


H1

Chinook Ridge



This new SDAB Hearing is in follow-up to the Appellate Court's **DECISION** that the previous SDAB was in error in revoking the Development Permit for an 81 Stall RV Park & Castle (event center). The Appellate Court Ordered a new SDAB Hearing with a new panel.

Importantly these first 2 Phases in the DP are the foundation of the longer-term goal: **Phase III, the golf/play course designed to enhance intergenerational communications between youth and their elders.**

This is a presentation to the SDAB following the Appellate Court's ruling. Farmland once it has been rezoned **cannot be undone** by newcomers to the process. This usage is very compatible with the rural atmosphere as found by Rocky View Council in 2012. It is a walking, wilderness course that can be used for traditional walking golf, adjusted slightly for disc-golf, basketball-golf, soccer-golf, etc. There is even potential for other soft sports like rollerblading, cross country skiing, or just walking in nature enjoying each other's company. It is the owner's belief that facilities like this can help reconnect youth with their elders in a relaxed, non-hurried fashion where they can learn not just sportsmanship but ethics, morals and hope for our future and the futures of our grandchildren.

Due to the time limitations on development permits it has been easy for neighbors to forget the long-range goals of the project and only look at the initial Phases believing I was no longer building Phase III – the course.

Slide 1

H1 HP, 2020-12-14



Motivation

My background in Social Work, specifically Child Welfare and 4 decades fostering over 164 young people has demonstrated that well bonded individuals become better prepared adults. Bonds help create better mental health outcomes, and more integrated, socially engaged adults resulting in a lower crime rate and less addiction. I believe there is a strong tendency for Adults to sit on the sidelines and watch their children play Soccer, Hockey, Rugby, or Tennis as there are few outdoor occupations that make space for communication. The nature of the aforementioned games makes communication between adult and youth difficult. It often takes the form of elders yelling to or at the youths from the sidelines. Golf (or golf -like games such as disc-golf, basketball golf, soccer golf, hockey sac-golf) played on a course similar to golf but WALKING on the other hand, is a sport the adult and youth can play together while engaging in conversation which provides a teaching tool and opportunity for role modelling desired behavior. What activities can an adult do with their child or youth to increase the bond between the two and encourage the transfer of morals, ethics, and social awareness. This social bond results in strengthened social fabric and resiliency for both youth and adult.

Kids are enrolled in various competitive sports programs for the benefit of physical health, opportunity to play on a team and pure enjoyment. They also play online games that can be violent and incredibly competitive. There is little 'space' where adults and youths can interact and are not

violent, loud, and extremely competitive. While some board games like scrabble, chess and the like can fill this void they are not fashionable at the moment. Other sports like bowling, billiards, surfing, skateboarding, archery, recreational dance, fishing, canoeing can fill the void this are sometimes indoors, or require they significant travel.

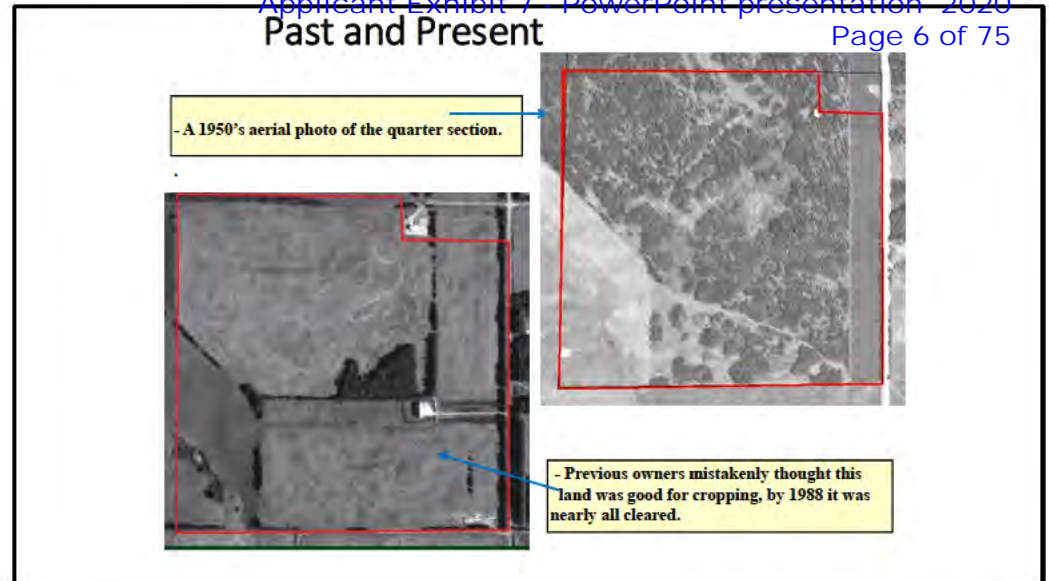
Communications between youth and elders is at an all time low. This results in a weakening of the bonds within the family and a concomitant wakening in the social fabric which results in higher crime rates, drug, and alcohol addiction, etc. Golf can enhance communication by providing spaces for youth and elders in a safe outdoor environment. Concomitantly golf should be less expensive and more affordable for families as a social program.

The relationship between parent, stepparent, grand parent or foster parent and child is one that I have significant interest and experience in. I developed specific methods for creating substantial youth/elder bonds and found that an adult who can spend quality time with a youth engaging in an enjoyable activity will enable relationship strength between the two. It must not be forced as in a 'therapeutic' situation. It cannot occur across the table or desk as in many face-to-face settings; often, this is too threatening for the youth – especially a youth in stress. Spaces where the youth and adult are side-by-side engaging in a pleasant, distracting activity are far better settings for in depth communication as they are far less threatening.


Why the land was rezoned from FARM to BUSINESS, LEISURE & RECREATION

When we bought the land in 1988, my husband and I wanted the rural lifestyle. He grew up on a farm in Saskatchewan. Now as a police officer in Calgary, we both wanted to raise our family where they had room to roam, ride dirt bikes and generally get away from the city. When we separated and divorced, I kept the farm. He had not been able to successfully farm it and had no interest in it. I knew that had to continue paying the mortgage with off-farm income until such time as I could find a higher and better use for the land.

Past and Present



I looked at the history of the land and how it looked in 1950; heavily forested, mixed vegetation, lots of birds and wildlife. When we bought the land in 1988 it had been cleared. Since then, I've planted over 22,000 trees. I have lived here over 32 years and will continue to reside here. When I retire my two adult sons will take over managing the property.

Randy Harnack &
 Carol Webb

 Sept. 10th, 2012

Rick Michalenko, Senior Planner
 Rocky View County
 911 - 32 Ave. N. E.
 Calgary, AB T2E 9X8

Dear Mr. Michalenko,

RE: 2012- RV 016 – Land Redesignation Application – Chinook Ridge


We are writing in support of the Cartwright family's application for redesignation of their land. We not only live on the quarter section immediately south of Chloe's property which we farm along with our quarter section to the east but I, Randy, grew up on this farm and will likely be the eventual owner of it through inheritance. We also own other land in the area.

More importantly we had a 5 year lease on Chloe's quarter in the mid 1980s and personally know how hard it is to farm because of the sandstone bedrock and protrusions, swampy areas and tree clusters. It has uneven rolling terrain, the bottom 25 acres retains moisture to the point it cannot be swathed. Several times when attempting to farm the land I found my equipment severely stuck in wet areas on the high land and needed to call someone with huge equipment to tow me out. Or struck huge chunks of sandstone slabs and damaged our equipment.

We have known of other farmers in the area who considered renting the property and chose not to rent it because of its' small fields, and wet or rocky conditions. In our opinion this is not prime farmland and truly lives up to its' Canadian Land Inventory Classification as:

Class 4H – Severe limitations due to temperature.
 Class 4H, T – Severe limitations due to temperature and adverse topography.

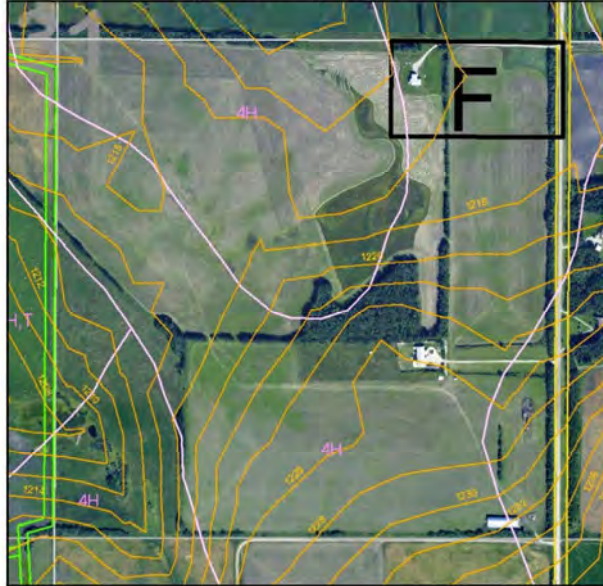
We hope you approve this application as it would provide both jobs and recreation in the local area and be a better use for the land.

Sincerely


A neighbor and 3rd generation farmer tried renting my land, but it was too frustrating. Particularly the time he sunk his tractor in a wet area up to the axles and needed 2 others to pull him out. The land was an anomaly and needed a better use.

A letter from Randy Harnack talking about the challenges of farming this land. He tried.

Extracted from the Canadian Land Inventory Map as shown on
Rockyview County's website.



This is the AADC advertisement that ran in the local Newspapers in early May 1988. I put in a bid and apparently there were no other bids submitted.

NONE of the long term farmers in the area—McArthur, Harnack, Farquharson, Vaughn, Robertson, Bierbeck, Bales, Maffitts or Davies bid on it—Perhaps because they new it was not good farmland to add to their holdings.

My bid won and I took possession in August 1988.

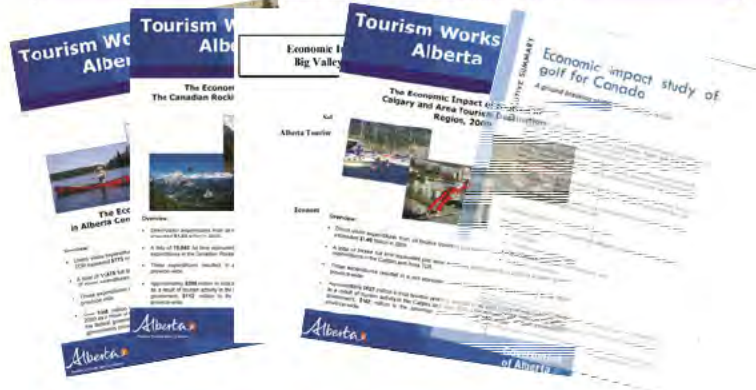
Two prior owners were foreclosed on, yet no one locally wanted to buy the land as they believed there was no water available for livestock or household use and not great for crops.

This land is classified as 4H and 4HT which means it is challenged by lack of Heat and Topography (slopes to the west) the root zone does not get enough sun to dry the soil enough for harvesting. Plus, it has sandstone outcroppings and wet areas that are unsuitable for farming. It would have been better left as bush.

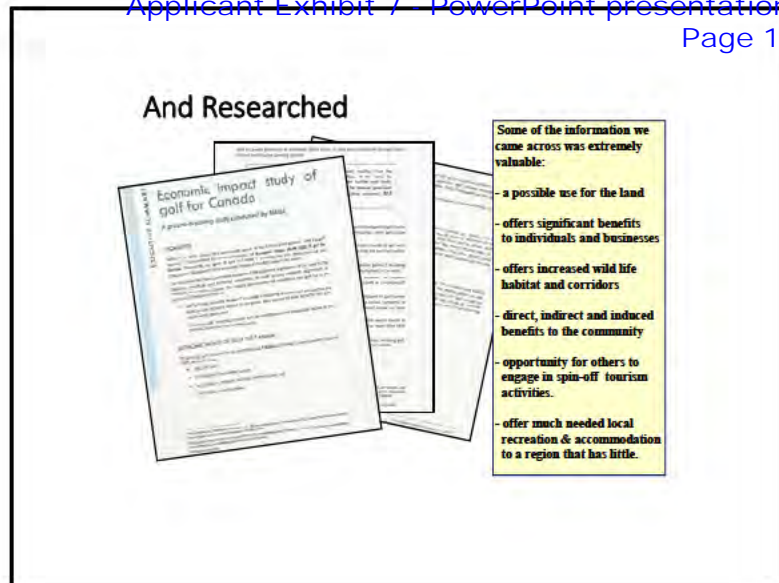
Two previous farmers went into foreclosure because the land is so poorly suited to farming. Of course, unless you actually get out and walk the land or try to farm it you would never know its limitations. That has been a problem as many of the neighbors think it is – just looking at it from the road.

Community Consultations & Engagement

and looked at not only agricultural uses but also studied Travel, Tourism and Economic Market related items in order to find the most compatible, desirable and sustainable alternate use.



I began researching alternatives for land use. Crop production on the land was not meant to be and as mentioned the Municipal Development Plan did not give us any guidance in regard to developing recreational property.



We researched the impact of golf on the community, the economy and on individual health. What is really important to me – as a social worker – is that **Golf does not need to be a rich man's sport**. The peaceful nature of the outdoors provides a perfect platform for cross generational communications. **Affordability is the key factor in helping families spend quality time together in a healthy environment with kids taking a break from electronic games.**

And Researched some more



Research indicates
travelers are more
sophisticated. They
want:

- golf stay and play
- white-water rafting
- Ice climbing
- Caving
- Rock climbing
- hang gliding
- glide rafting
- maze navigation
- hiking
- mountain biking
- star gazing
- horse-back riding
- fishing
- hot air ballooning

What Travelers want are Experiences!!!

Today's travelers are more adventurous and outgoing than ever before. They want to try things that they either cannot find or cannot afford at home. **THEY WANT EXPERIENCES!**

Area businesses will benefit

Chinook Ridge intends to partner with and encourage other local individuals and businesses in developing or expanding their venues. Collectively we can provide many of the 'experiences' tourists demand today.



Naturally, these efforts will benefit all areas of Rocky View County as we help diversify the local economy.

We met with other tourist attractions in Rocky View County: Outfitters, Archery Ranges, a market garden, a Meadery, other Golf courses and we are positioning ourselves to partner in joint marketing endeavours with them to offer enhanced opportunities to tourists. Together we can apply for Tourism Destination Region marketing funds and the guidance of experts leveraging our visibility year-round.

Neighbour Consultations began in 2008.

With 6 pieces of hand delivered correspondence



To all neighbours in within a 3 km radius.

As part of our public consultation process, we sent letters to 33 neighbours beginning as early as 2008. We engaged and engaged. There is no way we missed informing anybody with ears on. Even had full page articles in the Hitching Post News (free and local paper)

Neighbours included:**33 Households**

Walter & Wendy Vaughn	Mr. & Mrs. Pat Singer	Bruce & Darcy Robertson
Ron & Betty Bosch	Frank & Lisa Herbert	Don & Marlene Farquharson
Jim & Chris Davies	Rene Beierback	Randy Harnack & Carol Webb
Ian & Susan Robertson	Lila Robertson	Malcolm & Serena Holbrook
Don & Sheri Robertson	Pat & Al Wylie	Dan & Barb Hoskins
Robert & Elaine Watson	Barry & Mackie Herbert	Ken & Arlene Guzda
Doug & Nancy Havens	Reese-Williams/Bales	Brad & Tracey Foster
Brad & Dawn Carter	Jackie & Geoff Matticks	Shera & David Scott
Gerry & Linda Hagel	Glenda & Billy Butler	Jim & Bernice McLean
Karen Farquharson	Pam & Doug Reid	Lois & Peter Garrett
Don Amidon	Becky Lawer	Anne & Tomas Lorenc

This first letter was to attend a coffee meeting to hear about our proposal and outlined the nature of the development. **No one responded to this letter.**

The second letter offered to meet with any neighbours individually and review our concept. **Again I did not receive any responses to this letter.**

Our 1st and 2nd letters went out to all neighbours within a 3 km radius requesting time to get together and discuss our proposal. No one responded to either of these letters.

The 3rd Letter & Responses

Our third letter was hand delivered to neighbours in the spring of 2010. It was easier for people to simply check off if they were

1. in support of the application
2. did not support the application or
3. did not have sufficient information

26 responses were received from this delivery.

12 responses - Supported the application

One - well wishing letter,

"look forward to seeing this come to fruition",

"Go for it - Great Idea",

"Looks fantastic! A wonderful development for our part of the country",

"What an awesome addition to the area!",

"YES",

"Resident owner is Strongly for it", other owner "is afraid the value of the land will be reduced."

"I think it is a great idea - Good Luck"

- others just checked the "I support" box without elaborating.



I changed the format of the letters to a simple 'check box' and we began to get some responses. We received 12 Supportive, 4 Opposed and 10 Undecided responses.

Opposed

4 responses were opposed

The reasons were:

- This is agricultural land – inadequate water supply, does not want increased density
- Will impact water, traffic will damage marginal roads, noise will be an issue, impaired drivers
- Traffic noise and increased traffic flow on roads unable to handle it
- run off from golf course (chemicals-pesticides and fertilizer) will come onto our land which is used for grazing animals and crops. Stress on limited supply of water in the area, wastewater from sewage, increased traffic.

1 unsolicited email from a resident who lives somewhere in the area and 'heard' about our proposal.

- "I strongly object to a golf course as it will destroy the environment by driving and residing, . . . I will not support this in any way possible as an advocate of the natural area.



There were 4 basic reasons for opposing the development. Some people believed there was an insufficient water supply in the area, that increased traffic would damage already marginal roads, that there would be an increase in noise detrimental to this quiet rural neighbourhood, that it would result in impaired drivers. These were our concerns as well, but we felt we had plans to mitigate these issues. One neighbour felt that run-off from the golf course onto his land would damage his crops and animals. We knew we could mitigate that concern as well because of the irrigation method we chose.

Undecided



10 responses –felt they did not have enough information

Want more information on:

- Traffic, paving 574 and upgrading Twp Rd 290, impaired drivers
- Water quantity and how it might affect the wells in the area
- Noise

Our Concerns matched our neighbours

- was there enough ground water to sustain this type of development
- could we avoid damaging the wild life habitat and corridors
- could the road networks support the increase in traffic
- what would happen with the wastewater produced by the Lodge
- could we design a space that would be both people and wild life friendly
- could we add to the economic viability of this community
- could we remain financially viable as a business

Not surprisingly our concerns matched those our neighbours expressed in our feedback form and in their response to Rocky Views circulation in April of 2011. Concerns were about water quantity, wildlife habitat , traffic, and wastewater. These concerns were addressed in the technical studies provided to Council.

Finding Water!

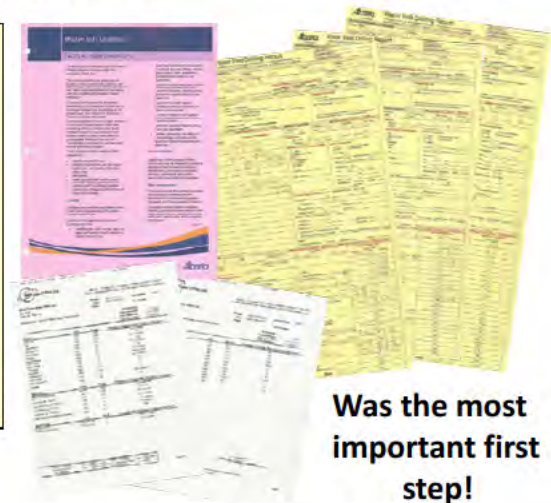
-Chinook Ridge is located in the Red Deer River drainage basin.

- water licences are still available

- Q20 test was performed

- confined aquifer

- water licence application in process.



Was the most important first step!

Before we could do anything, we had to find water in sufficient quantity to service the development's needs! The water licence application includes Potability Wastewater Treatment design will be finalised prior to building the course. **WE FOUND WATER,** Large volumes of it.

Ready to hire the Professionals



Once we found sufficient water we could turn to hiring professionals to bring this idea to fruition; Rod Whitman for golf course design, and Stantec Consulting for the Integrated Water Management Plan, Biophysical Impact Assessment, Transportation Impact Assessment and the Phase I Environmental study. Some of those pieces needed updating for the new design of Chinook Ridge. Others are unnecessary at this time.

Our 4th Letter to the neighbours

Sent out to the neighbours on December the 10th, 2010. It notified them that we found water in sufficient quantity and with a recovery rate for water well licensing purposes in a confined aquifer.

Do you have any wells on your property that are not registered?

Now we are confident in starting the other studies that were part of the IWMP including:

- Potability
- Irrigation
- Stormwater Management
- Wastewater Management

- Biophysical Impact Assessment
- Traffic Impact Assessment
- Environmental Phase I



We sent out our 'Found WATER' letter! At the same time I needed to make sure no one had wells that had not been reported – so steps could be taken to protect their water source. I compiled well-log information on all of the neighbours water wells.

Soil Analysis for Irrigation Study

Stantec's team supervised the drilling and completed some preliminary soil tests on site.

Portions of the land are not irrigatable and will require amendments to the soil during construction.



We even found nuggets of COAL that had been deposited by glaciers.

A series of 10 soil samples were taken from various fields and analysed to assess the soil's ability to handle irrigation. It was found that large portions of the land are not irrigatable and will require amendments to the soil during construction. BUT only the Tees and Greens will be irrigated.

The results of all these assessments indicate that our water, wastewater treatment, irrigation plans, soil, location and conservation methods will dove-tail nicely with our plans for development.



The detailed studies and report were made available on our website for everyone's review. Copies were made available to all neighbours, Councillors and others interested in the development. Here binders containing the full engineering reports, post card with flash – drive containing the reports and a FYI booklet a condensed version of the reports.

Our 5th note to the neighbours

The Postcard & flash-drive contained all of Stantec Engineering's reports;

- Integrated Water Management Plan
 - Potability
 - Wastewater
 - Stormwater
 - Irrigation
- Transportation Impact Assessment
- Biophysical Impact Assessment
- Environmental – Phase 1 Study
- Our cover letter
- a letter from Jason Pick, Olds College,
- Audubon Society information
- an invitation to contact me if there were any questions or concerns.



Our 5th correspondence went out to neighbours on September 16th, 2011. This was a postcard with a flash-drive attached, loaded with all of the technical studies and reports.. A hard copy of these reports, etc. was left for the coffee crowd at the Bottrel store. Another was lent to neighbours who requested to borrow it.

Our 6th note to neighbours

Hand delivered to the 33 neighbours
plus 90 more to the larger area.

- posters were hung at the Bottrel General Store
- at coffee shops
- the hair salon in Cremona
- Cochrane Ranch House bulletin board
- lawyers offices
- store bulletin boards in Cochrane
- advertised on Range Radio
- Cochrane Times
- Cochrane Eagle
- Airdrie Weekly
- www.ChinookRidge.ca website
- sent out to newsletter data base
- LinkedIn
- Facebook



Our 6th correspondence to neighbours was delivered in October, a Personal Invitation to a Informational Public Open House. 120 of these were delivered to a larger area - beyond the 3 km radius. Posters were hung in the Bottrel general store, in hair salons, restaurants, store bulletin boards, legal offices and town offices. Notices were place in 3 local papers and advertised on Range radio.

Public Information Open House Notices

Public Information Open House
Tuesday Oct. 11/11 from 5:00 until 8:00 PM
at
Dartique Lodge
 (North of Cochenuc on Hwy. #22 to Hwy. #574, turn west to Horse
 Creek Rd., turn south to Trp. Rd. 283—follow signs from #22)
Regarding the proposed development of:



Chinook Ridge
 Lodge & Golf Course Ltd.

Located 25 minutes from Kelowna

If you are interested in hearing about a possible new venue for:

Golf	X-Country Skiing	Spa days	Rollerblading
Flays	Wildlife Viewing	Seminars	Performances
Biking	Accommodations	Fine Dining	Meeting Spaces
Concerts	Wild Watching	Stargazing	Event Skating

For the purpose of sharing information re: the Redesignation Application
 of 120 Acres at S4, S31, T28, R3, W5 (28599 Hqs. Rd. 33) & adjacent
 from Ranch & Forest District to Recreation-Landscape & Recreation District to
 include: a 21 room Country Inn, 18 hole golf course, 500 seat banquet
 hall, spa, etc. All interested parties are welcome to attend
 & share information with the Carving & Stantec Consulting.

Refreshments will be served!

On Redesignation Application and more information visit our
www.ChinookRidge.ca or call 405-630-0888

RESULTS OF OPEN HOUSE

- 40 people attended
- 2 couples were neighbours
- Stantec staff were available for Q & A
- handed out FYI Booklets
- most attendees were 'interested parties'
- attendees were asked to fill out comment cards
- comments are compiled on the following pages

Open house notice, 40 people attended. Stantec's staff were on hand to answer any questions and there were lots of them. It was a busy 3 hour period.

Comment Card Quotes



Supportive


- This is an excellent plan & I hope it goes ahead.
- Great Concept. Like your ideas - reuse of water and prior to that recover of water.
- More recreation items are needed in way of camping, GOLFING, etc. Outside activities. You have my support.
- Good for the area, creating new jobs/opportunities for local people.
- Good presentation. Home-work has been done. Sensitive to area concerns.
- Very good to see economic diversification, quality plan, good local employer, increased commercial tax base. Best of Luck!
- Thanks for this meeting, look forward to a place to go for dinner.
- Proposed development sounds like a wonderful idea. Good Luck!
- I was very interested in your proposed development. I found it inspiring and will be keeping my eye on its progress as this development appeals to me.

We compiled all of the comment cards submitted as either Supportive, Concerned or Opposed.

Support
Continue

Supportive – Continued

- The overall plan is well organized – from irrigation to the supply of water and the usage of water. I especially like the plan which includes wildlife; it would be very interesting to see both exist. I am looking forward to being able to play on this course.
- It is all good! I can't wait to see it.
- Very enthused about this potential development. Feel something like this is needed in the area. I like the concept of how the water will be used for the golf course. All the best in this endeavour.
- Very Interesting project. Wishing you all the Best!!
- Facility sounds great! Can't wait to see it open!
- It will be great for retreats & wedding! Great renewable energy plans. Exciting addition to this rural community!
- Can't wait to see it open. Looks like an awesome opportunity for this community and family life.
- Excellent tourist attraction. Looking forward to it!
- I think this facility will benefit the area. It is an exciting idea and I look forward to seeing it working well.



These 2 pages of comments in Support of our application are all direct quotes.

Concerned & Opposed Comments

Concerned

- Thanks for this informative meeting. Still concerned about the water issue and need for paving 574. Rockyview County residents.

Opposed

-What is the plan for construction? Traffic flows? Twp Rd 290 will not support this traffic use. Impaired drivers on the roads due to unavailability of taxis. A Mountain View County resident.

-A faxed comment card follows from a Mountain View County resident.

Overall, we were very pleased with the positive comments about our proposed development. We were disappointed that the folks who stated they did not have enough information - did not come out to find out more about it!

Of the 40 attendees at our open house there were only 3 that were either Concerned & Opposed to the development. The first – is looking forward to having a place to go out for dinner but REALLY wants the 574-highway paved to alleviate decades of dust from the gravel.

The 2 individuals still opposed are County of Mountain View residents. One is adamant the 22 highway is too dangerous already and does not want increased traffic until that highway is twinned. The other believes Twp Rd 290 is not built well enough to handle increased volume and does not want his taxes to go up. He is also concerned about having to “haul more drunk drivers out of the ditch”.

Concerns

How we will handle Impaired Drivers

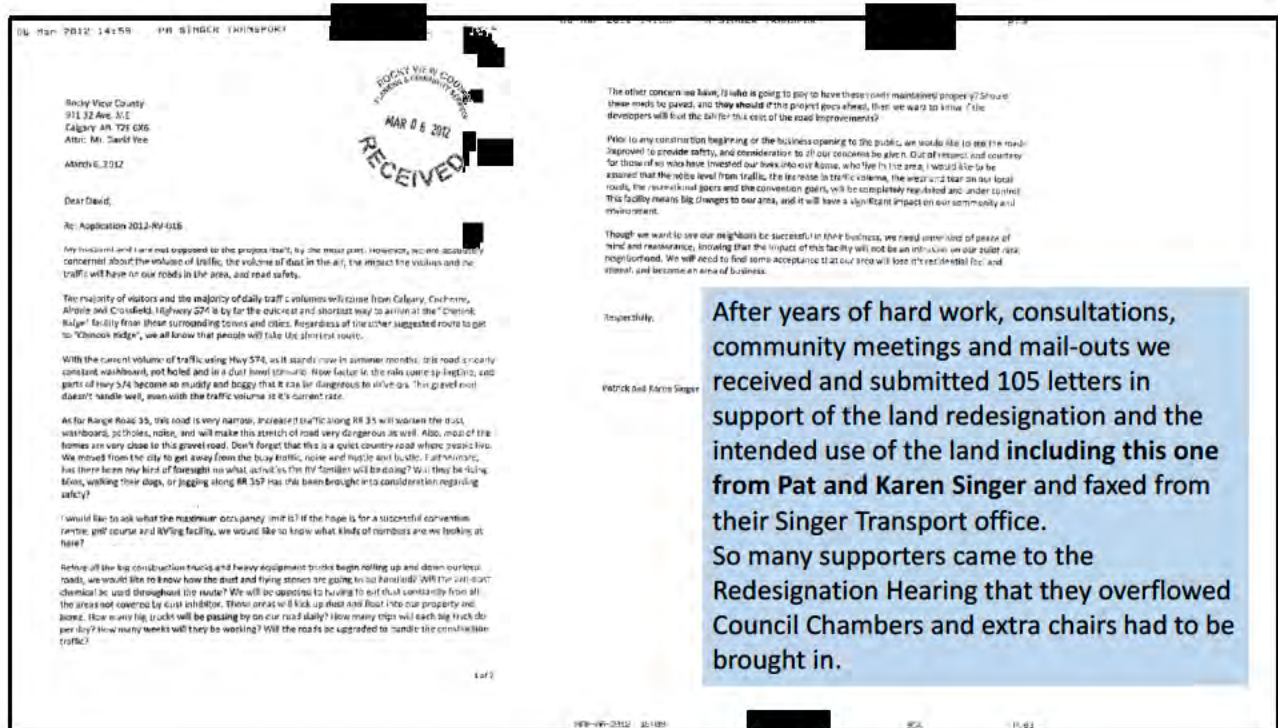
- train staff in determining when a client should be 'cut-off'
- provide a properly calibrated breathalyser
- options will be presented to them
 1. rent a room, cabin or their own RV
 2. have a designated driver
 3. hire a pair of local drivers to take them &
 4. wait, drink coffee and sober up
 5. insist on leaving/driving & management will call the local RCMP.





Noise Issues

Anything of a noisy nature will be held indoors, the building design and construction will minimize any noise.

Handling impaired drivers is an issue for everyone. People will be aware of our policies designed to discourage impaired driving. Several options will be presented to them pointed out to the host or hostess of the event. About the noise concerns - Currently I have several large, out-door parties per year in the yard including outdoor concerts, neighbours have never complained nor even been aware I hosted an event. The surrounding trees seem to act as a noise buffer. It was due to this concern that we expanded the RV Park. More people can stay over and not drive home impaired.

