Englishman River Program Status Update

Prepared For:
Drinking Water and Watershed Protection Technical Advisory Committee
February 14, 2012

Prepared By: Mike Squire, AScT
AWS / ERWS Program Manager

Program Status

- April 2011, completed Phase 1 Planning Study

The Study Objectives:

- Review prior work and determine future water supply needs for the AWS communities
- Determine the site and development concept for a new intake and water treatment plant on the Englishman River
- Determine how the surface water (also termed bulk water) and groundwater resources can best be managed over the next 40 years

The Study Activities

- Population Growth Trends
- Water Demands
- Groundwater Management
- Water Intake and Treatment Plant Locations
- Water Supply Infrastructure
- Water Supply Strategic Plan

Fourteen discussion papers. Draft Summary Report was issued December 2010. Final report issued April 26, 2011

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Planning Study Conclusions:

Conclusion 1:

Climate changes will lead to more extreme events – both drought conditions and flood events.

During extreme drought conditions, there may be insufficient water in the Englishman River to meet current fisheries release and domestic water license extraction quantities.

Planning Study Conclusions:

Conclusion 2:

Water supply over the next 40 years will be a combination of groundwater supply and surface water supply from the Englishman River.

- Existing groundwater wells will continue to be operated. Any increased usage will be managed to not exceed sustainable aquifer yield
- By 2050, about 50% of the overall annual water supply will come from the Englishman River

Planning Study Conclusions:

Conclusion 3:

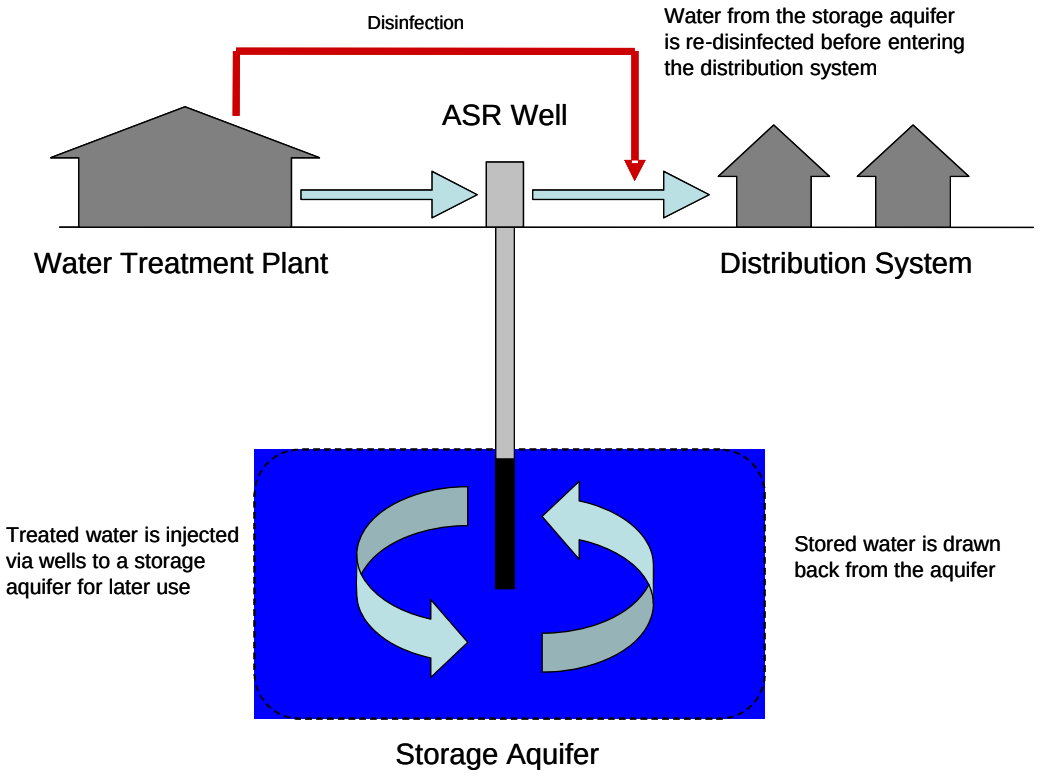
Service areas will require differing quantities of bulk water at different times over the 40 years.

Service Area	When is Bulk Water Needed?	Projected Need in 2050
City of Parksville	2016	54%
RDN Nanoose	2016	22%
RDN French Ck	Timing is to be determined	18%
Town of Qualicum Beach	About 2030-2040	6%

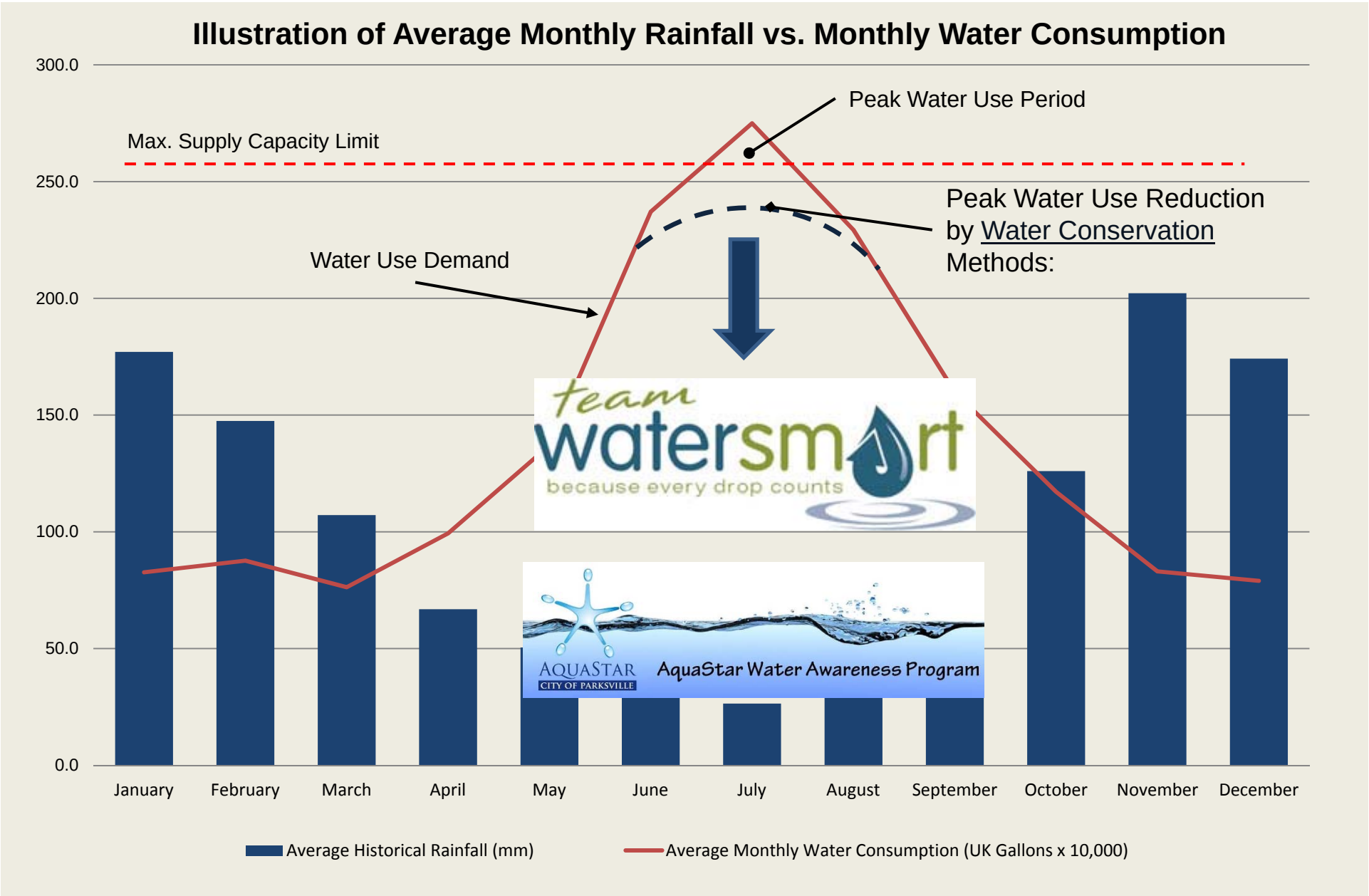
Planning Study Conclusions:

Conclusion 4:

