



## Quail Valley Water System Improvement Plan

**To:** Joe Schiewe – Holt Homes  
Paul Sellke, PE, GE – AKS Engineering & Forestry, LLC

**From:** Jason Melady, RG, CWRE – Summit Water Resources, LLC  
Ryan Dougherty, PE, RG – Summit Water Resources, LLC

**Date:** December 12, 2023

### Executive Summary

Summit Water Resources, LLC (Summit) has prepared this water system improvement plan (WSIP) for Holt Homes (Holt) to support water system planning efforts for the Quail Valley development in Banks, Oregon. The purpose of this WSIP is to estimate the water demands of Holt's proposed development, identify and evaluate water supply strategies to meet projected water demands, and recommend a preferred water supply strategy for implementation.

To project the water demands of Holt's proposed Quail Valley development, conservative assumptions related to population density and water use characteristics were utilized. Water demand projections indicate the following:

- **Full Buildout Population:** At full buildout in 2035 the population of the Quail Valley development is estimated to be 2,370.
- **Projected Peak Season ADD:** Assuming that irrigation demands for community open spaces are met with the existing TVID connection, the resulting peak season ADD is estimated to be 0.28 MGD.
- **Projected MDD:** Assuming that irrigation demands for community open spaces are met with the existing TVID connection, the resulting MDD is estimated to be 0.39 MGD.

To meet the Quail Valley development's projected demands, a recommended water supply strategy was identified and developed which consists of using the existing TVID connection to meet irrigation demands of community open spaces and constructing one new deep water supply well (constructed similarly to Well 2). To provide storage redundancy and adequate fire flow a new 1 MG reservoir will be constructed (see Kennedy Jenks, 2022b for recommended storage improvement).

Review of available data suggests that this water supply strategy will reliably provide 0.34 MGD during the peak season and a short-term maximum capacity of 0.42 MGD, which exceeds the development's projected demands. Therefore, the recommended water supply strategy satisfies Section 152.003(D)(2) of the Banks Development Code because a new source of water of sufficient quality and quantity to serve over 100% of the developments projected water needs will be provided to the City.

## 1 Introduction

Summit Water Resources, LLC (Summit) has prepared this water system improvement plan (WSIP) for The Holt Homes (Holt) to support water system planning efforts for the Quail Valley development in Banks, Oregon.

Summit understands that Holt is evaluating development of a multi-phase residential housing community. Per 152.003(D) of the City's municipal code, applicants for new developments must either obtain:

1. Confirmation from the City Engineer verifying that the City's water system has adequate capacity to serve the proposed development, or;
2. The applicant must provide documentation satisfactory to the City Engineer of its own alternative source of water that is legally capable of being dedicated to and annexed by the City of sufficient capacity to serve the proposed development.

Further guidance for interpretation and administration of Section 152.003(D)(2) is outlined in Resolution 2022-03 and summarized below for new residential subdivision proposals:

- For all new residential subdivision proposals (land divisions proposing a total of 4 or more lots), the applicant shall demonstrate compliance with Section 152.003(D) of the Banks Development Code by providing one or more new sources of water of sufficient quality and quantity to serve 100% of the development's projected water needs as a means of augmenting the capacity of the City's public water system.

The purpose of this WSIP is to estimate the water demands of Holt's proposed development, identify and evaluate water supply strategies to meet projected water demands, and recommend a preferred water supply strategy for implementation that meets the requirements of Section 152.003(D)(2).

## 2 Projected Water Demands

This section reviews key aspects of Holt’s proposed development and provides estimates of associated water demands.

### 2.1 Overview of Proposed Development

Summit understands that Holt is interested in evaluating one development scenario, identified as Quail Valley. Key aspects of the Quail Valley development scenario were provided by AKS Engineering & Forestry, LLC (AKS) and are summarized below.

#### Quail Valley

This development scenario includes a mix of 955 single-family detached and attached homes (SFHs), 5 acres of commercial and 2.4 acres of industrial zoning, as well as irrigated open spaces, ponds/wetlands, and vegetated corridors. The phasing and number of lots associated with the Quail Valley development scenario are tabulated below on Table 1.

The Quail Valley development includes 9.78 acres of ponds/wetlands, 8.81 acres of temporarily irrigated vegetated corridors (only irrigated for the initial two years), and 24.5 acres of permanently irrigated open spaces.

