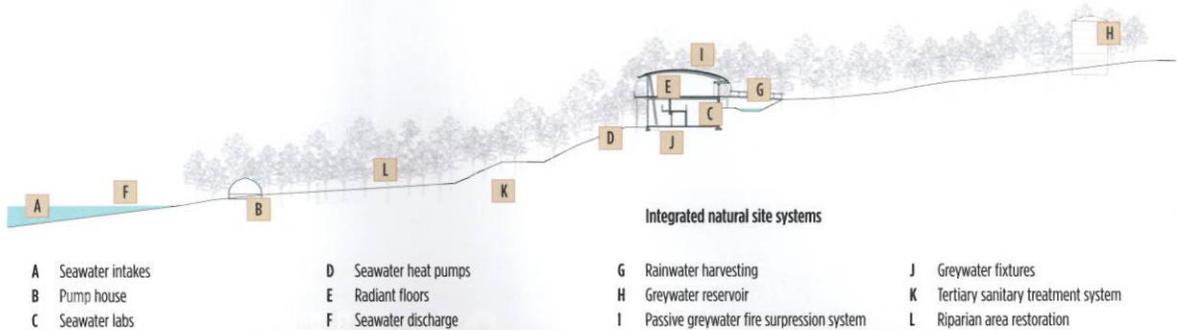


THE FIELD STATION IS BUILT INTO A NATURAL SLOPE. THE FORM OF THE BUILDING WAS INSPIRED BY THAT OF A SHELLFISH [2].

The program is organized on three levels around a central atrium. This vertical space provides a visual connection between research, visitor and administrative areas of the building, ensures good penetration of natural light from the extensive glazing and acts as the main ventilation plenum facilitating the movement of air, through stack effect, from low pressure-sensitive window vents to clerestory exhaust openings.

The project is intended to serve as a model for responsible and restorative coastal development by using the natural resources of sun, wind, rain and ocean to reduce the operational footprint. Simple practical and accessible solutions were favoured over complex technologies.





THE MAIN VISITOR ENTRANCE LEADS TO THE EVENT HALL WITH VIEWS OVER BAYNE'S SOUND. THE SOLID WOOD ROOF IS EXPOSED, WHILE THE SOLID WOOD FLOOR HAS A CONCRETE TOPPING CONTAINING RADIANT HEATING COILS. CARPET TILE BY TANDUS [3]. THE WOOD STRUCTURE GIVES THE BUILDING ITS DEFINING MATERIAL CHARACTER. MEZZANINE WALKWAYS GIVE VISITORS VIEWS DOWN TO THE RESEARCH FLOOR [4].

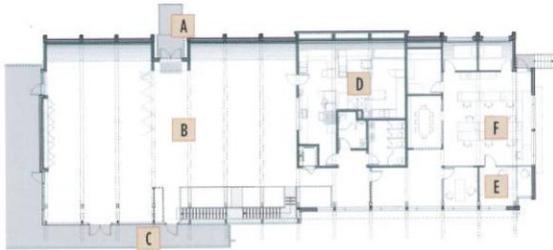


An integrated approach to the development of the site, previously illegally logged, led to the rehabilitation of a salmon-bearing stream, in addition to low-impact site development practices aimed at eliminating possible harm to the shellfish growing habitat from the operations of the Station.

Water, sewer and storm services have no reliance on municipal services and are all managed on-site. Water for domestic consumption is obtained from an on-site well; water for fire protection and sewage conveyance is rain-harvested then collected in a reservoir located at the top of the site.

Sanitary sewage is discharged on-site following tertiary treatment resulting in high-quality effluent, posing no harm to site or ocean ecology. Storm water is filtered, collected and redirected to feed the rain-water reservoir, with excess water discharged through a series of ponds forming the rehabilitated riparian area.