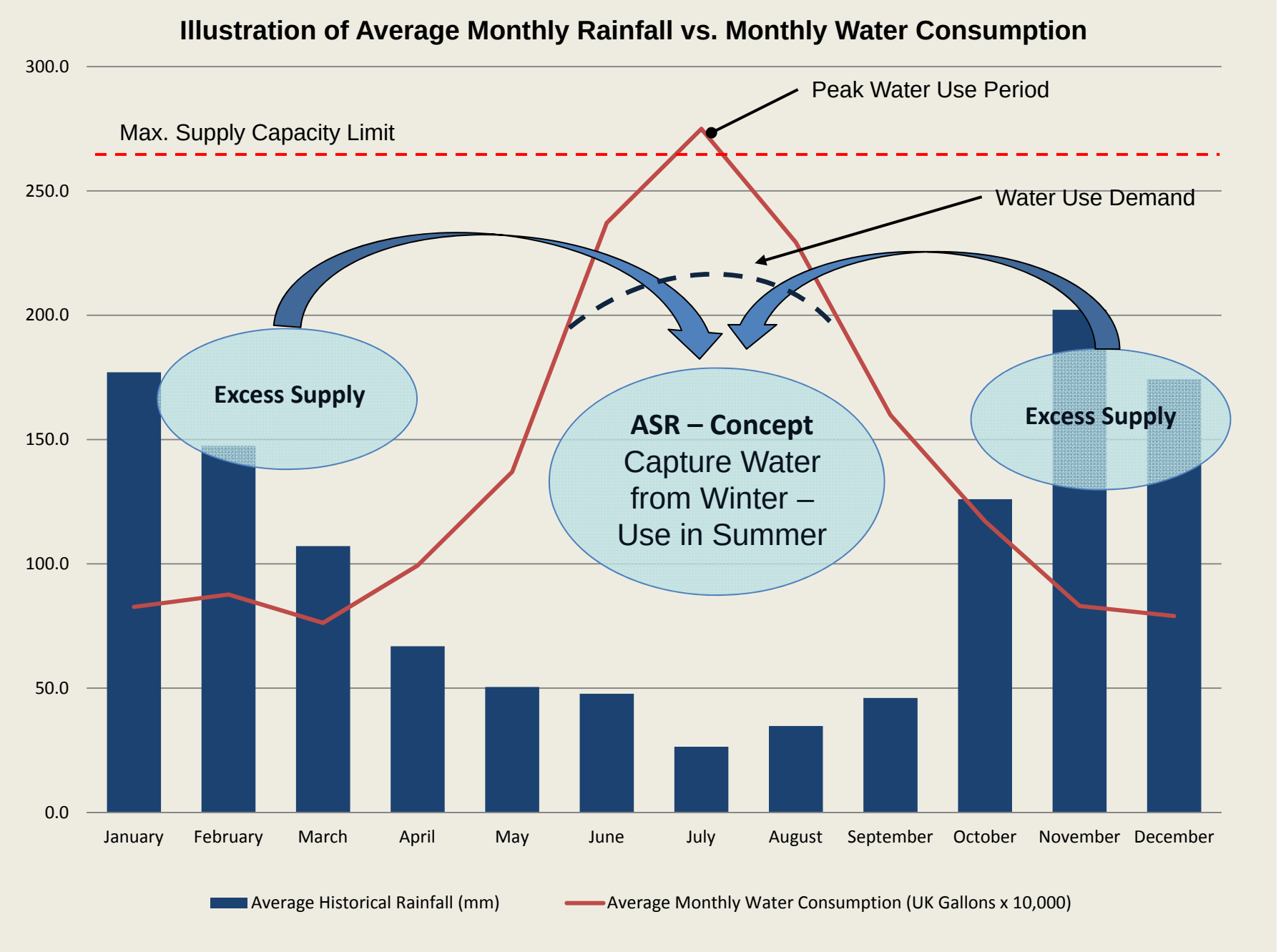
Aquifer Storage and Recovery (ASR) could play a major role as a “third water source”.



Advantages of ASR.....



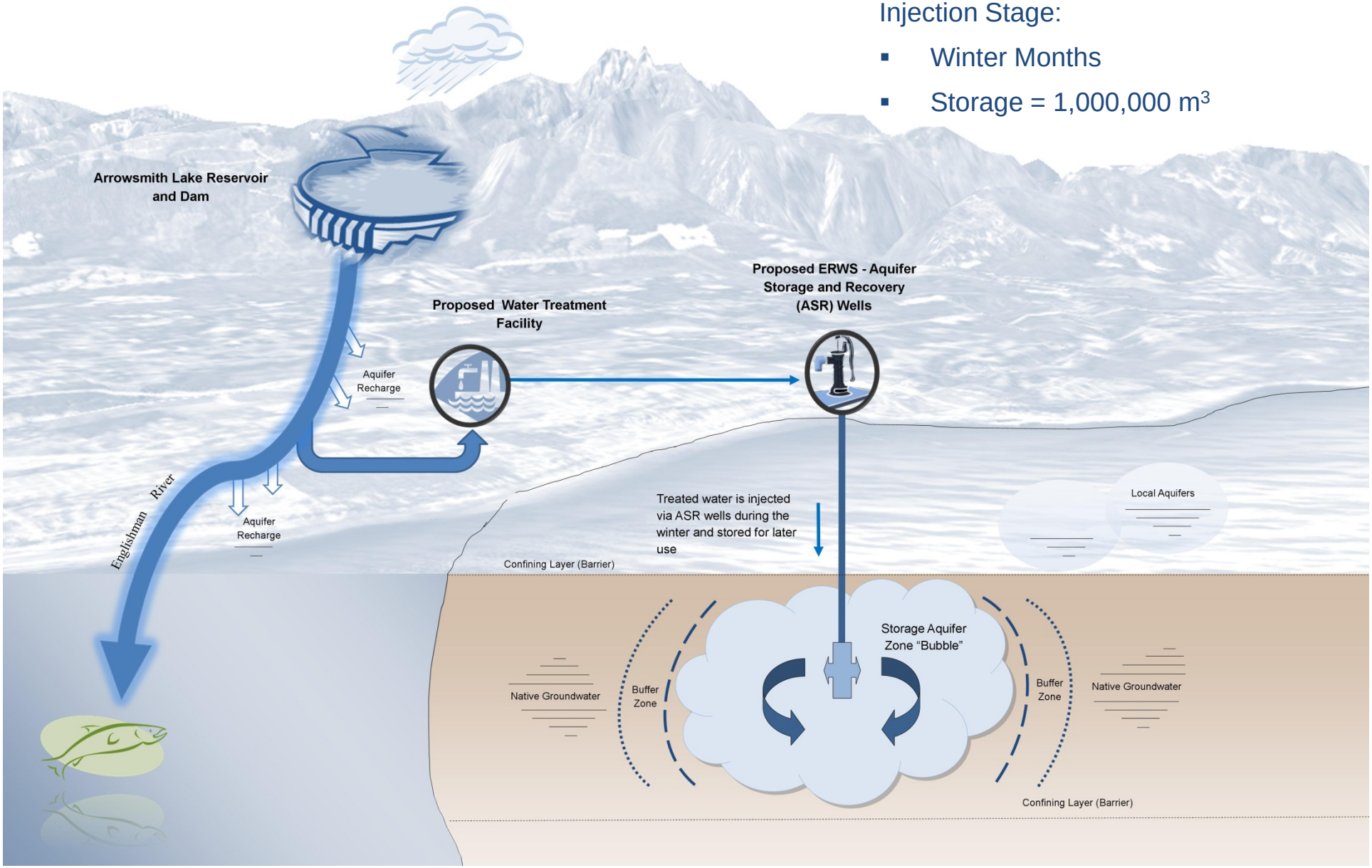
Advantages of ASR.....



- Aquifer Storage Recovery (ASR)..how it works

Injection Stage:

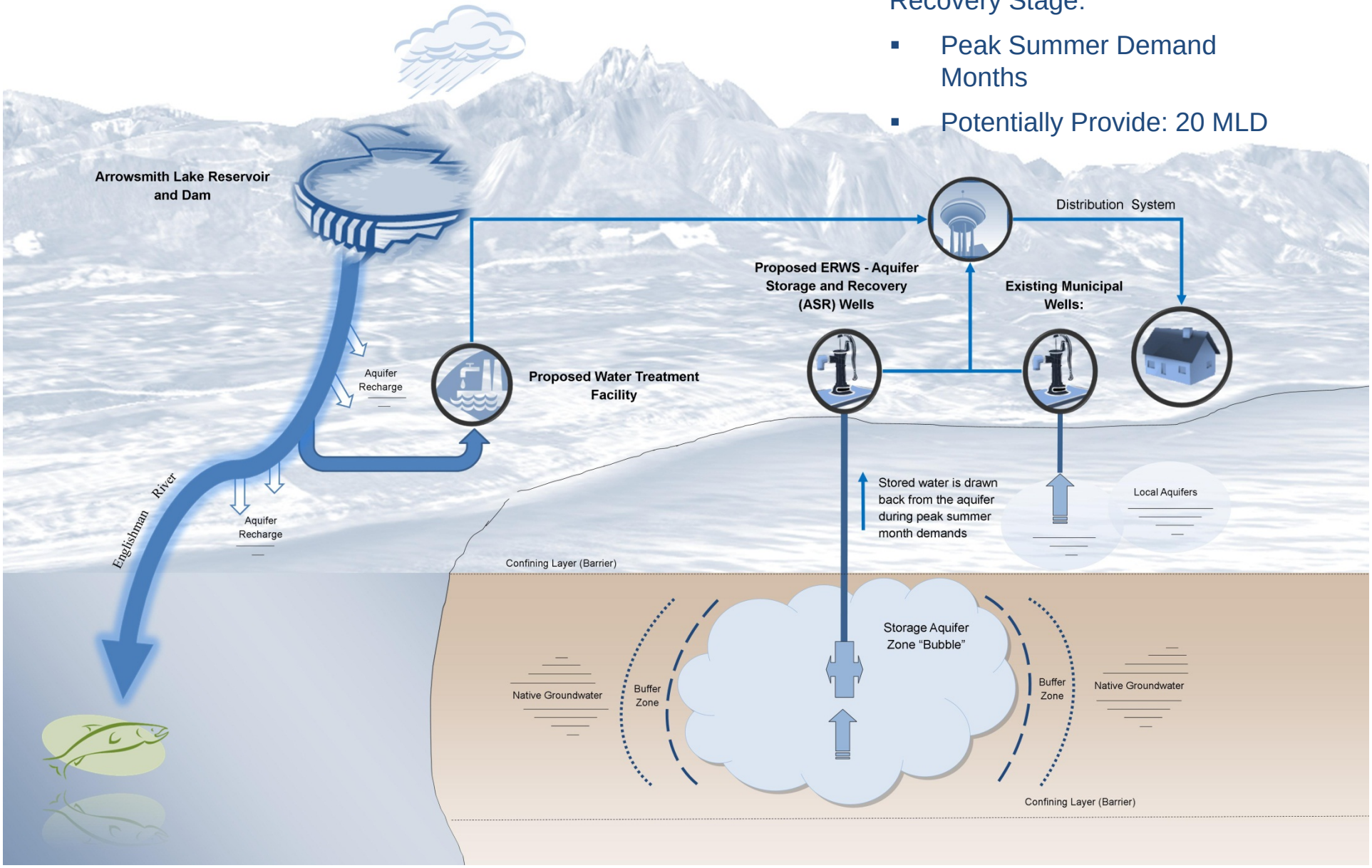
- Winter Months
- Storage = 1,000,000 m^3