**Table 1. Overview of Proposed Quail Valley Development**

Development Scenario	Number of Lots / Irrigated Acres											Total Lots	Total Acres
	2024	2026	2027	2028	2029	2030	2031	2032	2033	2034	2035		
<b>Quail Valley Development</b>													
Quail Valley SFHs (detached)			45	45	87	166	99	89	112	111	56	<b>810</b>	
Quail Valley SFHs (attached)			15	15	18	36	20	25	12	4	0	<b>145</b>	
Ponds/Wetlands (ac)		4.95			3.74		1.09					<b>9.78</b>	
Vegetated Corridor* (ac)		2.95			4.38		1.48					<b>8.81*</b>	
Irrigated Open Spaces (ac)		4.88	14.7	0.43	4.05		1.53					<b>24.5</b>	
Commercial Zone (ac)			2.5		2.5							<b>5.00</b>	
Industrial Zone (ac)			2.4									<b>2.40</b>	
<b>Total Lots</b>			<b>60</b>	<b>60</b>	<b>105</b>	<b>202</b>	<b>119</b>	<b>114</b>	<b>124</b>	<b>115</b>	<b>56</b>	<b>955</b>	

**Notes:**

\* Vegetated corridors are assumed to only require irrigation for two years, after which time the temporary irrigation systems are disconnected  
ac=acres SFHs=single-family homes

### 2.2 Water Demand Projection Methodology

To project the water demands of the Quail Valley development, conservative assumptions related to population density and water use characteristics were utilized which are summarized below on Table 2. For the proposed Quail Valley development, demands were projected assuming that the irrigation demands of ponds/wetlands, irrigated open spaces, and vegetated corridors are met with the existing Tualatin Valley Irrigation District (TVID) connection, which reportedly provides 500 gpm (CwM-H2O, 2021c). Coordination and approval of this irrigation source will be needed to confirm that TVID will allow the continued use of the TVID connection to meet future irrigation demands for the large open spaces within Quail Valley. Holt is currently in the process of negotiating an agreement with TVID to maintain irrigation water rights for the benefit of the development.

**Table 2. Assumptions for Water Demand Projections**

Parameter	Value	Data Source
SFH (detached) ADD (gpcd)	91	Demand of New SFHs (see Kennedy Jenks, 2023)
SFH (attached) ADD (gpcd)	68	75% of SFH (detached) ADD (Hazen and Sawyer, 2018)
Commercial Zone ADD <sup>1</sup> (gpd/1,000 sqft)	56	Average water use for all commercial building types (EPA, 2012)
Industrial Zone ADD <sup>1</sup> (gpd/1,000 sqft)	10	Average water use for non-refrigerated warehouses (EPA, 2012)
Peaking Factor	1.98	2021 WMCP, 2015-2019 Meter Data (CwM-H2O, 2021a)
Residential Irrigation Multiplier	3.5	Calculated based on 2015-2019 Meter Data (methodology from JWC, 2021)
Pond/Wetland Duty (AFY)	2.5	Simulated water budget annual outflow for Willamette Valley wetlands (OSU, 2017)
Irrigated Open Spaces Duty <sup>2</sup> (AFY)	1.5	Avg. annual irrigation duty (USDA, 2018)
SFH (detached) PPH	2.6	Washington Co. Average (PSU, 2020)
SFH (attached) PPH	1.8	70% of SFH (attached) PPH (USCB, 2020)

**Notes:**

- <sup>1</sup> Estimates of water use for the Quail Valley commercial and industrial zones assume that building areas will match the areas assumed for the traffic study (65,340 sqft commercial, 60,000 sqft industrial).  
<sup>2</sup> Estimates of water use for vegetated corridors (8.81 acres, see Table 1) assume that an annual duty of 1.5 AFY will be required for two years, after which time the temporary irrigation systems will be disconnected. Therefore, the irrigation demands of vegetated corridors are not carried through in demand projections.

ADD=average day demand      gpcd=gallons per capita per day      SFH=single family home  
 AFY=acre-feet per year      PPH=people per household      sqft=square feet

### 2.3 Water Demand Projection Results

Projected water demands for the proposed Quail Valley development are summarized on the figures below.