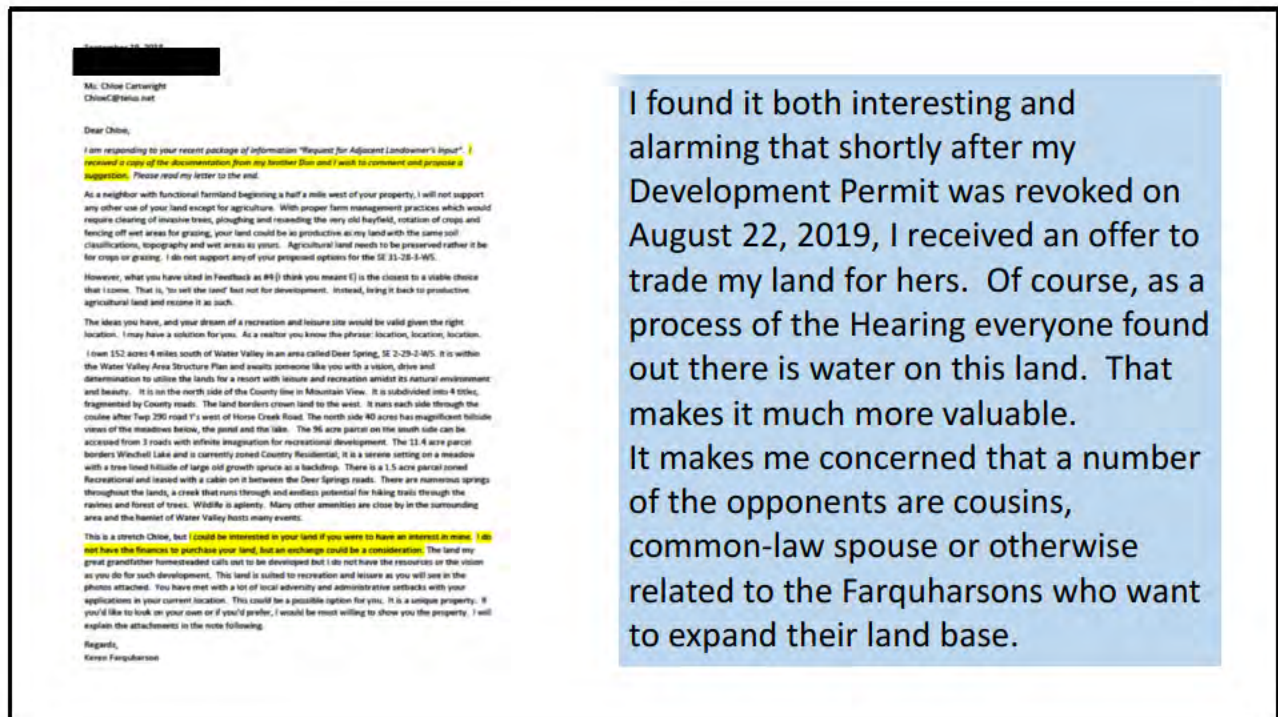


These 105 letters of support were for exactly the same use – Hotel with banquet hall, golf course and RV Stalls (and cabins) The ration have changed somewhat. Fewer hotel rooms, more RV stalls – same size banquet hall, smaller golf course (so kids and elders can play)

ROCKY VIEW COUNTY BYLAW C-7188-2012	
A Bylaw of Rocky View County to amend Bylaw C-4841-97, being the Land Use Bylaw	
WHEREAS	the Council deems it desirable to amend the said Bylaw, and
WHEREAS	the Council of Rocky View County has received an application to amend Part 5, Land Use Map No. 87 of Bylaw C-4841-97 to redesignate the SE 31-28-3-W5M from Ranch and Farm District to Business-Leisure and Recreation as shown on the attached Schedule 'A'; and
WHEREAS	Council held a Public Hearing and has given consideration to the representations made to it in accordance with Section 692 of the Municipal Government Act, being Chapter M-26 of the Revised Statutes of Alberta, 2000, and all amendments thereto.
NOW THEREFORE the Council enacts the following:	
1.	That Part 5, Land Use Map No. 87 of Bylaw C-4841-97 be amended by redesignating the SE 31-28-3-W5M from Ranch and Farm District to Business-Leisure and Recreation as shown on the attached Schedule 'A' forming part of this Bylaw.
2.	That all lands within the SE 31-28-3-W5M are hereby redesignated to Business-Leisure and Recreation as shown on the Schedule 'A' attached to and forming part of this Bylaw.
3.	The Bylaw comes into effect upon the date of its third reading.
Division: 9 File: 08731001 / 2012-RV-016	
First reading passed in open Council, assembled in the City of Calgary, in the Province of Alberta, on September 4, 2012, on a motion by Councillor McLean.	
Second reading passed in open Council, assembled in the City of Calgary, in the Province of Alberta, on November 6, 2012, on a motion by Deputy Reeve McLean.	
Third reading passed in open Council, assembled in the City of Calgary, in the Province of Alberta, on November 6, 2012, on a motion by Councillor Solberg.	
 REEVE OR DEPUTY REEVE	 MUNICIPAL CLERK

The land was changed from FARM to BUSINESS, LEISURE & RECREATION by a BYLAW created via a 7 to 2 Vote by the elected Council. There were 36 more letters of support for the DP Hearing

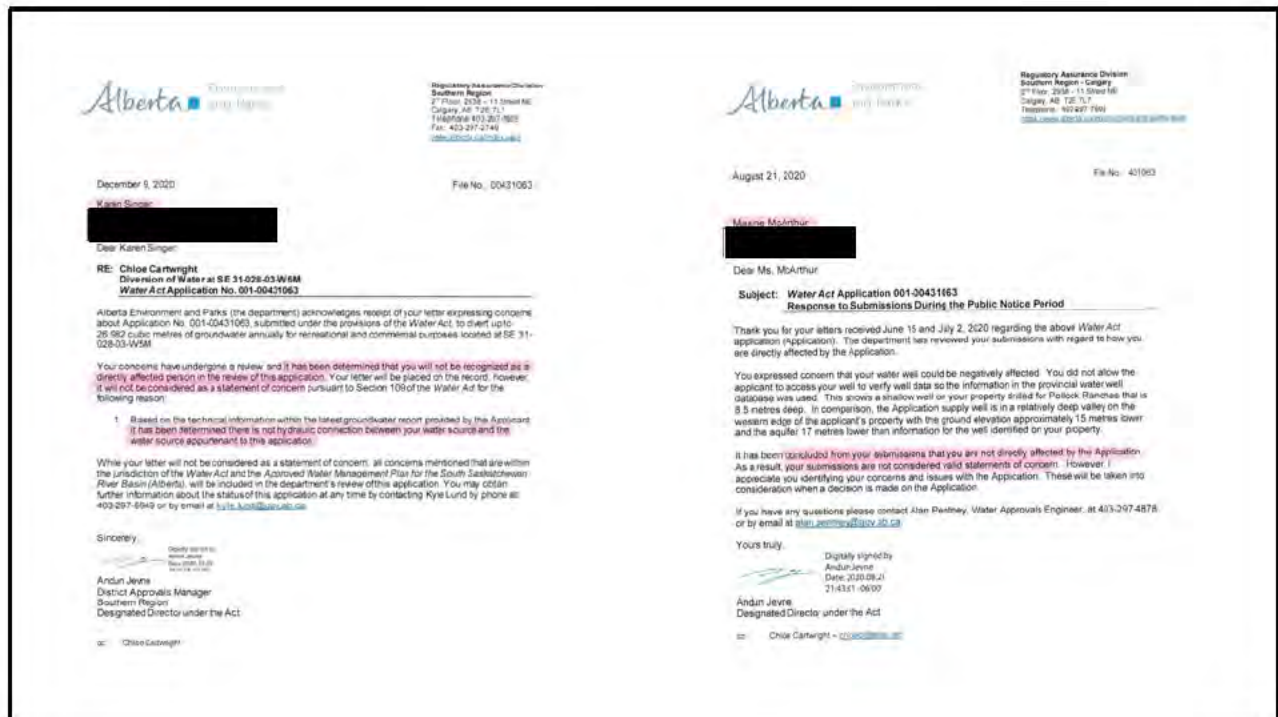
I have had difficulty getting a hold of the audio tapes from the 2012 Hearing. I've been told they were lost during the move from 32 Ave to the new County Office. 105 letters of support for the Redesignation Hearing, 36 more letters of support for the SDAB Hearing (that were not acknowledged). The latter were all different people than the first 105 and reflected the thoughts of other business owners and employees in Cremona, Water Valley, and Bottrel.



So, Farquharsons are related to McArthur, Bosch, McLean, and countless others in the area. Now there is water – in huge amounts where they always believed there was none – there is interest, perhaps pressure to thwart the development.

WATER


It should be noted that the owner believes water is the most essential element for life and as such it is a precious commodity that should never be wasted. Every available conservation will be used to prevent the waste of water. Low flow toilets, showers and tubs. The golf course, when built, will not be irrigated with fresh water EVER. I have done a significant amount of research into irrigating with a KISS root zone irrigation system which will utilize treated wastewater. There is no over ground spray and this results in a dry surface with reduced opportunity for weeds to take hold.



Alberta Environment and Parks has determined that Singers, McArthur, Watson, K. Farquharson and D. Farquharson **do not have valid Statements of Concern** and that the water used for Chinook Ridge operations will not impact their wells. This slide shows Singer and McArthur's letters.



This slide shows D. Farquharson, K. Farquharson and Watson's letters from AEP stating they **do not have valid Statements of Concern** as their wells are in different aquifers, there will be **no impact** on their wells from Chinook Ridge.



November 19, 2020

File No. 00431063

Jim Davies

Dear Jim Davies:

**RE: Chloe Cartwright
Diversion of Water at SE 31-028-03-WSM
Water Act Application No. 001-00431063**


Alberta Environment and Parks (the department) acknowledges receipt of your letter expressing concerns about Application No. 001-00431063, submitted under the provisions of the Water Act, to divert up to 26,982 cubic metres of groundwater annually for recreational and commercial purposes located at SE 31-028-03-WSM.

Your concerns have undergone a review, and it has been determined that you will be recognized as a directly affected person in the review of this application. Your letter is considered as a statement of concern pursuant to Section 109 of the Water Act and, as such, you will be advised of the Director's decision on pertaining to the above-mentioned application.

Each of your concerns, as identified within your letter, were reviewed by the department and the Applicant will be required to address the concerns that are within the jurisdiction of the Water Act. The onus is on the Applicant to supply the department with information that adequately demonstrates the identified concerns are resolved in accordance with the legislation and department policies.

If you have any questions or concerns, please contact Kyle Lund by phone at 403-297-5649 or by email at kyle.lund@gov.ab.ca.

Sincerely,


 Andun Jaume
 District Approvals Manager
 Southern Region
 Designated Director under the Act

Chloe Cartwright

Regulatory Assistance Division
Southern Region
2nd floor, 2603 - 11 St NW NE
Calgary, AB T2C 1T3
Telephone 403-297-7900
Fax 403-297-2749
reg.ad@ec.gc.ca

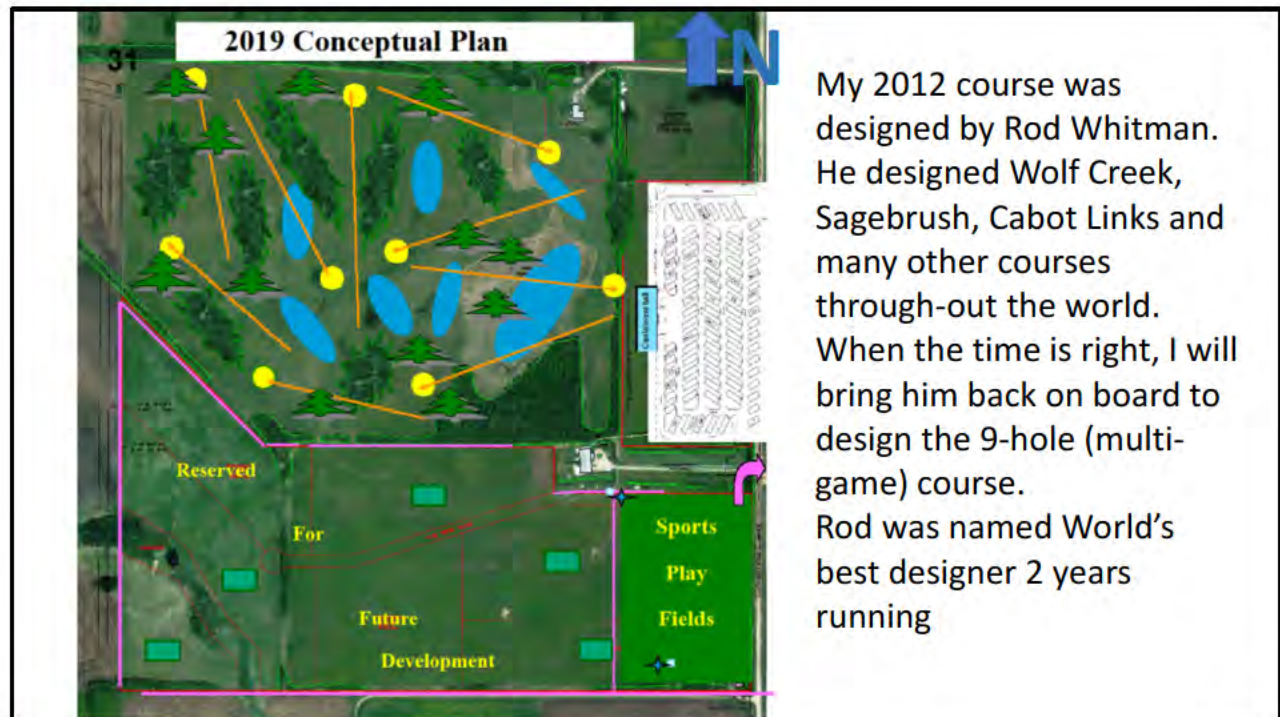
AEP determined that of all the neighbors only J. Davies has a valid Statement of Concern and that we may be in the same aquifer. They will take steps to ensure that Chinook Ridge's water use will not impact his well. Jim Davies water registration is for 3,275 m3/year.

The well Chinook Ridge will be drawing from is capable of producing 20.6 igpm or 49,455 m3/year) is calculated. The analysis indicates the well is capable of supplying water at a rate of 20.6 igpm.

The safe yield for the well is nearly double the license application volume of 26,982 m3/year, allowing for potential growth in water demand at a later date.

From the Solstice report

"It is clear that J. Davies' well was cycling on and off throughout the duration of the pumping test on the Chinook Ridge supply well. As it was in use it is not possible to determine which water level impacts are due to J. Davies' using the well and which may be due to pumping of the Chinook Ridge supply well. No lowering of water levels is noted during the pumping period and no increasing trend in water levels is noted during the recovery period, which would infer the wells are not connected."



My 2012 course was designed by Rod Whitman. He designed Wolf Creek, Sagebrush, Cabot Links and many other courses through-out the world. When the time is right, I will bring him back on board to design the 9-hole (multi-game) course. Rod was named World's best designer 2 years running

This is the overall Concept Plan. It is the **same purpose that Bylaw C7188-2012 was created for in a 7 to 2 vote by elected Council**. This plan breaks the development into 3 Phases although this development permit is only for Phase I & II due to the two-year time constraint imposed on duration of the permit.

Phase I – the RV Park

Phase II – the event center (castle)

Phase III – the 9-hole, walking, wilderness golf course.

The location of the event center was moved to the north where it is slightly lower elevation – still with mountain views but the natural environment lends itself to being a buffer for the neighbors against noise and visual privacy. Here it is surrounded by tall trees on 3 sides.

The 4th side (north boundary) will have a berm and mature trees planted.

The golf course was downsized to a 9-hole walking wilderness course to better meet the goals of a **platform for communications for youth and adults to connect, engage in meaningful conversations and build resiliency**. It is being called a 'golf course' for lack of better terminology. Youth cannot handle a full 18-holes. Patrons will be able to play other games like disc-golf, basketball golf, or soccer golf. This will enable even non-golfers to engage and I intend to make it wheelchair accessible. I hope to make this very affordable for families with children.

Outlined in pink is land for **later** development.

12/13/2020

Rod Whitman Golf Course Design

Like his mentors, **Pete Dye** and **Bill Coore** (Coore and Crenshaw, Inc.), Whitman understands the importance of detailed fieldwork. He spends an extraordinary amount of time on-site throughout the development of his golf course designs, and continues to personally carry out shaping work.

This type of dedication to his craft allows Whitman to continually study and tinker with preliminary design ideas throughout the construction process.


"The most enduring golf courses aren't created on a drawing board in a downtown office," says Whitman. "They're built by golf architects who spend an extraordinary amount of time on-site, in the dirt, throughout an entire project. It's the guys with dirt under their nails who will never build the worst courses and have a better chance to build the best."

[Home](#) - [Rod Whitman](#) - [Philosophy](#) - [Courses](#) - [Media](#) - [Contact](#) - [Gallery](#)

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About Rod Whitman

Rod Whitman has designed and constructed highly-acclaimed golf courses in Canada, the United States, Europe and Asia. His first solo design at **Wolf Creek Golf Resort** in Ponoka, Alberta (opened for play in 1983) perennially ranks amongst the top-20 golf courses in Canada.



"Wolf Creek is so good, so meticulously crafted that it's often used as a study for blossoming golf architects," writes golf journalist Andrew Pennen. "In fact, many of the current 'stars' in the field come to examine its gorgeous contouring and detail to learn the finer merits of moving dirt in ways that are both pleasing to the eye and incredibly rewarding to play."

Whitman's **Blackhawk Golf Club** near Edmonton, Alberta (opened for play in 2004) currently ranks 15th on SCOREGolf magazine's list of the top-100 courses in Canada. "Blackhawk is a bold vision that is reminiscent of the best golf courses created in Canada by the likes of Stanley Thompson," writes golf architecture critic, Robert Thompson. "In fact, Blackhawk may have more in common with (Stanley) Thompson's work, including the great designer's predilection for wide fairways, strategic bunkering and occasionally wild greens, than any Canadian designer in the last fifty years."

Most recently, Whitman designed **Sagebrush Golf and Sporting Club** in collaboration with Canadian PGA Tour professional, Richard Zokol. Located adjacent to Nicola Lake, amid British Columbia's unique, desert-like interior, Sagebrush was named Best New Course for 2009 by SCOREGolf magazine.

[www.rodwhitman.com/rod.cfm](#)

12

Rod Whitman designed the 18-hole course and will design the 9-hole course when the time comes. What a fabulous designer and Alberta born!

Other courses Rod has designed include:

Cabot Links

Winner of the Golf Inc. 2012 Development of the Year Award! Earning top honors for its dedication to the traditional links-style structure and natural beauty.

Blackhawk Golf Club

(18-holes) Edmonton, Alberta, Canada Ranks 15th on SCOREGolf magazine's list of the top-100 courses in Canada

Wolf Creek Golf Resort

(36-holes, Old Course + Links Course) Ponoka, Alberta, Canada Ranks 17th on SCOREGolf magazine's list of the top-100 courses in Canada

Sagebrush Golf Club (18-holes)

(In collaboration with Canadian PGA Tour professional, Richard Zokol) Quilchena, British Columbia, Canada Named Best New Course for 2009 by SCOREGolf magazine

Firethorn Golf Club

(9-hole addition) Lincoln, Nebraska, USA

Golf du Medoc (36 holes)

(Chateau course with Bill Coore + Vignes Course) Bordeaux, France, EU

Golf Langenstein

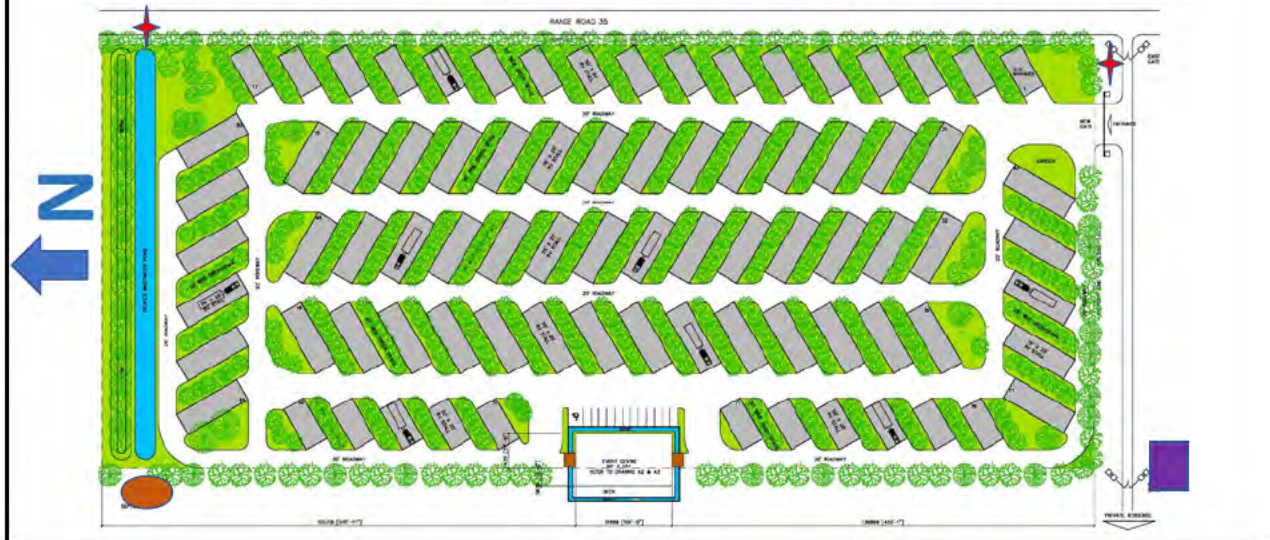
(27-holes) Singen, Germany, EU

Klub Rimba Irian

In collaboration with Bill Coore and Ben Crenshaw Kuala Kencana, Indonesia

Landscaping Plan and Underground Utility Services

This is the layout of the RV Park showing location of 81 Stalls, Castle, Stormwater pond and the tree buffers between each stall. The interior road is one way. Range Road 35 is the east boundary, and my driveway is the south boundary.

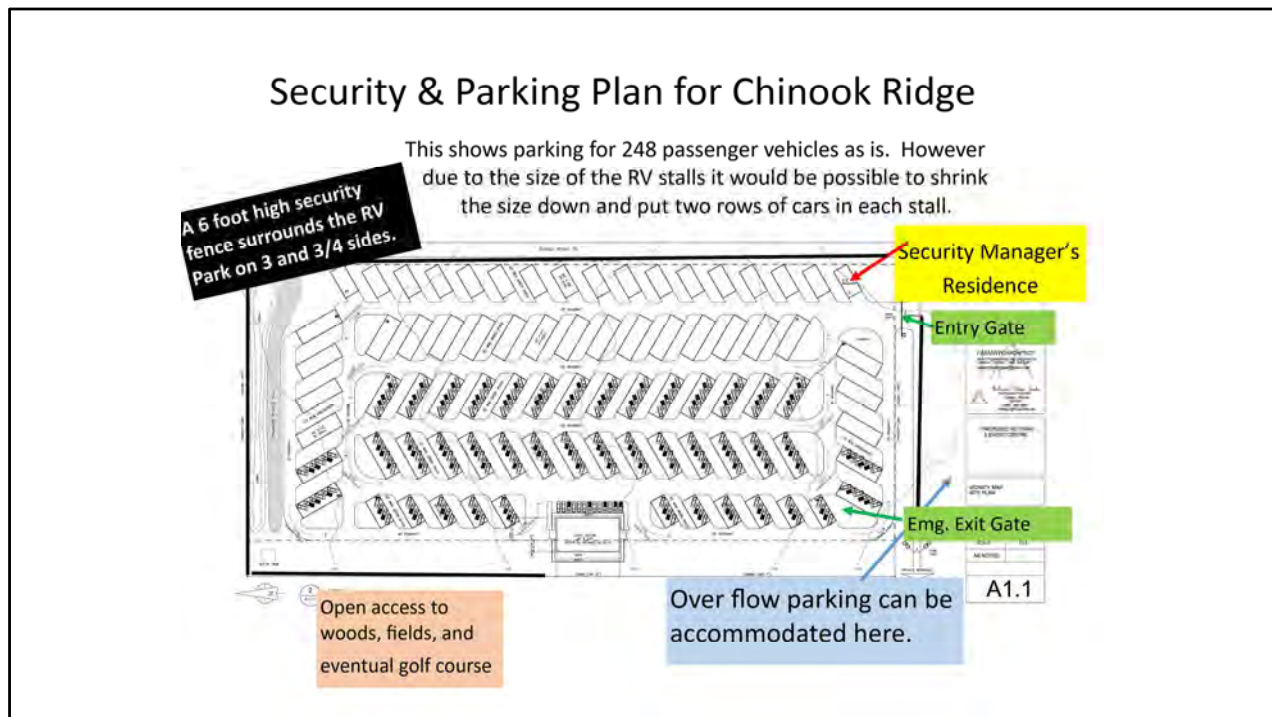


RV Park area is already surrounded on 3 sides by mature trees. A dirt berm with mature trees will be constructed and mature trees planted at the north end of the RV Park to act as a buffer to neighbors in that direction. Additionally, between each RV Stall are 25' buffer strips for privacy, further ensuring the area has a luxury out-door feel. In each corner area there will be more trees and native plants. It is not necessary to irrigate any of these areas. There is sufficient natural precipitation for them to establish and thrive.

The **BLUE** storm water pond will have lift stations (for firetrucks to draw water) at **RED stars**. As second lift station will be positioned at the entry gate to draw fresh water from the **PURPLE** underground cistern in the event of an emergency. Potential for skating on the pond in winter. Each stall will be fully serviced with water and power.

Septic lines will provide disposal to an underground septic tank in the far north west corner of the property (**ORANGE oval**). These tanks will be emptied by septic vacuum trucks as required. There will be no over-ground outflow!

Later when the golf course is being developed a septic treatment system will be installed, treated waste-water will irrigate specific spot areas of the course with an UNDERGROUND irrigation system – the KISS system. Designed to 'wick' water up from the root zone, there is no overland spray.

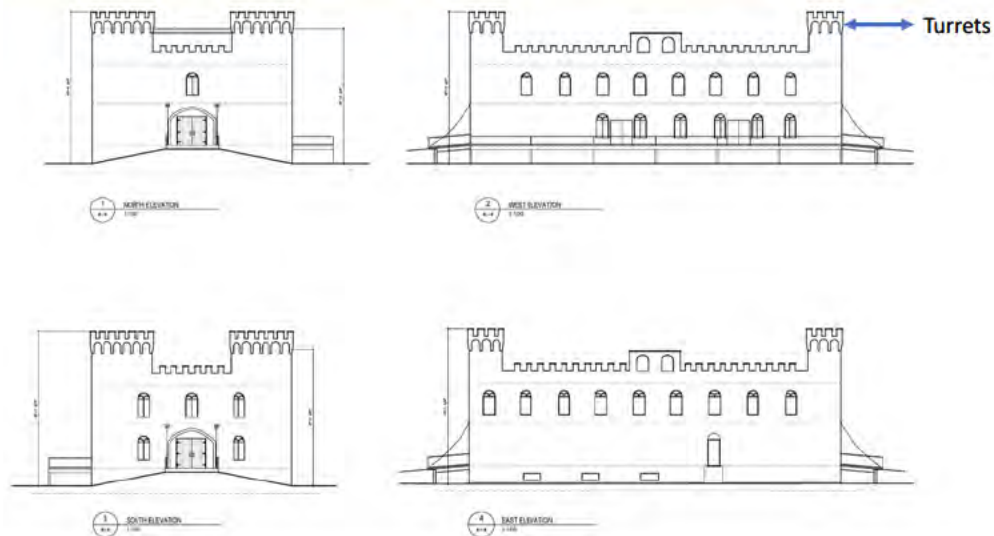


Many neighborhood issues were considered in conceptualizing the design of this development at the same time as considering how the experience will benefit the clients. This slide deals with site security and parking.

First you will note that there will be a **6-foot-high security fence** erected on **3 and 3/4** sides of the RV Park. An opening to the west will allow patrons to access the walking meditation paths, the chapel, and the eventual golf course. Prior to the course's construction other fields will be available for baseball, soccer, pickleball, etc. After the course is constructed – these 'other fields' can be relocated to the north to the area specified in slide 5. Note: there is a secondary emergency exit as required by the County. Exits are shown in **GREEN**. There will be a RV stall dedicated at the entry for live-on-site security person. They will be able to monitor who and when people arrive and leave, as well as ensure any issues arising between patrons are resolved in a timely fashion. It should be noted here that **the entry gate will be operated electrically**, patrons will have a code for entry and there is **currently a security camera** on that location. Another **camera with 360-degree** operation and digital recording will be added prior to the park's opening.

One of the Development Permit conditions was to supply a Parking Plan for 245 vehicles driven by patrons of the event hall. The above map shows how easily those vehicles can be accommodated. These stalls are not in addition to the RVs but instead of RVs as there can only be 500 people on site. PERIOD

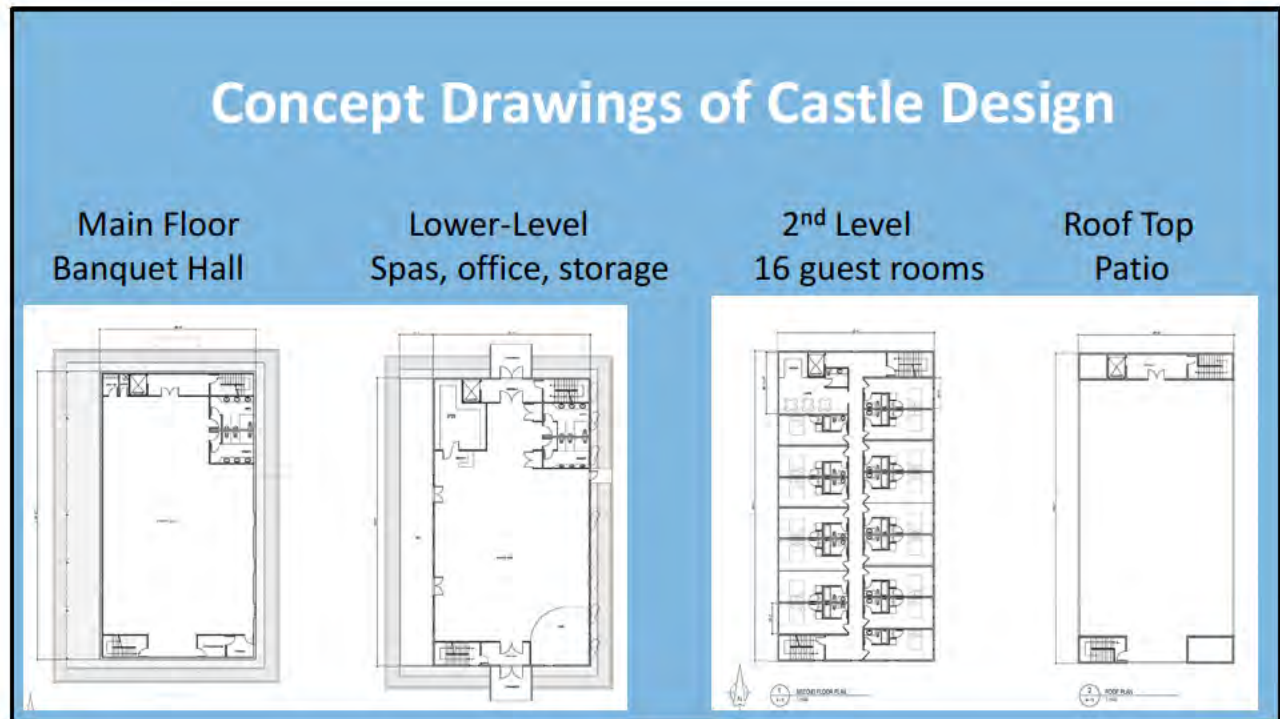
Concept Drawings of Castle Design



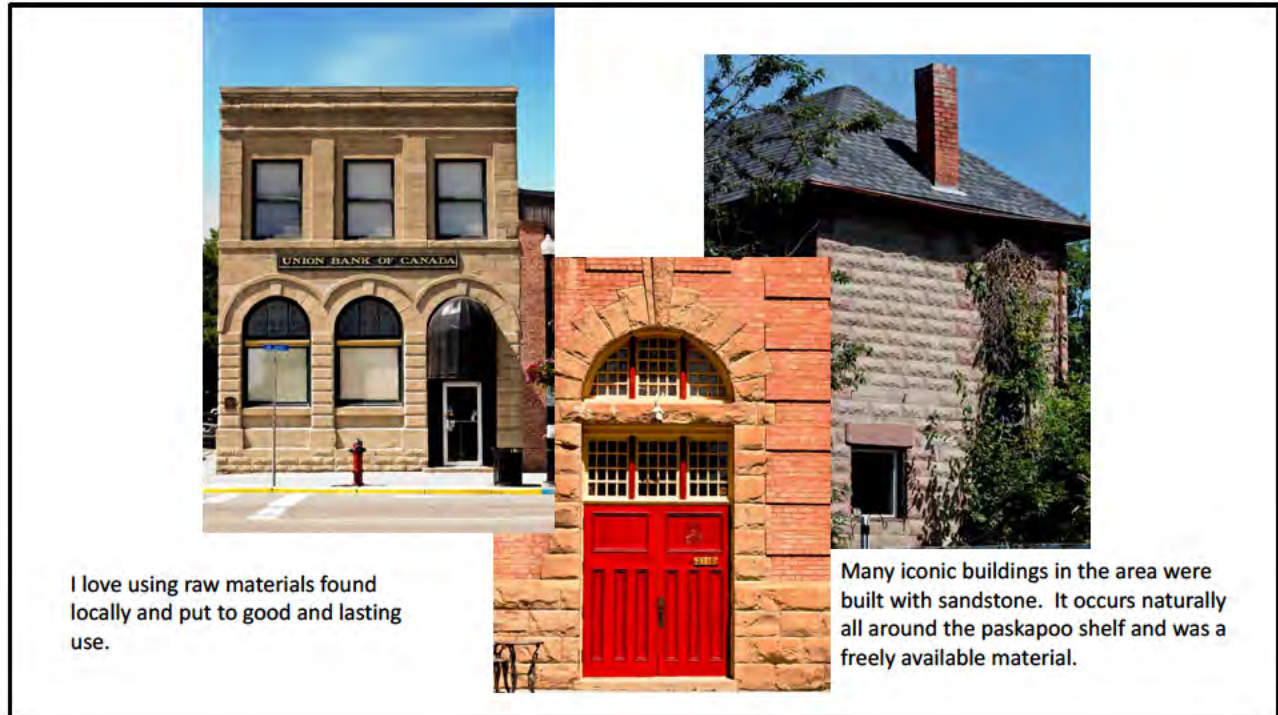
This Development Permit is for a Scottish Castle design. It is intended to be whimsical (not medEVIL as one of the opponents likes to portray it. The previous DP called for a barn-like structure, but that style was recently constructed just east of Cremona, the Mountain View Heritage site as an event center. Unfortunately, they are unable to offer accommodations or expansion for campers. This 2-storey structure provides:

1. Roof top patio with mountain, and eventually the course, view.
2. 16 guest rooms and a family style kitchen in the second level.
3. A 500-seat banquet hall which will have a full-service commercial kitchen to cater events.
4. The lower level will contain his and hers spas, continuous swim pools, infra-red saunas, steam rooms and esthetician services.

The exterior finish will be sandstone as can be found locally. The main structure will be completed by Mag-Pro Construction out of Aldersyde, AB. It is a modular-wall construction, built in their plant and transported and erected on site. Detailed design, construction management schedule, etc. will be completed as part of the Building Permit process.



These hotel rooms plus the family style kitchen on 2nd floor are intended for event guests who do not have an RV and to keep impaired drivers off the roads. This is just a view of the layout of rooms on each floor.



Sandstone was readily available even to the out-lying rural towns. It was used for entire buildings and as decorative elements on brick buildings as sandstone became harder to get. Particularly after a fire destroyed many buildings in Calgary, the mayor there and in other towns mandated that all new public buildings be constructed of sandstone or brick.