- Aquifer Storage Recovery (ASR)…..how it works

Recovery Stage:

- Peak Summer Demand Months
- Potentially Provide: 20 MLD



Aquifer Storage Recovery (ASR)

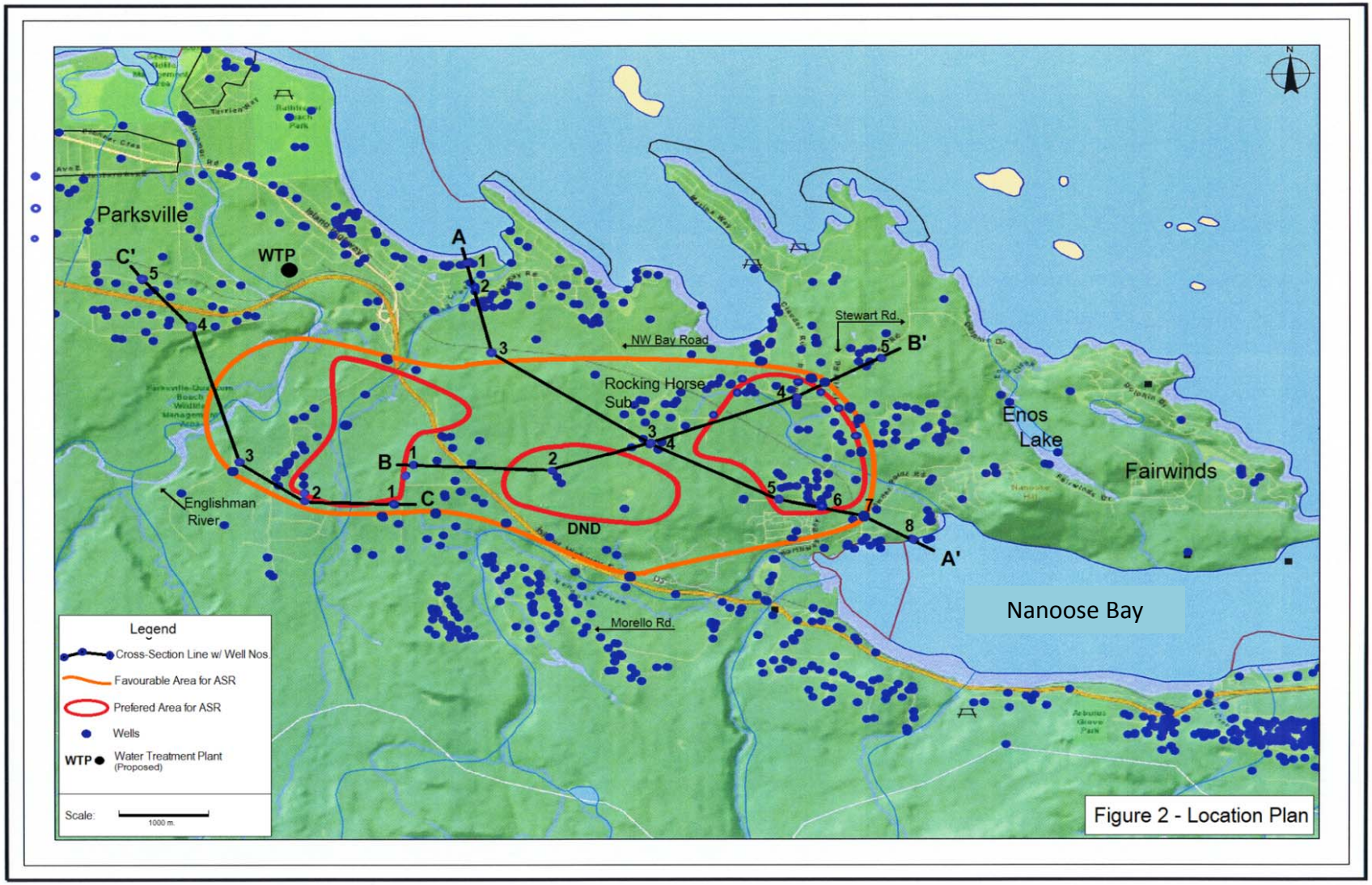
- All 13 Aquifers within the region were analyzed and rated.
- Aquifer No. 219 Nanoose Creek was the top rated aquifer in the region.

Aquifer Number	Aquifer Location / Name	Confinement	Water Quality	Depth	Hydraulic Gradient	Depth to Water	Transmissivity	Storage	Multi-Layer	WTP * Large Pipes Distance	End of System Location	Development	Total Scores
664	Little Qualicum River	0	10	0	5	0	10	0	0	0	10	5	40
663	Upper Whiskey Creek	0	5	0	5	0	5	0	0	0	5	10	30
217	Qualicum	5	5	5	10	5	10	5	0	0	10	10	65
212	Parksville	10	10	5	5	5	0	0	0	5	0	5	45
216	Parksville	5	5	5	5	5	5	5	0	10	0	5	50
220	Errington	10	5	10	5	0	0	0	0	5	0	0	35
209	Errington	10	10	0	5	0	0	0	0	0	0	10	35
219	**Nanoose Creek**	**10**	**10**	**10**	**5**	**10**	**5**	**10**	**10**	**10**	**10**	**10**	**100**
221	Parksville	5	10	0	10	0	5	0	0	5	0	10	45
214	Madrona Point	5	5	5	10	0	0	0	0	10	5	10	50
218	Nanoose Hill	5	10	10	5	0	0	0	0	0	10	10	50
210	Nanoose Bay	5	10	10	5	0	0	0	0	0	10	0	40
213	Lantzville	5	0	10	0	5	0	5	0	0	10	10	45

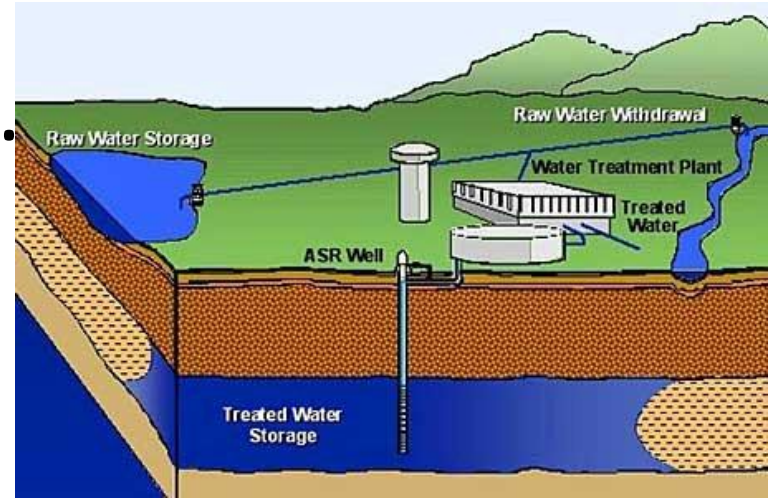
* *WTP - Water Treatment Plant*

Aquifer Storage Recovery (ASR)

- Further investigation is required to determine if the concept of ASR is feasible and that a confined aquifer is available



Advantages of ASR.....



Aquifer Storage Recovery (ASR)