- **Figure 1. Population Projection:** This figure presents the projected population for the proposed Quail Valley development. At the completion of development in 2035 the population of the Quail Valley development is estimated to be 2,370.
- **Figure 2. Projected Quail Valley Water Demands:** Using the proposed Quail Valley development plan (Table 1) and parameters developed by Summit (Table 2), the following water demands are estimated at the completion of development in 2035, assuming that irrigation demands are met with the existing TVID connection: ADD=0.20 MGD; Peak Season ADD=0.28 MGD, MDD=0.39 MGD.

Figure 1. Population Projection

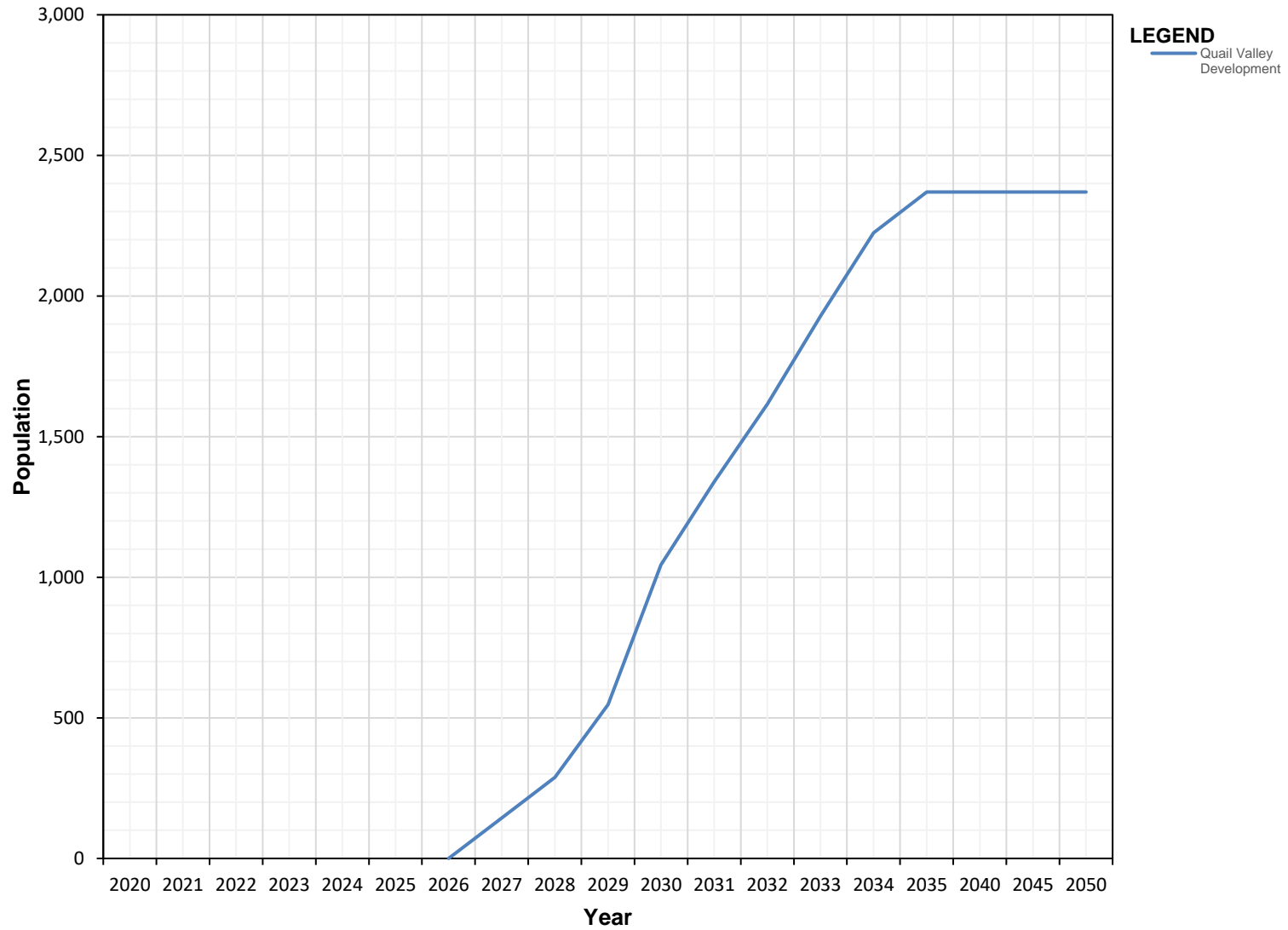


Figure 2. Projected Quail Valley Water Demands



### 3 Recommended Water Supply Strategy and Improvements

This section identifies and describes a recommended water supply strategy to satisfy the requirements of 152.003(D) of the City's municipal code (provide a new source of water of sufficient quality and quantity to serve 100% of the developments projected water needs).