Product Overview

2014



High Performance Structural Insulated Panel System



Magpro is my builder of choice not just because of the custom design and quick erection but also because of the materials: none allergenic, won't mold or warp and very well insulated.

The MAGpro Panel

Key Attributes and Benefits



Occupant Health and Comfort



MAGpro SIPS have no nutrients to feed mould or insects

No off-gassing - inert material is virtually VOC-free

Snug, comfortable and quiet space

Magpro Building Systems will build the Castle, not just yet, but within 2 to 3 years. It is a complete fabricated building system, built in their factory then transported to the site and erected. It happens very quickly once the order is placed.

The MAGpro Panel

Key Attributes and Benefits



Simplified Construction



- Fewer envelope materials
- Fewer trades
- Minimal site waste
- Faster time to lockup
- Straight, plumb walls
- Backframing not necessary

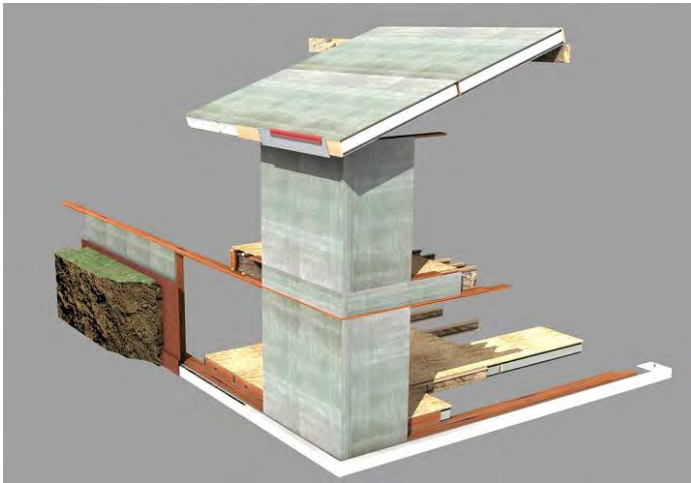
Complete building envelope in place in the same time it takes to frame a building

In the same time it takes to frame a building, you can have your complete envelope in place: exterior sheathing, insulation, and interior wall sheathing - all in one component. The product surpasses the vapour diffusion requirements for both interior and exterior sheathing, which means you can also skip the building wrap.

The MAGpro Panel



Used from foundation to roof



A high performance envelope for high performance buildings:

- Energy Efficient
- Simplified Construction
- Health and Safety
- Strong and Durable
- Versatile

The complete structure.

The MAGpro Panel

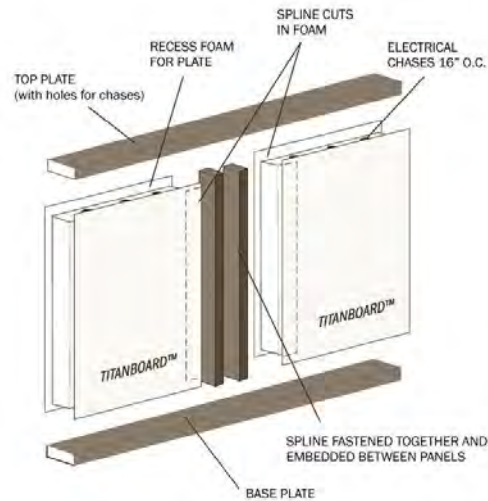
*From the manufacturer of the original
MgO SIP*



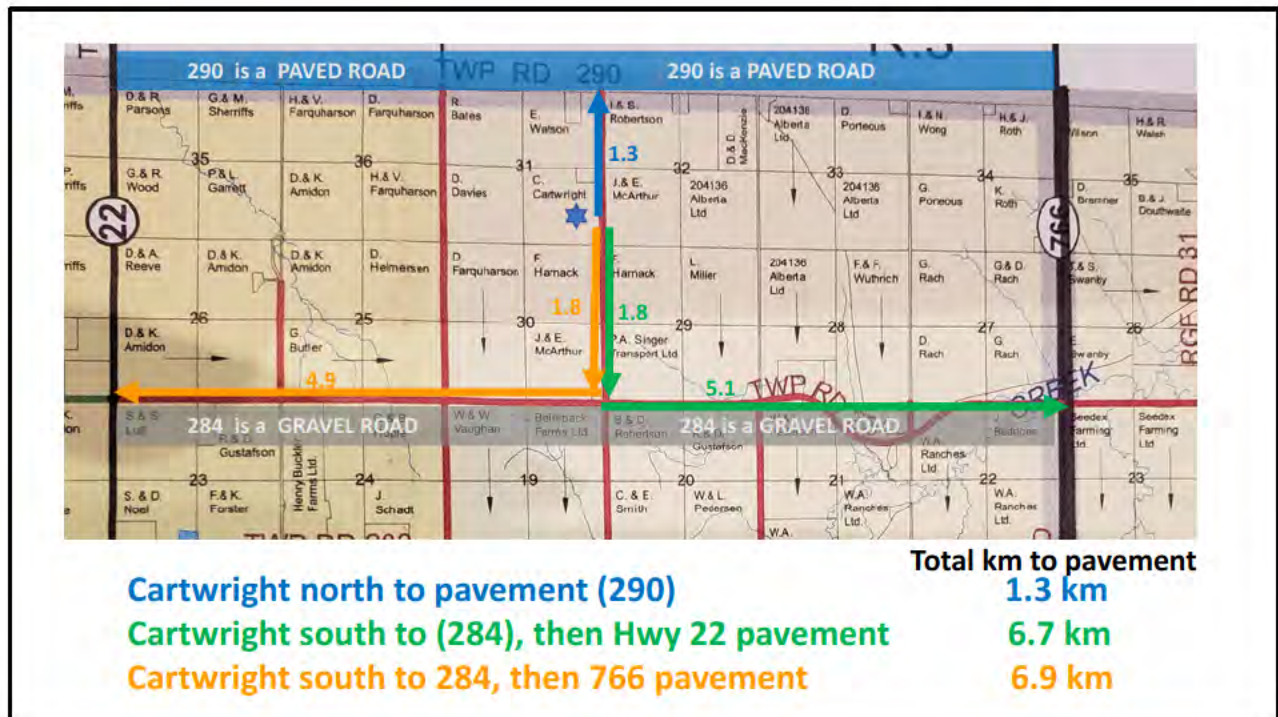
It Started Here in 2006!

- Magnesium Oxide Sheathing
- EPS Type 1 Insulation
- Dimensional Lumber
 - single for plates
 - 2-ply for splines
- 4 ft OC dimensional lumber connections (or as specified by Engineer)

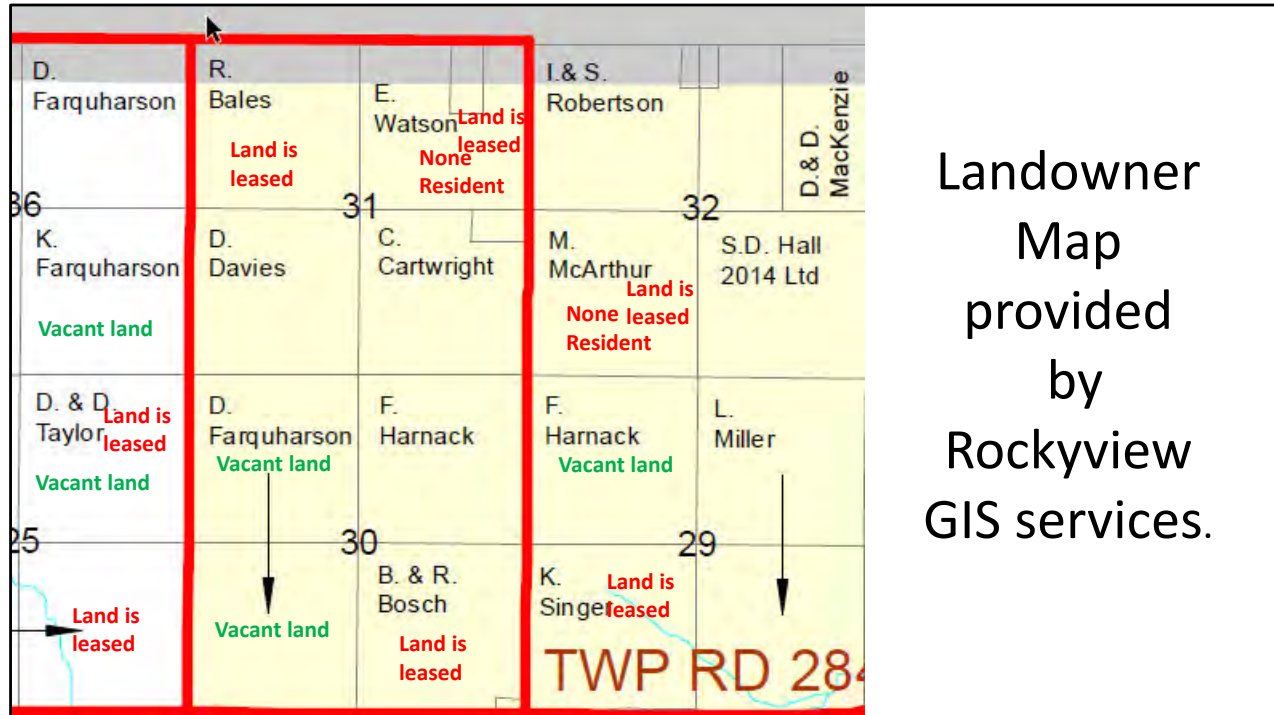
Current assembly in use since 2007, installed in approximately 500 buildings around the world.



**RV & Castle location,
size, roads and views of
neighboring properties**



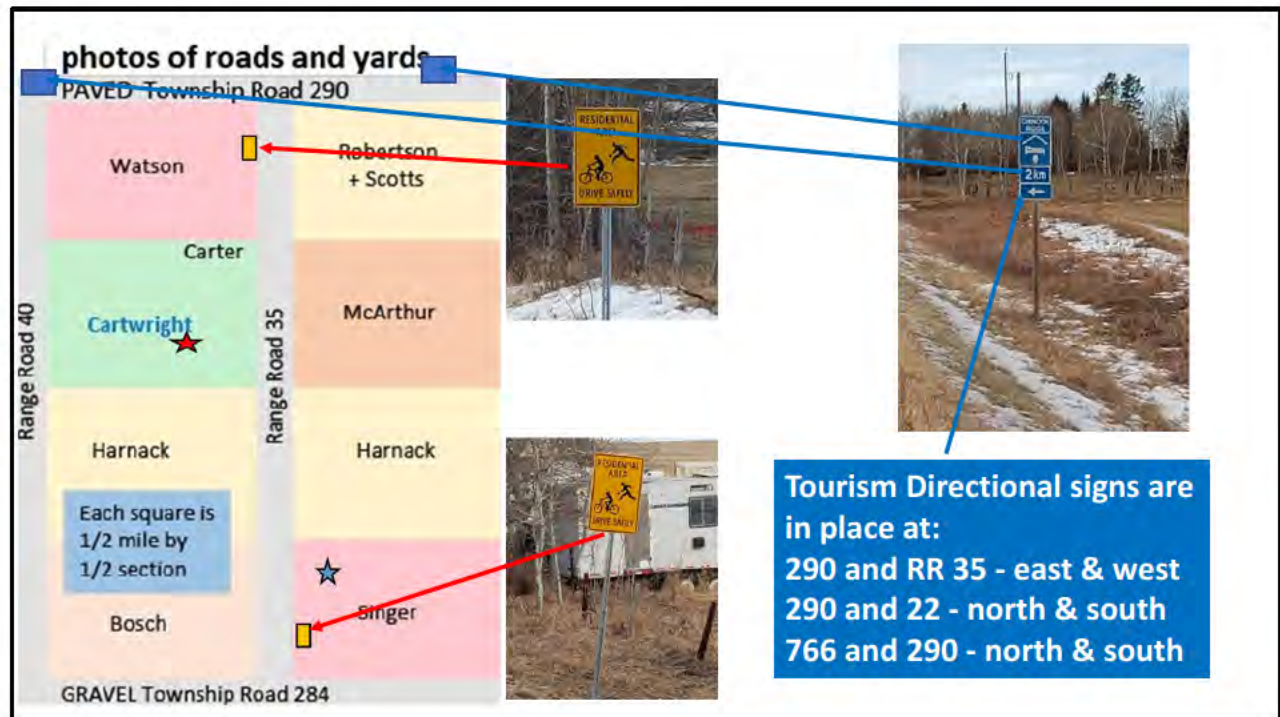
Distances between Chinook Ridge and various paved roadways are measured. **The closest paved road from Chinook Ridge is north 1.3 KM to Twp. Rd. 290.** The other directions result in gravel roads for 6.7 or 6.9 kms. Most RVers would prefer to stay on pavement as much as possible.



Landowner
Map
provided
by
Rockyview
GIS services.

This just shows the location of landowners. The only appellant that lives in the area is K. Singer. Mr. and Mrs. Watson live on an acreage above the town of Cochrane. Ms McArthur lives in Calgary. K. Farquharson lives several miles away and D. Farquharson lives on the NE quarter of 36.

All of the other Appellants live even further away except Davies who lives directly west of the subject property.



These are existing signs. Residential Area signs were placed by RVC at my request to slow down traffic in an attempt to address neighbor's concerns about dust. Residential Area signs were installed several years ago near the Singer property and the Watson property – opposite ends of Range Road 35. It wasn't significantly efficient. New methods to slow down traffic should be explored. Alternatively, we could consider installing a playground (with sign), speed bumps or a cattle gate to slow down speeders. Dust suppression chemicals are applied to this road when required. A lot of the traffic is not local. It is people taking short-cuts where there are no police.

Eight of these blue Tourism signs have been in place since 2003. With the new development all that is required are new face-plates to be installed on existing posts leading to Chinook Ridge RV Park.



This slide shows where the RV Park will be situated. Photo is taken as I exit my inner yard, looking left (north).



This photo is taken from the same location, as I exit my inner yard but looking to the right, South. You can see my hay shed if the distance at the far right which is the far SE corner of my quarter. I also want to draw your attention to the wide strip of land between the driveway and the trees. This is and equal distance on both sides of my driveway and could be used for angled over-flow parking if ever required.



This is my front entrance gate along Rng Rd 35. Both the stone pillar/planters and the custom gates will be moved to the inner yard. This **access will be widened** to accommodate RVs and **wider stronger electric security gates** will be installed. RVs will turn right once inside these gates to enter the RV Park. Immediate to the right inside the park is the living quarters of the site manager/security staff. A security camera already monitors who enters and who leaves the land. Another camera will be installed to monitor the park. Even with just one camera now I have been able to help capture perpetrators of local crimes.



This photo is from my driveway exit heading south on RR 35 towards the Harnack's 2 quarters on both the left side and the right side of RR 35. The Singer property is in the far distance on the left. You cannot see the Singer property from my land or visa versa. Singers appealed the height of the turret and my Castle, but it cannot be seen nor does it impact anyone. Period.



Now I have passed the hay shed and am well along the road adjacent to the Harnack's quarters. It is their driveway on the right side. In the distance you can start to see the Singer's roof. It is a large 2 storey duplex. Initially the land was in the name of Singer Trucking – at the time of land redesignation. The mailing address for notifications was at his office. Later the land transferred into Karen Singer's name and mail started going to her. You will note in Slide 7 of the powerpoint that Karen Singer wrote a letter stating they "**are not opposed** to the development" but elaborated that they are concerned about the dust and water.



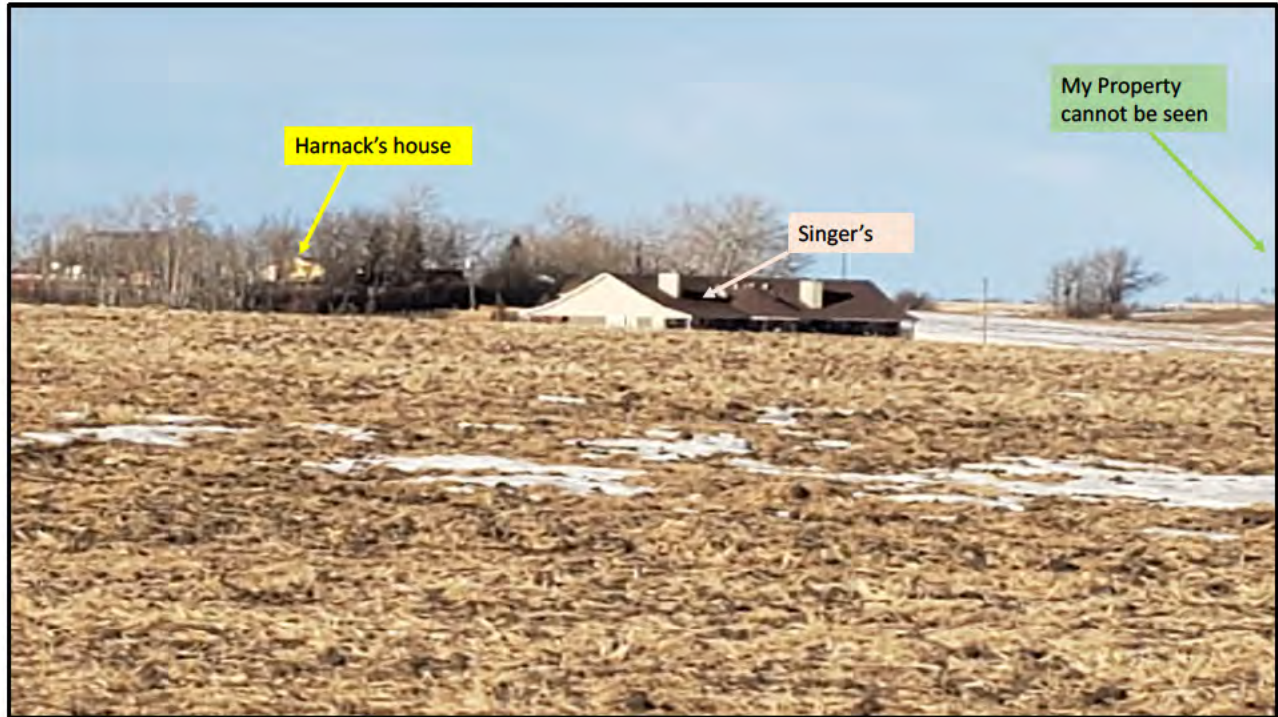
This photo was taken as I passed the Singer's yard and house. Another photo will show the view backward. Please note there are a variety of construction materials and trucking/hauling/storage equipment lined up along the property line adjacent to RR 35. Many trucks, campers, dump trucks, skid steers, flat deck trailers, site offices, pit-run, concrete blocks, wood scraps, etc. It has been this way for many years. I would prefer my patrons not have this view when coming to my property hence the tourism signs direct them north to the 290 and then south on RR 35.



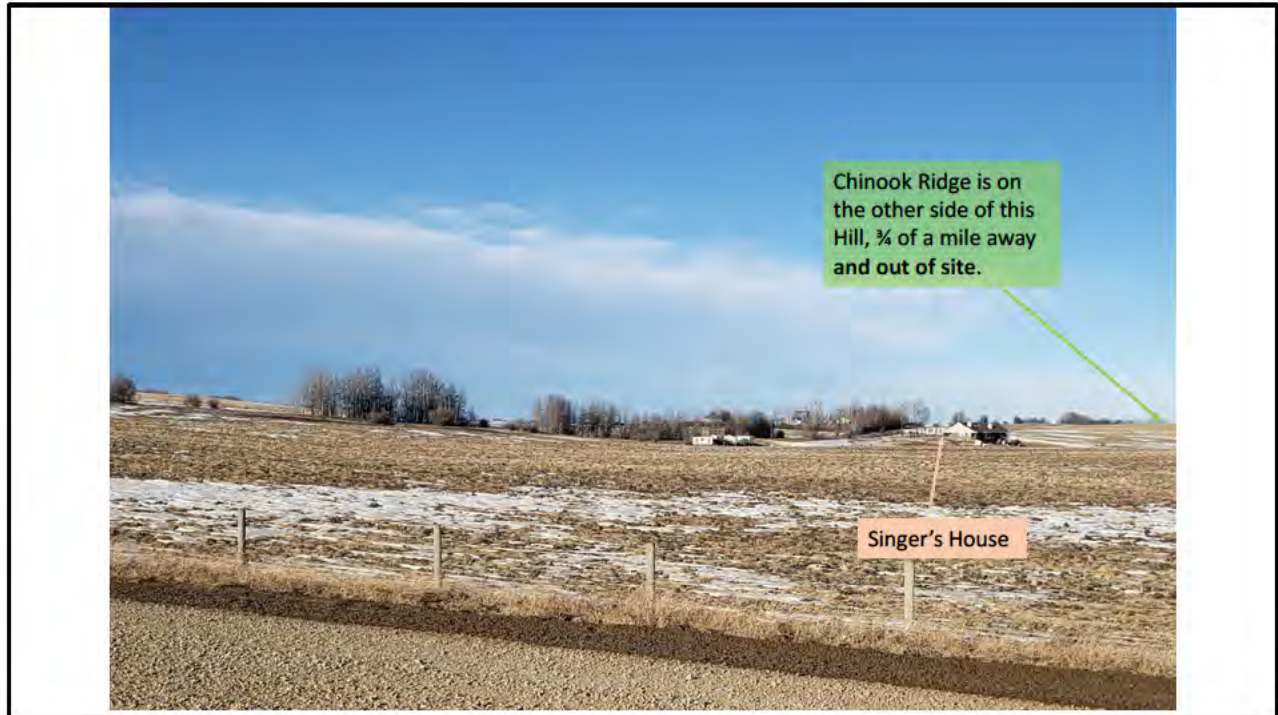
Another view looking back towards the Singer's duplex. Some of the equipment is hidden on the north or east sides of the house.



This just shows a better view of the 'scatter'. I am insulted that Singers would complain about the turret being .7 meters over height when their yard is the real eye-sore of the neighborhood.



I took this photo and enlarged it to show how **low the Singer's home is in relation to its surroundings.**



This is the view of Singer's property taken from Twp Rd 284 (highway 574). It is also a gravel road and forms the south boundary of their quarter, so if they were concerned about dusty roads – why buy there? Again, this shows that my property is not visible from theirs. Mine is contained and out of sight. Singer's do not farm their land it is rented out. They do keep a couple of horses.



This is a photo of RR 35 heading north just past the Singer's driveway showing the relatively steep incline on the way to my property.



This is the view just as I turn into my driveway of the McArthur property across the road. They have 3 approaches, yet it is still relatively private due to the trees. Ms McArthur does not live here. She inherited the property from her parents after the Land Redesignation Hearing in 2012. I do not believe she was even aware of it until I applied for the recent development Permit. The house and the land are rented out to separate individuals. She does not farm her land.



This is just another view of my entry gate that will be relocated and replaced with a wider gate. I will need to remove (or I hope move) one or two of the tall evergreens (white spruce) to allow the access to the RV Park.

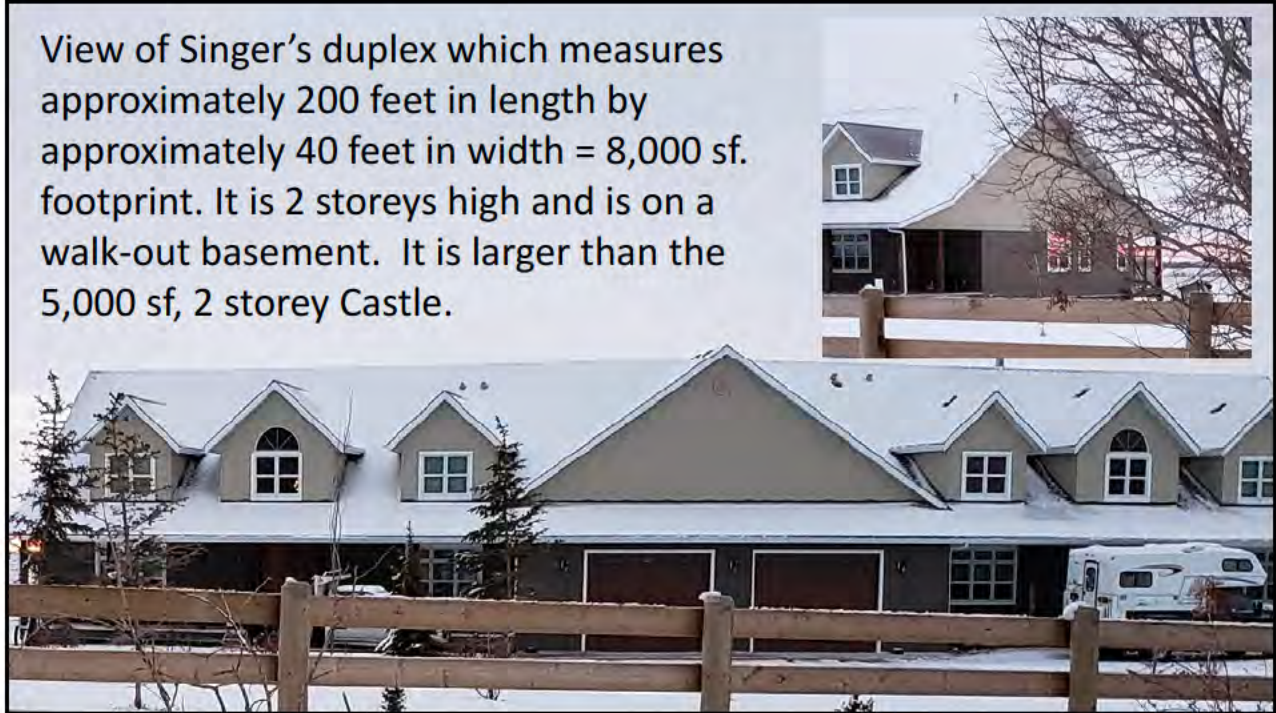


A view of the park area from my driveway.

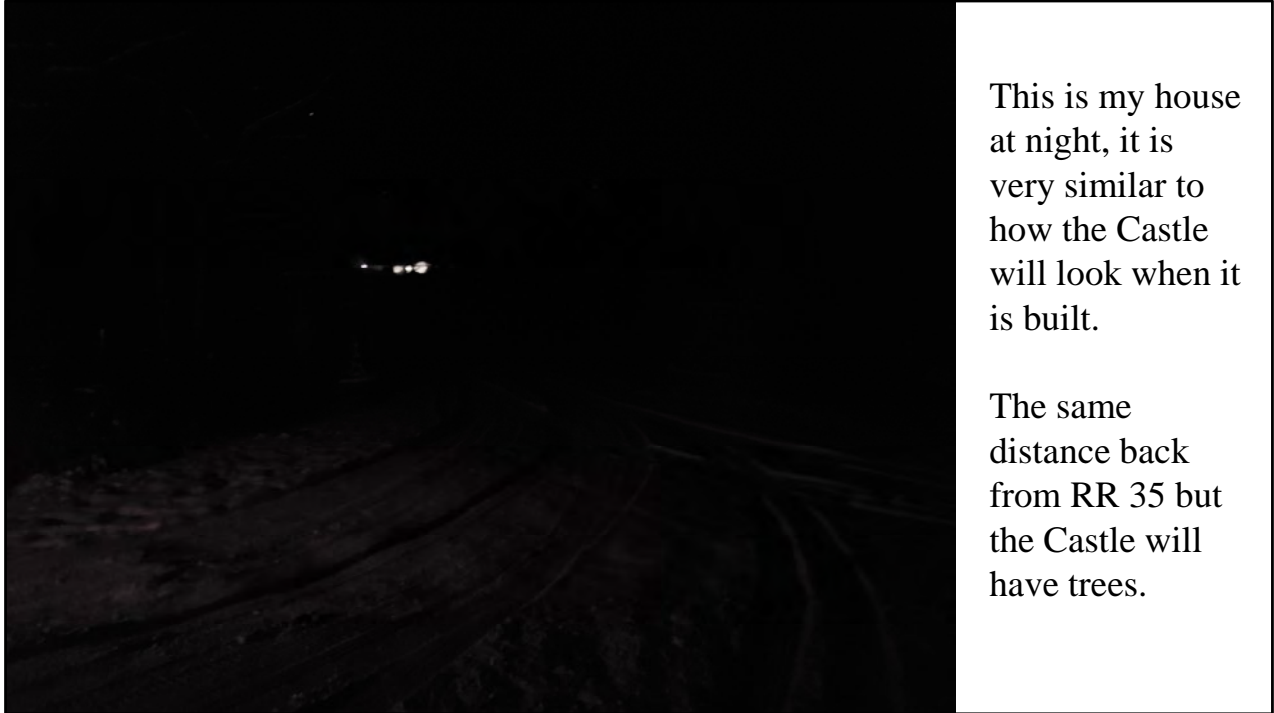


This photo is taken from the back deck on my house as I wanted to show how far away my nearest neighbor to the west is. Mr. Davies home is along the west boundary of his quarter while my house and development are close to the east boundary of my land. From time to time I hear Mr. Davies cows bawl – during weening. I have never smelled manure and have no reason to complain. From time to time a cow or two busts through the fence line. I call or text him and he deals with this promptly. I do not believe that Mr. Davies lifestyle or livelihood will be impacted by my development. The RV Park is far enough away and secluded by trees. The eventual walking golf course will be designed so as the ball direction will be away from his property and contained well within mine.

View of Singer's duplex which measures approximately 200 feet in length by approximately 40 feet in width = 8,000 sf. footprint. It is 2 storeys high and is on a walk-out basement. It is larger than the 5,000 sf, 2 storey Castle.



This is the view of the front of Singer's duplex home with a side view in the upper corner. This was taken from RR 35. I am approximating the footprint of the building is about 8,000 sq ft. It is 2 storeys high and sits on a walk-out basement open to the east. This building is larger than the 2 storey Castle which is only 5,000.



This is a photo of my house at night from RR 35. I have all the house lights on, yet you can barely see it. My house has a footprint of 4400 sq ft. The Castle is 5000 sq ft and 1 floor taller but at a lower elevation. Not very significant and there are no trees in the way in this photo. The Castle will sit at the same distance back from the road.



This is the view from RR 35 when there are no leaves on the trees. If you look quickly and hard as you are driving by you will be able to see the sandstone castle in the distance – through the first row of perimeter trees to the next row on the other side of the RV Park. I have approximated the size of it in the distance with this drawing. Keep in mind many more trees will be planted both in the perimeter and within each stall's 25-foot-wide buffer zone making it even more difficult to view from the road.

Quotes from Councillors previous Hearings

Councillor Margaret Bahcheli, Division 3: *“I find this one extremely difficult because the application was so exceedingly well done, well researched, and I have every faith that there is all the right energy behind this project. I like the whole concept of the golf course.”*

Rolly Ashdown, Division 4 - Reeve: *“It is a different golf course; it is a rural golf course and I have never seen one plus I do trust the Alberta Government’s Water licensing issues that they are going to put the applicant through so I will be supporting the motion to approve.”*

Paul McLean, Division 9, Deputy Reeve and councillor for the subject area *“We have heard a 5/4 split both issues are in provincial jurisdiction. Transportation and Water. I think there are opportunities to move forward and I encourage a reapplication.”*

Earl Solberg, Division 5. *"I will support the motion. Frankly, there is a campground at Bottrel already and so I think that, and I heard that the local people are able to use this golf course. It will be bringing it back to wildlife habitat that it once was. Looking at the picture from the 50s it seems to me to be better environmentally than a hay field. I think the employment factor is important for this area, up to 60 jobs is relevant. From my own experience we have a golf course in my area that came in similar to this. It had opposition from the neighbors and now the people are quite accepting of it and quite happy to have there and do go to the golf course and club house for lunch on occasion. So, I think once one of these gets put in place it becomes an amenity to the locals as much as it is from the outside. I am sure there are solutions to the 574 using maybe the gravel-lock process. It is something to be investigated."*


Greg Boehlke, Division 6, *"Upgrades of RR of 35, 2 miles of upgraded road. Water, wastewater, & stormwater. There ARE upgrades to the community. I welcome that request from staff."*

I took Council's advice and re-applied in 2012. The Bylaw passed in a 7/2 vote.

Unfortunately, the audio and comments from the 2012 Hearing have not been found.



Help us build strong, resilient Alberta families.



Chinook Ridge Chapel in the Woods

Our usage is very compatible with the rural atmosphere as found by Rocky View Council in 2012. Facilities like this can help reconnect youth with their elders in a relaxed, non-hurried fashion where they can learn not just sportsmanship but ethics, morals and hope for our future and the futures of our grandchildren. Unfortunately, it is difficult to measure social value and contributions to emotional and intellectual health in a business plan. But it is there.

Thank you so much for your undivided attention!



Chinook Ridge
285049, Range Rd 35
Madden, AB T0M 0S0

October 11, 2020

Attention Ms. Cartwright,

Dear Ms. Cartwright:

RE: Results of the pumping test conducted on Water Supply Well for License (GIC Well 2090656) on September 15 – 19, 2020 and update to water supply requirements

WATER SUPPLY REQUIREMENTS

Groundwater usage for the site is based on an 81-stall full service RV Park, a 14 suite hotel and a 500 seat banquet hall. All facilities operate year-round.

Water demands for a full-service RV Park, based on Table 2.2.2.2.B in the Safety Codes Council Alberta Private Sewage Systems Standard of Practice (2014) is 180 litres per campsite per day, or a maximum of 5,325 m³/year.

Water demands for the banquet hall, based on Golf Club usage of 113 litres per day per seat, is calculated at 20,637 m³/year.

Hotel usage is calculated at 90 litres per bed per day. Assuming two beds per room water demands for the hotel is calculated at 920 m³/year.

In addition to the above services a small amount of irrigation water will also be required on an annual basis of approximately 100 m³.

The total annual water requirements for operating the RV park, hotel, banquet hall and for minor irrigation is 26,982 m³.