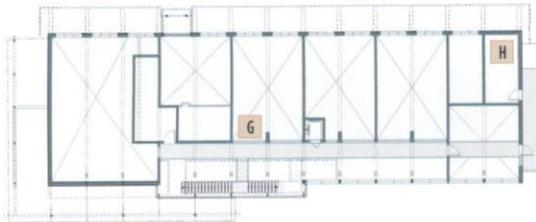
ARCHITECT McFarland Marceau Architects, Vancouver **CONSTRUCTION MANAGER** Heatherbrae Builders, Richmond, BC **LANDSCAPE ARCHITECT** Victoria Drakeford Landscape Architect, Nanaimo, BC **CIVIL ENGINEER** Koers & Associates, Parksville, BC **ELECTRICAL ENGINEER** Cobalt Engineering, Burnaby, BC **MECHANICAL ENGINEER** Perez Engineering, Vancouver **STRUCTURAL ENGINEER** Fast + Epp, Vancouver **PHOTOS** Michael Elkan Photography



Main floor plan

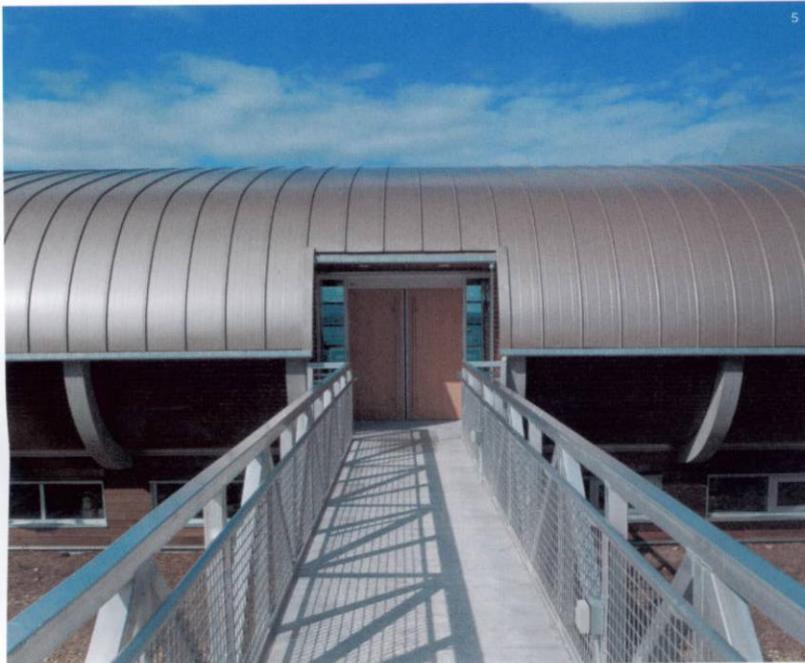


Ground floor plan



Mezzanine floor plan

- | | |
|-----------------------------------|-------------------------------|
| A Public entry | J Seawater classroom |
| B Main event hall/seminar room | K Mechanical room |
| C View deck | L Research corridor |
| D Demonstration kitchen | M Dry lab |
| E Administrative offices | N Seawater wet lab |
| F Graduate students work area | O Refrigerated sample storage |
| G Viewing mezzanine to labs below | P Sample sorting room |
| H Electrical room | Q Graduate student entry |
| I Atrium | |



PROJECT PERFORMANCE

- Energy intensity: 667 MJ/m²/year
[Includes both base building and process energy]
- Local materials by value: 27%
- Recycled materials content by value: 53%
- Water consumption from municipal source: 0 litres/occupant/year [Includes both base building and process energy]

THE STANDING SEAM METAL ROOF WAS FORMED ON SITE IN CONTINUOUS 21M LONG SECTIONS. THIS MEANT THAT THE MATERIAL COULD BE SHIPPED TO SITE MORE EFFICIENTLY THAN IF THE PANELS HAD BEEN PRE-FORMED IN THE FACTORY [5].

DETAIL OF CONNECTION BETWEEN GLULAM RIB AND INCLINED COLUMN (6); EXTERIOR VIEW OF ATRIUM BY NIGHT (7).



Driveway and parking areas have been surfaced with pervious material consisting of recycled oyster shells from Fanny Bay.

Building location, orientation and form were informed by topography as well as the need for shelter from the strong south-eastern prevailing winds. Sustainable building strategies include an ocean source geo-exchange system for heating and cooling backed by a bio-mass fueled boiler for make-up heat; radiant floor heating with displacement fresh air ventilation; large areas of high-performance glazing for natural light, integrated with high efficiency artificial lighting through the use of daylight and occupancy sensors; rainwater harvesting with gravity flow for toilets and fire protection; extensive use of regionally-sourced beetle kill wood; natural and low-VOC materials; and high-efficiency induction kitchen appliances.