#### 3.1 Water Supply Objectives

The following key objectives/criteria should be considered in identification and evaluation of water supply options. Water supply options that meet all of the following criteria should be retained for further consideration.

- Meet projected water demands
- Improve the redundancy and resiliency of the City's water system
- Manage local water resources sustainably and comply with applicable regulations
- Meet the objectives above cost effectively

#### 3.2 Identification and Evaluation of Water Supply Strategy and Improvements

To provide a new source of water of sufficient quality and quantity to serve 100% of the Quail Valley development's projected water needs, a recommended water supply strategy was identified which is described below.

##### Use Existing TVID Connection and Construct One New Well:

- **Concept:** The recommended water supply strategy consists of 1) using the existing TVID connection to meet irrigation demands of community open spaces, and 2) constructing one new water supply well (constructed similarly to Well 2).

The strategy for the new water supply well is based on static spinner testing data collected at The City's Well 2 and the Quail Valley Golf Course Well (see Attachment 1), which, in the opinion of the geophysical surveyor (Pacific Surveys, LLC), static testing indicates that commingling conditions are not present at either well (i.e., the two water bearing zones present in the local area act as a single aquifer system rather than two hydraulically distinct aquifers). Review of a technical memorandum recently prepared by CwM-H2O indicates that the City has updated their position regarding interpretation of the aquifer system (from an interpretation of separate aquifers to a single aquifer system, see CwM-H2O, 2023) to align with the data and interpretation presented by Summit.

Therefore, based on the static spinner testing results, Summit recommends that Holt and the City continue pursuing a water supply strategy reflecting a single aquifer within the local CRBG unit, which will reduce the number of wells needed to meet projected demands as new wells will have a greater production capacity.

- **Supply Capacity:** Summit's review of aquifer testing data for Well 2 suggests that a pumping rate of 200-250 gpm may be sustainable for the entirety of the peak season (Attachment 2), which is in-line with the estimated reliable capacity of the Quail Valley Golf Course Well (CwM-H2O, 2021b). Therefore, for planning purposes Summit conservatively assumes that a new well, constructed similarly to Well 2 and the Quail Valley Golf Course Well, should have a peak season reliable capacity of 0.34 MGD (236 gpm).

Similar to Well 2, a new well could likely pump at a higher capacity for short durations to meet peak demands. Therefore, for planning purposes Summit assumes that a new well, constructed

similarly to Well 2 and the Quail Valley Golf Course Well, will have a short-term maximum capacity equivalent to Well 2 (see CwM-H2O, 2018), or 0.42 MGD (290 gpm). Review of aquifer testing data for Well 2 suggests that a pumping rate of 290 gpm may be sustainable for multiple days, which is in-line with estimates for the Quail Valley Golf Course Well (CwM-H2O, 2021b).

A groundwater assessment prepared by OWRD for the City of Banks (OWRD, 2019) indicates that the local CRBG aquifer is relatively stable. Therefore, based on OWRD's opinion regarding aquifer stability and also considering that the City is planning on implementing an ASR system, Summit expects that the new well should be capable of producing at these capacities beyond the completion of the Quail Valley development. The added capacity from an ASR system is not included in Summit's supply-demand evaluation as ASR implementation is being led by the City. Excluding the added capacity from an ASR system results in a more conservative supply-demand evaluation for Quail Valley. However, Summit recommends that the new well be designed and constructed to facilitate ASR operations for integration into the City's water system and proposed ASR program.

- **Planning Level Schedule:** Based on the projected demands of the Quail Valley development (Figure 2), Summit recommends that the new well be brought online in 2025 (prior to when the demands from the initial phase of the Quail Valley development come online). However, the schedule for constructing the new well and integrating it with the City's existing water system largely depends on the water rights permitting timeline being led by the City.