PUMPING TEST

A 48-hour pumping test was conducted on Chinook Ridge's supply well (GIC ID 2090656) from September 15 – 19, 2020 by personnel from Wild Rose Water Wells. Water levels were measured in Chinook Ridge's supply well, two observation wells on Chinook Ridge property, one well on Jim Davies' property and one well on Karen Singer's property.

The purpose of the investigation was two fold: 1. A previous report undertaken by Stantec indicated a lower well productivity towards the end of the 24 hour test conducted in 2011 and this longer term test was undertaken to see if this trend continues, and; 2) To see if neighbouring wells are on the same aquifer as the aquifer utilized by Chinook Ridge and whether pumping of the water will adversely affect the neighbouring wells.

The location of the supply well and all observation wells are shown in Figure 1. The GPS location of all wells were measured by personnel from Solstice using a handheld Garmin64s. Well depths of the wells

on the Chinook Ridge property were measured to confirm the placement of the wells with respect to the well records. Elevation measurements were made with an optical transit of the Chinook Ridge and Davies wells.

Water level measurements were undertaken by placing Solinst pressure transducers in all wells with the exception of the Davies well as Mr. Davies requested nothing be placed down his well. Water levels were read in the Davies well with the aid of a Ravensgate Model 300 sonic water level device which measures water levels by sending a sound wave down the well. All transducers were cleaned with disinfectant and new rope was used prior to placement down the well.

A barometric transducer was installed at the site during the pumping test which allowed for barometric corrections of the wells that had pressure transducers in them. No large changes in barometric pressures were noted during the duration of the test.

The buildup period could have lasted longer however the readings show that buildup rates were very slow at the end of the 48 hour buildup period and no useful data would be obtained by further measurement.

An air photo showing well locations is as follows:

FIGURE 1. Aerial Image Showing Location of Supply and Observation Wells



The three Chinook Ridge wells are in close proximity with the Davies well being approximately twice the distance than the two Chinook Ridge monitoring well. The Singer well is located approximately 1300 m away from the Chinook Ridge well. Calculations based on the aquifer parameters in the Stantec report and utilizing the Cooper-Jacob formula indicated that the Singer well would see no response to pumping during the test.

The publicly available well details for all wells are summarized in Table 1. The Water Well Drilling Reports for each well are attached to this letter report.

TABLE 1. Supply and Observation Well Details

<u>Parameters</u>	<u>Chinook Ridge Supply Well</u>	<u>Chinook Ridge South Obs Well</u>	<u>Chinook Ridge SW Obs Well</u>	<u>K. Singer Obs Well</u>	<u>J. Davies Obs Well</u>
GIC Well ID	2090656	2090655	2090609	1240306	392001
GPS Location	51°25'57.32"N, 114°24'41.44"W	51°25'59.05"N, 114°24'50.50"W	51°25'57.90"N, 114°24'37.51"W	51°25'22.74"N, 114°23'56.56"W	51°25'58.33"N, 114°24'47.34"W
Well Depth (m BGS ¹)	14.63	10.67	14.33	27.43	16.76
Aquifer Zone (m BGS)	9.45 – 15.24	8.23 – 10.67	8.53 – 14.33	20.12 – 21.95	10.67 – 16.76
Screened Interval (m BGS)	10.06 – 13.72	8.53 – 10.67	10.67 – 13.72	21.34 – 27.43	10.67 – 16.76
Surface Casing (m)	+0.75 - ?	+0.85 - ?	+0.62 - ?	+0.51 – 6.10	+0.3 – 6.10
Static water level after installation (m, BTC ²)	6.54	7.77	7.60	6.47	12.19
Static water level prior to pumping test (m, BTC)	5.40	5.05	6.30	6.13	3.78
Top of Casing Elevation (masl ³)	1212.00	1214.20	1213.07	1236.51	1212.71
Ground Elevation (masl)	1211.25	1213.35	1212.45	1236.00	1212.41

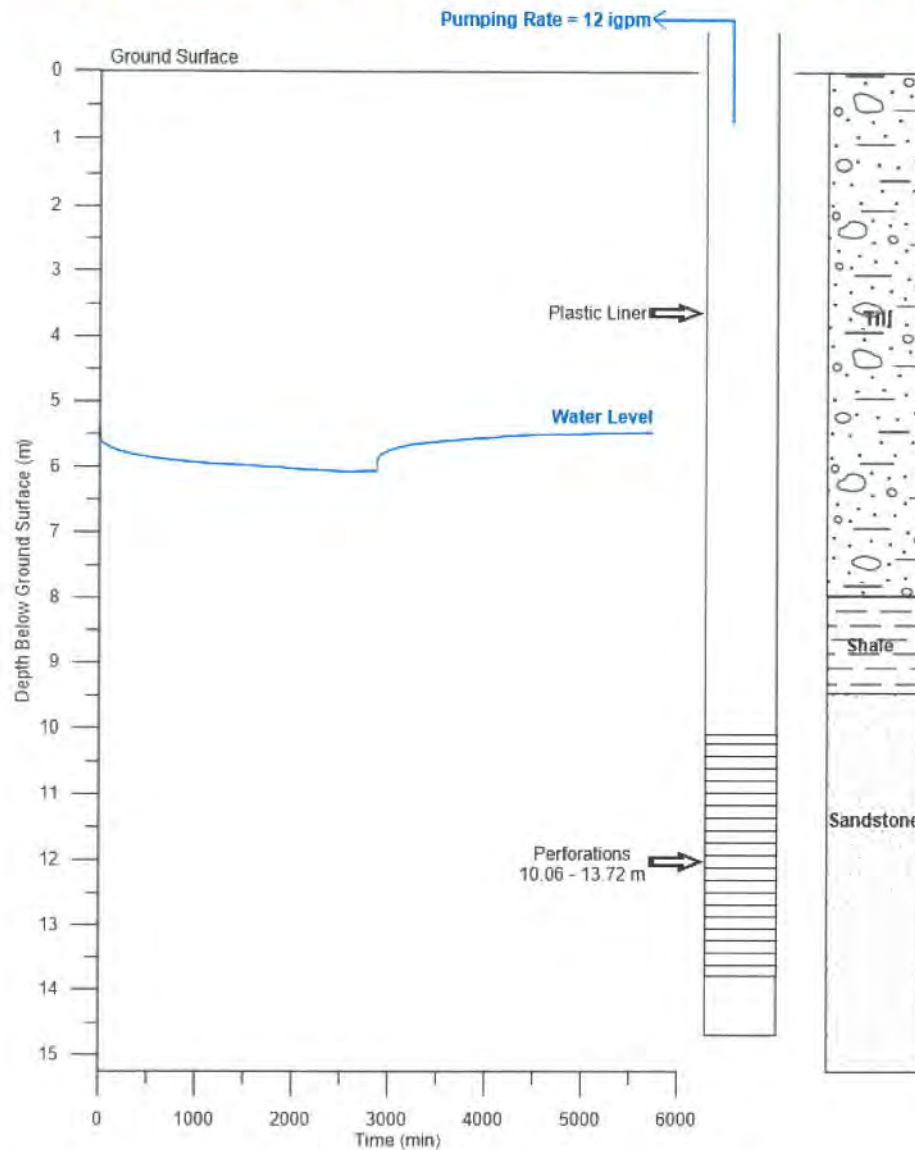
¹BGS = below ground surface, ²BTC = below top of casing, ³masl = meters above sea level

DETAILS OF THE PUMPING TEST

The 48-hour pumping test started at 11:50 am on September 15, 2020, with the supply well being pumped at 12 imperial gallons per minute. Water levels were measured in the supply well and the four observation wells over the 2878 minute pumping period and for an additional 2862 minutes following pumping cessation.

A graph showing water levels with time and a schematic of the well construction and strata of the supply well is as follows:

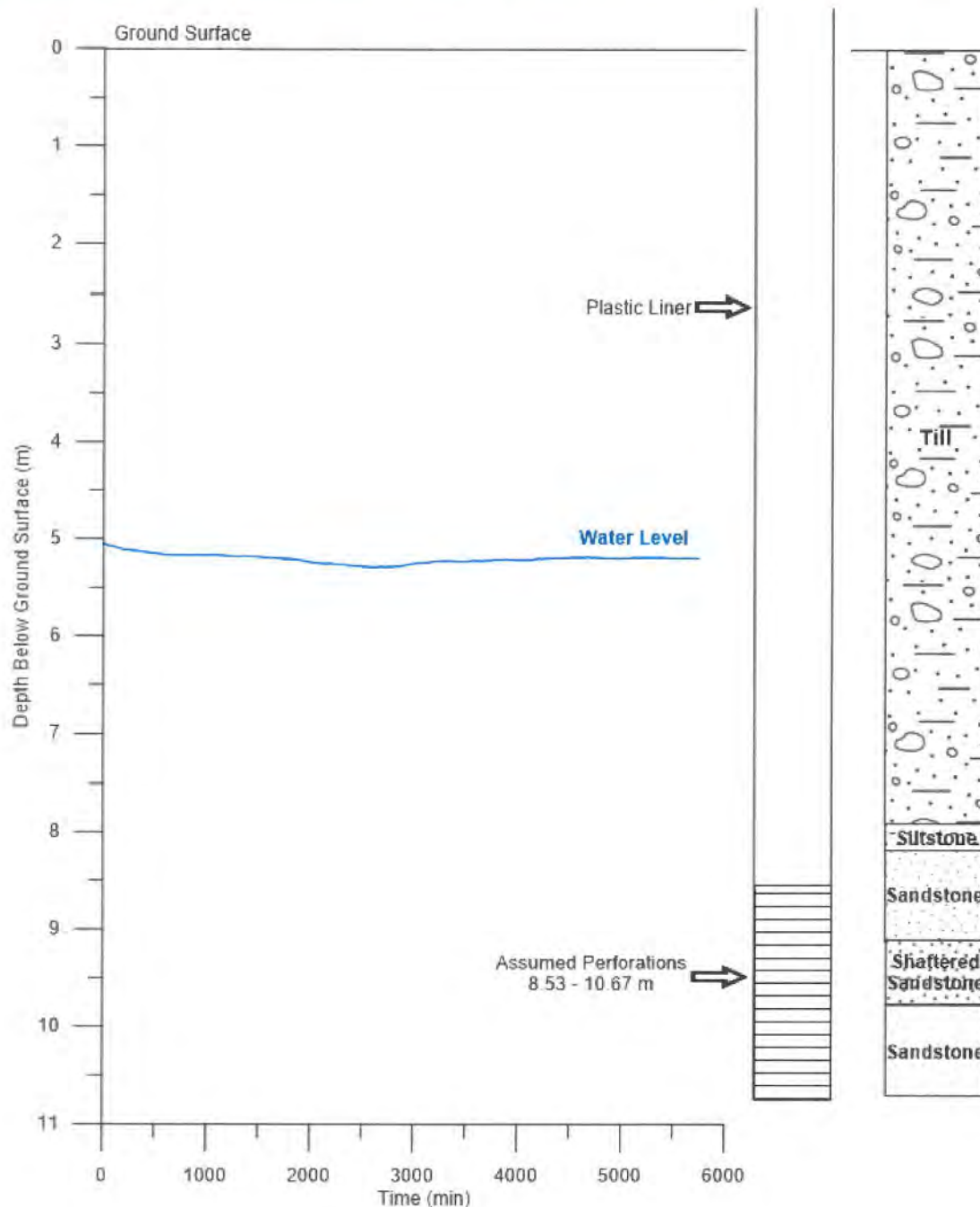
FIGURE 2. Pumping well schematic with water levels during the pumping test



The well had an initial static water level of 5.40 metres below ground surface (bgs) prior to pumping and drew down 0.67 metres to 6.07 metres bgs by the end of the pumping period. Water levels had built up to 5.48 metres at the end of the recovery period for an 88% recovery.

A graph showing water levels with time and a schematic of the well construction and strata of the south observation well is as follows:

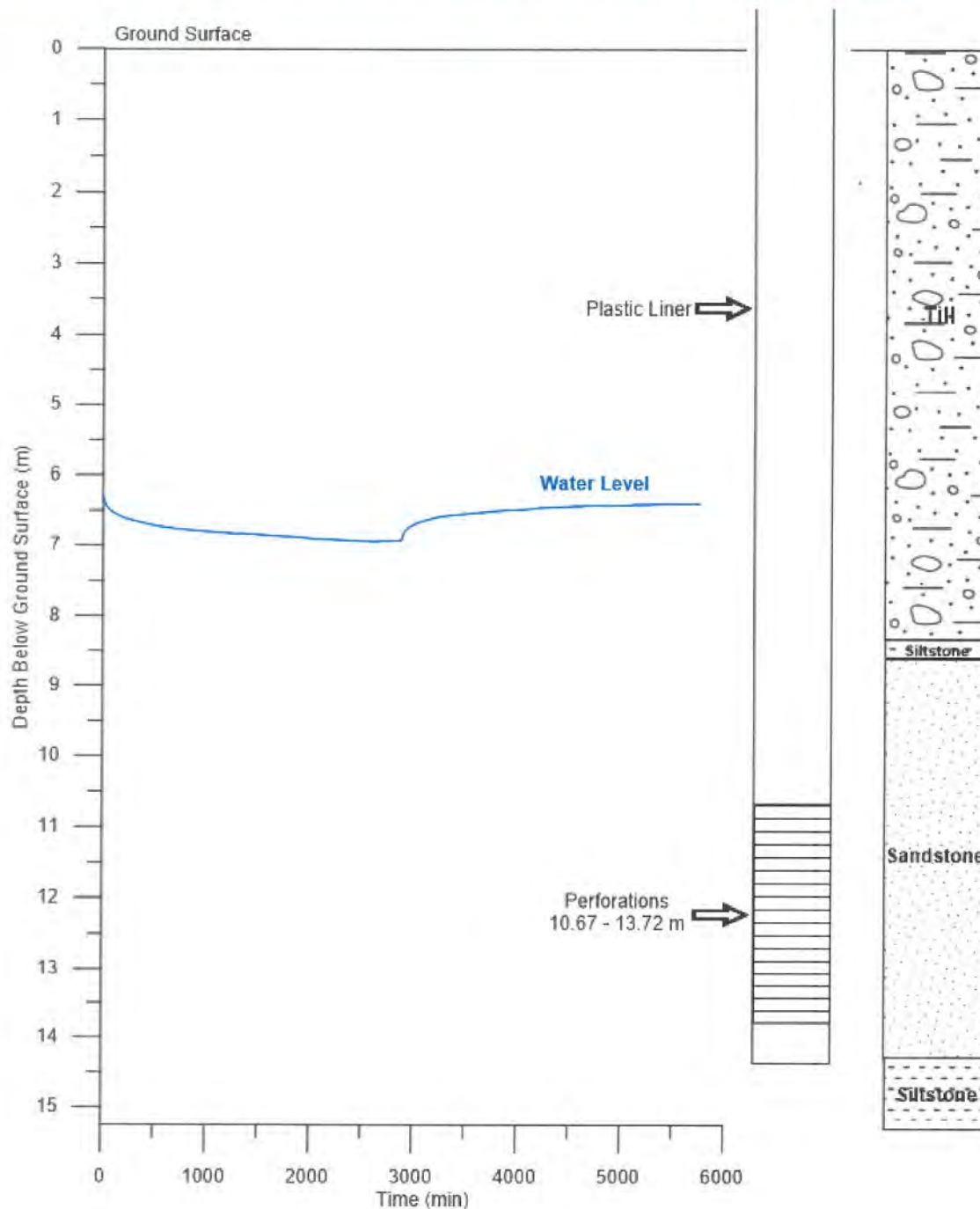
FIGURE 3. South observation well schematic and water level during the pumping test



The well had an initial static water level of 5.05 metres below ground surface (bgs) prior to pumping and drew down 0.23 metres to 5.28 metres bgs by the end of the pumping period. Water levels had built up to 5.20 metres at the end of the recovery period for a 35% recovery.

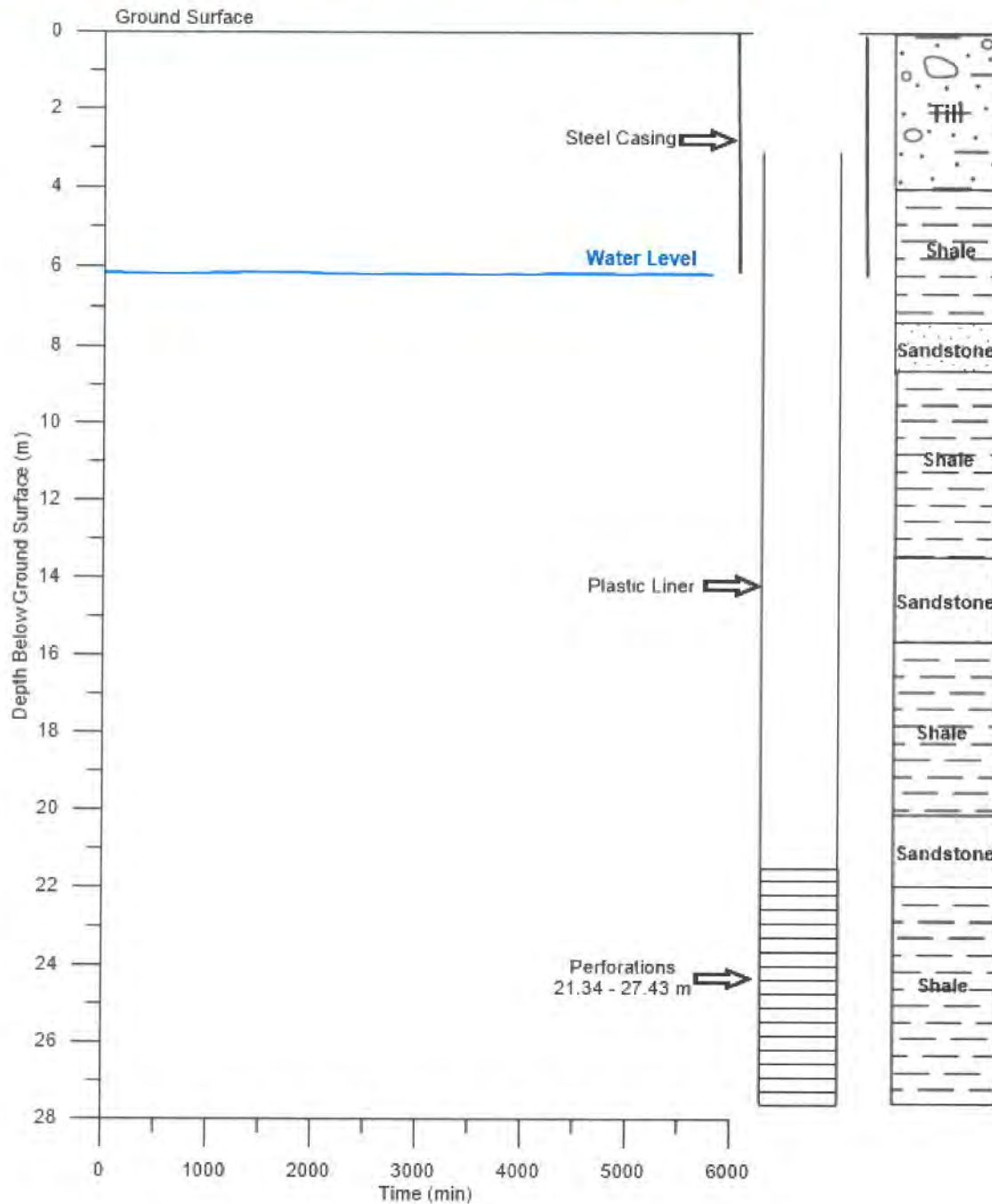
A graph showing water levels with time and a schematic of the well construction and strata of the southwest observation well is as follows:

FIGURE 4. Southwest observation well schematic and water level during the pumping test



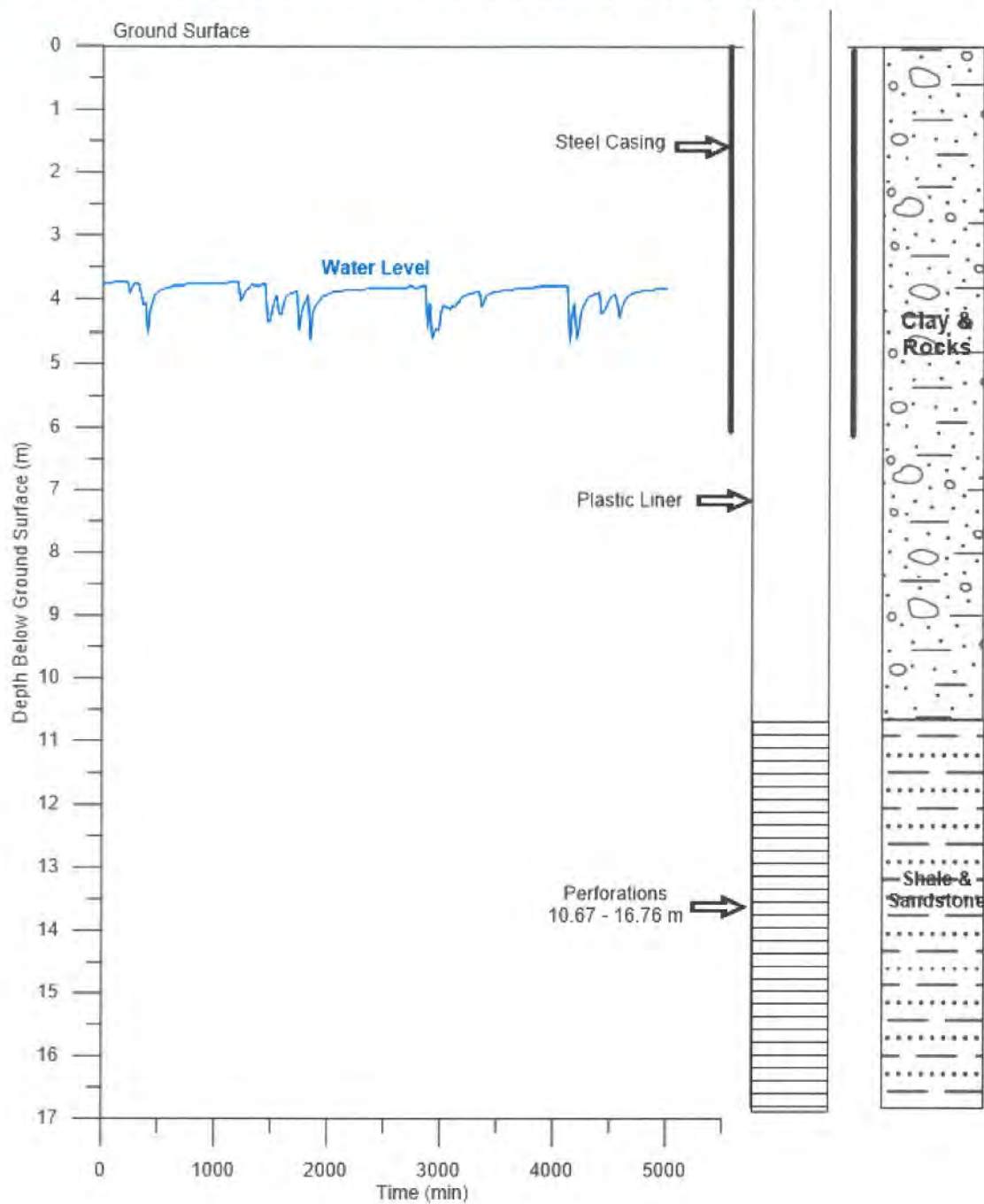
The well had an initial static water level of 6.30 metres below ground surface (bgs) prior to pumping and drew down 0.62 metres to 6.92 metres bgs by the end of the pumping period. Water levels had built up to 6.38 metres at the end of the recovery period for an 87% recovery.

A graph showing water levels with time and a schematic of the well construction and strata of K. Singer's observation well is as follows:

FIGURE 5. K. Singer well schematic and water level during the pumping test

The well had an initial static water level of 6.14 metres below ground surface (bgs) prior to pumping and drew down 0.01 metres to 6.15 metres bgs by the end of the pumping period. Water levels had built up to 6.15 metres at the end of the recovery period for a 100% recovery. The 0.01 meter fluctuation in water level is within the noise range of the pressure transducer used to record the water level in K. Singer's well.

A graph showing water levels with time and a schematic of the well construction and strata of J. Davies' observation well is as follows:

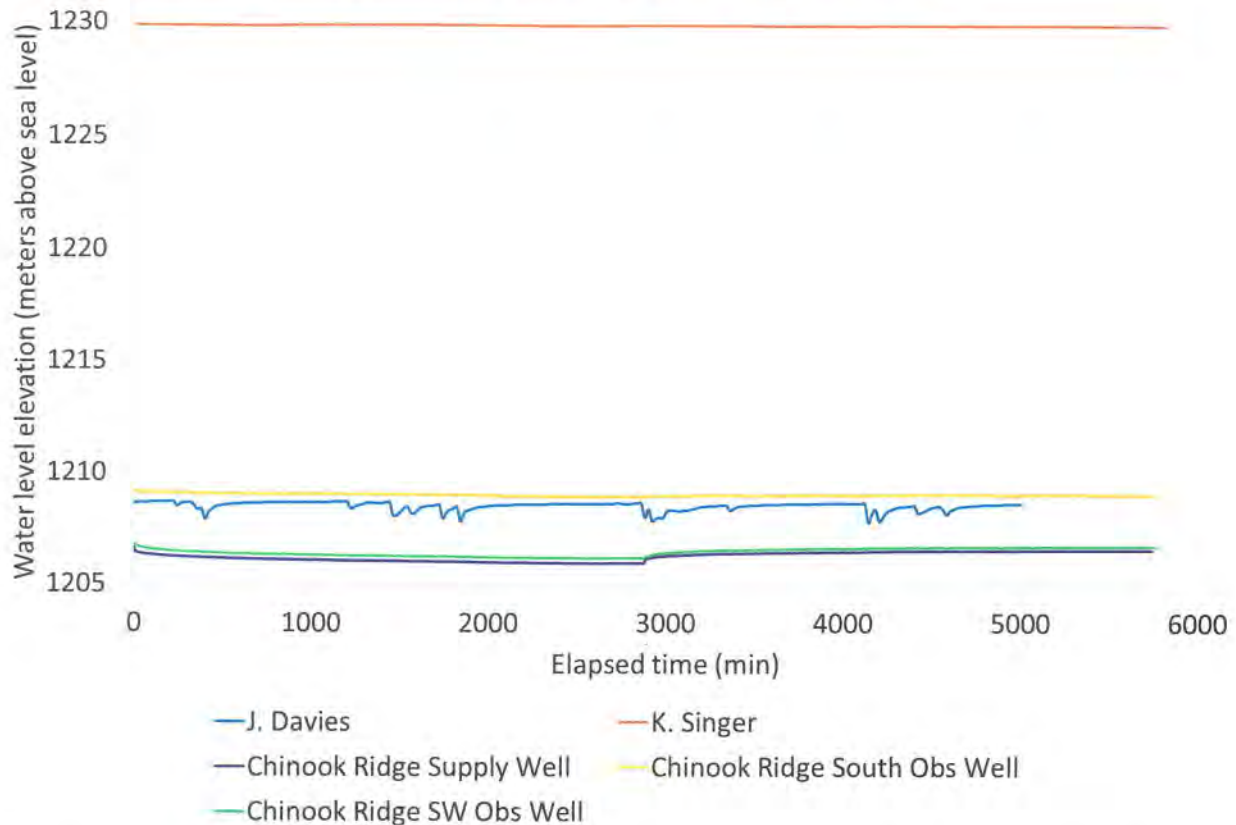
FIGURE 6. J. Davies well schematic and water level during the pumping test


The well had an initial static water level of 3.78 metres below ground surface (bgs) prior to pumping. By the end of the recovery period the water level in the well was 3.81 meters bgs. The well was cycling in and out of use throughout the pumping test so water level changes attributed to pumping from the Chinook Ridge supply well are not able to be discerned. It appears that the pump is cycling in approximately 12 hour increments which would align with scheduled cattle feedings, likely using an automatic waterer.

WATER ELEVATION

The elevation in meters above sea level was determined for the top of casing for all 5 wells using a topographic map with a 2 meter contour interval and Leica optical transit survey to measure the relative elevation of the 3 Chinook Ridge wells and J. Davies well. The plot below shows the elevation of the water level in each well during the pumping test.

FIGURE 7. Elevation (meters above sea level) of the water level in each well



The water level in the Chinook Ridge supply well and southwest observation well track each other very closely, indicating they are producing from the same aquifer.

The Chinook Ridge wells and J. Davies' well are at similar elevations, while K. Singer's well has water levels that sit over 20 meters above the Chinook Ridge wells.

The elevation of the water level in the Chinook Ridge supply well compared to K. Singer's and other wells in the area can also be represented in a geologic cross section. A topographic map showing the location of the wells relative to each other is shown in Figure 8. The geologic cross section (A – A') is shown in Figure 9, with lithology and well completion details shown taken from each wells Water Well Drillers Report.

FIGURE 8. Topographic map showing location of wells and geologic cross section line

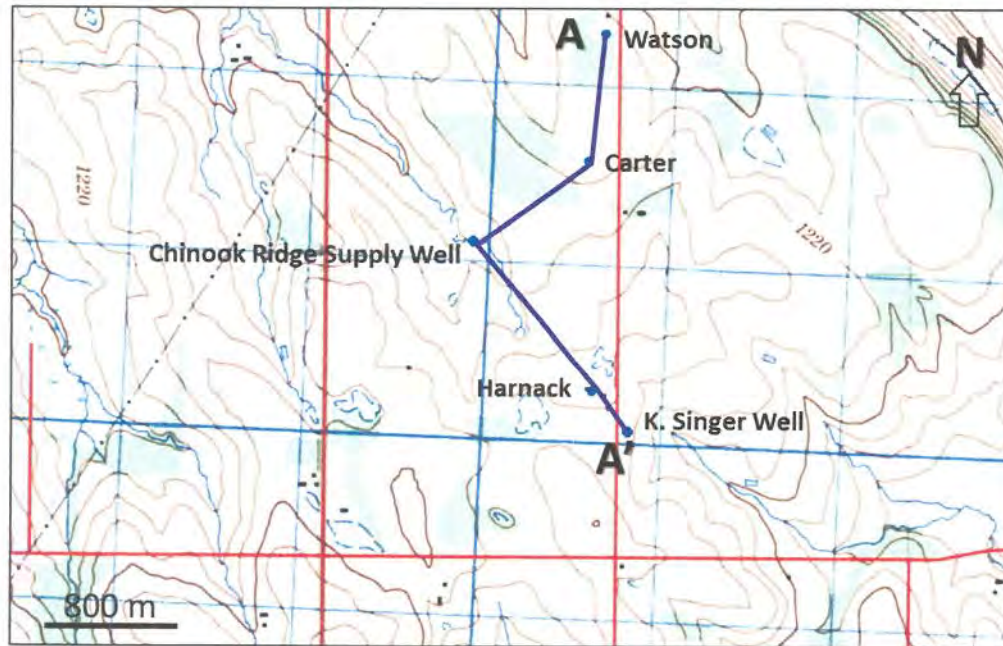
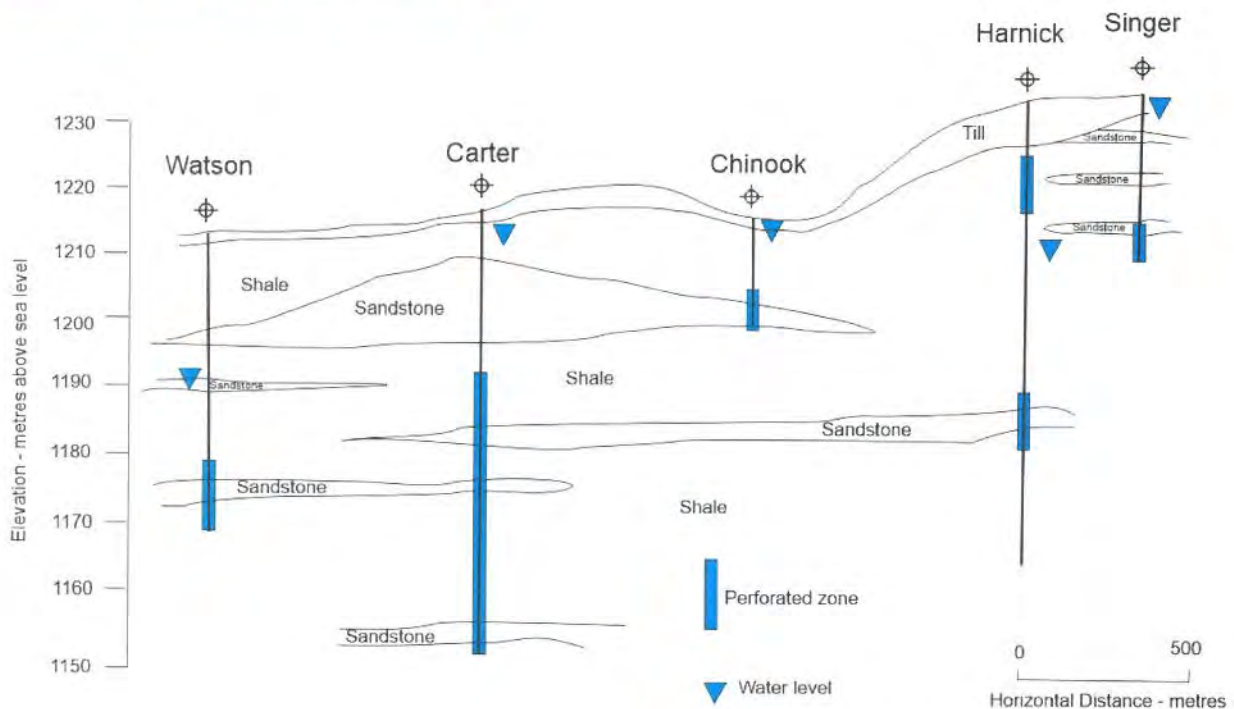


FIGURE 9. Geologic Cross Section A – A'

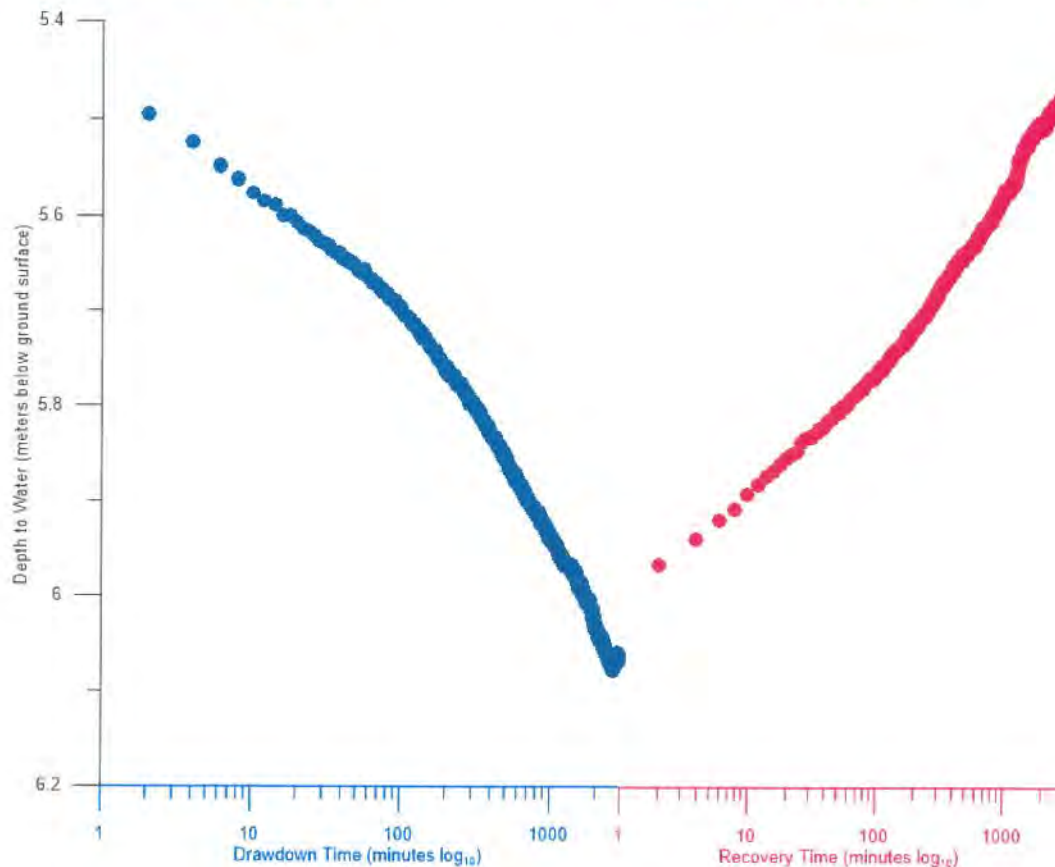


The static water levels shown in the cross section are those measured during the September 2020 pumping test of the Chinook Ridge supply well (see Table 1). K. Singer's well is not producing from the same aquifer as the Chinook Ridge supply well.

