From: Robert Barlow
Sent: Tuesday, July 12, 2022 4:54 PM
To: Robert Barlow
Subject: FW: Important Addendum Resource list to accompany A.Hodson letter of June 3,2022- waterlevels, waterhauling, cisterns, sustainability research
Attachments: millions of liters of water delivered.docx; build out calculation-Langereis.docx

From: ALIX HODSON [redacted]
Sent: Saturday, June 18, 2022 11:00 AM
To: Alex Allen; Laura Busheikin; Scott Colbourne; David Critchley; Jeanine Dodds; Doug Fenton; Peter Grove; Peter Johnston; Michael Kaile; Kees Langereis; Peter Luckham; David Maude; bmcconchie@islandstrust.bc.ca; Lee Middleton; dmorrisson@islandstrust.bc.ca; Laura Patrick; Timothy Peterson; Tahirih Rockafella; Dan Rogers; Grant Scott; Kate-Louise Stamford; Cameron Thorn; Jane Wolverton; Paul Brent
Subject: Important Addendum Resource list to accompany A.Hodson letter of June 3,2022- waterlevels, waterhauling, cisterns, sustainability research

Addendum to my letter of June 8th, 2020: "Millions of liters of Potable Water Hauled to Gabriola" Island directed to the Executive Committee.

To all Trustees:

My compliments and thanks to Sue Ellen Fast, Bowen Island Trustee and Vice-Chair on the Executive committee, who had the acuity to distinguish between unsubstantiated opinion versus researched information. Moreover, Ms. Fast had the assertiveness and insight to recommend and insist, against the opposition, that my letter based on FOI and substantive facts be included and forwarded to the Trust Programs Committee for consideration in the 2050 Policy Statement re-write.

The following resources support my claims:

Fact 1- In regards to the decreasing groundwater levels on Gabriola Island.

References and Background Reports:

State of our Aquifers Regional District of Nanaimo, Aquifer 709,
Prepared by GW Solutions, 2017; www.rdn.bc.ca; (as seen online June 1, 2022)

Water level analysis: Observation Well Information Gabriola Island, Aquifer 709 11A(15) Water level period of record available 43.4 years the trend is a moderate to large rate of decline; Vunerability –high; Productivity low
Test Wells: OW 196, 107, 316, 385; Water level trend declining; water level trend category is moderate to large rate of decline, Vulnerability-high, Productivity low (pg.2)

Waterline RDN; Drinking Water and Watershed Protection-Regional Groundwater level Analysis for summer 2020; Groundwater trends for Gabriola 5.6; pg. 11 &12 www.rdn.bc.ca; (as seen online June 1, 2022)
Four active observations wells used to monitor one mapped aquifer. The historical groundwater level trends for bedrock Aquifer 709 (Nanaimo Group Formation) suggest a stable to large decline in water levels overtime (Figures B36 to B39) Where data was recorded, groundwater levels in 2020 are below the seasonal average, suggesting a high potential for groundwater shortage this summer May 2020)…

Sarah Hardy, Water Authorizations Specialist
File: 58000-38-21/20013567 Gabriola Housing Society; Nov. 30, 2020
"I note that the overall trend in winter (maximum elevation) water levels appear to be declining over time (green dashed line), and that during latter part of the record starting around 2002, summer groundwater levels are deepening substantially (by approximately 2 m), and that this trend to deeper summer levels continued beyond 2005, despite an interpretation of a wetter phase beginning around that time. A pattern of deepening of summer water levels is being observed in several areas of B.C. and in the Gulf Islands (Allen, Stahl, Whitfield, & Moore, 2014; Lapcevic, Kenny, & Wei, 2006), and may be a result of longer duration dry season, increased rainfall intensity in fall/winter periods or other factors affecting the relative proportions of runoff and infiltration, and due to increases in groundwater demand from new or existing wells. The closest active provincial observation well is OW385 (Gabriola Island, Horseshoe Road) 1.2 km northeast of the subject site. Groundwater levels in OW385 fluctuate by approximately 3 m annually (Figure 4) (Province of B.C., 2020). Within the RDN State of Our Aquifers report the long-term trend for this well was rated as declining at a moderate rate -0.045 m per year from 2012-2016, and-0.05 m per year since the well was established in 2010. This decline is attributed primarily to climatic factors "(GW Solutions Inc., 2017, pg 5&6).
**Upon request more resources can be provided if needed.*

Fact 2: Cistern installation and maintenance costs;

To avoid the unsightly optics of an above ground tank farm and its impact on the ecosystem the only alternative is a concrete subterranean cistern.

1. Concrete subterranean cistern, if geologically possible, based on a current factual example by a reputable Gabriola Contractor and engineered to RDN standards is in the neighborhood of at least $20,000.00 for single family dwelling.

2. Plastic (tank farm of 4) cisterns costs over $10,000. Volume needed for a single family dwelling to last the dry season is upwards of 11,300 gallons or 51,371 liters.