The building is an example of the BC Government's 'Wood First' policy that mandates the use of wood wherever possible in publicly-funded projects. This includes a glulam frame structure, heavy timber decking for the curved roof and nail-laminated solid wood floors. The use of wood in place of other more energy-intensive materials, together with the CO₂ already sequestered within the wood, reduces the building's net carbon footprint by 300 tonnes. ◀

Appendix 3 – Metal Mag Award to Nelson Roofing and Sheet Metal



Nelson Roofing takes international awards

Project: Centre for Shellfish Research Field Station
 Roofing contractor: Nelson Roofing & Sheet Metal, Cumberland, BC
 Metal supplier: Cascadia Metals, Delta, BC
 Architect: McFarland Marceau Architects, Vancouver
 Construction Manager: Heatherbrae Builders, Richmond, BC
 Landscape Architect: Vibrona Drakford Landscape Architects, Nanaimo, BC
 Civil Engineer: Kover & Associates, Port Moody, BC
 Electrical Engineer: Cobalt Engineering, Burnaby, BC
 Mechanical Engineer: Parsz Engineering, Vancouver
 Structural Engineer: Fast + Epp, Vancouver
 Photos: Michael Etkan Photography / Nelson Roofing & Sheet Metal

Nelson Roofing & Sheet Metal crews work on the Centre for Shellfish Research Field Station at Deep Bay on Baynes Sound

Demanding metal roof wins praise for skill and environmental awareness

By Frank O'Brien

Nelson Roofing & Sheet Metal Ltd. of Vancouver Island has captured two international awards for its roofing metal work on a challenging project for Vancouver Island University (VIU).

The RCABC member captured top honours in the roofing category from Chicago-based MetalMag in its 2011 Architectural Award. One of only two Canadian firms that were awarded by the industry magazine, Nelson Roofing also won a top award for its green initiatives from U.S.-based SAB magazine for the same building: the 13,000-square-foot Centre for Shellfish Research Field Station at Deep Bay on Baynes Sound, a remote site about 45 minutes south of Comox.

Under the guidance of architect McFarland Marceau Architects of Vancouver, the design was to "evoke the ribs of a shell and the appearance of crashing waves."

Chris Smith, Nelson's project manager, said they were notified of the MetalMag award in May, and the magazine published a report on the project in its September 2011 edition. "The guys are really stoked about this as it has put us on the architectural sheet metal map," Smith said.

The RCABC dispatched a film crew to Deep Bay to record the project, which will be used as a training video at its Architectural Sheet Metal campus in Langley.

The SAB environmental award recognized that "the project is a

model for responsible and restorative coastal development... simple practical and accessible solutions were favoured over complex technologies" in the LEED platinum building.

"I am very proud of all our workers for rising to the challenge and completing this project. They are true craftsmen."

The metal roof, however, was indeed complex and Smith was quick to credit his eight-man crew, especially fabricator foreman Iain McDougall and installation foreman Mike Kaulback for "exceeding the client's expectations."

The building is meant both as a research centre and as a public showcase for VIU's shellfish research program. "Metal was chosen to compliment the shell of the building and provide clean, uninterrupted lines," Smith explained.

Formed on site

Originally, the client had thought that the metal roof, which required curved panels as long as 70 feet, would need to have joints in the panels at the junction of the slight curve to the major curve. In fact, the joints were included in the original design.

"Although this is a common detail, it does take away from the aesthetics of the roof as there is an interruption in the clean lines of the panels," Smith said.

He put the challenge to Iain McDougall to make a continuous panel and through trial and error (a few scrap panels) the team was "able to exceed expectations," Smith explained.

"Iain curled the panels up to 180 degrees," marvelled Smith, "and Mike (Kaulback) and his team made sure they fit without seams." He added "I am very proud of all our

workers for rising to the challenge and completing this project. They are true craftsmen."

All of the metal was sourced from Delta-based Cascadia Metals, but the fabricating was done on site. All together, the project took about a month and was completed last summer.