PUMPING TEST INTERPRETATION

A dual semi-log graph of the pumping test data in the Chinook Ridge supply well is shown below to illustrate the water level data during the pumping test more clearly.

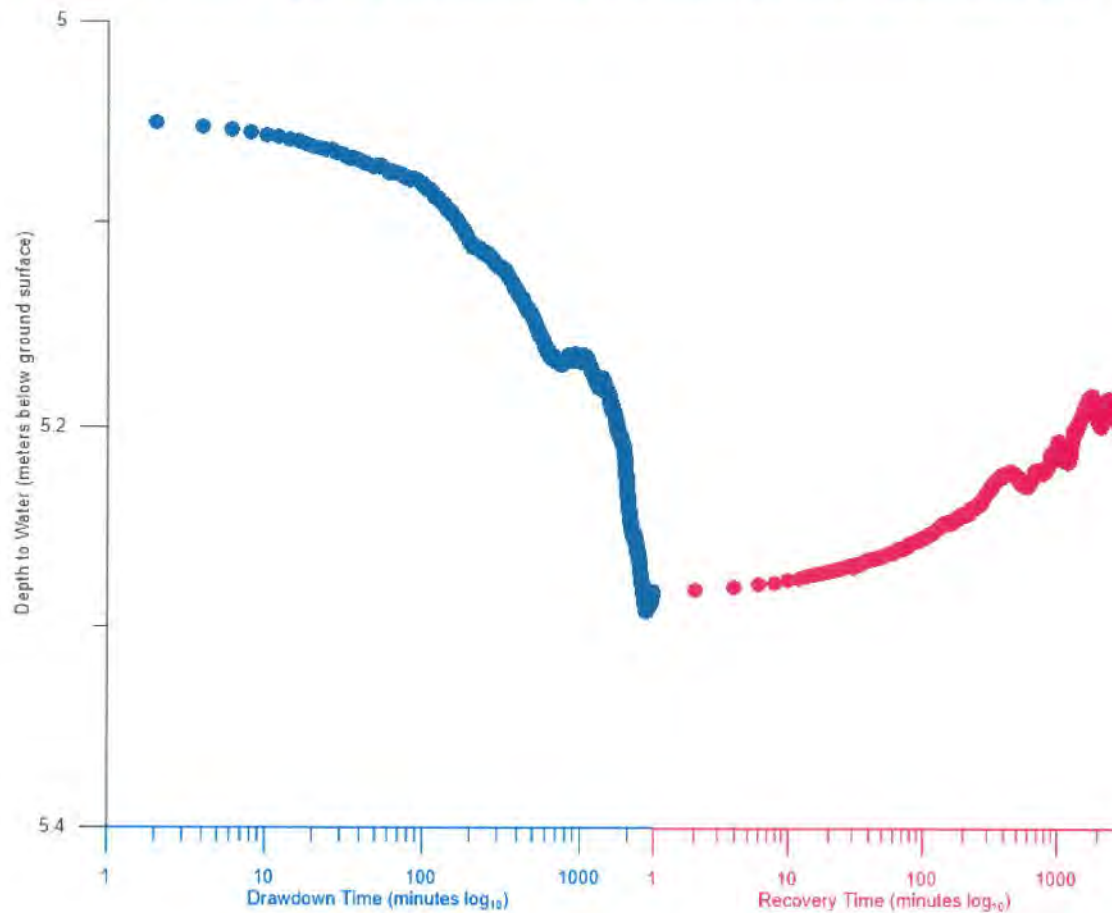
FIGURE 10. Dual semi-log graph of drawdown and recovery in the supply well



The rate of drawdown in the supply well declines at a constant rate over the first 100 minutes of pumping. From 100 minutes until the end of the pumping period the rate of drawdown in the pumping well increases (doubles) but remains relatively constant. The increase in drawdown rate likely indicates a limited aquifer extent, with an aquifer boundary being encountered in the subsurface around 100 minutes into pumping. A similar curve form is seen in the recovery data, with early recovery occurring at a slower rate before increasing around 100 minutes into the buildup period. This also indicates the aquifer the supply well is producing from is of limited lateral extent.

A dual semi-log graph of the pumping test data in the South observation well is shown below to illustrate the water level data during the pumping test more clearly.

FIGURE 11. Dual semi-log plot of drawdown and recovery in the South observation well

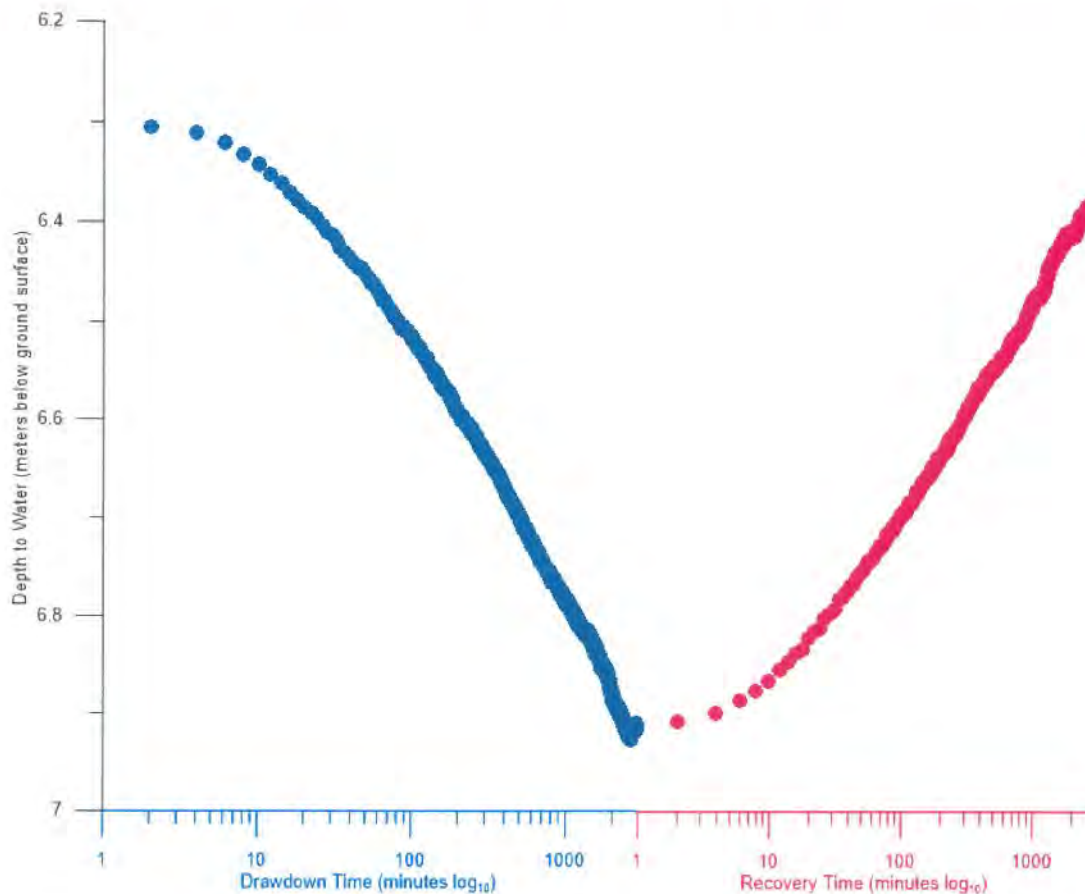


The south observation well begins responding to the pumping of the supply well within 2 minutes of the pump being turned on. The rate of drawdown begins to increase around 100 minutes (same as in supply well) into pumping and continues to increase until the end of the pumping period. Water levels in the well begin recovering after the pump is turned off but never reach static conditions by the end of the buildup period. Both the drawdown and recovery data indicate the observation well is in hydraulic connection with the supply well and that the aquifer the well is completed in is of limited lateral extent.

It is possible that the slight perturbations in the data are due to pumping from the Jim Davies wells. This observation along with the similar water elevations as shown in Figure 7 indicates these two wells might in partial hydraulic communication.

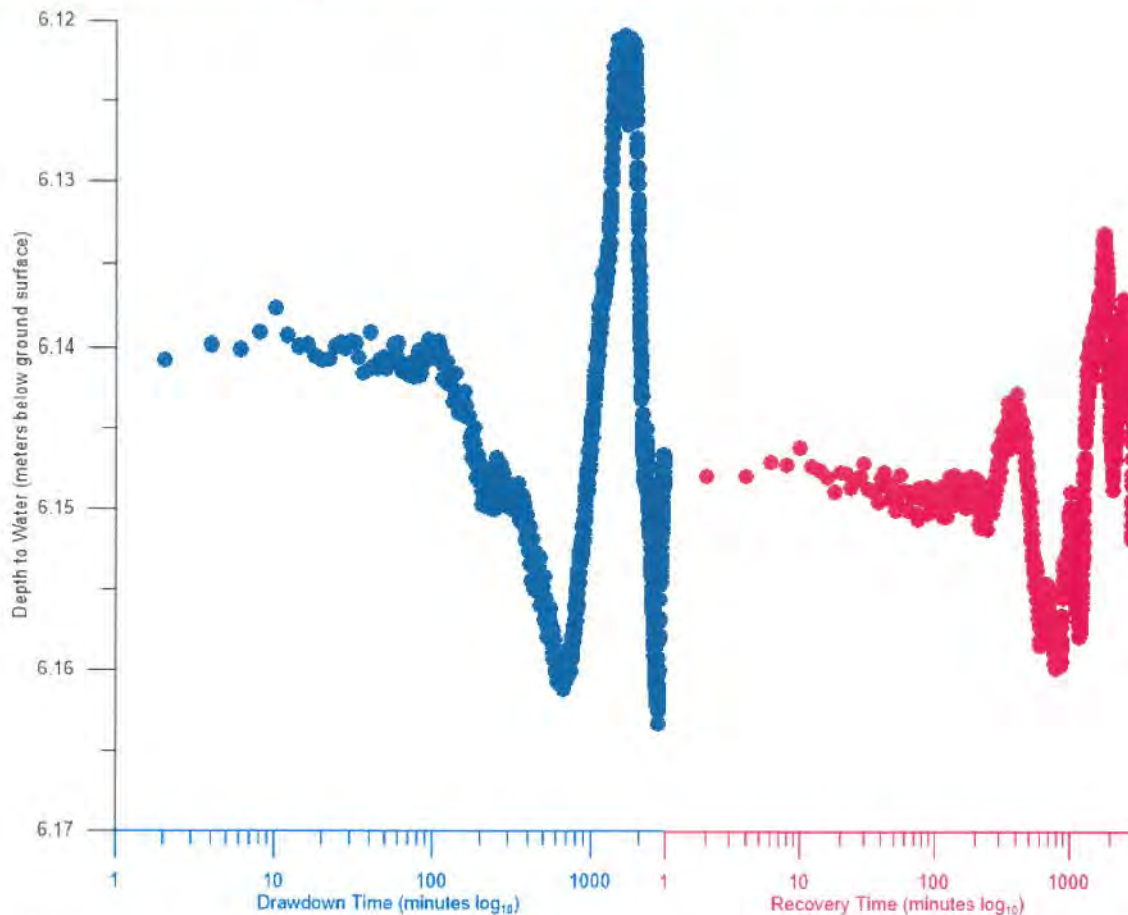
A dual semi-log graph of the pumping test data in the Southwest observation well is shown below to illustrate the water level data during the pumping test more clearly.

FIGURE 12. Dual semi-log plot of drawdown and recovery in the Southwest observation well



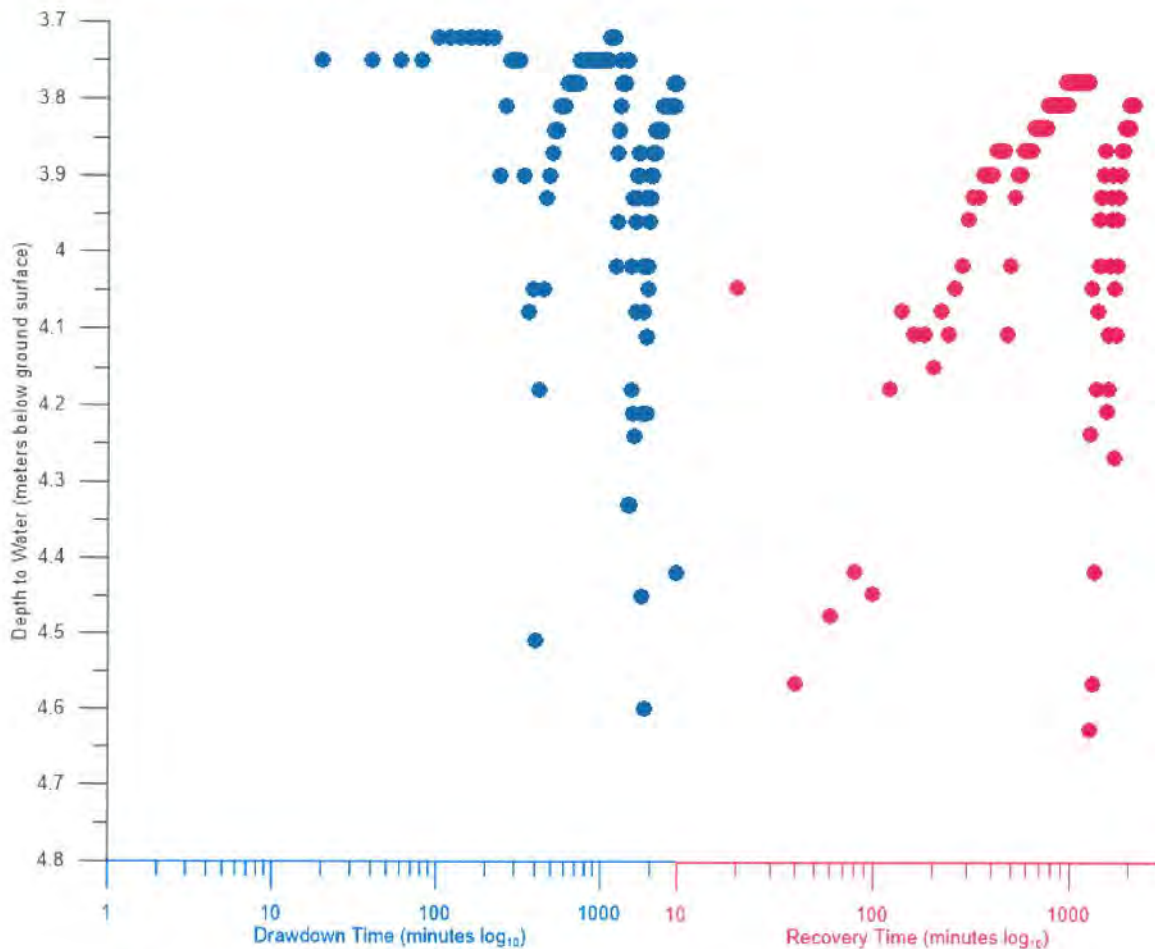
The southwest observation well begins responding to the pumping of the supply well within 3 minutes of the pump being turned on. The rate of drawdown begins to increase around 100 minutes (same as in supply well) into pumping, although the rate change is not as abrupt as in the pumping and south observation well. Water levels in the well begin recovering after the pump is turned off but never reach static conditions by the end of the buildup period. Both the drawdown and recovery data indicate the observation well is in hydraulic connection with the supply well and that the aquifer the well is completed in is of limited lateral extent.

A dual semi-log graph of the pumping test data in K. Singer's well is shown below to illustrate the water level data during the pumping test more clearly.

FIGURE 13. Dual semi-log plot of drawdown and recovery in K. Singer's well

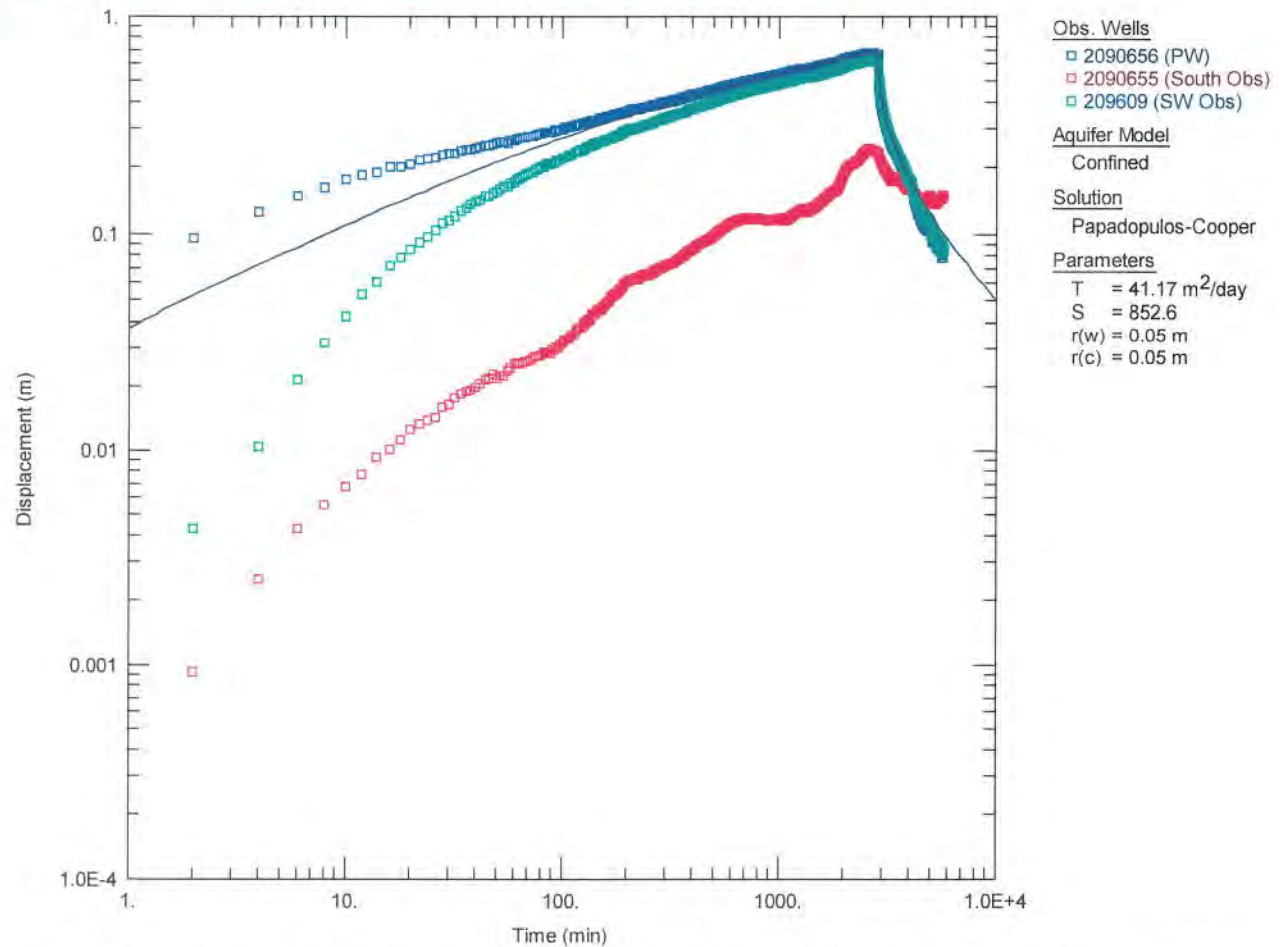
There is no drawdown in the well until around 100 minutes into pumping at which point the water level in K. Singer's well begins to oscillate ± 0.02 m from the static water level. A similar response is seen in the recovery data. The small change in water level is within the range of noise of the pressure transducer used to measure the change in water level in K. Singer's well. There is no trend in the water level data to indicate a hydraulic connection to the Chinook Ridge supply well, as water levels did not decline over the pumping period and did not increase during the buildup period, as is shown in the two nearby observation wells which are in hydraulic connection to the supply well (south and southwest observation wells).

A dual semi-log graph of the pumping test data in J. Davies' well is shown below to illustrate the water level data during the pumping test more clearly.

FIGURE 14. Dual semi-log plot of drawdown and recovery in J. Davies' well

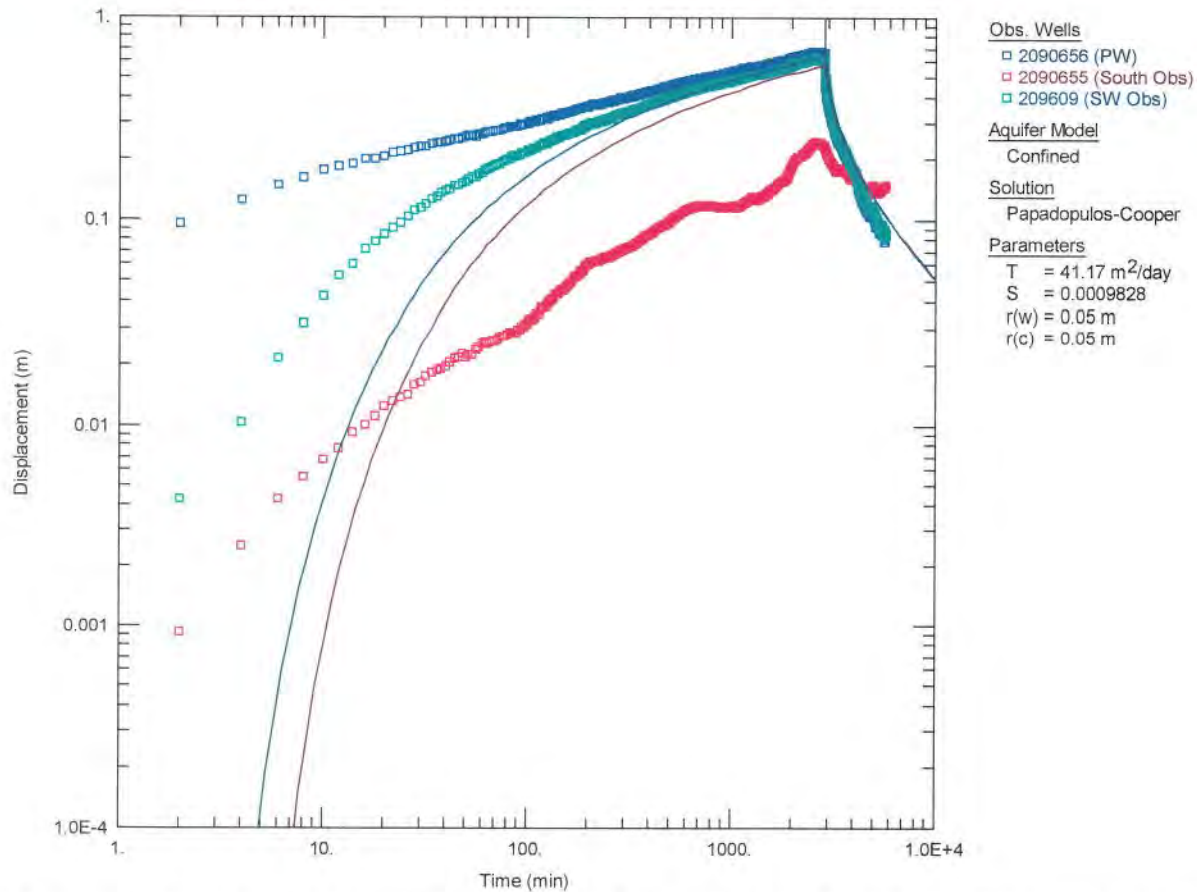
It is clear that J. Davies' well was cycling on and off throughout the duration of the pumping test on the Chinook Ridge supply well. As it was in use it is not possible to determine which water level impacts are due to J. Davies' using the well and which may be due to pumping of the Chinook Ridge supply well. No lowering of water levels is noted during the pumping period and no increasing trend in water levels is noted during the recovery period, which would infer the wells are not connected.

The pumping test data was interpreted with the aid of the AQTESOLV program developed by Hydrossoft Inc. The Papadopoulos-Cooper solution was used for a confined aquifer with radial groundwater flow. A graph showing water level displacement with time and a fitted curve is as follows:

FIGURE 15. Papadopulos-Cooper solution fit to pumping well data

A good fit to the pumping test data is observed, indicating the solution is appropriate. The transmissivity of $41.17 \text{ m}^2/\text{day}$ is calculated, indicating a high permeability aquifer. The previous Stantec report, which was thought to represent an overly optimistic transmissivity, reported an average transmissivity of $62.6 \text{ m}^2/\text{day}$. The Stantec report did not match much of the data set, especially late time data (after 1000 min) which is most representative of long term aquifer responses. In this case, Solstice matched pumping test data from 200 minutes until 3000 minutes, giving a much more representative assessment of long term aquifer response to pumping.

Using the same transmissivity value derived from the pumping test data the Papadopulos-Cooper solution was fit to the Southwest observation well data to determine aquifer storativity as follows:

FIGURE 16. Papadopoulos-Cooper solution fit to Southwest observation well data

The storativity of the aquifer is 0.00098, which is within the typical range for shallow sandstone aquifers.

WELL YIELD

The twenty-year safe yield of the well (Q_{20}) can be calculated using the modified Moell method as suggested in Alberta Environments Guide to Groundwater Authorization (March 2011) as follows:

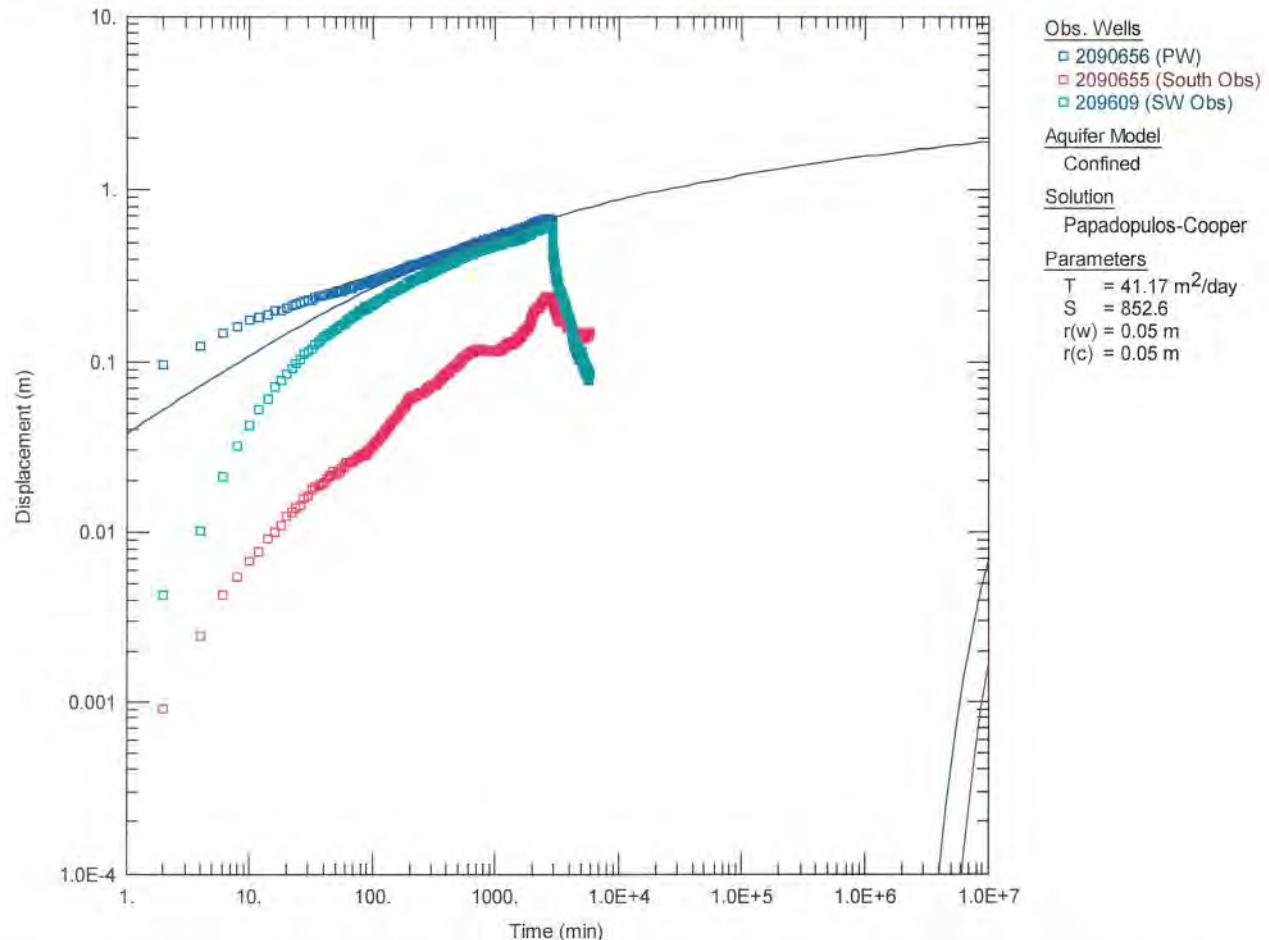
$$Q_{20} = \frac{(0.7 * Q * H_a)}{S_{100\text{min}} + (S_{20\text{yrs}} - S_{100\text{th}})}$$

Where

Q	-	Pump test flow rate = 78.6 m ³ /day (54.6 litres/min)
H _a	-	Available Head = 4.8 m
S _{100 min}	-	Observed drawdown at 100 minutes (0.30 m)
(S _{20yrs} - S _{100 th})	-	Difference between drawdown at 20 years and 100 min (1.92 m - 0.27 m = 1.65 m)
0.7	-	Safety factor

The theoretical 20-year drawdown is determined by extrapolating the Papadopoulos-Cooper solution curve as follows:

FIGURE 17. Papadopoulos-Cooper solution extrapolated to 20 years of pumping



Substituting in the above values a 20-year safe yield (Q_{20}) of $135.4 \text{ m}^3/\text{day}$ (20.6 imperial gallons per minute or $49,455 \text{ m}^3/\text{year}$) is calculated. The analysis indicates the well is capable of supplying water at a rate of 20.6 igpm, which is greater than the tested rate of 12.0 igpm. The safe yield for the well is nearly double the license application volume of $26,982 \text{ m}^3/\text{year}$, allowing for potential growth in water demand at a later date.