### 3.3 Comparison of Recommended Water Supply Strategy to Projected Demands

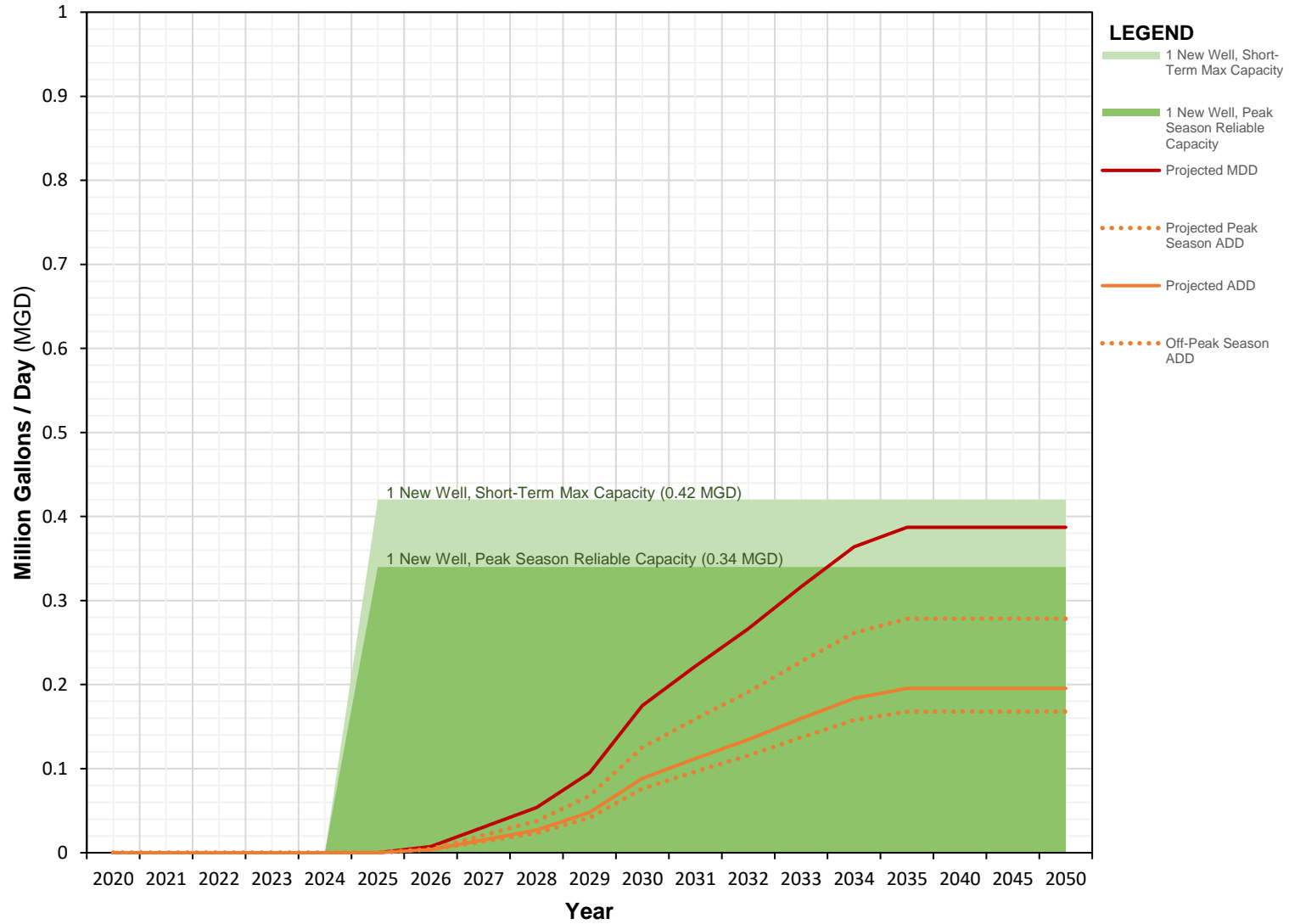
A comparison between the recommended water supply strategy and the projected water demands of the Quail Valley development is summarized on the following figure:

- **Figure 3. Quail Valley Water Supply-Demands:** This figure utilizes the proposed development plan for Quail Valley (Table 1) and demand parameters developed by Summit (Table 2) to project water demands and then overlays the added supply capacity from one new well in accordance with the water supply strategy and assumptions identified above. Key observations are noted below for this figure:
  - Assuming that irrigation demands for community open spaces within the Quail Valley development are met with the existing TVID connection, then 0.28 MGD of supply capacity will be necessary to meet the peak season ADD (or one new well, constructed similarly to Well 2, with a peak season reliable capacity of 0.34 MGD).
  - Assuming that irrigation demands for community open spaces within the Quail Valley development are met with the existing TVID connection, then 0.39 MGD of supply capacity will be necessary to meet the MDD (or one new well, constructed similarly to Well 2, with a short-term maximum supply capacity of 0.42 MGD). To provide storage redundancy and adequate fire flow, storage improvements will likely be necessary (see Kennedy Jenks, 2022b for recommended storage improvement of new 1 MG reservoir).
  - Summit understands that the City is concerned about sufficient capacity and redundancy after the Quail Valley development is incorporated into the City's water system. While the City has not shared recent meter data (since replacement of the Sellers Road Pipeline), a review of the City's historical meter data indicates that the City's current (2022) MDD is 0.58 MGD (see Summit, 2023). Adding the projected

MDD for the Quail Valley development (0.39 MGD) results in a total MDD of 0.98 MGD. To evaluate whether the City has sufficient capacity and redundancy, Summit evaluated a scenario in which the City loses its largest producing source (firm capacity). In this scenario, the firm capacity of the City's existing system would be 0.69 MGD (see Table 3-3 of Kennedy Jenks, 2022b). Combining the City's firm capacity (0.69 MGD) with the short-term maximum capacity from one new well (0.42 MGD) produces a total supply capacity of 1.11 MGD, which exceeds the total MDD of 0.98 MGD. Therefore, because the City would be able to meet the MDD even after losing its largest supply source (Well 2), the City's water system should have sufficient capacity and redundancy with an additional new well.

- By using the existing TVID connection to meet demands of community open spaces, additional volumes of excess water from the City's springs during peak winter flow months can be used for ASR which will further increase the resiliency of the City's water system.

Figure 3. Quail Valley Water Supply-Demands



### 3.4 Summary of Recommended Water Supply Strategy and Improvements

A comparison between projected demands and the recommended water supply strategy is provided below on Table 3.

**Table 3. Comparison of Projected Demands and Recommended Water Supply Strategy**

Element	TVID Irrigation, 1 New Well
Full Buildout Peak Season ADD (MGD)	0.28
Peak Season Reliable Capacity (MGD)	0.34
Full Buildout MDD (MGD)	0.39
Short-Term Maximum Capacity (MGD)	0.42
Implementation Schedule Meets Timing of Demands?	Yes
Increases City Redundancy/Resiliency?	Yes

In summary, to meet 100% of the projected demands of the Quail Valley development, an appropriate water supply strategy should provide at least 0.28 MGD of peak season reliable supply capacity (peak season ADD) and 0.39 MGD of short-term maximum supply capacity (MDD). The recommended water supply strategy consists of using the existing TVID connection to meet irrigation demands of community open spaces, and constructing one new water supply well (constructed similarly to Well 2). Review of available data suggests that this water supply strategy will reliably provide 0.34 MGD during the peak season and a short-term maximum capacity of 0.42 MGD, which exceeds the development’s projected demands. Therefore, the recommended water supply strategy satisfies Section 152.003(D)(2) of the Banks Development Code because a new source of water of sufficient quality and quantity to serve over 100% of the Quail Valley development’s projected water needs will be provided to the City.

## 4 Data Gaps and Uncertainties

This section identifies data gaps and uncertainties.

- The maximum reliable capacity of Well 2 is reported by Kennedy Jenks to be 290 gpm (0.42 MGD). The reported maximum capacity of Well 2 has been inconsistent across recent reports, ranging from 290 gpm (nameplate capacity of pump; see CwM-H2O, 2018) to 350 gpm ("current operational rate"; see CwM-H2O, 2021b). Summit's review of aquifer testing data from Well 2 (Golder, 2008) suggests that a pumping rate of 300 gpm can only be sustained for approximately 17 days based on recent static water levels in the aquifer and an assumed pump submergence requirement of 15 feet (see Attachment 1). Robust long-term pumping and water level data for Well 2 was not available for Summit's review at the time of this report.
- The static water level in Well 1 at the time of construction was 34 feet bgs (8/24/1977). The most recent static water level reported to OWRD was 106 feet bgs (3/3/2020), which represents a decline of 72 feet from the static water level at the time of construction. Summit does not have access to the City's daily pumping records so it is unclear whether the static water level measured on 3/3/2020 is representative of true static conditions, or possibly a recovering condition (pumping at Well 1/Well 2 occurred a few days prior). Additionally, Summit understands that both wells are equipped with pressure transducers to automatically measure and record water level measurements in the wells, however, CwM-H2O has indicated that these measurements are unreliable because the depth settings of the pressure transducers are uncertain. Summit also understands that in the summer-fall of 2023 surveying of the City's existing wells revealed that historical water level data was incorrect and that the water levels at Well 1 and Well 2 are similar. Regardless, a groundwater assessment prepared by OWRD for the City of Banks (OWRD, 2019) indicates that the local CRBG aquifer is relatively stable. Therefore, Summit expects that the City's wells would be able to continue producing at their customary capacities beyond the completion of the Quail Valley development.