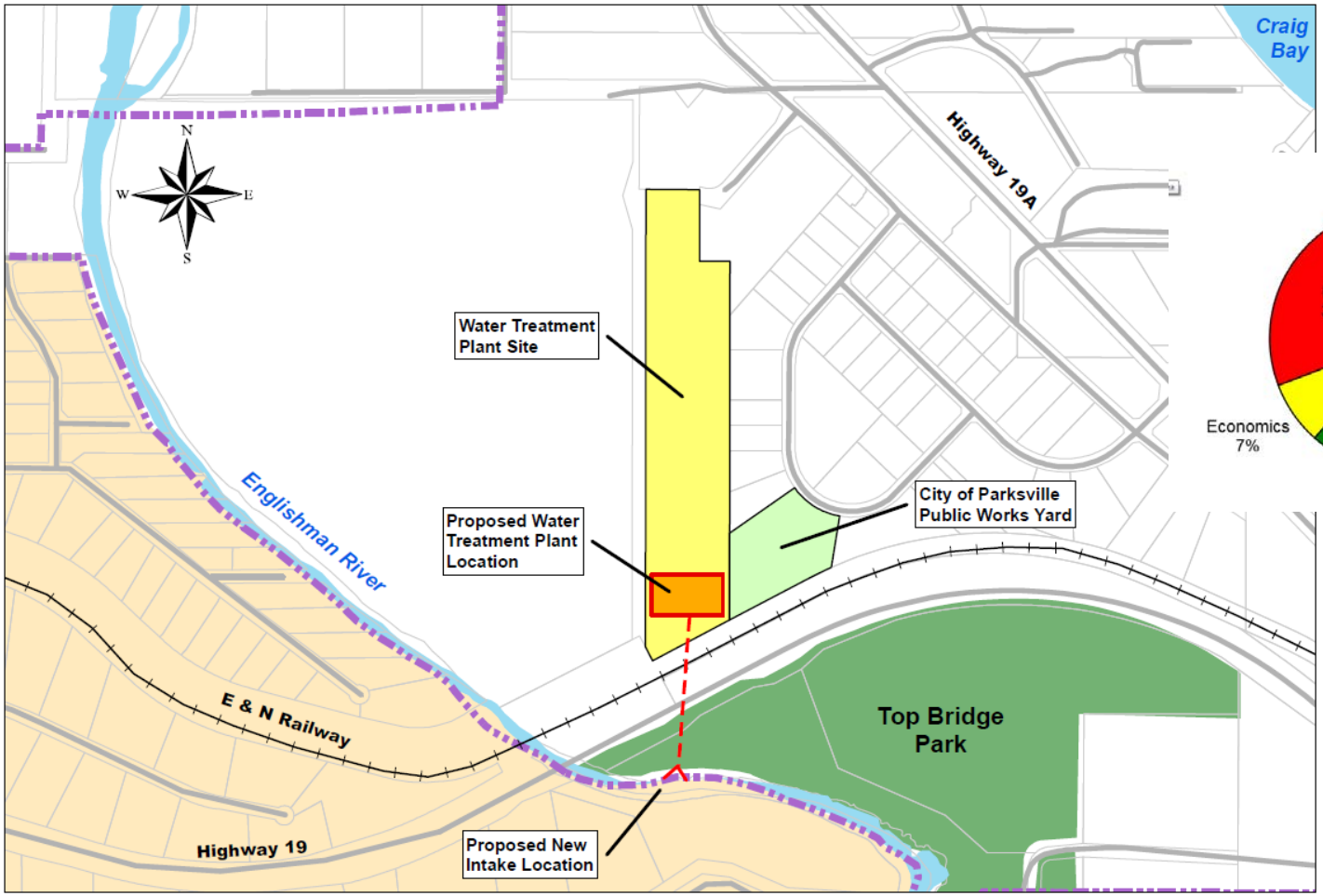
- Third Source of Water Supply
- Reduce Water Treatment Plant size
- Allows a balanced water supply
- Provides cooler water to consumers in the summer months
- More feasible than conventional above ground potable water storage
- Allows treated water from the winter months to be stored for use in the summer
- Less Surface Water Use during Peak Summer Demands - up to 50 % (Environmental – more water available for fish)
- Existing Aquifer Benefits (groundwater improvements through displacement of native groundwater, may also prevent influx of seawater)
- Defer or Reduce Infrastructure Expansion

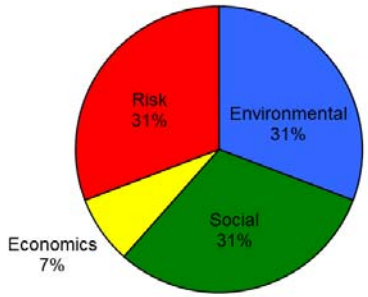
ASR Challenges:

- Uncertainties, require thorough engineering review and well drilling, piloting and investigation (up front engineering costs)
- Currently no groundwater regulation – Water Act.
- Health Authority regulations / approvals – first in BC

Planning Study Conclusions:

Conclusion 5:

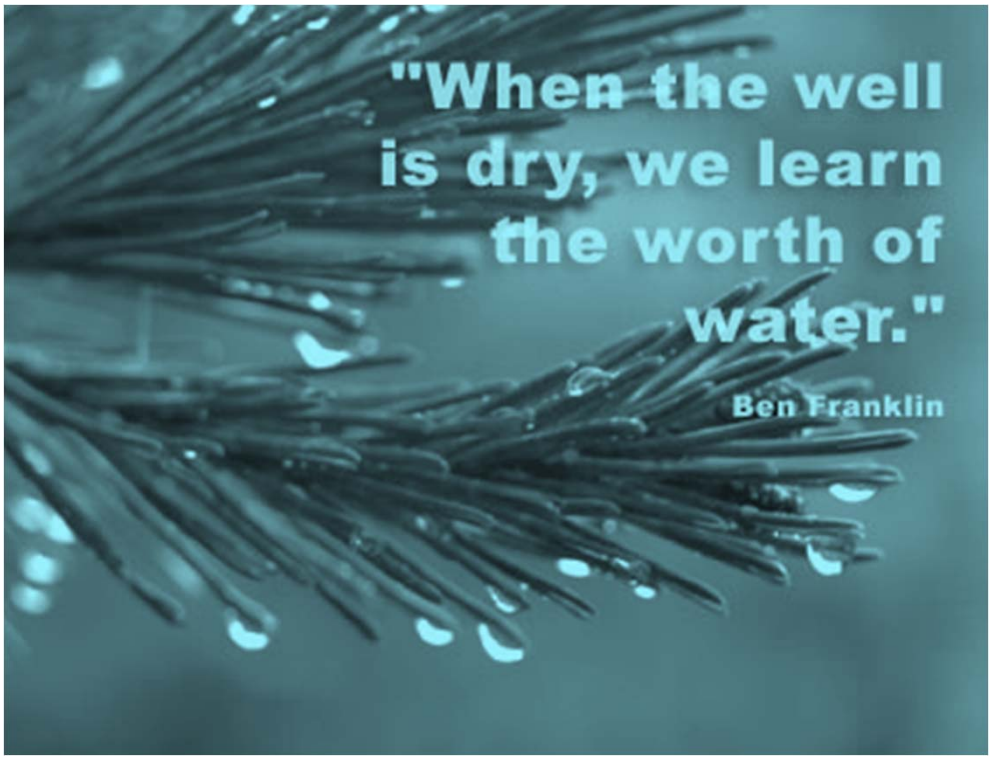




Proposed Water Treatment Plant

250 125 0 250 500
Meters

Why are we planning for future water supply ?



Proactive Sustainable Approach, knowing that.....

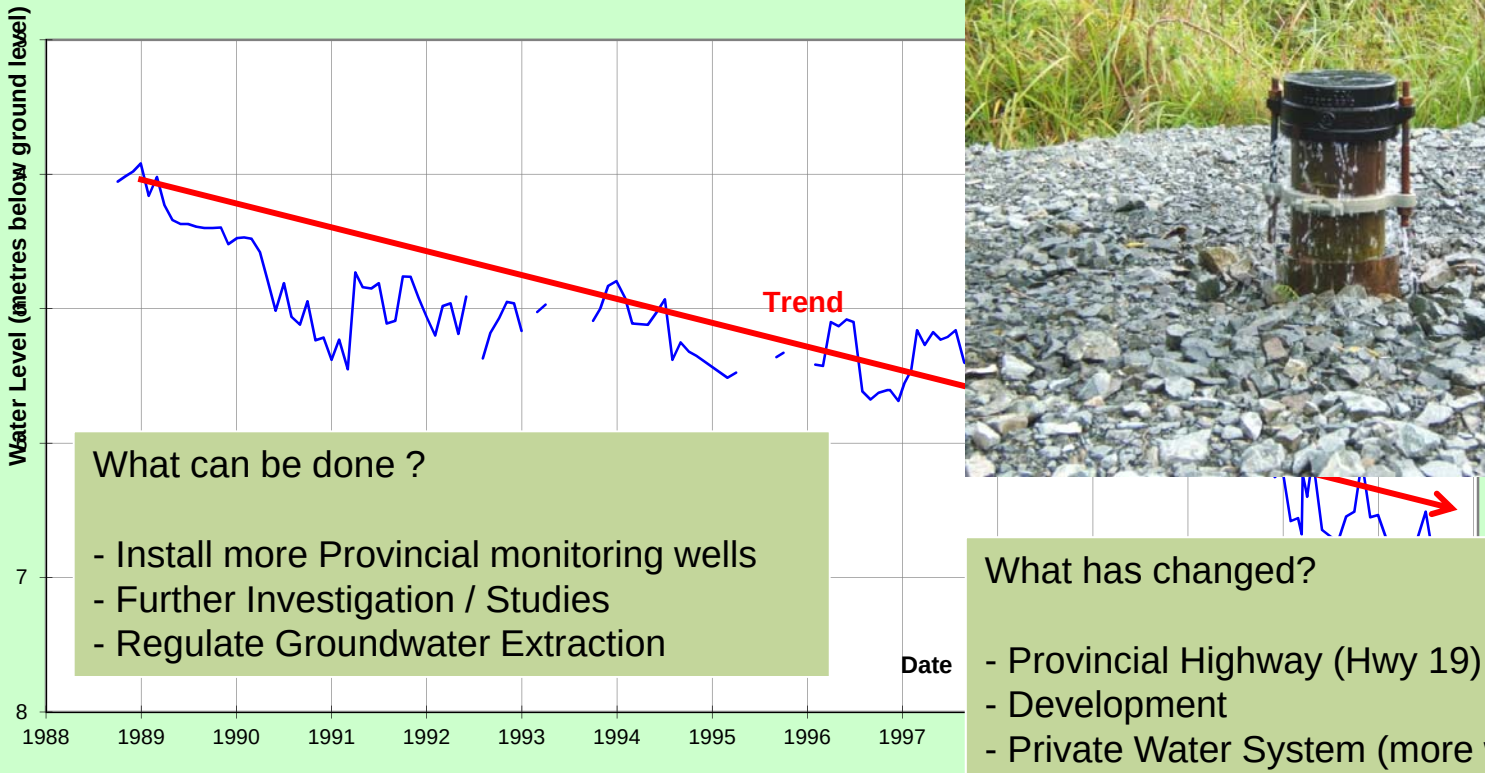
Drinking water is the public's biggest natural resource and ensures our best security for the future.

Why do we need a New Intake ?

- Declining Aquifer Levels (Parksville)

Hydrograph of Observation Well No. 304 Springwood Well, Parksville

Note: This information is from only one observation well located in the Parksville aquifer. The AWS service area region consists of 13 individual aquifers.