The Stantec report used both the Farvolden Method and Moell Method to calculate the 20-year safe yield, coming up with $104.9 \text{ m}^3/\text{day}$ and $64.4 \text{ m}^3/\text{day}$, respectively. A different formulation of the Moell Method was used by Stantec than was used in this report. The differences in the safe yield calculated by Stantec are due to the different formulas used (which had a difference of $40.5 \text{ m}^3/\text{day}$ between their two methods) and the different values inserted into the formulas. Solstice used a static water level of 5.40 meters in the pumping well (as measured prior to the start of the pumping test), whereas Stantec used 6.54 m, the static water level from the 2010 Water Well Drillers Report. Stantec also used a different method of calculating available head (drawdown) in the well by measuring from the static water level to the top of the well completion zone, however, the Alberta Environment Guide to Groundwater Authorization (2011) guidelines state to measure the available head from the static water level to the top of the aquifer. The differences in available head values used to calculate the 20-year safe yield are compounded by the

difference in static water level between the Stantec report and this report.

EFFECT ON WATER LEVELS FOR EXISTING USERS

Using the Cooper-Jacob equation the expected drawdown in the aquifer at various time and distances due to pumping of the well can be calculated by the following formula:

$$s = \frac{(0.183 * Q)}{T} \times \text{Log} \left(\frac{2.25 * T * t}{r^2 S} \right)$$

Where

s	-	Drawdown (m)
S	-	Storativity (0.00098)
Q	-	Tested Pump Rate (78.6 m ³ /day)
T	-	Transmissivity (41.17 m ² /day)
t	-	Time (days)
r	-	Radial distance from pumping well (m)

A table showing water level drawdown with distance as a function of time is as follows:

TABLE 2. Cooper-Jacob distance drawdown calculations

Distance (m)/ Time (days)	Well	100	300	500	1000	1600	3000
1	2.65	0.34	0.01	-	-	-	-
7	2.94	0.64	0.30	0.15	-	-	-
30	3.16	0.86	0.52	0.37	0.16	0.02	-
365	3.54	1.24	0.90	0.75	0.54	0.39	0.20
1826	3.79	1.48	1.15	0.99	0.78	0.64	0.45
3652	3.89	1.59	1.25	1.10	0.89	0.74	0.55
7305	4.00	1.69	1.36	1.20	0.99	0.85	0.66

The following assumptions were included in the above calculation: No recharge is occurring, and all wells are screened over the same aquifer. From this table, we can infer that the most a neighboring well (≤ 100 m) in the same aquifer will experience in additional drawdown will be less than 2 meters over a 20-year pumping period. The available head in nearby wells ranges from 4 to 6 meters, so additional drawdown of less than 2 meters will not be of concern for neighbouring groundwater users.

The two Chinook Ridge observation wells are located 65 m (South observation well) and 62 m (SW observation well) from the supply well. Drawdown in the south observation well was 0.23 m and was 0.62 m in the southwest observation well after 2 days of pumping. This is in line with drawdown expected at these distances based on the above table.

The available head in the pumping well is 4.8 meters. Thus, the additional drawdown in the well of 4.00 meters after 20 years of pumping would not hinder the wells performance, as long as the pump is placed low enough.

Effect on K. Singer's Well

K. Singer's well is located 1,405 meters southeast of the Chinook Ridge supply well. Using the Cooper-

Jacob equation the expected drawdown in K. Singer's well after 2 days (48-hours) due to pumping of the Chinook Ridge supply well can be calculated by the following formula:

$$s = \frac{(0.183 * Q)}{T} \times \text{Log} \left(\frac{2.25 * T * t}{r^2 S} \right)$$

Where

s	-	Drawdown (m)
S	-	Storativity (0.00098)
Q	-	Tested Pump Rate (78.6 m ³ /day)
T	-	Transmissivity (41.17 m ² /day)
t	-	Time (2 days)
r	-	Radial distance from pumping well (1,405 m)

A table showing water level drawdown in K. Singer's with distance as a function of time due to production from the Chinook Ridge supply well is as follows:

TABLE 3. Cooper-Jacob distance drawdown calculations for K. Singer's well

Distance (m)/ Time (days)	1405
2	-
7	-
30	0.05
365	0.43
1826	0.68
3652	0.78
7305	0.89

The following assumptions were included in the above calculation: No recharge is occurring, and both K. Singer's and the Chinook Ridge supply well are screened over the same aquifer.

From this table, we can infer that no drawdown would have been expected in K. Singer's well due to production from the Chinook Ridge supply well after 2 days of pumping. This matches with what was observed in K. Singer's well during the pumping test, with no measurable drawdown occurring in the well. Under the assumption that the wells are completed in the same aquifer an impact to K. Singer's well would not occur until 30 days into pumping, at which point a 0.05 meter change in water level would be observed. As the pumping test completed on the Chinook Ridge supply well indicates the aquifer it produces from is limited in lateral extent it is unlikely K. Singer's well is completed within the same aquifer as the Chinook Ridge supply well.

From this table, we can infer that the most K. Singer's well will experience in additional drawdown (under the assumption it is completed in the same aquifer as the Chinook Ridge supply well) will be 0.89 meters overs a 20-year pumping period. The available head in K. Singer's well is 14.50 meters, so additional drawdown of 0.89 meters will not impact the ability of the well to supply water.

Ms. Singer also requested measurements be made on an "artesian well" that she has on her property. This "well" was located approximately 300 m south-east of her well at a pumping oil well. The "well" is a horizontal drainage pipe placed under the lease pad to maintain sufficiently deep water levels at the lease.

A check of the flow rate was made immediately prior to the start of the pumping test and right at the end

of the pumping portion of the test with the bucket and stopwatch method. Both measurements showed the same flow rate (within error of the reading) at a rate of approximately 4 imperial gallons per minute and no reduction of flow was observed during the test.

Effect on J. Davies' Well

J. Davies' well is located 137 meters west of the Chinook Ridge supply well. Using the Cooper-Jacob equation the expected drawdown in J. Davies' well after 2 days (48-hours) due to pumping of the Chinook Ridge supply well can be calculated by the following formula:

$$s = \frac{(0.183 * Q)}{T} \times \text{Log} \left(\frac{2.25 * T * t}{r^2 S} \right)$$

Where

s	-	Drawdown (m)
S	-	Storativity (0.00098)
Q	-	Tested Pump Rate (78.6 m ³ /day)
T	-	Transmissivity (41.17 m ² /day)
t	-	Time (2 days)
r	-	Radial distance from pumping well (137 m)

A table showing water level drawdown in J. Davies' with distance as a function of time due to production from the Chinook Ridge supply well is as follows:

TABLE 4. Cooper-Jacob distance drawdown calculations for J. Davies' well

Distance (m)/ Time (days)	137
2	0.35
7	0.54
30	0.76
365	1.14
1826	1.38
3652	1.49
7305	1.60

The following assumptions were included in the above calculation: No recharge is occurring, and both J. Davies' and the Chinook Ridge supply well are screened over the same aquifer.

From this table, we can infer that 0.35 meters of drawdown would have been expected in J. Davies' well due to production from the Chinook Ridge supply well after 2 days of pumping. The water level data collected for J. Davies' well during the pumping test does not show a water level decline of 0.35 meters over the pumping period of the Chinook Ridge supply well. This indicates the wells are likely not in hydraulic connection. As the pumping test completed on the Chinook Ridge supply well indicates the aquifer it produces from is limited in lateral extent it is improbable J. Davies' well is completed within the same aquifer as the Chinook Ridge supply well.

From this table, we can infer that the most J. Davies' well could experience in additional drawdown (under the assumption it is completed in the same aquifer as the Chinook Ridge supply well) would be 1.60

meters over a 20-year pumping period. The available head in J. Davies' well is 7.19 meters, so additional drawdown of 1.60 meters will not impact the ability of the well to supply water.

Yours truly,



Ken Hugo, P.Geol.

APEGA P12910

/att – Water Well Drillers Reports



Water Well Drilling Report

B-1 08731001 PRDP20185188

SDAB 2020 Dec 17

Application Export to Excel

GIC Well ID 2090656

GoA Well Tag No. Page 23 of 49

Drilling Company Well ID

Date Report Received 2012/10/10

GOWN ID

The driller supplies the data contained in this report. The Province disclaims responsibility for its accuracy. The information on this report will be retained in a public database.

Well Identification and Location										Measurement in Imperial			
Owner Name		Address			Town		Province		Country		Postal Code		
CARTWRIGHT, CHIOE		285049 Range Road 35			Madden		ALBERTA		CANADA		T0M 0S0		
Location	1/4 or LSD	SEC	TWP	RGE	W of MER	Lot	Block	Plan	Additional Description				
SE		31	28	3	5				SUPPLY WELL				
Measured from Boundary of						GPS Coordinates in Decimal Degrees (NAD 83)							
ft from						Latitude 51°25'57.32"N Longitude 114°24'41.44"W						Elevation 3982.94 ft	
ft from						How Location Obtained						How Elevation Obtained	
						Not Verified						Garmin 64s	

Drilling Information	
Method of Drilling	Type of Work
Combination	New Well
Proposed Well Use	
Other	

Formation Log			Measurement in Imperial		Yield Test Summary			Measurement in Imperial	
Depth from ground level (ft)	Water Bearing	Lithology Description	Recommended Pump Rate	10.00 igpm	Test Date	Water Removal Rate (igpm)	Static Water Level (ft)		
15.00		Brown Till & Clay	2010/11/10	14.99			21.46		
26.00		Gray Till & Clay							
31.00		Blue Gray Shale							
36.00		Brown Fine Grained Sandstone							
50.00		Brownish Gray Fine Grained Sandstone							
			Well Completion			Measurement in Imperial			
			Total Depth Drilled	Finished Well Depth	Start Date	End Date			
			50.00 ft	48.00 ft	2010/11/05	2010/11/05			
			Borehole						
			Diameter (in)	From (ft)	To (ft)				
			8.00	0.00	28.00				
			6.50	28.00	50.00				
			Surface Casing (if applicable)			Well Casing/Liner			
						Plastic			
			Size OD :	in	Size OD :	4.94 in			
			Wall Thickness :	in	Wall Thickness :	0.214 in			
			Bottom at :	ft	Top at :	-2.46 ft			
						Bottom at :	48.00 ft		
			Perforations						
			From (ft)	To (ft)	Diameter or Slot Width (in)	Slot Length (in)	Hole or Slot Interval (in)		
			33.00	45.00	0.125		6.00		
			Perforated by			Saw			
			Annular Seal			Bentonite Chips/Tablets			
			Placed from			0.00 ft	to	31.00 ft	
			Amount			150.00 Pounds			
			Other Seals						
			Type			At (ft)			
			Shale Trap			31.00			
			Screen Type						
			Size OD :			in			
			From (ft)			To (ft)	Slot Size (in)		
			Attachment						
			Top Fittings			Bottom Fittings			
			Pack						
			Type			Grain Size			
			Amount						

Contractor Certification		Certification No	
Name of Journeyman responsible for drilling/construction of well		14061Q	
RORY WAGNER		Copy of Well report provided to owner	
Company Name		Date approval holder signed	
WILD ROSE WATER WELLS LTD.		2010/11/10	



Water Well Drilling Report

B-1 08731001 PRDP20185188

SDAB 2020 Dec 17

Application Export to Excel

2090656

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The driller supplies the data contained in this report. The Province disclaims responsibility for its accuracy. The information on this report will be retained in a public database.

GIC Well ID
GoA Well Tag No.
Drilling Company Well ID
Date Report Received 2012/10/10

GOWN ID

Well Identification and Location										Measurement in Imperial		
Owner Name		Address			Town		Province		Country		Postal Code	
CARTWRIGHT, CHIOE		285049 Range Road 35			MADDEN		ALBERTA		CANADA		T0M 0S0	
Location	1/4 or LSD	SEC	TWP	RGE	W of MER	Lot	Block	Plan	Additional Descrip			
SE		31	28	3	5				SUPPLY WELL			
Measured from Boundary of					GPS Coordinates in Decimal Degrees (NAD 83)					Elevation		
ft from					Latitude 51°25'57.32"N Longitude 114°24'41.44"W					3982.94 ft		
ft from					How Location Obtained					How Elevation Obtained		
					Not Verified					Garmin 64s		

Additional Information										Measurement in Imperial	
Distance From Top of Casing to Ground Level										29.53 in	
Is Artesian Flow											
Rate										igpm	
Is Flow Control Installed											
Describe											
Recommended Pump Rate										10.00 igpm	
Recommended Pump Intake Depth (From TOC)										30.00 ft	
Pump Installed										Depth	
Type										ft	
Make										H.P.	
Model (Output Rating)											
Did you Encounter Saline Water (>4000 ppm TDS)										Yes	
Depth										ft	
Gas										Depth	
ft										ft	
Well Disinfected Upon Completion										Submitted to ESRD	
Geophysical Log Taken											
Submitted to ESRD											
Sample Collected for Potability										Submitted to ESRD	
Additional Comments on Well											
DRILLING METHOD COMBINATION ROTARY AIR AND ROTARY MUD. 24 HOUR PUMP TEST WAS DONE. BOREHOLE DIAMETER BETWEEN 28 FEET AND 50 FEET ALSO 5.5 INCHES. PROPOSED WELL USE - LODGE, WATER DIVERTED FOR DRILLING FROM MUNICIPAL SOURCE											

Yield Test			Taken From Top of Casing		Measurement in Imperial	
			Depth to water level			
Test Date	Start Time	Static Water Level	Pumping (ft)	Elapsed Time	Recovery (ft)	
2010/11/10	12:00 PM	21.46 ft		Minutes:Sec		
Method of Water Removal			21.46	0:00	23.52	
Type Pump			21.62	1:00	23.33	
Removal Rate			21.69	2:00	23.26	
14.99 igpm			21.72	3:00	23.23	
Depth Withdrawn From			21.75	4:00	23.20	
29.98 ft			21.78	5:00	23.20	
			21.78	6:00	23.16	
If water removal period was < 2 hours, explain why			21.82	7:00	23.16	
SEE FILE FOR ADDITIONAL PUMP TEST READINGS			21.85	8:00	23.13	
			21.85	9:00	23.13	
			21.88	10:00	23.10	
			21.92	15:00	23.06	
			21.98	20:00	23.03	
			22.01	25:00	23.00	
			22.05	30:00	23.00	
				35:00	22.97	
			22.08	40:00	22.97	
			22.15	50:00	22.97	
			22.18	60:00	22.90	
			22.21	70:00	22.90	
			22.24	80:00	22.87	
			22.28	90:00	22.83	
			22.31	100:00		
			22.34	120:00	22.80	
			23.52	1440:00	21.95	

Water Diverted for Drilling		
Water Source	Amount Taken	Diversion Date & Time
	ig	

Contractor Certification		
Name of Journeyman responsible for drilling/construction of well		Certification No
RORY WAGNER		14061Q
Company Name	Copy of Well report provided to owner	Date approval holder signed
WILD ROSE WATER WELLS LTD.	Yes	2010/11/10



Water Well Drilling Report

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Application Export to Excel

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Drilling Company Well ID
Date Report Received 2012/10/10

GOWN ID

Well Identification and Location										Measurement in Imperial	
Owner Name CARTWRIGHT, CHLOE		Address 285049 Range Road 35			Town Madden		Province ALBERTA		Country CANADA	Postal Code TOM 0S0	
Location	1/4 or LSD SE	SEC 31	TWP 28	RGE 3	W of MER 5	Lot	Block	Plan	Additional Description South Observation Well		
Measured from Boundary of					GPS Coordinates in Decimal Degrees (NAD 83)					Elevation	
ft from					Latitude 51°25'59.05"N Longitude 114°24'50.50"W					3992.78 ft	
ft from					How Location Obtained					How Elevation Obtained	
					Not Verified					Hand held autonomous Garmin 64s	

Drilling Information	
Method of Drilling Combination	Type of Work New Well
Proposed Well Use Other	

Formation Log			Measurement in Imperial		Yield Test Summary			Measurement in Imperial		
Depth from ground level (ft)	Water Bearing	Lithology Description	Recommended Pump Rate	5.00 igpm	Test Date	Water Removal Rate (igpm)	Static Water Level (ft)			
19.00		Brown Till & Clay	2010/10/28	30.00	25.49					
26.00		Gray Till & Clay								
27.00		Brownish Gray Siltstone								
29.00		Brown Fine Grained Sandstone								
30.00		Gray Fine Grained Sandstone								
32.00	Yes	Brown Shattered Sandstone								
35.00		Brown Fine Grained Sandstone								
			Well Completion			Measurement in Imperial				
			Total Depth Drilled	Finished Well Depth	Start Date	End Date				
			35.00 ft	35.00 ft	2010/10/28	2010/10/28				
			Borehole							
			Diameter (in)	From (ft)	To (ft)					
			8.00	0.00	26.00					
			6.00	26.00	35.00					
			Surface Casing (if applicable)			Well Casing/Liner				
						Plastic				
			Size OD :	in	Size OD :	4.94 in				
			Wall Thickness :	in	Wall Thickness :	0.214 in				
			Bottom at :	ft	Top at :	-2.66 ft				
						Bottom at :	35.00 ft			
			Perforations							
			From (ft)	To (ft)	Diameter or Slot Width(in)	Slot Length (in)	Hole or Slot Interval(in)			
			Perforated by			Saw				
			Annular Seal			Bentonite Chips/Tablets				
			Placed from			0.00 ft to 28.00 ft				
			Amount			150.00 Pounds				
			Other Seals							
			Type			At (ft)				
			Shale Trap			28.00				
			Screen Type							
			Size OD :			in				
			From (ft)			To (ft)				
						Slot Size (in)				
			Attachment							
			Top Fittings			Bottom Fittings				
			Pack							
			Type			Grain Size				
			Amount							

Contractor Certification		Certification No	
Name of Journeyman responsible for drilling/construction of well	RORY WAGNER	14061Q	
Company Name	WILD ROSE WATER WELLS LTD.	Copy of Well report provided to owner	Date approval holder signed
		Yes	2010/11/07



Water Well Drilling Report

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Application Export to Excel

GIC Well ID

GoA Well Tag No.

Drilling Company Well ID

Date Report Received 2012/10/10

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GOWN ID

Well Identification and Location										Measurement in Imperial	
Owner Name		Address			Town		Province		Country		Postal Code
CARTWRIGHT, CHLOE		285049 Range Road 35			Madden		ALBERTA		CANADA		T0M 0S0
Location	1/4 or LSD	SEC	TWP	RGE	W of MER	Lot	Block	Plan	Additional Description		
	SE	31	28	3	5				South Observation		
Measured from Boundary of					GPS Coordinates in Decimal Degrees (NAD 83)					Well	
ft from					Latitude 51°25'59.05"N					Longitude 114°24'50.50"W	
ft from					How Location Obtained					Elevation 3992.78 ft	
					Not Verified					How Elevation Obtained	
										Garmin 64s	

Additional Information										Measurement in Imperial	
Distance From Top of Casing to Ground Level										33.46 in	
Is Artesian Flow										Is Flow Control Installed	
Rate										igpm	
Describe											
Recommended Pump Rate										5.00 igpm	
Recommended Pump Intake Depth (From TOC)										28.00 ft	
Pump Installed										Depth	
Type										Make	
										H.P.	
										Model (Output Rating)	
Did you Encounter Saline Water (>4000 ppm TDS)										Depth	
Gas										Depth	
Well Disinfected Upon Completion										Yes	
Geophysical Log Taken											
Submitted to ESRD											
Sample Collected for Potability										Submitted to ESRD	
Additional Comments on Well											
METHOD OF DRILLING - COMBINATION OF ROTARY AIR AND MUD. LITH: 30' - 32' ALSO FINE GRAINED. 7 INCH CASING WAS DRIVEN FROM 26 FEET TO BOTTOM. PVC WAS INSTALLED THEN 7 INCH CASING WAS REMOVED. PROPOSED WELL USE - LODGE, WATER DIVERTED FOR DRILLING FROM MUNICIPAL SOURCE											

Yield Test			Taken From Top of Casing		Measurement in Imperial	
			Depth to water level			
Test Date	Start Time	Static Water Level	Pumping (ft)	Elapsed Time	Recovery (ft)	
2010/10/28	11:00 AM	25.49 ft		Minutes:Sec		
			25.49	0:00	28.00	
Method of Water Removal				1:00	26.41	
Type Air				2:00	26.31	
Removal Rate			30.00 igpm	3:00	26.25	
Depth Withdrawn From			28.00 ft	4:00	26.21	
				5:00	26.18	
				10:00	26.08	
				15:00	26.02	
If water removal period was < 2 hours, explain why						

Water Diverted for Drilling		
Water Source	Amount Taken	Diversion Date & Time
	ig	

Contractor Certification		
Name of Journeyman responsible for drilling/construction of well		
RORY WAGNER		
Company Name		
WILD ROSE WATER WELLS LTD.		
Certification No		
14061Q		
Copy of Well report provided to owner		
Yes		
Date approval holder signed		
2010/11/07		



Water Well Drilling Report

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Application Extra - Solstice Water Well Report

GIC Well ID

GoA Well Tag No.

Drilling Company Well ID

Date Report Received 2011/11/07

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GOWN ID

The driller supplies the data contained in this report. The Province disclaims responsibility for its accuracy. The information on this report will be retained in a public database.

Well Identification and Location										Measurement in Imperial			
Owner Name		Address			Town		Province		Country		Postal Code		
CARTWRIGHT, CHLOE		Range Road 35			Madden		ALBERTA		CANADA		T0M 0S0		
Location		1/4 or LSD	SEC	TWP	RGE	W of MER	Lot	Block	Plan	Additional Description			
SE		31	28	3	5					South Southwest Observation WELL			
Measured from Boundary of						GPS Coordinates in Decimal Degrees (NAD 83)							
ft from						Latitude 51°25'57.90"N						Longitude 114°24'37.51"W	
ft from						How Location Obtained						Elevation 1216.00 ft	
						Not Verified						How Elevation Obtained	
												Not Obtained	

Drilling Information	
Method of Drilling	Type of Work
Combination	New Well
Proposed Well Use	
Other	

Formation Log			Measurement in Imperial		Yield Test Summary			Measurement in Imperial	
Depth from ground level (ft)	Water Bearing	Lithology Description	Recommended Pump Rate	5.00 igpm	Test Date	Water Removal Rate (igpm)	Static Water Level (ft)		
21.00		Brown Till & Clay	2010/11/03	20.00			24.93		
27.00		Gray Till & Clay							
28.00		Brownish Gray Siltstone							
31.00	Yes	Brown Fine Grained Sandstone							
47.00	Yes	Brown Fine Grained Sandstone							
50.00		Gray Siltstone							
			Well Completion			Measurement in Imperial			
			Total Depth Drilled	Finished Well Depth	Start Date	End Date			
			50.00 ft	47.00 ft	2010/11/02	2010/11/03			
			Borehole						
			Diameter (in)	From (ft)	To (ft)				
			8.00	0.00	26.00				
			6.50	26.00	50.00				
			Surface Casing (if applicable)			Well Casing/Liner			
			Size OD : in			Size OD : 4.94 in			
			Wall Thickness : in			Wall Thickness : 0.214 in			
			Bottom at : ft			Top at : -2.03 ft			
						Bottom at : 47.01 ft			
			Perforations						
			From (ft)	To (ft)	Diameter or Slot Width (in)	Slot Length (in)	Hole or Slot Interval (in)		
			35.00	45.00	0.125		6.00		
			Perforated by			Saw			
			Annular Seal			Bentonite Slurry			
			Placed from			0.00 ft to 30.00 ft			
			Amount			150.00 Pounds			
			Other Seals						
			Type			At (ft)			
			Driven			31.00			
			Shale Trap			30.00			
			Screen Type						
			Size OD : in						
			From (ft)			To (ft)			
						Slot Size (in)			
			Attachment						
			Top Fittings			Bottom Fittings			
			Pack						
			Type			Grain Size			
			Amount						

Contractor Certification		Certification No	
Name of Journeyman responsible for drilling/construction of well	RORY WAGNER	14061Q	
Company Name	WILD ROSE WATER WELLS LTD.	Copy of Well report provided to owner	Date approval holder signed
		Yes	2010/11/07



Water Well Drilling Report

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Application Export to Excel

2090609

GoA Well Tag No.

Drilling Company Well ID

Date Report Received 2011/11/07

GOWN ID

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Well Identification and Location										Measurement in Imperial		
Owner Name		Address			Town		Province		Country		Postal Code	
CARTWRIGHT, CHLOE		285049 Range Road 35			Madden		ALBERTA		CANADA		T0M 0S0	
Location	1/4 or LSD	SEC	TWP	RGE	W of MER	Lot	Block	Plan	Additional Description			
SE		31	28	3	5				Southwest OBSERVATION WELL			
Measured from Boundary of					GPS Coordinates in Decimal Degrees (NAD 83)					Elevation		
ft from					Latitude 51°25'57.90"N Longitude 114°24'37.57"W					1216.00 ft		
ft from					How Location Obtained					How Elevation Obtained		
					Not Verified					Not Obtained		

Additional Information										Measurement in Imperial	
Distance From Top of Casing to Ground Level										24.41 in	
Is Artesian Flow											
Rate										igpm	
Is Flow Control Installed											
Describe											
Recommended Pump Rate										5.00 igpm	
Recommended Pump Intake Depth (From TOC)										35.00 ft	
Pump Installed										ft	
Type										H.P.	
Make										Model (Output Rating)	
Did you Encounter Saline Water (>4000 ppm TDS)										Yes	
Depth										ft	
Gas										ft	
Well Disinfected Upon Completion										Submitted to ESRD	
Geophysical Log Taken										Submitted to ESRD	
Sample Collected for Potability										Submitted to ESRD	
Additional Comments on Well											
COMBINATION ROTARY AIR & MUD DRILLING, PROPOSED WELL USE - LODGE, LITH: 28' - 31' ALSO SHATTERED, 31' - 47' SS & SILTSTONE STRINGERS, 7" WAS DRIVEN FROM 28' - 31', PVC CASING WAS INSTALLED AND 7" WAS REMOVED, BOREHOLE DIAMETER - RANGES FROM 6.5" TO 5.5" FROM 28' - 50', ANNULAR SEAL - ALSO BENTONITE CHIPS, WELL WAS PUMPED WITH AIR PRIOR TO USING SUB PUMP, RECOMMENDED PUMP RATE: 5 - 10 IGPM											

Yield Test			Taken From Top of Casing		Measurement in Imperial	
Test Date	Start Time	Static Water Level	Pumping (ft)	Elapsed Time	Recovery (ft)	
				Minutes:Sec		
2010/11/03	11:00 AM	24.93 ft	25.95	0:00		
Method of Water Removal				1:00	31.10	
				2:00	30.38	
				3:00	29.99	
				4:00	29.69	
				5:00	29.46	
If water removal period was < 2 hours, explain why PUMP TEST @ 15 IGPM @ 35'			30.41	7:00		
			30.58	8:00		
			30.74	9:00		
			30.87	10:00	28.71	
			31.89	20:00	27.79	
			32.55	30:00	27.26	
			33.10	40:00	26.90	
			33.37	50:00	26.67	
			33.63	60:00	26.44	

Water Diverted for Drilling		
Water Source	Amount Taken	Diversion Date & Time
WATER WELL (ON SITE)	700.00 ig	2010/11/01 6:00 PM

Contractor Certification	
Name of Journeyman responsible for drilling/construction of well	Certification No
RORY WAGNER	14061Q
Company Name	Copy of Well report provided to owner
WILD ROSE WATER WELLS LTD.	Yes
	Date approval holder signed
	2010/11/07



Water Well Drilling Report

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SDAB 2020 Dec 17

Application Export to Excel

392001

Drilling Company Well ID

Date Report Received 1985/10/16

GOWN ID

Well Identification and Location										Measurement in Metric	
Owner Name		Town				Province		Country		Postal Code	
DAVIES, JIM											
Location		1/4 or LSD	SEC	TWP	RGE	W or MER	Lot	Block	Plan	Additional Description	
SW		31	28	3	5					Jim Davies Observation Well	
Measured from Boundary of		GPS Coordinates in Decimal Degrees (NAD 83)				Elevation		m			
m from		Latitude 51.434700				Longitude -111.417667		How Location Obtained		How Elevation Obtained	
m from		Map Latitude: 51°25'58.33"N				Longitude: 114°29'47.34"W		Not Obtained			

Drilling Information	
Method of Drilling	Type of Work
Rotary	New Well
Proposed Well Use	
Stock	

Formation Log		Measurement in Metric	
Depth from ground level (m)	Water Bearing	Lithology Description	
10.67		Clay & Rocks	
16.76		Shale & Sandstone	

Yield Test Summary		Measurement in Metric	
Recommended Pump Rate	0.00 L/min		
Test Date	Water Removal Rate (L/min)	Static Water Level (m)	
1985/09/17	90.92	12.19	

Well Completion		Measurement in Metric	
Total Depth Drilled	Finished Well Depth	Start Date	End Date
16.76 m		1985/09/17	1985/09/17
Borehole			
Diameter (cm)	From (m)	To (m)	
0.00	0.00	16.76	
Surface Casing (if applicable)		Well Casing/Liner	
Steel	Plastic		
Size OD :	14.12 cm	Size OD :	
Wall Thickness :	0.396 cm	Wall Thickness :	
Bottom at :	6.10 m	Top at :	
		Bottom at :	
Perforations			
From (m)	To (m)	Diameter or Slot Width (cm)	Slot Length (cm)
10.67	16.76	0.635	20.32
Perforated by		Machine	
Annular Seal		Driven	
Placed from		6.10 m to 0.00 m	
Amount			
Other Seals			
Type		At (m)	
Screen Type			
Size OD :		0.00 cm	
From (m)		To (m)	
		Slot Size (cm)	
Attachment			
Top Fittings		Bottom Fittings	
Pack			
Type		Grain Size	
Amount			

Contractor Certification	
Name of Journeyman responsible for drilling/construction of well	Certification No
UNKNOWN NA DRILLER	1
Company Name	Copy of Well report provided to owner
DEN-ALTA DRILLING LTD.	Date approval holder signed



Water Well Drilling Report

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View in Imperial Export to Excel

Application Export to Excel

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Drilling Company Well ID

Date Report Received 1985/10/16

GOWN ID

Well Identification and Location								Measurement in Metric	
Owner Name DAVIES, JIM				Town		Province		Country	Postal Code
Location	1/4 or LSD SW	SEC 31	TWP 28	RGE 3	W of MER 5	Lot	Block	Plan	Additional Description
Measured from Boundary of				GPS Coordinates in Decimal Degrees (NAD 83)					
_____ m from				Latitude <u>51.434730</u> Longitude <u>-114.417567</u>				Elevation _____ m	
_____ m from				How Location Obtained				How Elevation Obtained	
				Map				Not Obtained	

Additional Information								Measurement in Metric	
Distance From Top of Casing to Ground Level _____ cm				Is Flow Control Installed _____					
Is Artesian Flow _____				Describe _____					
Rate _____ L/min									
Recommended Pump Rate _____ 0.00 L/min				Pump Installed _____		Depth _____ m			
Recommended Pump Intake Depth (From TOC) _____ 15.24 m				Type _____		Make _____		H.P. _____	
						Model (Output Rating) _____			
Did you Encounter Saline Water (>4000 ppm TDS) _____				Depth _____ m		Well Disinfected Upon Completion _____			
Gas _____				Depth _____ m		Geophysical Log Taken _____			
						Submitted to ESRD _____			
Additional Comments on Well _____				Sample Collected for Potability _____		Submitted to ESRD _____			

Yield Test				Taken From Ground Level		Measurement in Metric	
Test Date 1985/09/17		Start Time 12:00 AM		Static Water Level 12.19 m		Depth to water level	
				Pumping (m)		Elapsed Time Minutes:Sec	
						Recovery (m)	
Method of Water Removal							
Type <u>Air</u>							
Removal Rate <u>90.92 L/min</u>							
Depth Withdrawn From <u>0.00 m</u>							
If water removal period was < 2 hours, explain why _____							

Water Diverted for Drilling		
Water Source	Amount Taken L	Diversion Date & Time

Contractor Certification			
Name of Journeyman responsible for drilling/construction of well UNKNOWN NA DRILLER		Certification No. 1	
Company Name DEN-ALTA DRILLING LTD.		Copy of Well report provided to owner _____ Date approval holder signed _____	



Water Well Drilling Report

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SDAB 2020 Dec 17

Application Export to Excel

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GoA Well Tag No. Page 31 of 49

Drilling Company Well ID

Date Report Received 2010/08/02

GOWN ID

Well Identification and Location										Measurement in Metric	
Owner Name SINGER, PAT											
Location	1/4 or LSD	SEC	TWP	RGE	W of MER	Lot	Block	Plan	Additional Description		
5		29	28	3	5				K. Singer Observation Well		
Measured from Boundary of				GPS Coordinates in Decimal Degrees (NAD 83)							
_____ m from				Latitude 51.422967 Longitude -114.399083				Elevation 1229.56 m			
_____ m from				How Location Obtained				How Elevation Obtained			
				Hand held autonomous GPS 20-30m				Hand held autonomous GPS 20-30m			

Latitude: 61° 25' 22.74" N Longitude: 114° 23' 56.56" W

Drilling Information	
Method of Drilling Rotary - Air	Type of Work New Well
Proposed Well Use Domestic	

Formation Log			Measurement in Metric		
Depth from ground level (m)	Water Bearing	Lithology Description			
3.96		Till			
7.32		Gray Medium Grained Shale			
8.53		Tan Tight Sandstone			
13.41		Gray Medium Grained Shale			
15.54		Gray Fine Grained Sandstone			
20.12		Dark Gray Hard Shale			
21.95		Gray Fine Grained Sandstone			
23.77		Gray Shale			
27.43		Black Hard Shale			

Yield Test Summary			Measurement in Metric		
Recommended Pump Rate	22.73 L/min				
Test Date	Water Removal Rate (L/min)	Static Water Level (m)			
2010/07/18	22.73	6.47			

Well Completion				Measurement in Metric			
Total Depth Drilled	Finished Well Depth	Start Date	End Date				
27.43 m	27.43 m	2010/07/12	2010/07/12				
Borehole							
Diameter (cm)		From (m)	To (m)				
21.59		0.00	6.10				
13.34		6.10	27.43				
Surface Casing (if applicable)				Well Casing/Liner			
Steel				Plastic			
Size OD :		16.84 cm	Size OD :		11.43 cm		
Wall Thickness :		0.478 cm	Wall Thickness :		0.602 cm		
Bottom at :		6.10 m	Top at :		3.05 m		
			Bottom at :		27.43 m		
Perforations							
From (m)		To (m)	Diameter or Slot Width (cm)	Slot Length (cm)	Hole or Slot Interval (cm)		
21.34		27.43	13.335		0.00		
Perforated by Saw							
Annular Seal Bentonite Chips/Tablets							
Placed from		0.00 m	to	6.10 m			
Amount		2.00 Bags					
Other Seals							
Type		At (m)					
Screen Type							
Size OD :		cm					
From (m)		To (m)	Slot Size (cm)				
Attachment							
Top Fittings		Bottom Fittings					
Pack							
Type		Grain Size					
Amount							

Contractor Certification		Certification No	
Name of Journeyman responsible for drilling/construction of well		41140A	
GREGG LEWIS		Copy of Well report provided to owner	
Company Name		Date approval holder signed	
DEN-ALTA DRILLING LTD.		2010/08/02	



Water Well Drilling Report

The driller supplies the data contained in this report. The Province disclaims responsibility for its accuracy. The information on this report will be retained in a public database.