3. Roof assisted cisterns require a minimum yearly cost of maintenance of approximately $1700 per year (roof cleaning and gutters $900.00, tank cleaning $800.00) and this

excludes replacement of equipment. Every time the tanks are cleaned new water needs to be added at a cost of $250 -$350 per 2000 gallons depending on the hauler.

4. Yearly replacement of UV and charcoal filter systems $200.00 and this does not include settlement filters and reverse osmosis.

None of the above information and figures include the initial set up costs for the entire installation: plumbing, electrical, regulating and control systems and labor costs which are substantial. Professional costs for labor fees $80.00- $100.00 per hour. If a roof has to be replaced for the purpose of water collection that has to be added on as well.

N.B. The above figures have been obtained from the owners of existing dwellings on Gabriola Island where a well is not an option. The usage volumes of the cisterns are based upon two single-family dwellings housing two people, the residents were, throughout the dry season, extremely careful and conservation minded. These volumes are based on actual demand and not impossible measures that may not be impossible to sustain.

Also, variability as to yearly cleaning costs are dependent on pollen, needles and other debris that cover the roof. Shut-offs, were used, but at times not put in place early enough so the water was contaminated. Pollen and other debris stay on the roof and in the gutters until the roof is cleaned, thus yearly cleaning.

Cistern maintenance is not as simple as is claimed and ongoing costs appear to be a consideration when installing a system.

Fact 3: Foi from City of Nanaimo dated May 24, 2022 as seen below:

“Summer Rain” is our major hauler of potable water:

From: [redacted]
To: "Alix Alix" <alisvendsen@shaw.ca>
Cc: [redacted]
Sent: Tuesday, May 24, 2022 10:52:42 AM
Subject: RE: City of Nanaimo Freedom of Information Request FOI-22-068

Good morning,

I can confirm that Summer Rain took 1,119,000 imperial gallons of potable water from our water filling stations in 2021. The City does not keep record of where purchased water is being hauled once they leave our water filling stations.

The above email was redacted and any sensitive information, such as, the sender omitted. The FOI was intended for my use and it was requested that

the email not to be passed on. Please, respect this request and accept the above information as proof.

1,119,000 Imperial Gallons converts to 5,087,074.71 liters

As outlined in my letter to Executive Committee on June 3, 2022**:** "Island Water Hauling" the second hauler by their own account delivered water to Gabriola in the approximate volume of: 2 truck loads of 4000 gallons per day over the dry season times 5 days a week times 4weeks times 5.5 months and then converted 880,000 imperial gallons converts to 4,000,559 liters. Recently, a second FOI was submitted to the City of Nanaimo requesting confirmation of the above volume. The above volumes for "Island Water Hauling" were given by phone in conversation with staff".

Based on only two haulers the FOI and furnished information by second hauler, Gabriola Island is importing upwards of 9,000,000 (9 million) liters of water per year. We acknowledge that there may be more haulers that have not yet been identified.

Fact 4: Sustainablity:

2016 State of the Islands, indicator Project: Final Report ; Accepted Threshold for Ecosystem Health;The Natural Areas Converted for Human Use in the Islands Trust Area; www.islandstrust.bc.ca;

In the above report the graph on page 19 shows that Gabriola, Mayne and Hornby are on or near the threshold for ecosystem health. It also states that an accepted threshold (pg.18) for our region is 30-40% of converted area for any given habitat. As land conversion begins to go above this threshold, the number of species in a given habitat decline more rapidly. The islands being mostly bedrock would be best served with the 30% threshold and in 2022 Gabriola has surpassed this mark.

Gulf Islands' Aging water systems under pressure amid booming population, climate change; Michel John Lo: Globe and Mail article May 21, 2022;

In this article the writer interviews several Trust members and among them there is agreement that water is a concern. Lo reports that the aging water systems are under pressure to keep up with the population boom and climate change. Bernie Arnell, a semi-retired environmental consultant, specializing in natural water management, asks this question about Salt Spring watershed issues:

If we are getting some climate-change effects already and we are getting increasing numbers of households being built… is there going to be a collision at some point where we run out of water?"

On Gabriola as you can see from the above **F0I (Fact 3)** the import of millions of liters of potable water to the island indicates that many residents last year ran out of water.

Looking at future projections of build-outs here is what we know:

Mr. K. Langereis, Trustee Gabriola Island; see attachment.

In this report Mr. Langeries breaks down the potential build out situation on Gabriola which will increase our population to 8,463 residents and this does not include secondary suites from subdivision, split zoned lots, treaty held lands and commercial residential densities. The estimated population figure of 8,463 would almost double the current population.

I have to ask does any of this sound sustainable, to you?

These figures are real and are not merely an unsubstantiated opinion. For the sake of the environmental health of the Islands and the well being of their inhabitants, the Chair, Vice Chairs and Trustees must make a greater effort to distinguish between unsubstantiated opinion and well-researched factual information. Please, please, please give the latter the importance and consideration that it deserves as it will go a long way to rebuilding trust in the Trust.