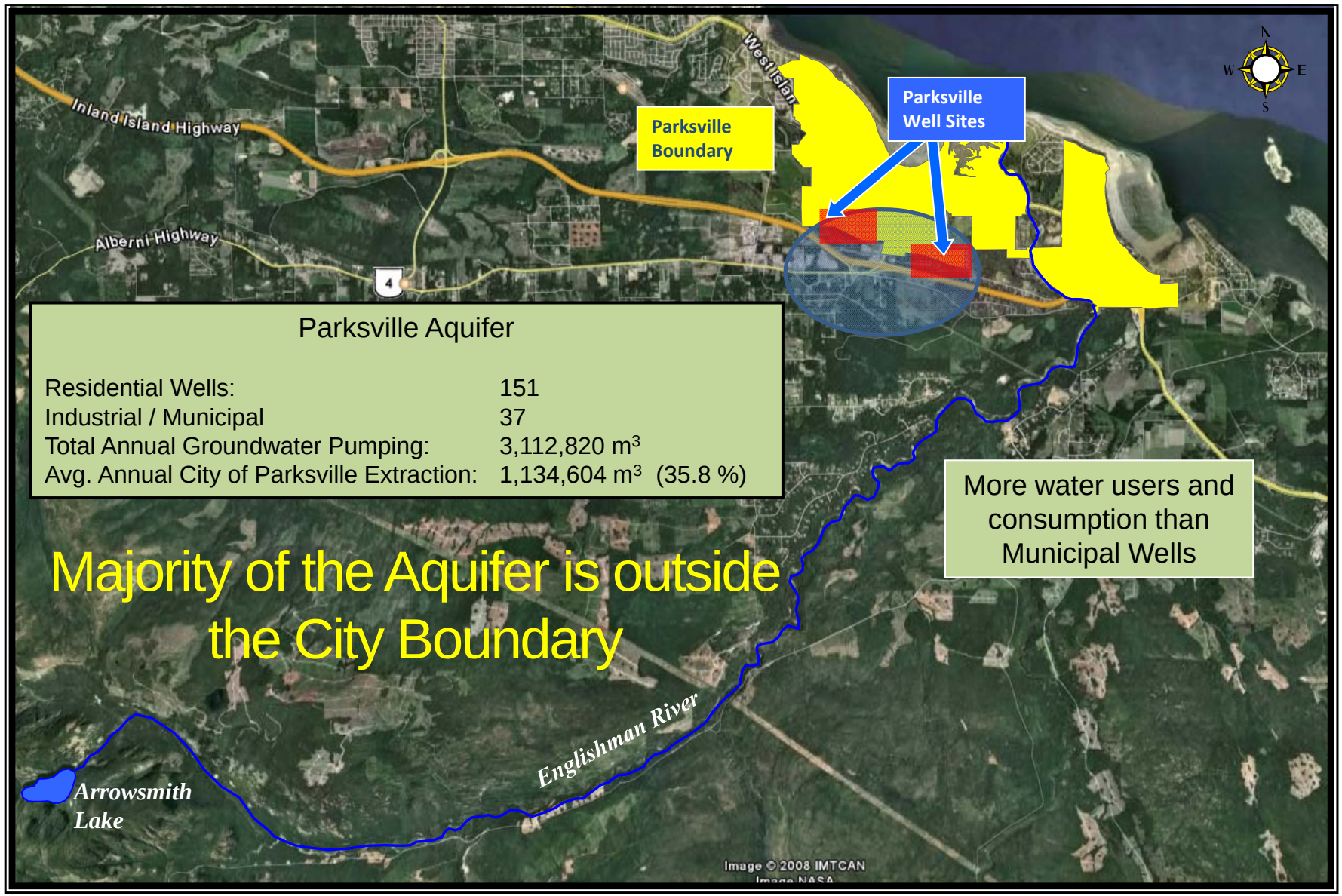
What can be done ?

- Install more Provincial monitoring wells
- Further Investigation / Studies
- Regulate Groundwater Extraction

What has changed?

- Provincial Highway (Hwy 19)
- Development
- Private Water System (more wells)
- Climate

Why do we need Water Treatment and a New Intake ?

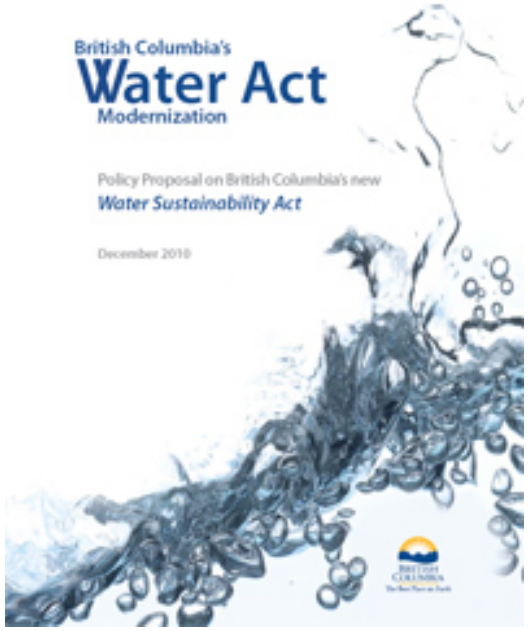


Why do we need a New Intake ?

- No Formal Control over Aquifer Area

  - The Current Water Act does not regulate groundwater extraction
  - The Province Considers our area at High Risk for Quality
  - The Majority of the Aquifer re-charge area is Outside City Boundaries
  - Farm Practices Protection (Right to Farm Act) ?
  - Water Act is Being Modernized (….2012) to :

    - Protect In-Stream Flows (Water License)
    - Regulate Groundwater Use
    - Require more Efficient Use of Water

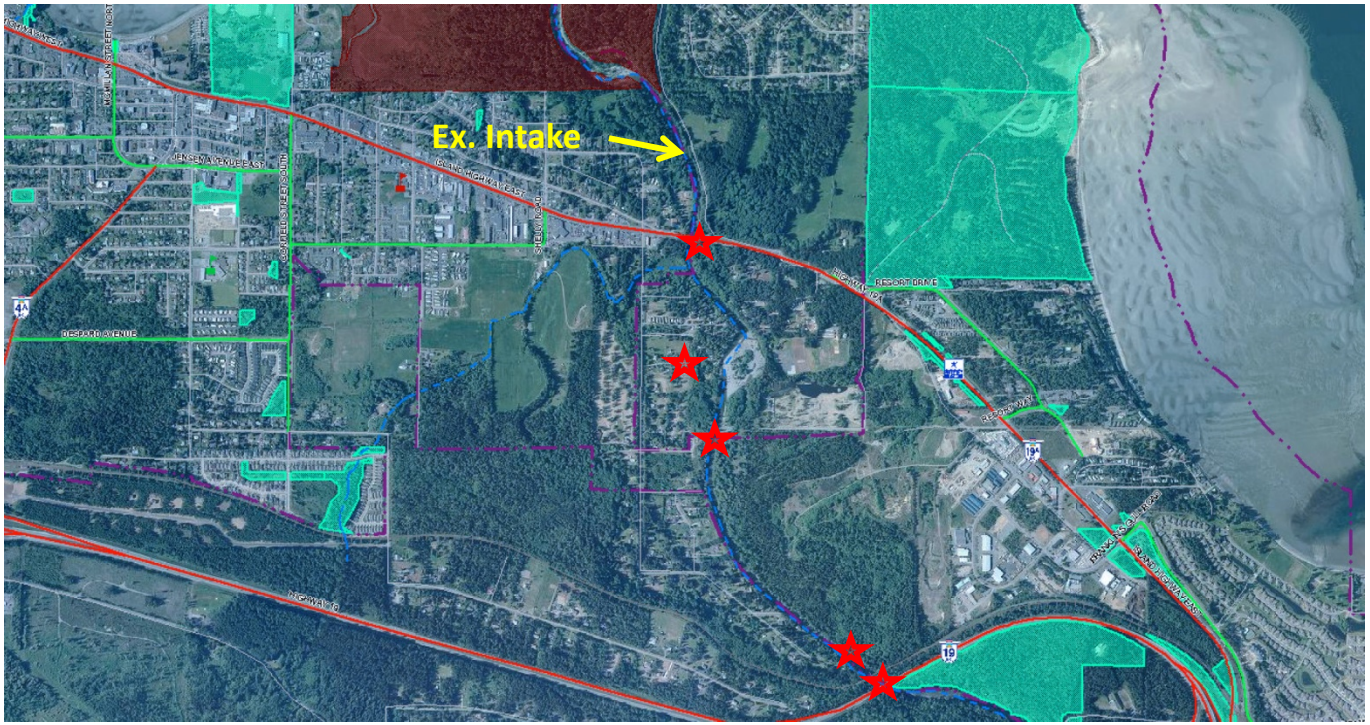


Why do we need a New Intake ?

Existing / Interim Intake Location

Location (risk of contamination):

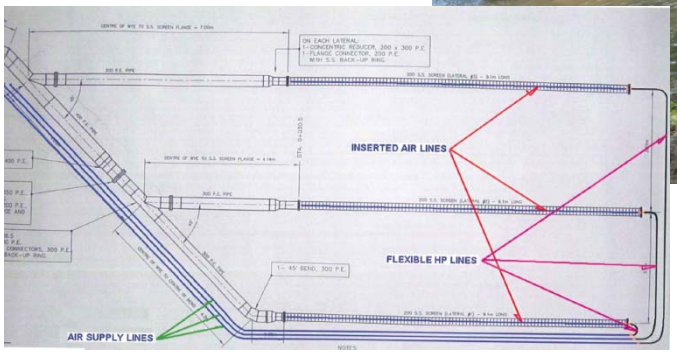
- Below two Highways……fuel spill
- Below one Railway / Septic Fields / Oil Tanks
- Below Flood Plain Area
- Below Sanitary Sewer Crossing



Why do we need a New Intake ?