B-1 08731001 PRDP20185188

SDAB 2020 Dec 17

Application Export to Excel
1240306

View in Imperial
GIC Well ID
GoA Well Tag No.
Drilling Company Well ID
Date Report Received 2010/08/02

Page 32 of 49

GOWN ID

Well Identification and Location										Measurement in Metric	
Owner Name		Address		Town		Province		Country		Postal Code	
SINGER, PAT											
Location	1/4 or LSD	SEC	TWP	RGE	W of MER	Lot	Block	Plan	Additional Description		
	5	29	28	3	5						
Measured from Boundary of				GPS Coordinates in Decimal Degrees (NAD 83)				Elevation			
m from				Latitude 51.422967 Longitude -114.399083				1229.56 m			
m from				How Location Obtained				How Elevation Obtained			
				Hand held autonomous GPS 20-30m				Hand held autonomous GPS 20-30m			

Additional Information										Measurement in Metric	
Distance From Top of Casing to Ground Level		50.80 cm									
Is Artesian Flow		Is Flow Control Installed									
Rate		L/min		Describe							
Recommended Pump Rate		22.73 L/min		Pump Installed		Depth		m			
Recommended Pump Intake Depth (From TOC)		25.91 m		Type		Make		H.P.		Model (Output Rating)	
Did you Encounter Saline Water (>4000 ppm TDS)		Depth		m		Well Disinfected Upon Completion		Yes			
Gas		Depth		m		Geophysical Log Taken		Submitted to ESRD			
Additional Comments on Well		Sample Collected for Potability		Yes		Submitted to ESRD					

Yield Test			Taken From Top of Casing Depth to water level		Measurement in Metric	
Test Date	Start Time	Static Water Level	Pumping (m)	Elapsed Time	Recovery (m)	
2010/07/18	9:00 AM	6.47 m		Minutes:Sec		
Method of Water Removal			6.47	0:00	16.51	
Type Pump			7.76	1:00	14.77	
Removal Rate			8.21	2:00	13.36	
Depth Withdrawn From			8.53	3:00	12.18	
22.73 L/min			8.89	4:00	10.89	
25.30 m			9.21	5:00	10.20	
If water removal period was < 2 hours, explain why			9.43	6:00	9.72	
			9.60	7:00	9.40	
			9.81	8:00		
			9.92	9:00	8.96	
			10.03	10:00	8.81	
			10.26	12:00	8.58	
			10.44	14:00	8.38	
			10.58	16:00	8.22	
			10.82	20:00	7.98	
			11.07	25:00	7.82	
			11.26	30:00	7.67	
			11.67	35:00	7.54	
			12.22	40:00	7.42	
			12.98	50:00	7.32	
			14.46	60:00	7.23	
			15.89	75:00		
			15.98	90:00		
			16.37	105:00		
			16.51	120:00		


Water Diverted for Drilling		
Water Source	Amount Taken	Diversion Date & Time
	L	

Contractor Certification		
Name of Journeyman responsible for drilling/construction of well		Certification No.
GREGG LEWIS		41140A
Company Name		Copy of Well report provided to owner
DEN-ALTA DRILLING LTD.		Yes
		Date approval holder signed
		2010/08/02

August 11, 2020

File No.: 431063

Ms. Chloe Cartwright



Dear Ms. Cartwright

**Subject: *Water Act* Application 001-00431063
Supplemental Information Request**

Thank you for the July 30, 2020 response by Solstice Environmental Management (Solstice) to the department's July 21, 2020 request for information. This information has been reviewed and the following supplemental information request is provided for your response.

It has been concluded that more technical information is needed in order to process the application. The following are observations that led to this information request.

1. The water needs identified in the application are based on a pumping rate of 60.2 m³/day that requires the pump to run continuously every day when the facility is fully operational. This is considered impractical as noted on page 3.2 of the report titled, Groundwater Evaluation – Chinook Ridge Lodge and Golf Course SE 31-28-3-W5, dated December 2020 by Stantec (Stantec Report). As a result either a higher maximum pumping rate is necessary, which the aquifer does not appear to accommodate, or the size of the proposed facility and corresponding water use must be reduced.
2. The Stantec Report discussed boundary effects in Section 2.3. The discussion flagged that the aquifer is of limited size and recommended careful monitoring for up to two years to determine the aquifer's long term response to the diversion. These cautions bring into question the capability of the aquifer to supply sufficient water to meet the requested daily pumping rate and the sustainable yield.
3. The Stantec Report, section 2.3 - page 2.5, claims to have followed the *Alberta Groundwater Evaluation Guidelines*. However, Appendix 4 of the Guideline notes that for pumping rates above 65 m³/day (recommended for periods of time in the summer) requires a minimum 48 hour pumping period. It also requires the recovery period to be at least 90%. The recovery periods for the 3 wells were as follows:
 - a. Production well – 76%
 - b. North Monitoring well #1 – 13.8%
 - c. East Monitoring well #2 – 73%

4. The July 30, 2020 Solstice letter assumed the Davies well is in the same "zone" as the proposed Chinook Ridge well. Solstice acknowledged that there were unknown details for the Davies well and the potential adverse effects were unknown which suggests additional assessment is necessary.
5. The June 5, 2020 pumping test, referenced in the July 16, 2020 Solstice letter, was conducted on the North Monitoring Well (#1) rather than the supply well identified in the Stantec Report. This is based on a personal observation of the well being pumped on that day and on the water well flow test record which states "North Pumping Well". This may affect conclusions in the Solstice letters of July 16 and August 10, 2020.

It is concluded from the above observations that the Stantec Report must be updated to verify the boundary conditions and the sustainable yield, including maximum pumping limits, as well as to evaluate the potential impact on other landowner wells. The required update is to include the following:

- minimum 48 hour aquifer pumping test of the proposed supply well with a minimum 48 hour recovery period;
- continuous monitoring of the supply well and the two monitoring wells during pumping and recovery period;
- if possible, monitoring of the water levels of the Davies well during the pumping and recovery period; and
- an aquifer analysis, aquifer test result interpretation and an assessment of potential impacts on wells in the vicinity including those wells owned by persons, with wells, who submitted letters of concern on this application.

If you require a teleconference meeting to review this supplemental information request prior to conducting work please advise me.

If you have any questions please contact me at 403-297-4878 or by email at alan.pentney@gov.ab.ca.

Yours truly,



Alan Pentney
Water Approvals Engineer

cc: Ken Hugo, Solstice Environmental Management



Chinook Ridge Castle and RV Park
285049 Range Road 35
Madden, AB T0M 0S0

Date: July 30, 2020

Attention: Chloe Cartwright

Dear Ms. Cartwright:

**RE: Response to Alberta Environment and Parks Letter of July 21, 2020
Water Act Application 001-00431063**

We have been responding to Alberta Environment and Parks (AEP) and various landowners in the area. Part of the correspondence to the landowners was conducted prior to our most recent update letter of July 16, 2020 and it seemed prudent we incorporate our responses to their letters.

Firstly, with respect to our statement about the status of the Stantec report of 2011 we should re-iterate that the Stantec report followed analysis procedures as outlined in the current Alberta Environment Guide to Groundwater Authorization (2011) and the report was prepared by a respected firm and an experienced professional hydrogeologist.

As a result, it should be expeditious to submit this report in support of the license application and we have no issues with the report, with the exception of time sensitive matter of which we provided an update in our July 16, 2020 letter report. Further it is accepted industry and regulatory practice to use another consultants report.

AEP has let us know that they have already accepted at least part of the Stantec report (whether the water well is under the direct influence of surface water). Following our professional society (APEGA) guidelines, if AEP has concerns with other aspects of the Stantec report, APEGA requires that Stantec be provided with an opportunity to respond. Depending on the concern from AEP and the Stantec response we may be able to provide our own response, but until then I believe the Stantec report should be able to stand on its own merits.

With respect to individual Statements of Concern we offer the following clarifications:

Karen Farquharson – Pasture land owner 800 – 1600 m west of supply well

Boundary effects were observed in the Stantec pumping test report and interpretations (Section 2.3). As well the relative lack of response in Observation Well 1, which is completed over a shallower interval than the supply well (aquifer at 9.1 – 9.8 m in Obs Well 1 versus a completion zone of 11.0 – 15.2 m in the pumping well) also indicates a lack of vertical communication.

These results are consistent with the geological interpretation of the aquifers in the Paskapoo Formation consisting of sandstones deposited in relatively narrow river channels capped with relatively impermeable shales.

While longer pumping tests will provide more data, we do have water level data over 3.05 log cycles (Stantec report Figure 2.2). Increasing the pumping period to two days would provide water level data

over 3.3 log cycles, perhaps not a significant amount. I would note that the test length follows Alberta Environment guidelines so the authors of this guideline thought the test length was sufficient.

It should be noted that Karen Farquharson does not have a well on her land and does not appear to have a direct interest in groundwater supply.

Karen Singer – Neighbour to the SE approximately 1.6 km from Supply Well

The Stantec report on the uncertain nature of geological investigations and Ms. Singer's concerns in her letter of June 10, 2020 (Points 3, 5 and 6) require an appreciation of the geological nature of the aquifers of which we tried to convey in our response letter of July 2, 2020. We will bring additional points here with the realization that our description might still not be satisfactory. In our opinion the questions raised require a geological specialist to appreciate the answers fully, which is likely why the Stantec report alluded to these factors without discussing them in detail.

If the aquifer that supplies the Chinook Ridge well is of limited size, as Stantec suggests and the geological interpretation supports, this feature would be favourable in that the aquifer would not be connected to other aquifers that other groundwater users in the area utilize. The aquifer consists of sandstone bodies formed from river channel deposits and as such are limited in size – however various river channels may be connected with each other in three dimensions, either as stacked channels or as channels that connect with each other horizontally in discontinuous locations.

Determining the distribution of the aquifers in three dimensions with the well log data is often difficult and uncertain. Seismic data may help, but of course would be cost prohibitive. Electric logs (SP, gamma, resistivity, etc.) would have provided further information but need to be run at the time of well drilling and AEP does not require electric logs.

It should be noted that in response to the uncertainties inherent in any geological investigation AEP has made for a provision for a safety factor in the calculations. The distance from the Singer well to the Chinook Ridge supply well is greater than 1.6 km and unlikely to be affected at this distance. AEP does not routinely require analysis of groundwater effects at this distance.

Maxine McArthur – Neighbour to the east

As we were not able to take measurements on the wells on Ms. McArthur's property during our field survey we will not add additional comments to our letter of July 3, 2020.

Don Farquharson – Neighbour to the south-west

Mr. Pentney is correct in that the letter of July 16, 2020 is in response to concerns of Mr. Farquharson that time sensitive material in the Stantec report needed updating. We have recompleted the field verified survey to ensure that accurate well locations and owners are shown. Mr. Farquharson has also noted several well reports in the AEP water well database but lesser amounts on the field survey. Some of the well reports are for decommissioned wells or are records of water chemistry and the number of well reports is not indicative of the number of wells on the Chinook Ridge property.

As the water supply well for Chinook Ridge is determined to not be in direct communication with surface water there should be no adverse effects to any impacts on dugouts on the Farquharson property.

Robert and Elaine Watson – Neighbour to the north

Our field survey has shown that the aquifer supplying the Watson well is at an elevation of 1180 – 1168 m above sea level. The Chinook Ridge supply well has an aquifer at an elevation of 1208 – 1204 m above sea level, considerably higher and indicative of separate aquifers.

The static water level in the Watson water well is at an elevation of around 1190 m above seal level whereas the elevation of the water level in the Chinook Ridge supply well is at an elevation of around 1212 m above sea level. These different water level elevations also provide support that the two wells obtain water from separate aquifers.

A north to south cross section from the Watson well through the Chinook supply well and south to the Harnack Well is attached. Some sandstone bodies can be correlated between wells. Most wells obtain water from deeper aquifers than the aquifer supplying the Chinook Lodge well.

Jim Davies – Neighbour to the west

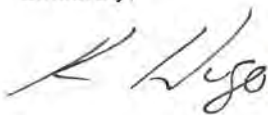
As we were not able to investigate the Jim Davies well there is some question as to the details of the well location and depth. It appears, as our letter of June 16, 2020 indicates, that one of the wells on the Jim Davies property is relatively shallow and quite possibly obtains water from the same zone as the Chinook Ridge water supply well.

Access to the Davies well during the pumping test conducted on the Chinook Ridge water supply well in June of this year would have been beneficial.

If the assumption is made that the two aquifers are connected than some interference will occur. Calculations for the interference effect are shown in the Stantec report (Table 3.1). Distance between the two wells is not accurately known but likely on the order of 100 – 200 m. According to Table 3.1 an additional drawdown of less than 1 m should occur.

The total available drawdown in the Davies well is again uncertain but appears to be on the order of 3 – 4 m. As such an additional drawdown of 1 m will occur after 20 years due to pumping from the Chinook Ridge Supply Well. This additional drawdown may not cause an adverse affect, depending on the productivity of the Davies well and the demands of water from that well.

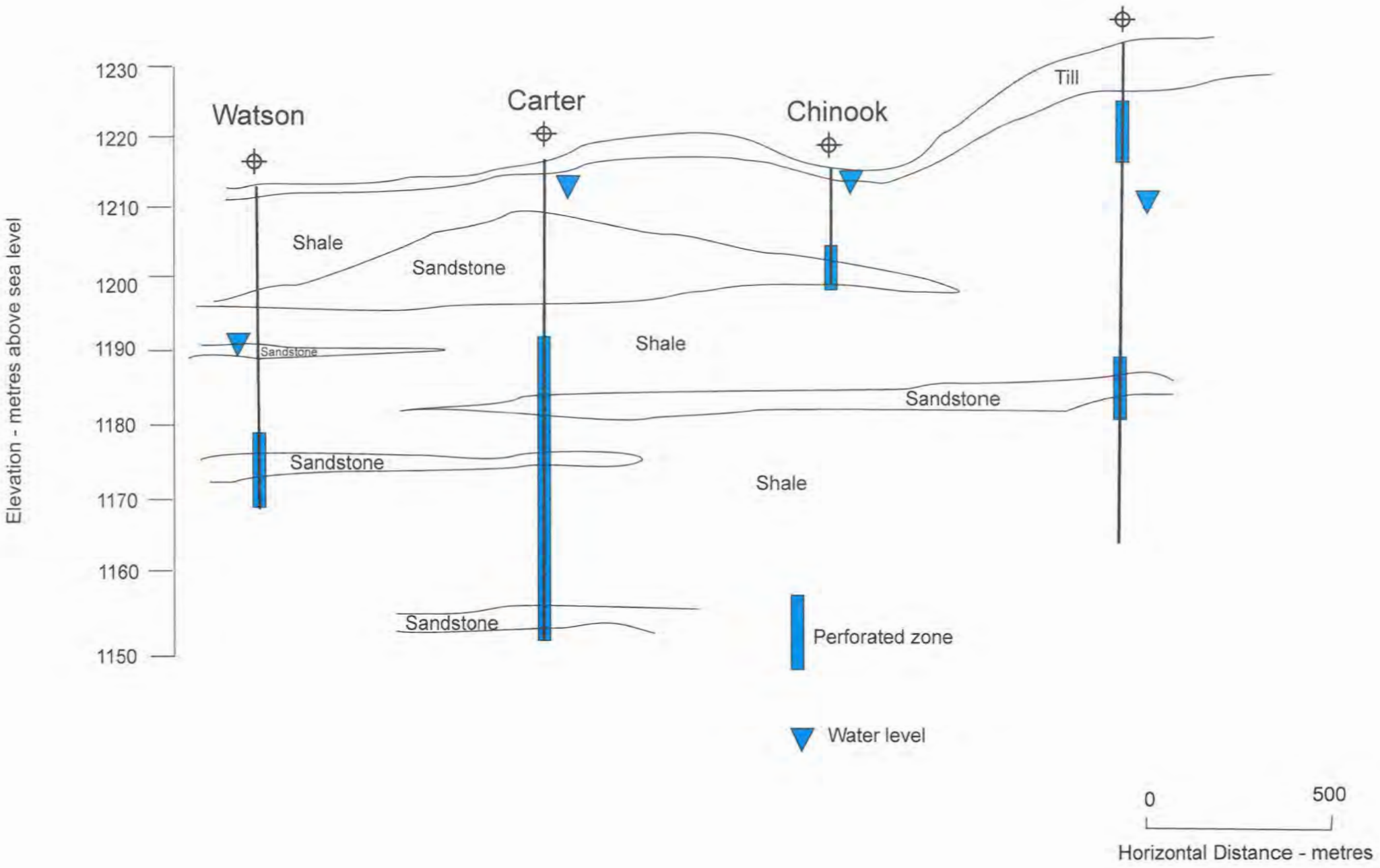
Sincerely,



Ken Hugo, P.Geol.
 Hydrogeologist
 APEGA P12910



/att – cross sections



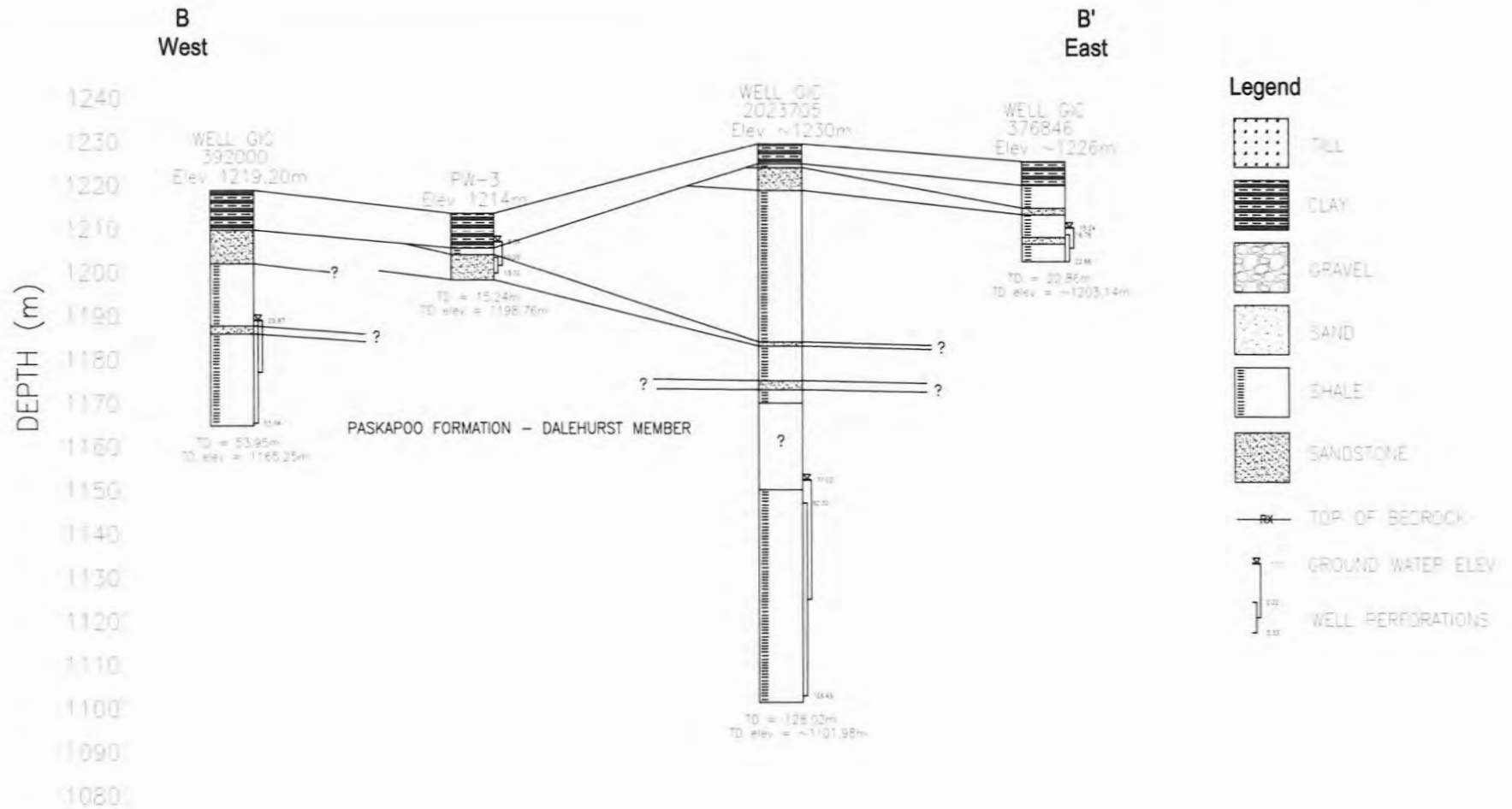


FIGURE 1.4

HYDROGEOLOGIC PROFILE - WEST TO EAST



Chinook Ridge Castle and RV Park
285049, Range Rd 35
Madden, AB T0M 0S0

July 16, 2020

Attention: Chloe Cartwright

Dear Ms. Cartwright,

RE: Update to Report entitled "Groundwater Evaluation – Chinook Ridge Lodge and Golf Course, SE – 31 – 28 – 3W5"

A groundwater supply evaluation report was prepared by Stantec Consulting Ltd. in 2010 that determined that a groundwater supply well on the Chinook Ridge Lodge and Golf Course property (now called Chinook Ridge Castle & RV Park) is capable of supplying 64.4 cubic metres per day of water without causing adverse affects to nearby users. The aquifer supplying the well was determined to not have a direct connection with surface water. The report was prepared in a format as required by Alberta Environment and Parks for submission to AEP in support of a license application for the well.

As the report is now 10 years old and an update to the report was requested by some neighbours as they were concerned about possible changes since 2010. Aquifer properties such as aquifer transmissivity and storativity will not have changed, nor will the geological description of the various strata underlying the site. Four components of the report that could have changed since the initial investigation 10 years ago are:

1. Groundwater users in the area may have changed due to new wells installed or old wells abandoned, ownership changes, or change in groundwater use.
2. Water levels in the wells due to pumping or long term climatic trends
3. Well productivity changes due to biological or chemical encrustation of the well screen.
4. Water chemistry changes due to changes in precipitation or infiltration patterns

A new field verified survey was conducted in June of 2020 and a short term pumping test on the supply well was conducted in July of 2020.

Field Verified Survey

Prior to the field survey the landowners in the area were contacted to seek permission to measure water levels in their wells and locate the wells precisely. Landowners were contacted with delivery of a letter describing the field measurement procedure. Permission was not obtained from all land owners in the area. Seven wells were measured, four landowners twice refused offers to measure their wells.

Procedures of the field survey is as follows:

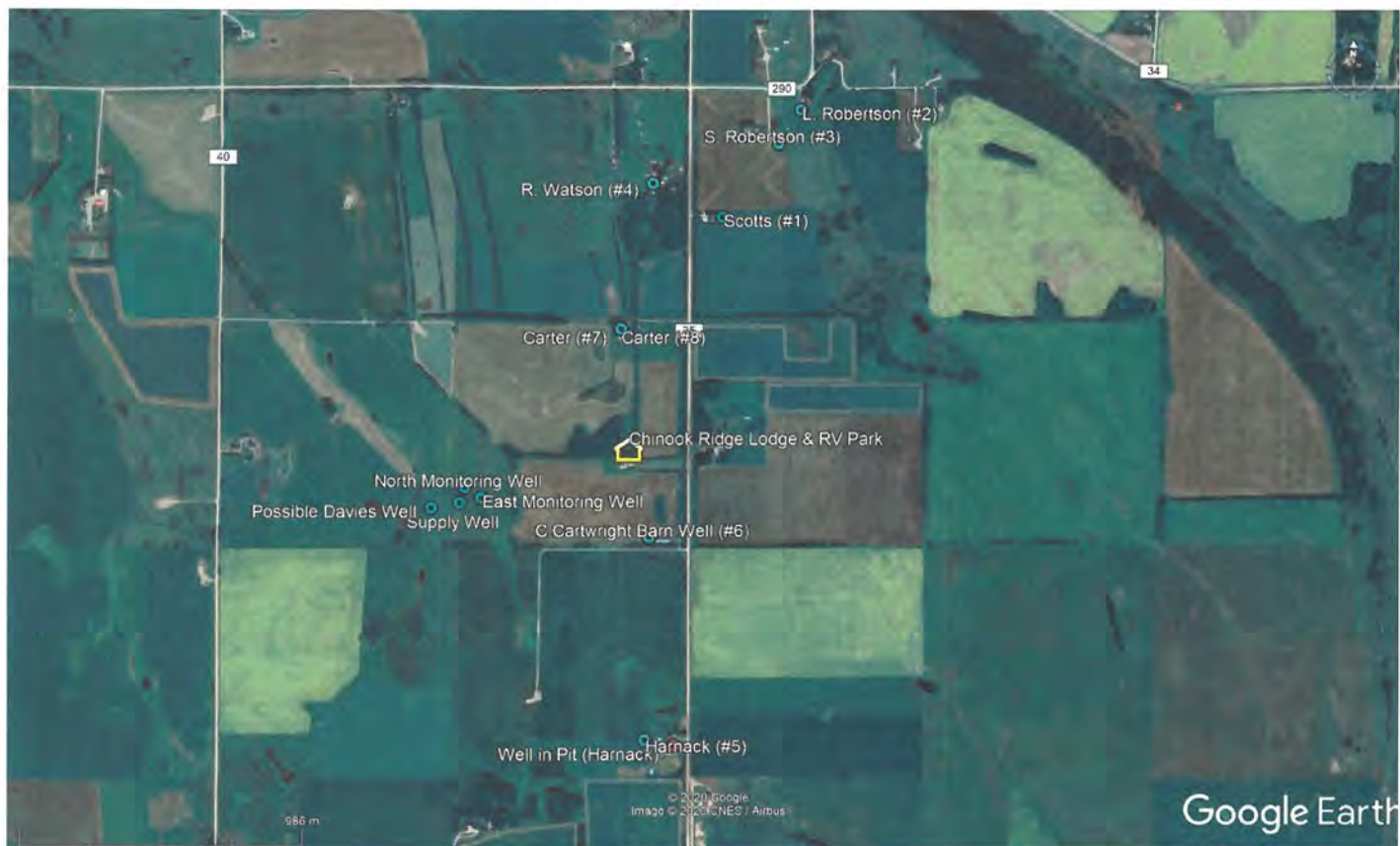
- Water levels of wells located in pits were not measured due to confined space entry restrictions.

- Water levels were measured with the aid of an RGI Model 300 Sonic Water Level Meter. This meter uses a sound wave to measure non-pumping water levels in the well. This meter avoids issues related to getting water level probes stuck in well and issues with cross contamination associated with using a water level probe in several wells.
- GPS locations of the wells were measured with a Garmin 64s hand held device.
- Notes were collected on well casing type and diameter to aid in determining which Water Well Drillers Report is associated with the well.
- Well elevations were obtained using LIDAR derived contour maps provided by Rockyview County. The survey is accurate to ± 2 m.

Using the water level measurements, water well location, well owner and other available data collected in the field (well casing material, well casing diameter, name of driller, well depth etc.) the presumed well record for each well was accessed on the Government of Alberta Water Well Database. The well records included are our best possible estimate of the corresponding water well record based on available data given the available data.

An aerial photo showing the location of each well measured during the survey is included in Figure 1. Neighbors who did not grant access to measure their well water levels are not included on the air photo with the exception of Davies who provided a verbal description of his well location.

FIGURE 1. Aerial View of Well Locations



Water Well Details and Water Level Measurements

Map Identifier	#1	#2	#3	#4	#5
LSD Location	NW-32-28-3W5	NW-32-28-3W5	NW-32-28-3W5	16-31-28-3W5	SE-31-28-3W5
GPS Location	51.4416185°N, -114.398447°E	51.4450160°N, -114.3945032°E	Unknown	51.4426812°N, -114.4019048°E	51.4251492°N, -114.4022763°E
GIC Well ID	392004	2022505	Unknown	404736	416470
Well Owner	Scotts	L. Robertson	S. Robertson	Rob Watson	Harnack
Well Use	Domestic	Domestic	Unknown	Stock	Domestic & Stock
Well Elevation	1214	1190	1194	1214	1240
Well Depth (m)	15.2	33.5	Unknown	45.7	79.3
Completion Zone (m)	9.8 – 14.3	18.3 – 30.5	Unknown	33.5 – 45.7	19.8 – 24.4 54.9 – 59.4
Completion zone elevation	1204 - 1200	1172 - 1160	-	1180 - 1168	1220 – 1216 1185 - 1181
Date Drilled	1974/07/04	2004/09/09	Unknown	1995/04/25	1975/07/29
Original Static Water Level	8.84	12.60	Unknown	24.38	24.38
Original Static Water Elevation	1205	1177	-	1190	1216
Water Level Measured June 23, 2020	9.20	12.26	Well in pit, water level not measured	23.22	26.62

Map Identifier	#6	#7	#8	#9	Chinook Ridge
LSD Location	SE-31-28-3W5	SE-31-28-3W5	SE-31-28-3W5	SW-31-28-3W5	SE-31-28-3W5
GPS Location	51.431517°N, -114.402206°E	51.4380807°N, -114.1035202°E	51.4380803°N, -114.4034809°E	?	51.423259° N, -114.41151° E
GIC Well ID	2023705	399551	399552	392001?	2090656
Well Owner	Chloe Cartwright	Carter	Carter	Davies	Chinook Ridge
Well Elevation	1234	1218	1218	1218	1218
Well Use	Other	Domestic	Domestic	Livestock	Event Facility
Well Depth (m)	128.0	45.7	66.1	16.8?	14.6
Completion Zone (m)	82.3 – 126.5	28.7 – 44.2	24.4 – 65.2	10.7 - 16.8	10.1 – 13.7
Completion Zone Elevation	1152 – 11 08	1189 – 1174	1194 - 1153	1207 - 1201	1208 - 1204
Date Drilled	2008/11/03	1994/11/28	1994/12/14	1985/09/17	2010/11/05
Original Static Water Level	77.02	28.65	24.38	12.2	6.54
Original Static Water Elevation	1157	1189	1194	1206	1212
Water Level Measured June 23, 2020	75.08	3.60	3.83	No permission	5.41

Points to consider from the survey are as follows:

- The well record for Scott's well is quite uncertain but the best possible match available on the Alberta Water Well Database.
- The water level in L. Roberson's domestic well has decreased by 0.34 meters from 2004 to 2020.
- R. Watson also had a second well located 5 meters north of the measured well, but the well was in a pit. The water level in the well that was measured has increased by 1.16 meters from 1995 to 2020.
- The water level in the Harnacks well that was not in a pit decreased by 2.24 meters from 1975 to 2020.
- The water level in Chloe Cartwrights barn well has increased by 1.94 meters from 2008 to 2020.
- The water level in both Carter wells appeared to have increased substantially since drilling in 1994. The large increase in water level may be due to the original static water level measured in 1994 being recorded before the water level in the well had fully recovered from drilling.
- Wells that have similar completion intervals as Chinook Ridge are Scott, and possibly Davies (#1 and #9). Wells that have similar water level elevations to Chinook Ridge is Harnack (#5). The Davies well is in close proximity to the Chinook Ridge supply well and possibly has a similar completion interval, but the historic static water levels are not similar and this water level indicates the two wells are not on the same aquifer. As permission was not obtained from Davies to measure water levels a comparison to recent water levels could not be made.

The findings are in agreement with the Stantec findings that the aquifers are not regionally extensive.

There does not appear to be any well that have similar completion zone elevations and water level elevations to the Chinook Ridge water supply well and it cannot be established that the aquifer supplying the Chinook Ridge aquifer is on the same aquifer as any of the neighbouring wells.

Chinook Ridge Water Supply Well Productivity

A short term pumping test was conducted on the water supply well on July 5, 2020 by personnel from Wild Rose Water Wells Ltd. The pumping test consisted of pumping the well at a rate of 15.7 imperial gallons per minute for 2 hours. Water levels were read for the two hours and for 90 minutes after pumping ceased. The pumping test report from Wild Rose is attached.

The pumping test data was evaluated with the aid of the AQTESOLV program developed by HydroSoft. As with the original pumping test interpretation undertaken by Stantec a dual porosity (fractured) model was used in the interpretation. A graph showing water displacement with time and the fitted model curve is also attached.