As Smith explains, the inverted roof consists of a Bakor Blueskin underlayment with Aquatrac primer. On this there are two layers of 1-inch JM polyisocyanurate insulation in staggered layers to give better thermal value. The custom colour "Champagne Metallic" 24 gauge 1-inch high standing seam panel was custom roll formed and curved onsite, using a Quattro panel machine and Schiebad RBM curving machine. This impressed the SAB environmental judges because it dramatically reduced the cost and energy consumption that would



Nelson's skilled crew, from the top down: Sean Bryan, Isaac, Gable Babcock, Jamie Yarde, Dan Dickie, Isaac Wilkerson



A test panel is inspected after profiling to ensure it has been correctly curved to fit the roof radius



The completed Centre for Shellfish Research Field Station acts as a research facility and a public education centre on Vancouver Island.



Installation of curved standing seam panels with sliding clips to allow for expansion and contraction over slip sheet and insulation



Eave edge of radius panels leading to a heavy gauge galvanized gutter



Lowest eave of radius panels, on the underside of the curve, leading back into the heavy gauge galvanized gutter

have been required in transporting finished metal panels to the remote location, which would have required either barges or hauling down a gravel logging road.

The roof substrate consists of three different mediums and a constantly varying curve. It started on the bottom of the curve with precast concrete and then turned

into glulam beams where the major curve meets the slight curve and finally ends with custom structural galvanized outriggers. All of this is covered by tongue-and-groove decking.

"The general contractor, Heatherbrae Builders, did an excellent job of tying them all together and giving us a true and

accurate deck to work from," Smith said. "Standing seam roofing is only a skin and it has to follow whatever is underneath so it was important to have a good surface to start from as this project is highly visible."

MetalMag judge Jason Wright of Hickok Cole Architects in Washington, D.C. noted, "The challenges of forming such material

precisely in this environment should be commended."

Fellow judge Tim Wurtele, an architect with HDR Architects in Omaha, Nebraska, was also wowed. "The detailing is very well done given the fact that the metal panels were formed on site."

For Nelson Roofing & Sheet Metal, the project is just another job

well done for one of Vancouver Island's leading roofing contractors. "We are doing a lot of metal work, both on the Island and the Sunshine Coast," Smith said.

With the international applause that the Deep Bay project has earned, Nelson will likely be handling a lot more metal roofs in the future. ■



All of the prefabricated metal coils – some sheets are 70 feet long – were roll formed to the profile on site.



The crew, tied off to seam anchors on the roof, created a conveyance system to slide the metal panels up on extra-long floor joists



The award-winning project put Nelson Roofing "on the architectural sheet metal map"



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Appendix 4- Sustainable Seafood Summit Shellfish Tour

Jan. 21, 2011

FOR IMMEDIATE RELEASE

CONTACT: Jon Rowley rowley@nmlink.com
206-963-5959

SEAFOOD SUMMIT SHELLFISH FARMS FIELD TRIP BRINGS INTERNATIONAL SUSTAINABLE SEAFOOD EXPERTS TO VANCOUVER ISLAND JANUARY 29

Locally Grown Shellfish Dinner Will Inaugurate New Deep Bay Marine Field Station Kitchen And Dining Facility

Fanny Bay, British Columbia: Sponsored by Taylor Shellfish Farms and Fanny Bay Oysters, a group of international sustainable seafood experts will tour Vancouver Island shellfish farms Jan 29 as part of the SeaWeb Seafood Choices 2011 Seafood Summit pre-conference field experience “Discovering Sustainable Seafood on Vancouver Island”.

“The Vancouver Island shellfish field trip ties in perfectly with the Summit’s theme of “Sustainability without Borders” by following highly sustainable aquaculture practices from production to consumption, farm to plate,” says Becky Marshall, Director of North American Programs, SeaWeb. “What participants will see and taste exemplifies many of the sustainability aspirations of the seafood industry”.

Touring by bus from Vancouver, participants will visit a shellfish hatchery, scallop farm, oyster farm, FLUPSY (floating upwelling system), processing plants and the brand new Vancouver Island University Deep Bay Marine Field Station. For lunch, the group will have the opportunity try the locally famous Fanny Bay Inn Oyster Burger. An oyster and wine pairing by lantern light on the Burney Road oyster bed will precede the Field Station’s inaugural culinary event where acclaimed chef Xinh Dwelley of Xinh’s Clam & Oyster House in Shelton WA and award-winning chefs from the Culinary Institute of Vancouver Island will prepare a feast of locally grown sustainable shellfish.