Deficiencies in current Parksville water intake (Three Horizontal Well Screens)

- Becoming increasing difficult to operate due to the age of the existing infrastructure and the current location being adjacent to a single family residential neighbourhood.
- Only two of the three infiltration gallery legs are operational
- The intake gallery is under the Englishman River gravel bed and current maintenance procedures implicate fish habitat
- In flood plain and therefore becomes inaccessible during flood events
- Type of intake does not lend itself for future expansion



Why do we need Water Treatment and a New Intake ?

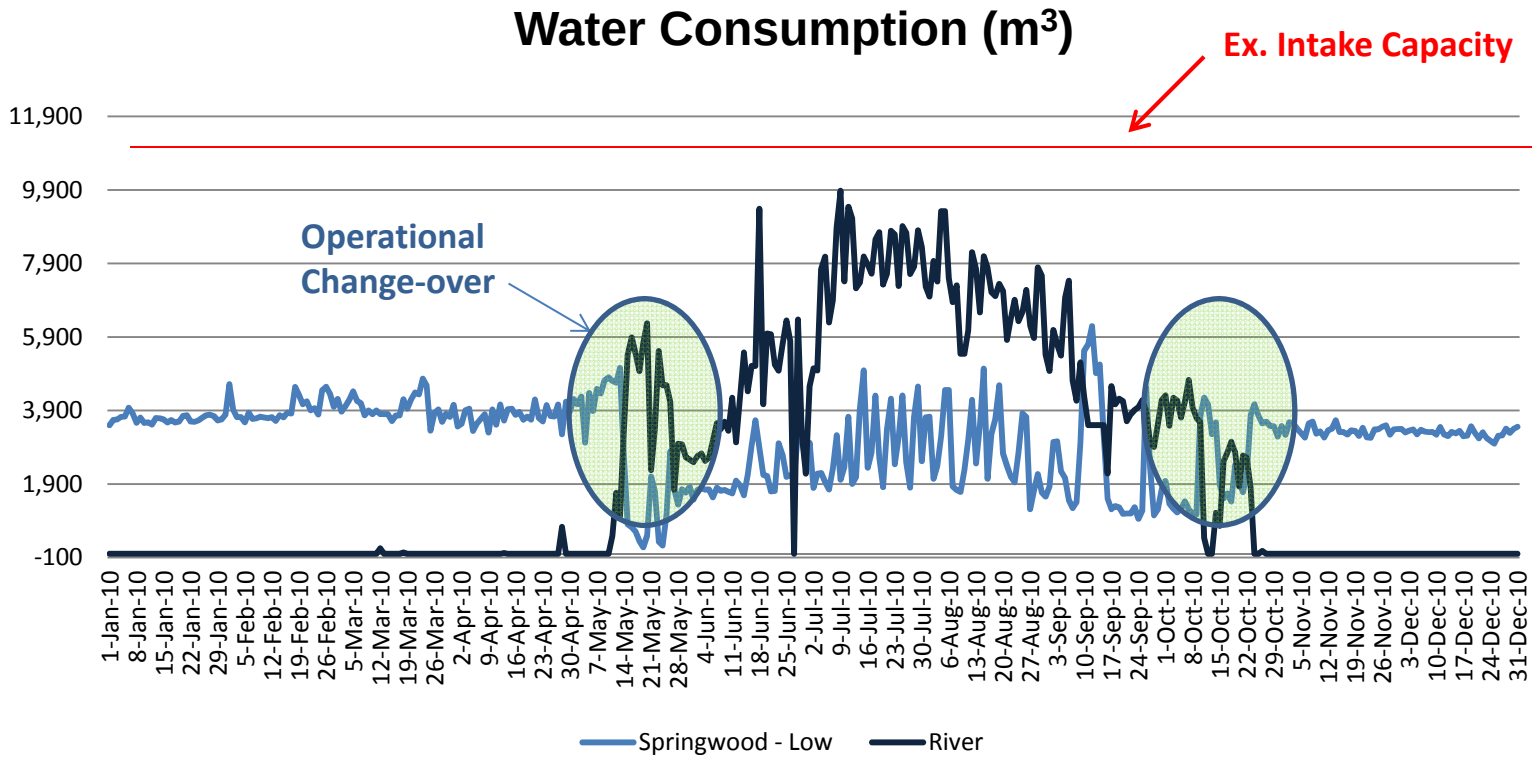
- Climate Change

  - Indication of more extreme events (wetter) and drier summers – both drought and flood events
  - Sea Level Rise – will it make the existing intake tidal ?
  - Salt Water intrusion into foreshore aquifers ?

Why do we need Water Treatment ?

- New VIHA Water System Operating Conditions

Our Operating Permit previously allowed us to extract water from the Englishman River below 5 NTU. This requirement has now changed to below 1 NTU. This has reduced the time that we can draw water from the Englishman River and therefore need to take from the wells.



Condition 6.

To be constructed by December 31, 2016

In accordance with VIHA 4321 treatment policy for the Englishman River water source, provide finished water quality using technology that will achieve the following performance standard; a 4-log removal/inactivation of viruses, a 3-log removal/inactivation of Giardia cysts and Cryptospordium oocysts, provide two treatment processes and produce finished water with less that 1 NTU turbidity.

In consultation with, and in reference to the City of Parksville letter dated February 4, 2009 (Your file 5600-10-AWS), the City of Parksville is required to meet the following implementation plan:

May, 2009: Obtain the services of a professional engineering firm to develop a conceptual plan and preliminary design for a water intake and treatment facility.
November, 2010: Conceptual plan and preliminary design is completed.
December, 2013: Detailed design of the new intake and treatment facility is completed.
January, 2015: Construction for the water intake and treatment facility commences with completion scheduled for December 31, 2016.

Date: April 24, 2009

B. Wrenall

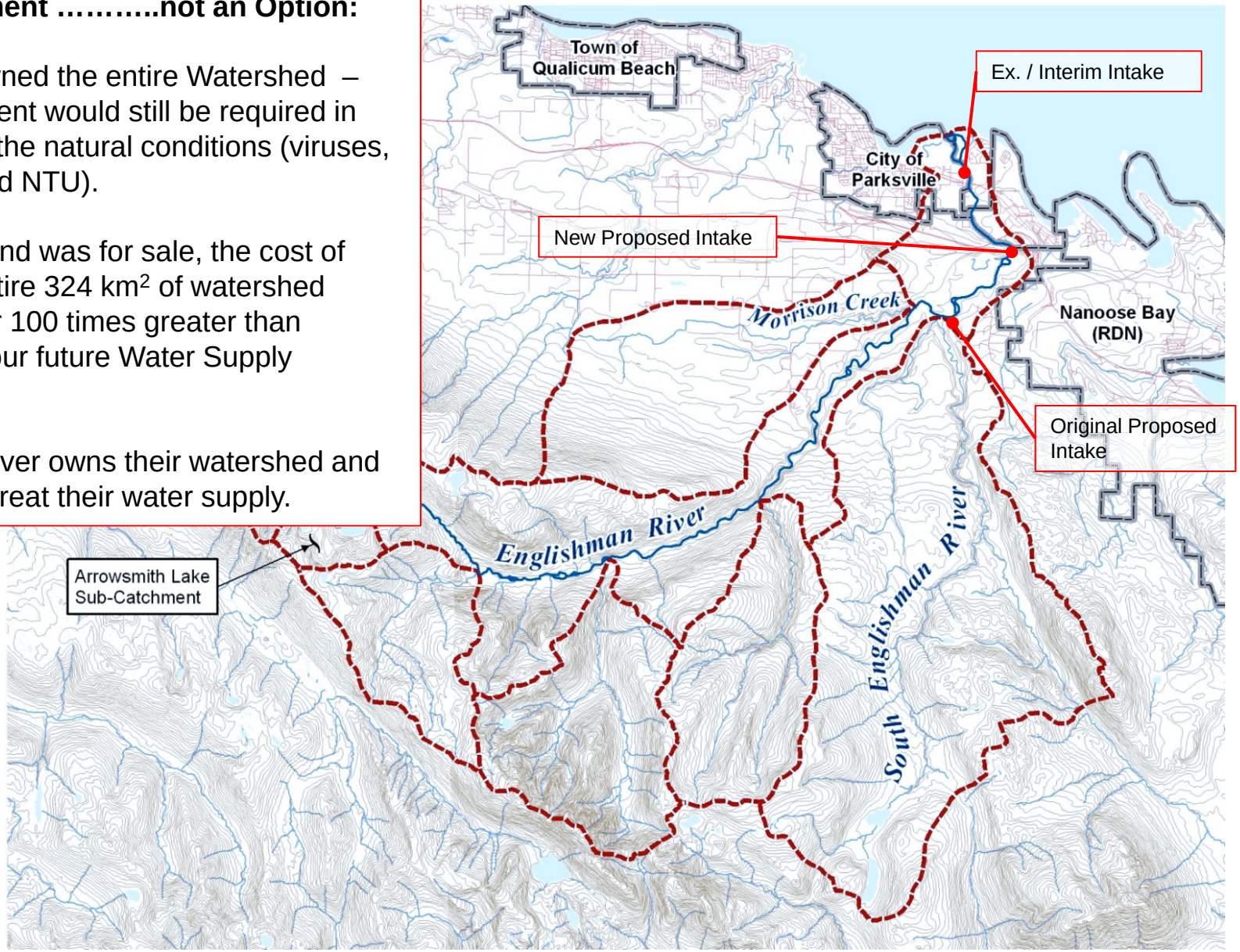
Why do we need Water Treatment ?