A very good fit to the data is observed. No indications of well damage are present as the early time data fits the model curve as well as the late time data. A comparison of this pumping test data and interpretation with the pumping test data and interpretation as presented in the Stantec report is as follows:

Pumping Test Comparison

Test Date	Static Water Level	Transmissivity	Specific Capacity @ 120 min pumping
11/10/2010	6.54 m	62.6 m ² /day	350 m ² /day
5/7/2020	5.41 m	91.3 m ² /day	256 m ² /day

Note: Transmissivity based on aquifer thickness from the Stantec report of 3.70 m ($T = K \times b$)

The two transmissivities are similar with the recent pumping test showing a higher transmissivity, however as aquifer transmissivities often vary over one order of magnitude the 30% difference between these two tests is not significant. The Stantec report for the dual porosity model would likely have shown a different transmissivity value if only the data to 120 minutes was used.

The results show some decrease in specific capacity with time; however, the static water level is higher in 2020 such that the available head for the aquifer will be higher which would allow for similar long term yield calculations. Due to the relatively small amount of drawdown observed (less than 0.4 m) we would consider the calculated specific capacity values in 2010 and 2020 to be similar.

Water Chemistry

A water sample was collected during the pumping test on July 5, 2002 and submitted to WSH Labs (1992) Ltd. for analysis of routine dissolved parameters. The lab report is also attached. A summary of the results, with a comparison to the water chemistry data as presented in the Stantec report and drinking water quality guidelines is as follows:

Water Chemistry Analyses

Parameter	2010 Results	2020 Results	Drinking Water Quality Guidelines
Calcium	107	109	
Iron	0.12	0.03	0.3
Magnesium	37.9	37.8	
Manganese	0.01	0.01	0.05
Potassium	4.2	4.1	
Sodium	19	22	200
Bicarbonates	521	511	
Bromides	< 0.2	< 0.1	
Carbonates	0	0	
Chlorides	3.6	4.4	250
Fluorides	0.15	0.17	1.5
Nitrates	1.49	1.2	10
Nitrites	< 0.05	< 0.02	1

Sulphates	23	27	500
Electrical conductivity	808	796	
Total Dissolved Solids	452	457	500
pH	7.82	7.82	6.5 – 8.5

Note: all results in mg/L except electrical conductivity in $\mu\text{S}/\text{cm}$ and pH in pH units

The water quality shows no change between 2010 and 2020.

Summary

The data and interpretations provided in this letter report are in agreement with the data collected and interpretations provided in the 2010 Stantec report. The data collected here provides no indications that the conclusions in the Stantec report would not be considered to still be valid.

This updated letter is to be used in conjunction with the original Stantec report as submitted to the client. No interpretation of the data or conclusions within the Stantec report is provided in this letter update and concerns with respect to the Stantec report will need to be addressed by Stantec Consulting Ltd.

Sincerely,

Ken Hugo, P.Geol.
 Senior Hydrogeologist
 APEGA P12910



ATTACHMENTS: PUMPING TEST REPORT, WATER WELL CHEMICAL ANALYSIS REPORT

WILD ROSE WATER WELLS LTD.

B-1 08731001 PRDP20185188

SDAB 2020 Dec 17

Applicant Exhibit 8 - Solstice Water Well Report

Box 4028 49

Olds, AB T4H 1P6

Phone/Fax: (403) 556-6700

RURAL INDUSTRIAL MUNICIPAL

Water Well Drilling - Repairs - Pumps & Pressure System - Environmental Drilling - Flow Testing - Well Abandonments

WATER WELL FLOW TEST

July 5/20

Tested By: R. Wagner
Water Well Driller

Well Owner: Chloe Cartwright
Address:

1/4 or LSD	SECTION	TWP	RANGE	W. MED.
SE	31	28	3	5

Location on Property: North Pumping Well

Elapsed time in Minutes	Depth to water level during Pumping	Depth to water level during Recovery
0	5.41	5.80
1		5.70
2	5.55	5.69
3		5.665
4	5.57	5.65
5	5.59	5.64
6		
7		
8		
9		
10	5.63	5.60
15		
20	5.68	5.55
25		
30	5.705	5.53
35		
40	5.72	5.52
45		
50		5.51
60	5.75	5.50
70	5.76	
80	5.77	5.49
90	5.78	5.485
100	5.79	
110		
120	5.80	

REMARKS

Measurements in: metres

Water samples were taken from the end of the discharge hose

Water samples were clear with no sediment or odour

Well ID #2090656

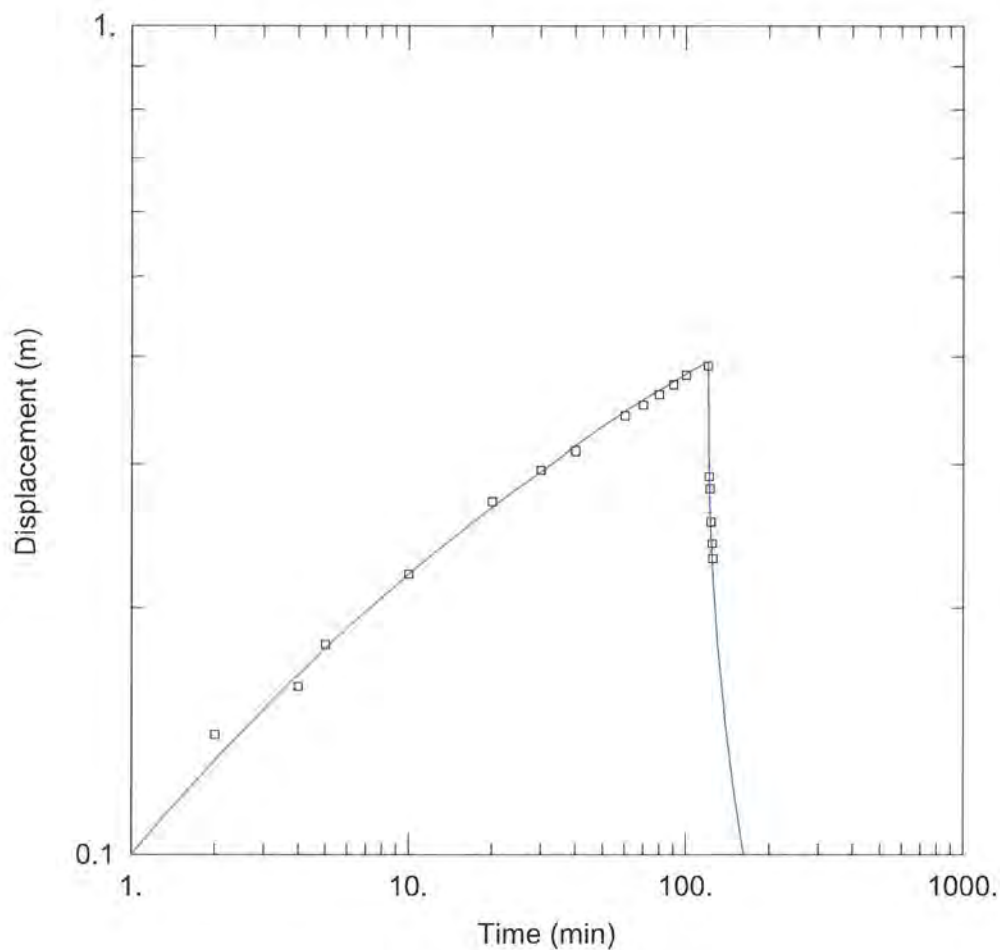
Well Depth is 50 feet

Test Requested by:

Name:
Address:
Email:
Phone No.:
Contact:

Flow Rate Information

Pumped at: 15.7 igpm
Pressure gauge reading:
Measured from:
Distance to ground level:



WELL PRODUCTIVITY TEST

AQUIFER DATA

Saturated Thickness: 4.27 mAnisotropy Ratio (K_z/K_r): 1.

WELL DATA

Pumping Wells

Well Name	X (m)	Y (m)
2090656	0	0

Observation Wells

Well Name	X (m)	Y (m)
□ 2090656	0	0

SOLUTION

Aquifer Model: FracturedSolution Method: Barker $K = 24.67$ m/day $S_s = 4.359$ $K' = 1.44$ m/day $S_s' = 0.001 \text{ m}^{-1}$ $n = 2.$ $b = 4.27$ m $S_f = 0.$ $S_w = 0.$ $r(w) = 0.0826$ m $r(c) = 0.0627$ m



Phone: (403) 250-9164 • Fax: (403) 291-4597 • www.wshlabs.com

Wild Rose Water Well Ltd.

Box 4028
Olds, AB T4H 1P6

Phone: (403) 556-6700 Lab Number: 87971
Fax: (403) 556-6700
Email: waterwells@telusplanet.net PO Number:

Sample Info: Chloe Cartwright
Well ID #2090656

Sampled By:
Date Sampled: 7/5/2020
Date Received: 7/6/2020
Date Reported: 7/7/2020

TEST REPORT

Analyte	Units	Result	CDW Guideline Maximum	Detection Limit
Calcium	mg/L	107	No Guideline	0.02
Iron	mg/L	0.12	AO: 0.3	0.03
Magnesium	mg/L	37.9	No Guideline	0.02
Manganese	mg/L	0.01	AO: 0.02, MAC: 0.12	0.01
Potassium	mg/L	4.2	No Guideline	0.02
Sodium	mg/L	19	AO: 200	0.02
Bicarbonates	mg/L	521	No Guideline	-
Bromides	mg/L	<0.2	No Guideline	0.2
Carbonates	mg/L	0	No Guideline	-
Chlorides	mg/L	3.6	AO: 250	0.1
Fluorides	mg/L	0.15	MAC: 1.5	0.02
Nitrates as N	mg/L	1.49	MAC: 10	0.04
Nitrites as N	mg/L	<0.05	MAC: 1	0.05
NO ₃ + NO ₂ as N	mg/L	1.49	No Guideline	0.04
Sulfates	mg/L	23	AO: 500	0.9

Parameter	Units	Result	CDW Guideline Maximum	Detection Limit
Electrical Conductivity (at 25°C)	µS/cm	808	No Guideline	0.2
pH	pH	7.82	7.0 - 10.5	-
Hardness (as CaCO ₃)	mg/L	423	No Guideline	0.1
Total Alkalinity (as CaCO ₃)	mg/L	427	No Guideline	3
P-Alkalinity (as CaCO ₃)	mg/L	0	No Guideline	-
Hydroxide (as CaCO ₃)	mg/L	0	No Guideline	-
Total Dissolved Solids (calculated)	mg/L	452	AO: 500	4

WSH Labs (1992) Ltd. as per:

KBW

Sum of Cations	9.37	TDS / EC Ratio	0.56
Sum of Anions	9.23	Sodium Adsorption Ratio	0.39
Ion Balance	1.01	Saturation Index	1.02

Legalities

Lab Number: 87971

- (1) The results above are related only to the items analyzed.
- (2) Results apply to the sample(s) as received.
- (3) Analytical determinations were performed in Calgary, AB. 3851B - 21 Street NE.
- (4) Condition of sample(s) upon receipt:
Acceptable
- (5) External provider(s) of laboratory results:

References

- (1) Accredited by CALA to ISO/IEC 17025 for specific tests.
- (2) Guidelines for Canadian Drinking Water Quality are provided courtesy of Health Canada, June 2019.
https://www.canada.ca/content/dam/hc-sc/migration/hc-sc/ewh-semt/all_formats/pdf/pubs/water-eau/sum_guide-res_recom/sum_guide-res_recom-eng.pdf

Acronyms & Nomenclatures

< denotes less than detection limit	MAC = Maximum Acceptable Concentration
> denotes greater than	OG = Operational Guidance Value
AO = Aesthetic Objective	TNTC = Too Numerous To Count (>80 colonies)
CDW = Canadian Drinking Water	

Standard Methods for the Examination of Water and Wastewater 23rd Edition (2017)

Alkalinity. 2320 B. Titration Method.
Ammonia Nitrogen. 4500-NH₃ C. Titrimetric Method.
Anions. 4110 B. Ion Chromatography with Chemical Suppression of Eluent Conductivity.
Biochemical Oxygen Demand. 5210 B. 5-Day BOD Test.
Color. 2120 B. Visual Comparison Method.
Conductivity. 2510 B. Laboratory Method.
Fluoride. 4500-F⁻ C. Ion-Selective Electrode Method.
Hardness. 2340 B. Hardness by Calculation.
Metals. 3125 B. Inductively Coupled Plasma / Mass Spectrometry (ICP-MS) Method.
Organic Carbon. 5310 B. High-Temperature Combustion Method.
pH. 4500-H⁺ B. Electrometric Method.
Total Kjeldahl Nitrogen / Nitrogen (Organic). 4500-Norg B. Macro-Kjeldahl Method.
Total Suspended Solids. 2540 D. Total Suspended Solids Dried at 103-105°C.
Turbidity. 2130 B. Nephelometric Method.

Hach Methods

Chemical Oxygen Demand. Hach Method 8000.
Chlorine, Total & Free. As per Hach CN66 Test Kit Instructions.
Coliforms, Total and E. coli. (Membrane Filtration). Hach Method 10029.
Ortho-Phosphate. Hach Method 8048.
Sulfides. Hach Method 8131.
Tannin & Lignin. Hach Method 8193.
Total Phosphate. Hach Method 8190.

June 24, 2019

Sent via E-mail

Attn: Chloe Cartwright

Re: Transportation Impact Assessment – Chinook Ridge Lodge
Rocky View County, Alberta; **PRDP20185188**
SDAB Presentation Summary

JCB Engineering Ltd. (JCB) is pleased to present this summary of a presentation for the Subdivision and Development Appeals Board (SDAB) of Rocky View County for the Chinook Ridge Lodge. This summary is for the work conducted by JCB to date for this project with regards to the transportation impact assessment (TIA).

1. Preliminary Study

In March 2019, JCB provided an update to the 2011 TIA conducted for the subject development. The purpose of the update was to determine if there would be significant changes in the impact on the transportation network due to changes in the development concept. The trip generation was updated based on the new development concept and compared to what was calculated in 2011. The volumes on the impacted roadways from the 2011 report were also reviewed and updated to reflect the conditions in 2019. New concerns since 2011 from Rocky View County, Mountain View County and Alberta Transportation were also reviewed for the TIA update.

It was concluded that the recommendations from the 2011 TIA were still valid, with the exception that Range Road 35 had to be reviewed to confirm if there were any elements that were below the standards for a 'Regional Moderate Volume' roadway classification.

A copy of the JCB report was provided in the agenda for the SDAB.

Upon review by Rocky View County, additional information was requested by the County to be included in the JCB report. Since then, **JCB has confirmed an updated scope of work with Rocky View County and Alberta Transportation, and is in the process of revising the 2019 TIA.**

2. Traffic Counts

On June 20, 2019 JCB conducted a traffic count at the intersection of Highway 574 and Range Road 35 to confirm if there had been any significant changes to the volumes at this intersection since 2011; a summary of the peak hour counts is appended to this letter. In 2011, there were a total of 15 vehicles entering that intersection in the AM peak hour, in 2019 a total of 10 vehicles entered. In the 2011 PM peak hour 20 vehicles entered the intersection, and in 2019 only 17 vehicles entered in the same hour. From this information, traffic volumes have decreased at the intersection of Highway 574 and Range Road 35.

In the JCB report from March 2019, it was assumed that traffic volumes would increase by 1.4% per year based on historical traffic count data available from Alberta Transportation. The assumptions made in the JCB report would therefore result in over estimated traffic volumes and thus have more conservative results from the analysis.

This information will be included in the upcoming revision to the JCB report to determine the background traffic volumes to be used in the analysis.

3. Collision Statistics

Data from Alberta Transportation was obtained to determine the frequency and severity of collisions of impacted intersections along Highway 574 at Highway 22, Range Road 35 and Highway 766; all intersections that were reviewed in 2011 and are to be reviewed in the 2019 update. These collision statistics are appended to this letter.

None of these intersections had collision rates or costs greater than the provincial benchmarks for intersections on similar classifications of highways; at the intersections with Range Road 35 and Highway 766 there were no collisions on record in the past 5 years. There was only 1 collision at the intersection of Highway 574 and Highway 766 in the records, it was animal related and had resulted in only property damage; there were no collision on record for the intersection of Highway 574 and Range Road 35. At the intersection of Highway 574 and Highway 22 there were only 4 collisions in the past 5 years, 9 collisions in the past 15 years; and of these only 1 resulted in a minor injury, all of the other collisions were property damage only.

None of these intersections are collision prone locations, and this information will also be included in the upcoming revision to the JCB report.

* * * * *

If you wish to discuss any items within this letter, please feel free to contact the undersigned at jcbarett@jcbengineering.ca or (403) 714-5798.

Sincerely,



Justin Barrett, P. Eng., PTOE
President and Transportation Engineer
JCB Engineering Ltd.

Attachments: Traffic Counts – Highway 574 and Range Road 35
Collision Statistics – Highway 574 at Highway 22, Range Road 35, Highway 766

Location:

Rge 35 at Hwy 574, Rocky View County

GPS Coordinates:

Date:

2019-06-20

Day of week:

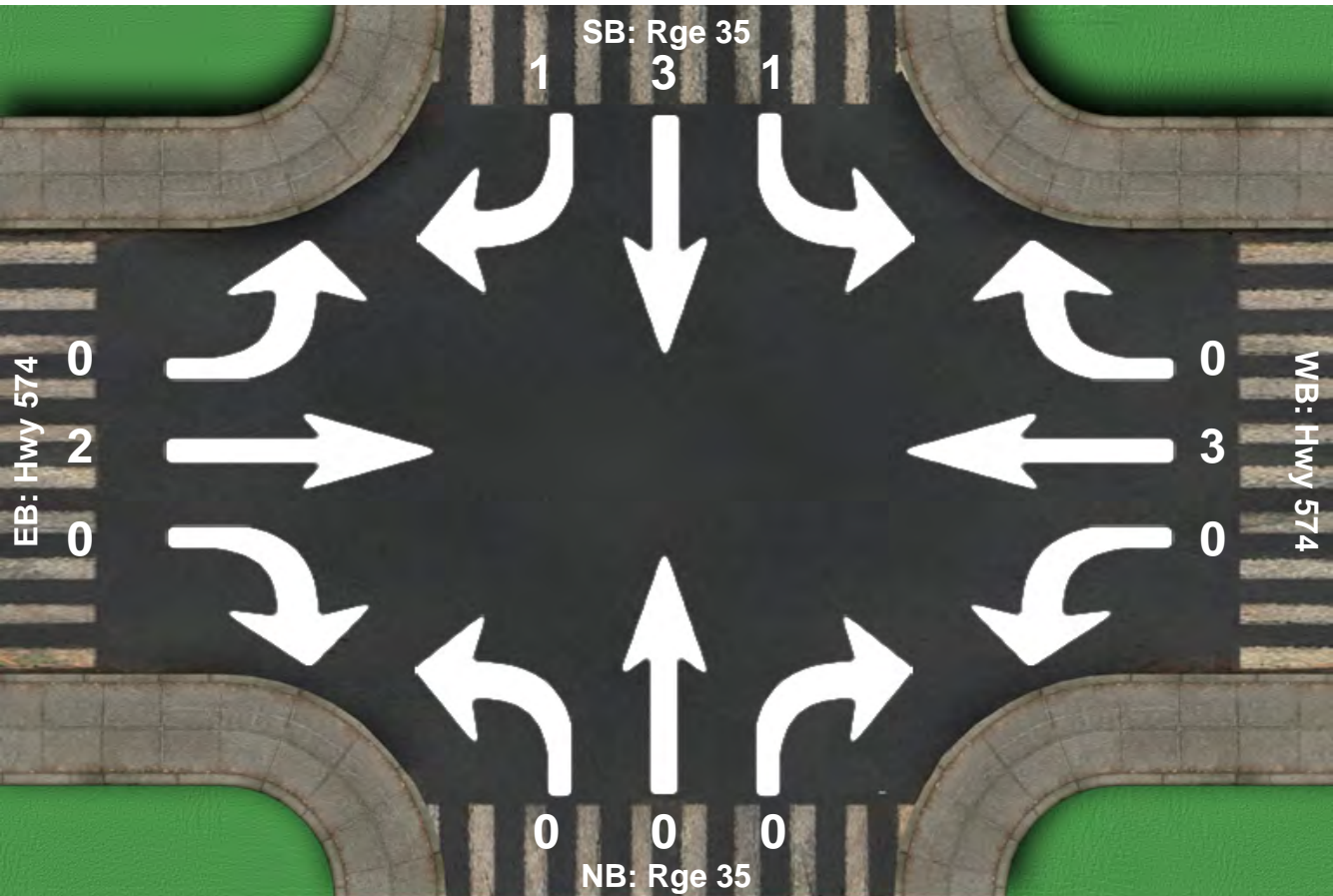
Thursday

Weather:

Raining, 10 C

Analyst:

JCB



Intersection Peak Hour

07:30 - 08:30

	SouthBound			Westbound			Northbound			Eastbound			Total
	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	
Vehicle Total	1	3	1	0	3	0	0	0	0	0	2	0	10
Factor	0.25	0.38	0.25	0.00	0.38	0.00	0.00	0.00	0.00	0.00	0.50	0.00	0.62
Approach Factor	0.42			0.38			0.00			0.50			

Location:

Rge 35 at Hwy 574, Rocky View County

GPS Coordinates:

Date:

2019-06-20

Day of week:

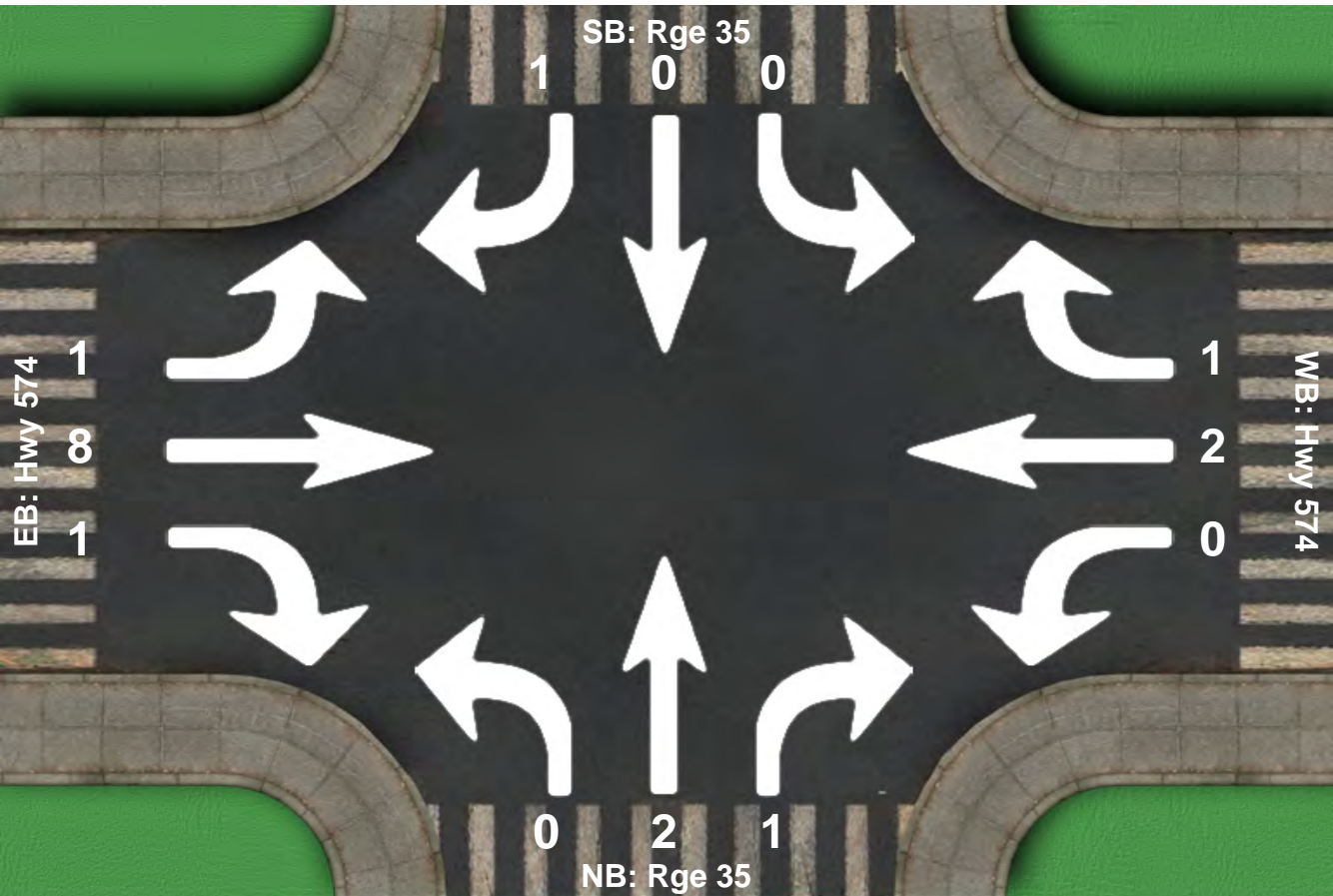
Thursday

Weather:

Overcast, 10 C

Analyst:

JCB



Intersection Peak Hour

16:00 - 17:00

	SouthBound			Westbound			Northbound			Eastbound			Total
	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	
Vehicle Total	0	0	1	0	2	1	0	2	1	1	8	1	17
Factor	0.00	0.00	0.25	0.00	0.50	0.25	0.00	0.50	0.25	0.25	0.50	0.25	0.71
Approach Factor	0.25			0.38			0.75			0.62			

TIMS Network Expansion Support System (NESS) TIMS Geometric Report

INT # **4297-1** INT type AT GRADE - TYPE UNKNOWN

Region: SOUTHERN REGION

INT Effective Date: 01-Oct-00

Page 31 of 41

Location: **HIGHWAY 22:16 AND 574:02**

Classification: LV 2 Signalized: N Last paved yr: 1991

Divided: N

Posted speed: 100 Lit: N Last paved road name: 22

TM number: 62240

NESS Safety Calculations (2012 - 2016)

	Actual	BM	Deltas
Total rate:	54.161	63.1	8.9
Non animal rate:	54.161	59.6	5.4
Collision cost (\$ x M):	0.023	0.479	0.456

Total (ani + non ani)	Non-animal	2012	2013	2014	2015	2016
# Daytime: 1	Daytime				1	
# Nighttime: 2	Nighttime		1		1	
	Unknown		1			

Modify Outliners for Non Animal Collision					
	2012	2013	2014	2015	2016
F and Maj Inj.	0	0	0	0	0
Min. Inj.	0	0	0	0	0
Non ani	0	0.6	0	2	0

Three Similar Collisions Over Five Yrs Period

(excluding off road and animal collision)

Year:

Prim. evt.:

Collision Frequency Over Last 15 Yrs

Severity - non ani. 2002 2003 2004 2005 2006 2007 2008 2009 2010 2011 2012 2013 2014 2015 2016 Last 5 yrs

FATAL																0
MAJOR																0
MINOR					1											0
PDO			1		1							2		2		4
TOTAL	1	0	1	0	2	1	0	0	0	0	0	2	0	2	0	4
TOTAL-non ani.	0	0	1	0	2	0	0	0	0	0	0	2	0	2	0	4

Collision Summary Last 5 Yrs (2012 - 2016)

(Non animal collisions)

Month	Freq	Hour	AM	PM	Weekday	Freq
Jan:	1	0:			Mon:	
Feb:	1	1:			Tue:	
Mar:		2:			Wed:	
Apr:		3:			Thu:	1
May:	1	4:			Fri:	2
Jun:		5:		1	Sat:	
Jul:		6:	1		Sun:	1
Aug:	1	7:	1		unknown:	
Sep:		8:				
Oct:		9:				
Nov:		10:		1		
Dec:		11:				
unknown:		unknown:				

Collision event	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	Last 5 yrs
ANIMAL	1					1										0
BACKING																0
HEAD ON																0
LEFT TURN:ACROSS PATH																0
OFF ROAD LEFT																0
OFF ROAD RIGHT			1													0
OTHER																0
PASSING:LEFT TURN					1											0
PASSING:RIGHT TURN																0
PEDESTRIAN																0
REAR END					1											0
RIGHT ANGLE																0
SIDESWIPE:OPP DIR												1		1		2
SIDESWIPE:SAME DIR													1			1
STRUCK OBJECT												1				1
UNKNOWN																0

INT polygon yr: 31-Mar-2017

*The number of collision in this report are collisions at and near the intersection and is calculated using intersection polygon in TIMS.

*Cost of PDO collision had increased from \$1,000 to \$2,000 in 2011

TIMS Network Expansion Support System (NESS) TIMS Geometric Report

INT # **16757-1** INT type AT GRADE - TYPE UNKNOWN

Region: SOUTHERN REGION

INT Effective Date: 01-Oct-00

Page 34 of 41

Location: **HIGHWAY 574:02 AND RANGE ROAD 35**

Classification: LV 3

Signalized: N

Last paved yr:

Divided: N

Posted speed: 80

Lit: N

Last paved road name:

TM number:

NESS Safety Calculations (2012 - 2016)

	Actual	BM	Deltas
Total rate:	0	400.5	400.5
Non animal rate:	0	393.8	393.8
Collision cost (\$ x M):	0	0.246	0.246

Total (ani + non ani)	Non-animal	2012	2013	2014	2015	2016
# Daytime: 0	Daytime					
# Nighttime: 0	Nighttime					
	Unknown					

Modify Outliners for Non Animal Collision					
	2012	2013	2014	2015	2016
F and Maj Inj.	0	0	0	0	0
Min. Inj.	0	0	0	0	0
Non ani	0	0	0	0	0

Three Similar Collisions Over Five Yrs Period

(excluding off road and animal collision)

Year:

Prim. evt.:

Collision Frequency Over Last 15 Yrs

Severity - non ani. 2002 2003 2004 2005 2006 2007 2008 2009 2010 2011 2012 2013 2014 2015 2016 Last 5 yrs

TOTAL	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
TOTAL-non ani.	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

Collision Summary Last 5 Yrs (2012 - 2016)

(Non animal collisions)

Month	Freq	Hour	AM	PM	Weekday	Freq
Jan:		0:			Mon:	
Feb:		1:			Tue:	
Mar:		2:			Wed:	
Apr:		3:			Thu:	
May:		4:			Fri:	
Jun:		5:			Sat:	
Jul:		6:			Sun:	
Aug:		7:			unknown:	
Sep:		8:				
Oct:		9:				
Nov:		10:				
Dec:		11:				
unknown:		unknown:				

INT polygon yr: 31-Mar-2017

*The number of collision in this report are collisions at and near the intersection and is calculated using intersection polygon in TIMS.

*Cost of PDO collision had increased from \$1,000 to \$2,000 in 2011

TIMS Network Expansion Support System (NESS) TIMS Geometric Report

INT # **4296-1** INT type AT GRADE - TYPE UNKNOWN

Region: SOUTHERN REGION

INT Effective Date: 01-Oct-00

Page 38 of 41

Location: **HIGHWAY 574:02 AND 766:02**

Classification: LV 3 Signalized: N Last paved yr: 2005

Divided: N

Posted speed: 80 Lit: N Last paved road name: 766

TM number: 66240

NESS Safety Calculations (2012 - 2016)

	Actual	BM	Deltas
Total rate:	0	233.7	233.7
Non animal rate:	0	227.9	227.9
Collision cost (\$ x M):	0	0.246	0.246

Total (ani + non ani)	Non-animal	2012	2013	2014	2015	2016
# Daytime: 0	Daytime					
# Nighttime: 0	Nighttime					
	Unknown					

Modify Outliners for Non Animal Collision					
	2012	2013	2014	2015	2016
F and Maj Inj.	0	0	0	0	0
Min. Inj.	0	0	0	0	0
Non ani	0	0	0	0	0

Three Similar Collisions Over Five Yrs Period

(excluding off road and animal collision)

Year:

Prim. evt.:

Collision Frequency Over Last 15 Yrs

Severity - non ani. 2002 2003 2004 2005 2006 2007 2008 2009 2010 2011 2012 2013 2014 2015 2016 Last 5 yrs

FATAL																0
MAJOR																0
MINOR																0
PDO																0

TOTAL	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0
TOTAL-non ani.	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

Collision Summary Last 5 Yrs (2012 - 2016)

(Non animal collisions)

Month	Freq	Hour	AM	PM	Weekday	Freq
Jan:		0:			Mon:	
Feb:		1:			Tue:	
Mar:		2:			Wed:	
Apr:		3:			Thu:	
May:		4:			Fri:	
Jun:		5:			Sat:	
Jul:		6:			Sun:	
Aug:		7:			unknown:	
Sep:		8:				
Oct:		9:				
Nov:		10:				
Dec:		11:				
unknown:		unknown:				

Collision event 2002 2003 2004 2005 2006 2007 2008 2009 2010 2011 2012 2013 2014 2015 2016 Last 5 yrs

ANIMAL	1															0
BACKING																0
HEAD ON																0
LEFT TURN:ACROSS PATH																0
OFF ROAD LEFT																0
OFF ROAD RIGHT																0
OTHER																0
PASSING:LEFT TURN																0
PASSING:RIGHT TURN																0
PEDESTRIAN																0
REAR END																0
RIGHT ANGLE																0
SIDESWIPE:OPP DIR																0
SIDESWIPE:SAME DIR																0
STRUCK OBJECT																0
UNKNOWN																0

INT polygon yr: 31-Mar-2017

*The number of collision in this report are collisions at and near the intersection and is calculated using intersection polygon in TIMS.

*Cost of PDO collision had increased from \$1,000 to \$2,000 in 2011