The day will also include a presentation on “Ocean Acidification and the Shellfish Industry” on the ferry by NOAA’s Richard Feely, a world authority on the subject. Andrew Thomson, DFO Director of Aquaculture Management will provide a briefing on the transition from provincial to federal aquaculture management.

“Fanny Bay Oysters and Taylor Shellfish are pleased to be hosting the Seafood Summit tour of shellfish farms on Vancouver Island”, says Bill Taylor of Taylor

Shellfish and Fanny Bay Oysters. “It is a great opportunity to share the challenges we face as shellfish farmers, to show why farmed shellfish is probably the most sustainable of seafoods and especially to show off the delicious tastes of our incredible shellfish at the Field Station dinner.”

Held this year in Vancouver, BC Jan 31-Feb 2, the Seafood Summit, annually brings together all facets of the global sustainable seafood industry for a conference with the goal of making the seafood marketplace environmentally, socially and economically sustainable. Now in it’s ninth year, the Summit is internationally recognized as the forum that inspires productive dialog towards helping today’s business leaders critically examine the many factors influencing their place in a rapidly changing global landscape.

30

Web links:

Vancouver Island University, Centre for Shellfish Research, Deep Bay Marine Field Station:

viu.ca/deepbay/index.asp / updates blog: www.viudeepbay.com

Seafood Summit: <http://seafoodchoices.org/seafoodsummit.php>

Fanny Bay Oysters: fannybayoysters.com/

Taylor Shellfish: taylorshellfishfarms.com/

Appendix 5 – Archie Johnstone Plumbing and Heating Ltd.



Pat Johnstone, service manager, Archie Johnstone Plumbing and Heating; Business Manager Dale Dhillon

Mid Island Representative Jim Noon, International Representative Rob Kinsey, Business Manager Dale Dhillon, Journeymen plumbers Vance Campioni and Dan Pullan, Superintendent; and General Manager Garth Johnstone, Archie Johnstone Plumbing and Heating

Deep Bay Field Station— Journeymen and Apprentices Making a Difference for the Environment and Economy

Deep Bay Field Station is Vancouver Island University's (VIU) new \$8.6 million project, which includes a 13,000-square-foot facility for shellfish research, training, and education located at the southern end of Baynes Sound in Nanaimo on Vancouver Island. Half of British Columbia's shellfish farms are located in Baynes Sound, which makes it accountable for roughly 75 percent of all shellfish processing in the province. The waters are shallow and protected, making the location ideal for aquaculture. VIU was fortunate to have the shoreline property in Baynes Sound donated to the research center, enabling the field station to be located in the heart of shellfish aquaculture.

The field station is an extension of VIU's Center for Shellfish Research,

and it is seeking to attain the coveted LEED Platinum certification with the field station's design and construction. As of December 31, 2009, only 12 out of 134 buildings that have completed the LEED certification process were fortunate enough to attain the platinum certification in Canada, which is fewer than 10 percent. LEED Platinum is the highest rating given by the United States Green Building Council (USGBC), and its requirements are stringent. It is anticipated that the Deep Bay Field Station will consume just 35 percent of the power of a standard building of its size. The new field station contains a ton of pipe, and members from Local 324 working for Archie Johnstone Plumbing and Heating are joining the team to make the LEED Platinum certification a reality for the Research Center.

One important aspect of attaining LEED Platinum certification is water

efficiency and efficiency in heating and cooling. Journeymen and apprentices from Local 324, working for Archie Johnstone Plumbing and

Heating are responsible for constructing the elaborate recycling systems, including potable water, light gray, dark gray and black water systems for the project.

General Manager Garth Johnstone, Archie Johnstone Plumbing and Heating, stated, "We are a third-generation mechanical contracting company established in 1954. We attribute our success to the skilled tradespersons we have from Local 324 and the harmonized relationship we have between management and labor. It has enabled us to take on an array of projects, both large and small, with very different challenges associated with each."