Conclusion:

In the light of Climate Change we must set limits to growth and establish Carrying Capacity for each island:

"The land use planning function consumes nearly three-quarters of the Islands Trust annual budget, and its activities have direct impact on virtually every resident of the Trust Area. Yet, there is no comprehensive analysis of the Trust Area's capacity to sustain current population and activity, or its ability to accommodate more growth and development, especially in light of climate change and other considerations. The absence of an overarching vision for the Trust Area as a whole, setting out limits to growth, measures for protection of the environment, and sustainable strategies for development must be addressed"

Gre Great Northern Governance Review Final Report, page 4

Respectfully yours,
Alix Hodson-Deggan

B. Buildout map:

The report relies upon the data from the draft buildout map and estimates a full buildout population of about 6,632 if all possible development under the current bylaws occurs with full occupancy. The draft buildout map is, however, missing potential increases currently possible.

My own rough calculation:

The Census data indicates 72% occupancy rate and Health records indicate about 4400 residents. Assuming the 4400 represents 72% occupancy of all dwelling, a 100% occupancy would result in a population of 6,111 (ie 4400 divided by 0.72). However, there is unrealized growth potential that will increase that maximum population.

Vacant lots: there are 490 vacant lots which add another 931residents (using 1.9-person average per dwelling and assuming only one dwelling on the lot is constructed). This brings the total to 7,042 residents. I am using the latest census data occupancy rate and recognize that it may have changed somewhat.

Secondary suites: The draft map indicates there are 636 secondary suites possible on existing lots. This may include some existing secondary suites. Until this number is known it will be a rough estimate at best. The draft 2010 buildout map indicated 23 secondary suites were built at that time. Estimating that there are now 46 suites (ie double from 2010), the potential increase in secondary suites is 590 new suites. This translates to (590 times 1.9) a population increase of 1,121 bringing the total population to 8,163 residents.

Subdivision: The draft Map indicates there 158 additional densities possible through subdivision which adds an additional 300 residents (ie 1.9 times 158) if only one dwelling is constructed. This brings the total population to 8,463 residents.

However, some lots that could be subdivided may create a new lot of sufficient size to allow for another secondary suite. Large Rural Residential, Resource, Agricultural and Forestry zoned lots that may be subdivided carry that extra potential for secondary suites. Some Small Rural Residential zoned lots, based on size, may also have that potential. It depends on how the property owner decides to subdivide with respect to the minimum lot size for subdivision. A new lot created by subdivision may or may not

permit a secondary suite based on the minimum lot size for the zone. The following chart sets out the average parcel size for subdivision. It should be noted that the minimum lot size for a zone is not a factor in subdivision, but it does determine if a secondary suite is permissible.

Lot sizes and subdivision provisions

Zone	Average lot size for subdivision	Secondary suite potential on at least one lot upon subdivision	Minimum lot size	Secondary suite potential on a lot at the minimum size
SRR	2.0 hectares (4.94 acres)	Only if the lot or lots are 2 hectares or larger.	0.5 hectares (1.24 acres)	None
LRR	4.0 hectares (9.88 acres).	Always-on all lots	2.0 hectares (4.94 acres).	Always
AG	8.0 hectares (19.77 acres).	Always- on all lots	8.0 hectares (19.77 acres).	Always
Resource	8.0 hectares (19.77 acres).	Always-on all lots	8.0 hectares (19.77 acres).	Always
Forestry	60.0 hectares (148.26 acres)	Always-on all lots	60.0 hectares (148.26 acres)	Always

The upcoming developments of Resource Residential 1 and 2 zoned lots include the potential for some secondary suites. The recent 2018 density transfer development (27 lots) has an 8 secondary suite potential. Phase 2 of the Legends subdivision lots (20) may also have a secondary suite potential. These two developments (27 lots plus 20 lots) if approved will reduce the 490 vacant lots with subdivision potential. The new densities are already accounted for except for the potential for secondary suites. As these two developments are not yet finalized, the actual potential will only be known upon approval.

Split zoned lots: Split zoned lots also allow for a potential density increase as each portion of such a lot is considered a separate lot for purposes of a dwelling.

Commercial and tourist commercial zoned lots These zones are permitted 1 residential dwelling unit per development. Some of these dwelling units are in existence.

Other: The approximately 1000 acres of land held by Government for possible treaty negotiations is excluded but may add additional densities in the future.

Multi-dwelling affordable housing: the potential density total for all multiple-dwelling affordable housing projects is unknown as it is dependent on LTC approval of an application. The number of densities for each development is limited to a maximum of 12 dwelling units per hectare and up to a maximum of 24 dwelling units for the development, but there is no cap on the number of such developments.

Conclusion:

The estimate of 8,463 residents does not take into account secondary suites from subdivision, split zoned lots, treaty held lands and commercial residential densities.

The estimated population figure of 8,463 residents would almost double the current population. Had this estimation been known at the time of the Survey, it may have affected responses to some questions.