Water Treatment …….not an Option:

Even if we owned the entire Watershed – Water Treatment would still be required in order to treat the natural conditions (viruses, pathogens and NTU).

Given if the land was for sale, the cost of buying the entire 324 km^2 of watershed would be over 100 times greater than constructing our future Water Supply upgrades.

Metro Vancouver owns their watershed and still needs to treat their water supply.



Program Status

- AWS / ERWS governance Models complete – executed on July 1, 2011
- Financial Budgets (Current Year & Five Year Plan)
- ASR Grant Application (UBCM Innovative Fund – GAS Tax Rebate) 1.3 Million (Phase 2 investigation)
- Water Quality Analysis – Year Program, started in September 2011

Daily:

-Temperature

- NTU

- True Colour

- PH

-Conductivity

- UVT

- DOC / TOC

Monthly:

- Full Spectrum Analysis

Quarterly:

- THM & HAA (disinfection by-products)

Water Treatment Property

- Property Purchased: June 2011
- WTP Property Work – Community Work Program with Corrections BC
- Interim use for Training: Backhoe Certification & Trench Shoring

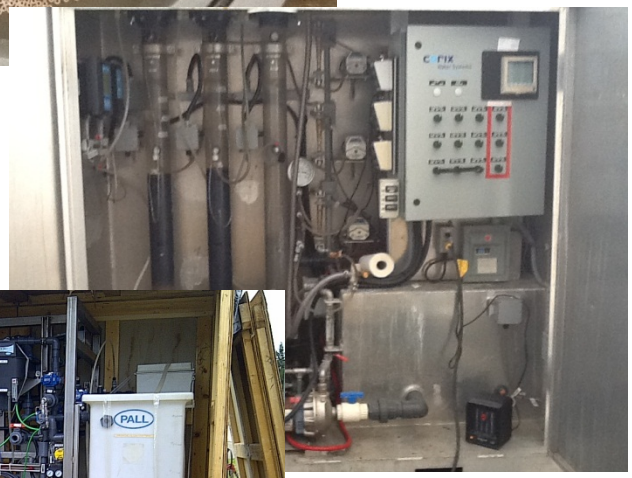
Engineering – Next Phases

Water Treatment Plant – Pilot Testing, Fall 2011 to March 2012

Capture extreme winter events in an effort

to determine the best treatment option for the

Englishman River source water.

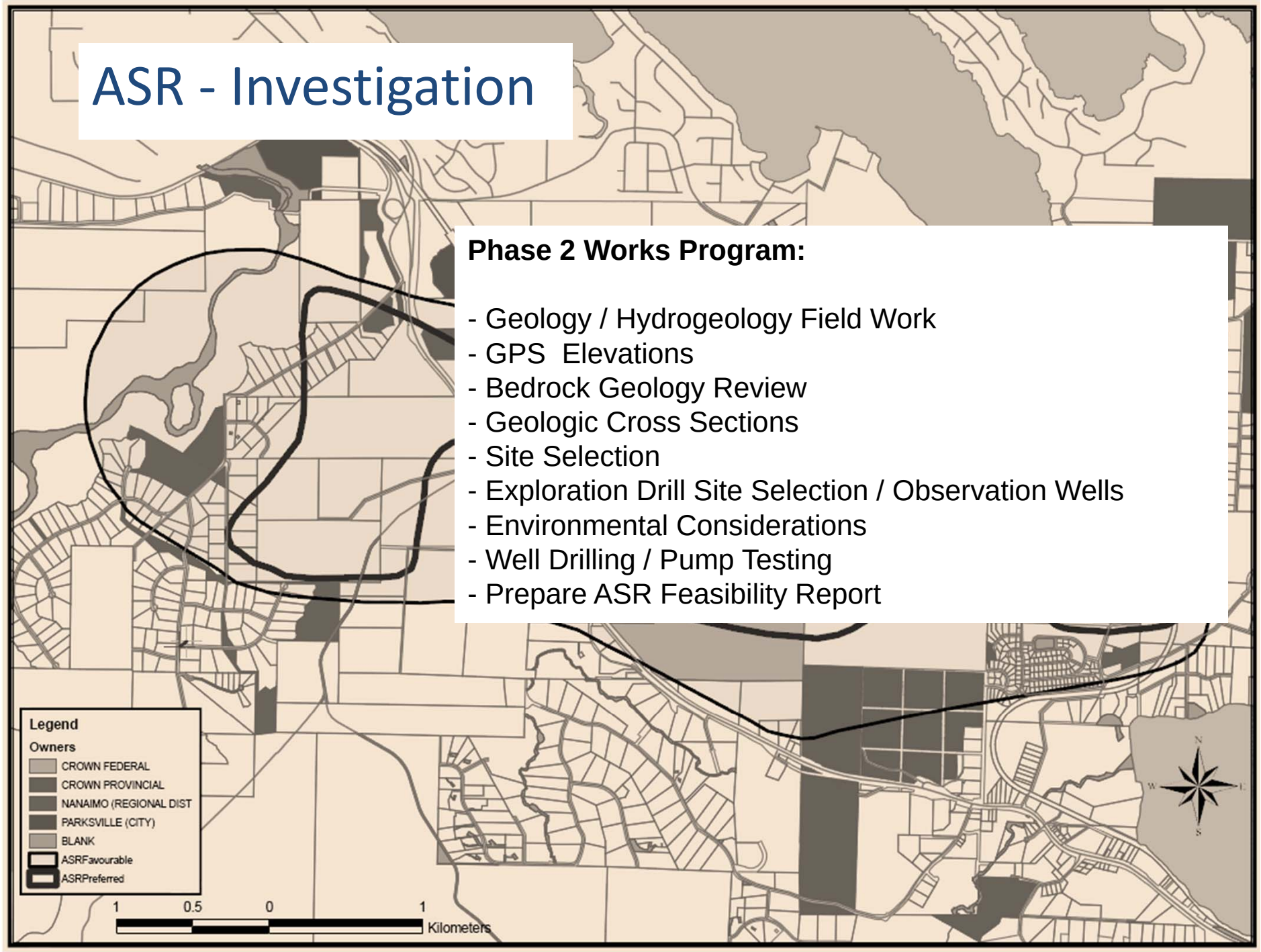


- Conventional Treatment
- Membrane Treatment

Establish:

- Future Capital & Operating Costs
- Optimal Treatment Process for the E.R. source water

ASR - Investigation



Phase 2 Works Program:

- Geology / Hydrogeology Field Work
- GPS Elevations
- Bedrock Geology Review
- Geologic Cross Sections
- Site Selection
- Exploration Drill Site Selection / Observation Wells
- Environmental Considerations
- Well Drilling / Pump Testing
- Prepare ASR Feasibility Report

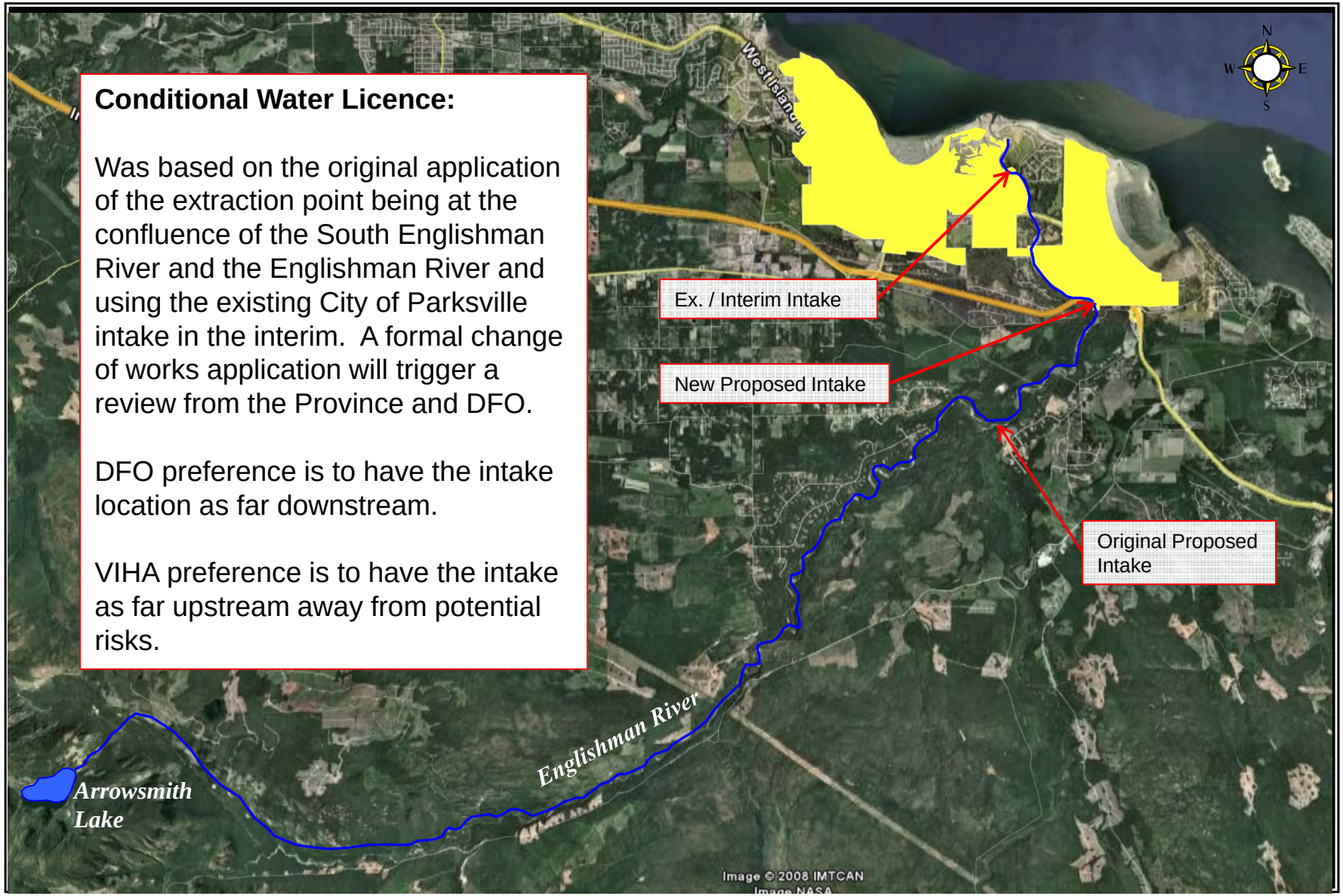
AWS – IMPLEMENTATION PLAN (CRITICAL PATH)