The system the craftsmen are con-



The Hudson

Local 324 Team working for Professional Mechanical Limited, The Hudson



Staff of Archie Johnstone Plumbing and Heating



Journeyman plumber
Travis Ridders,
Bayside Mechanical

Journeyman plumber
Jason Dives,
Lockerbie and Hole

structing for the Deep Bay Research Center is essentially an open geothermal loop, reducing water use through recycling and re-use, as well as rainwater harvesting. The open geothermal loop works something like this. Seawater will be pumped into a seawater head tank, pumped through drum filters, and then pumped into the research drums and aquariums to be used in the labs. The seawater is then discharged from the research drums and aquariums, filtered, pumped through heat exchangers and discharged back to the ocean. On the other side of the heat exchangers, a closed hydronic system is circulated through water-to-

water-source heat pumps, supplemented by a wood-fired boiler to provide space heating or cooling through a radiant floor heating system. This system will be complemented by a forced air system using variable air volume boxes and a heat recovery ventilation system. Domestic hot water is also preheated through the same method as the HVAC system. Rainwater is captured and retained for non-potable use. Extra rainfall is diverted to a retention pond and then will spill into the creek system. The rainwater that is collected and stored will be used in low-flow water-conserving faucets and dual-flush toilets, thus minimizing the potable water used

in the sanitary waste system.

There will be a kitchen for the culinary students to prepare shellfish delicacies. The potable water system will be used in the kitchen and showers. It will then be recycled through a sanitary/wastewater treatment process and then disinfected. The recycled water will then be sent to the primary head tank, which in turn diverts the water to toilets, for wash water, to run the sprinkler system, for irrigation, and to the supplementary fire holding tank. During a fire, all gray water is diverted to the sprinkler system.



Ellice Street Shelter



Journeymen plumbers Larry Tutty, and Brian Thompson, foreman, Erb Technical Plumbing; and Journeyman sprinklerfitter Rens Milkert, foreman, SRL Fire Protection Ltd.



Apprentice plumber Phillip Erb, Erb Technical Plumbing



Journeyman plumber Owen Steamsmith, Erb Technical Plumbing



Journeyman sprinklerfitter Rob Hillier, SRL Fire Protection



Journeyman sprinklerfitter Joe Blazuk, SRL Fire Protection



Uptown

Situated high on a hill overlooking Deep Bay, the building mimics a clamshell, with an entire wall of glass overlooking the bay. Tongue-and-groove exposed Douglas fir, harvested after being severely damaged by the pine beetle, is mounted on concrete haunches and glu-lam beams. This creates a beautiful ceiling, which visitors will notice as they step into the large foyer overlooking the sound. This educational area will include interpretative displays, web-linked flat panel displays of the underwater biodiversity that inhabits the sound and shellfish farm, and it will be used for lectures and cooking demonstrations in the future. The facility will also include research labs, both wet and dry.

The field station and research center's intent is to provide infrastructure and shellfish research that is expected to be unparalleled in Canada and on the West Coast of the United States. British Columbia's shellfish industry brings in about \$38 million annually, but expectations are that the province could see the industry increase to more than \$100 million per year by harvesting oysters, clams, mussels and scallops, if properly maintained and managed. Deep Bay station manager Brian Kingzett stated

that aquaculture operations now account for almost 50 percent of all seafood products around the world. Oysters are a hot commodity, with 94 million pounds farmed annually. Clams account for 8.5 million pounds, and 2.5 million pounds of mussels are farmed annually. Economic opportunities are abundant when it comes to shellfish.

Kingzett added, "There are certainly economic opportunities to explore here, but it's also about food security and quality of life issues for the future of the planet, as well." He continued, "British Columbia only produces .02 percent of the world's shellfish. The global oyster industry is now worth about \$13 billion alone, so we envision a big future for the shellfish farming industry in British Columbia with its many local coastlines." First Nation tribes have remained advocates for the continued success of shellfish farming in the province, and they have joined the team to create this sustainable lifestyle.

Why are oysters so important to the environment? In coastal systems, bivalve shellfish are viewed as the ecosystem engineers of bays and estuaries, creating viable conditions for many other species to survive. Water quality is essential for

shellfish growers. Over the years, poor septic systems, animal waste, and encroaching human habitats have severely affected natural shellfish habitats. Low levels of oxygen in the water created by area pollutants have created adverse conditions for fish and shellfish. Oysters are important for the sustainability of their natural habitat. An oyster filters 65 gallons of water a day. Globally, 85 percent of oyster reefs have been lost, making the reefs the most severely damaged marine habitat on the planet. Protecting Deep Bay is paramount to the continued success of shellfish harvesting, and the Archie Johnstone team can be proud that they have not only constructed a LEED Platinum research and educational facility, but they have created a facility that will have a pivotal impact on shellfish farming in the future—creating jobs and growing the economy on Vancouver Island.