2011 | 2012 | 2013 | 2014 | 2015 | 2016 | 2017

AWS - Implementation Plan

Task Name	Duration	Start	Finish	Predecessors
ADMINISTRATION AND GOVERNANCE	**1710 days**	**Fri 5/13/11**	**Thu 11/30/17**	
Meet Subject Conditions for Property	3 days	Fri 5/27/11	Tue 5/31/11	
Notice of Subject Conditions to Vendor	5 days	Wed 6/1/11	Tue 6/7/11	2
Final Sale of Treatment Plant Property	1 day	Wed 6/8/11	Wed 6/8/11	3
Secure Easment from E & N / Railway Corridor Foundation for Intake	592 days	Fri 5/27/11	Sat 8/31/13	
Secure Easment from MoT for Intake	592 days	Fri 5/27/11	Sat 8/31/13	
Secure Easment from other adjacent Land Owners	592 days	Fri 5/27/11	Sat 8/31/13	
Define / Finalize Governance Model	17 days	Wed 6/1/11	Thu 6/23/11	
Explore Senior Government Grant Funding	417 days	Fri 5/27/11	Mon 12/31/12	
Finacial Analysis: Explore Borrowing Options with or without Grants	90 days	Mon 2/18/13	Fri 6/21/13	9
New Intake Permit - Meeting No. 2 with MoE (Modification of Water License and E.R. Flow Requirements)	417 days	Thu 6/16/11	Fri 1/18/13	33,31
New Intake Permit - Final Meeting with MoE (Modification of Water License and E.R. Flow Requirements)	1 day	Wed 10/16/13	Wed 10/16/13	11
Treatment & ASR Process Permit, Meeting No. 2 with VIHA	1 day	Fri 3/23/12	Fri 3/23/12	32
Treatment & ASR Process Permit, Final Meeting with VIHA	1 day	Wed 9/18/13	Wed 9/18/13	11
Modify 2011 Operating Budget and Capital Budget to reflect proposed Work Plan	22 days	Fri 5/13/11	Mon 6/13/11	
2012 Operating and Capital Budget	1 day	Sat 12/31/11	Sat 12/31/11	15,8
2013 Operating and Capital Budget	1 day	Mon 12/31/1	Mon 12/31/12	16
2014 Provisional Operating and Capiatl Budget	1 day	Tue 12/31/13	Tue 12/31/13	17
2015 Operating and Capital Budget	1 day	Wed 12/31/1	Wed 12/31/14	20
2015 Finall / Revised Operating and Capital Budget - Based on Referendum	8 days	Mon 8/11/14	Wed 8/20/14	40,41,18
2016 Operating and Capital Budget	1 day	Thu 12/31/15	Thu 12/31/15	19
2017 Operating and Capital Budget	1 day	Sat 12/31/16	Sat 12/31/16	21
COMMUNICATION STRATEGY	**901 days**	**Fri 2/25/11**	**Sun 8/10/14**	
Finalize Communication Strategy	39 days	Fri 2/25/11	Wed 4/20/11	
AWS Board Approval - Communication Plan	1 day	Tue 4/26/11	Tue 4/26/11	24
Finalize AWS Public Information Report and post on Web Page	33 days	Wed 4/27/11	Fri 6/10/11	25
AWS Board Approval	1 day	Mon 6/13/11	Mon 6/13/11	26
Schedule presentations to Public Resident Associations and Community Associations	147 days	Wed 4/27/11	Thu 11/17/11	25
Preparation of background information, FAQ's, information brochure and Post on Web Page	33 days	Wed 4/27/11	Fri 6/10/11	25
Presentation to Parkville Council (Workshop)	1 day	Wed 5/25/11	Wed 5/25/11	
Study Update Presentation to DFO	1 day	Thu 5/26/11	Thu 5/26/11	
Study Update Presentation to VIHA	1 day	Tue 5/31/11	Tue 5/31/11	
Study Update Presentation to MoE	1 day	Wed 6/15/11	Wed 6/15/11	
Presentation to Town of Qualicum Beach	1 day	Mon 6/20/11	Mon 6/20/11	
Presentation to RDN - TBA	1 day	Thu 6/16/11	Thu 6/16/11	
Public Open House No. 1	1 day	Thu 9/29/11	Thu 9/29/11	29
Public Open House No. 2	1 day	Fri 1/20/12	Fri 1/20/12	36
Update Arrowsmith Service Web Page	400 days	Fri 3/23/12	Thu 10/3/13	36,28,29,37
Final Open House (as required)	1 day	Sun 2/16/14	Sun 2/16/14	38
Public Referendum	1 day	Fri 7/11/14	Fri 7/11/14	38,39,12,14,1
Alternate Referendum Process (VIHA - Water Order)	8 days	Thu 7/31/14	Sun 8/10/14	40
WATER INTAKE AND TREATMENT FACILITY	**1600 days**	**Fri 5/27/11**	**Thu 7/13/17**	
Prepare Term of Reference for Pilot Testing / Benchmark	16 days	Fri 5/27/11	Fri 6/17/11	
Consultant Selection Process, Sole Source, EOI, RFQ, RFP, Quality Based Selection, Value Engineering for Pilot Testing	200 days	Sat 5/28/11	Thu 3/1/12	43
AWS Board Approval	1 day	Thu 6/23/11	Thu 6/23/11	15
Advertise for Consulting	30 days	Fri 6/24/11	Thu 8/4/11	45
Phase 2 - Engage Consultant for Benchmark Testing and Water Treatment Plant Pilot Testing	7 days	Fri 8/5/11	Mon 8/15/11	46
Phase 2 - Pilot Testing	250 days	Tue 8/16/11	Mon 7/30/12	47
Consultant Selection Process, Sole Source, EOI, RFQ, RFP, Quality Based Selection, Value Engineering for Preliminary Design, Detailed Design, Contract Preparation, Construction Services & Commissioning	200 days	Sat 10/1/11	Thu 7/5/12	45
AWS Board Approval	1 day	Wed 12/7/11	Wed 12/7/11	49
Advertise for Consulting	30 days	Mon 1/9/12	Fri 2/17/12	50
Engage Consultant on Phase by Phase basis	7 days	Sun 4/1/12	Mon 4/9/12	
Phase 3 - Preliminary Design	200 days	Sun 5/20/12	Thu 2/21/13	52,16
Phase 3 - Value Engineering	22 days	Sun 3/3/13	Mon 4/1/13	53
Phase 4 - Detailed Design	250 days	Fri 4/12/13	Thu 3/27/14	54,73,17
Phase 4 - Value Engineering	10 days	Sun 4/20/14	Thu 5/1/14	55
Phase 5 - Contract Preparation / Class B Cost Estimate	15 days	Sun 5/11/14	Thu 5/29/14	56
Phase 5 - Tendering	20 days	Sun 6/15/14	Thu 7/10/14	57
Phase 6 - Contract Award	0 days	Sun 8/3/14	Sun 8/3/14	58,20
Phase 6 - Construction	500 days	Sun 8/24/14	Thu 7/21/16	59,4,5,6,7
Phase 7 - Commisioning	250 days	Sun 7/31/16	Thu 7/13/17	60
AQUIFER STORAGE AND RECOVERY	**1574 days**	**Mon 7/18/11**	**Thu 7/27/17**	
Tour ASR Facilities	5 days	Mon 7/18/11	Fri 7/22/11	
Prepare Terms of Reference for Initial Phase of ASR Investigation	25 days	Mon 7/25/11	Fri 8/26/11	63,45
Determine Consultant Selection Process	10 days	Sun 9/4/11	Thu 9/15/11	64
Advertise for Consulting	40 days	Sun 9/18/11	Thu 11/10/11	65
AWS Board Approval	1 day	Wed 11/16/1	Wed 11/16/11	66
Phase 2 - Engage Consultant for ASR	7 days	Sun 11/20/11	Mon 11/28/11	67
Phase 2 - Preliminary ASR Investigation	90 days	Sun 1/1/12	Thu 5/3/12	68
Prepare Terms of Reference for Initial Stage II & Stage III - ASR Investigation	30 days	Sun 5/27/12	Thu 7/5/12	69
AWS Board Approval	4 days?	Wed 7/18/12	Sun 7/22/12	70
Phase 3 - Engage Consultant for ASR	7 days	Sun 8/19/12	Mon 8/27/12	71
Phase 4 & 5 - Preliminary ASR Investigation (Stage II)	150 days	Sun 9/16/12	Thu 4/11/13	72,16
Phase 6 - Stage III ASR / Construction	350 days	Sat 11/1/14	Thu 3/3/16	73,55,5,6,7,2
Phase 7 - Commisioning	250 days	Sun 8/14/16	Thu 7/27/17	74,60

Change of Works Application



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THANK YOU….

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