Diversification—The Key to Full Employment

Throughout Vancouver Island, dedicated members of Local 324 can be found on countless projects taking shape. Building LEED Gold certified residences has been prevalent for this

Appendix 6 – Letter from Gilles Patry, Canada Foundation for Innovation



President and CEO / Président-directeur général

June 21, 2011

Dr. Ralph Nilson
President & Vice-Chancellor
Vancouver Island University
Building 300, Room 301C
800 Fifth ST
Nanaimo BC V9R 5S5

Dear Dr. Nilson,

Thank you for the invitation to the grand opening of the Deep Bay Marine Field Station on June 23, 2011. I regret that, due to prior commitments, I will be unable to join you and your guests for this exciting event.

On behalf of the Canada Foundation for Innovation (CFI), I would like to take this opportunity to congratulate Vancouver Island University (VIU) as you celebrate the excellence, imagination, creativity and commitment demonstrated by your researchers, faculty and funding partners. The CFI is a proud supporter of the Centre for Shellfish Research and the Deep Bay Marine Field Station.

The research being conducted in this new facility has already begun to show results, and it will undoubtedly continue to reap benefits — both economical and environmental — for coastal communities and ecosystems. Now, more than ever, people are looking to researchers to solve pressing problems, and the critical work being done at facilities such as the Deep Bay Marine Field Station will go a long way to finding tangible solutions. The addition of the public space — with funding leveraged by VIU — will also undoubtedly make this state-of-the-art, award-winning research facility a special gathering place for the community.

Please convey my warmest greetings to your distinguished guests, and my best wishes to the entire research team.

Sincerely,

A handwritten signature in blue ink, appearing to read "Gilles G. Patry".

Gilles G. Patry

cc. Mr. Don Tillapaugh, Director, Centre for Shellfish Research

450-220, rue Queen Street, Ottawa, ON K1P 5E4 TEL/TÉL. (613) 947-8496 Fax/FAX (613) 973-0823 www.innovation.ca

Appendix 7 – Letter from Lynne Yelich, Minister of Western Diversification



JUN 23 2011

Ralph Nilso, Ph.D.
President and Vice-Chancellor
Vancouver Island University
900 Fifth Street
Nanaimo, British Columbia
V9R 5S5

Dear Dr. Nilso:

On behalf of the Government of Canada, I would like to congratulate Vancouver Island University on the official grand opening of its Deep Bay Marine Field Station.

Vancouver Island University is a leader in working with governments, industry and researchers to advance our sustainable aquaculture industries. I wish you success as you endeavour to create a world-class, community-based facility focused on shellfish research.

Our Government is proud to partner with Vancouver Island University and organizations across the province on projects that are diversifying B.C.'s coastal communities.

Congratulations again to Vancouver Island University and the many partners involved for providing the time, energy and financial support needed to bring this project to fruition. I wish you every success as you move forward.

Regards,

The Honourable Lynne Yelich, P.C., M.P.
Minister of State for Western Economic Diversification

Canada 

Deep Bay Marine Field Station Project Financial Statement
 Vancouver Island University
 Period: August 2005 to October 2011

Project Expenditures

Construction, Materials and Equipment	\$ 8,092,268
Engineering and Design	679,538
Project Management	342,415
Landscaping, Roads and Parking	283,193
Gifts in kind - land, leases, equipment	1,265,000
Total Expenditures	\$ 10,662,414

Project Income (Sources of Funding)

Knowledge Infrastructure Program	\$ 3,085,369
BC Ministry of Advanced Education	2,150,000
Island Coastal Economic Trust	1,000,000 <i>(final billing in progress)</i>
VIU	958,664
BC Knowledge Development Fund	900,000
Canada Foundation for Innovation	900,000
West Coast Community Adjustment Program	250,000
Marine Harvest	102,381
Fundraising	51,000
Gifts in kind - land, leases, equipment	1,265,000

Total Project Income **\$ 10,662,414**

Balance **\$ -**

I hereby certify that this statement accurately represents all project expenditures and all sources of project funding.

Wendy Young
 Director of Finance

Nov 30, 2011
 Date