## 5 References

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- CwM-H2O, 2023 DRAFT Interpretation of Basalt Water-Bearing Zones in the Area of Banks, Oregon. Prepared by CwM-H2O for the City of Banks. November 17, 2023.
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- GSI, 2021 Water Management and Conservation Plan, Joint Water Commission. Prepared by GSI Water Solutions, Inc. for the Joint Water Commission. February 2021.
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- Kennedy Jenks, 2019 Updated Water System Capital Improvement Plan 2019. Prepared by Kennedy Jenks Consultants for the City of Banks. February 6, 2019.
- Kennedy Jenks, 2022a Green Mountain Springs Capacity Evaluation. Prepared by Kennedy Jenks Consultants for the City of Banks. June 1, 2022.
- Kennedy Jenks, 2022b City of Banks Water System Master Plan Amendment. Prepared by Kennedy Jenks Consultants for the City of Banks. Developed on November 8, 2022 and adopted by City Council on March 14, 2023.

Kennedy Jenks, 2023	Banks East Side (Quail Valley) Development Water Considerations K/J 0791015*00. Prepared by Kennedy Jenks Consultants for the City of Banks. October 20, 2023.
Summit, 2023	East Banks Water System Improvement Plan. Prepared by Summit Water Resources, LLC for the Holt Group. April 18, 2023.
OSU, 2017	Water, Economics, and Climate Change in the Willamette Basin, Oregon. Prepared by the Oregon State University Extension Service in cooperation with the University of Oregon and Portland State University. February 2017.
OWRD, 2019	Groundwater Assessment of the Banks Area, Tualatin Valley, Oregon. Prepared by the Oregon Water Resources Department for the City of Banks. October 15, 2019.
PSU, 2020	Coordinated Population Forecast for Washington County, its Urban Growth Boundaries (UGB), and Area Outside UGBs 2020-2070. Portland State University Population Research Center. June 3, 2020.
USCB, 2020	National Multifamily Housing Council Tabulations of 2020 American Community Survey Microdata. US Census Bureau. Accessed July 2022.
USDA, 2018	Results from the 2018 Irrigation and Water Management Survey. United States Department of Agriculture. 2018.

## Attachments

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Attachment 1	Static Spinner Testing Data and Interpretation
Attachment 2	Well 2 Aquifer Testing Data

**Attachment 1**  
**Static Spinner Testing Data and Interpretation**

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# PACIFIC SURVEYS

## STATIC SPINNER UP & DOWN RUNS NON-PUMPING CONDITION

Job No. 23530	Company CITY OF BANKS						
File No.	Well WELL 2						
	Field BANKS						
	County WASHINGTON	State OR					
Location: 41700 NW BANKS RD. GPS: 45.6214 -123.1066				Other Services: VIDEO CALIPER DYNAMINC SPINNER STOP COUNTS SPINNER ANALYSIS			
Sec.	Twp.	Rge.	Permanent Datum Log Measured From Drilling Measured From		Elevation above perm. datum		Elevation K.B. D.F. G.L.
Date	01-12-2018						
Run Number	ONE						
Depth Driller	669'						
Depth Logger	669'						
Bottom Logged Interval	660'						
Top Log Interval	225'						
Pump Set @	196' (BOTTOM)						
Time Pumping Prior to Survey	30 MIN						
Pumping Water Level	NOT MEASURED						
Max. Recorded Temp.	N/A						
Pump Rate (GPM)	N/A						
Time Well Ready	0800						
Time Logger on Bottom	1200						
Equipment Number	PS-7						
Location	SAC						
Recorded By	SCHUMACHER						
Witnessed By	R. DOUGHERTY						
Perforation Record				Perforation Record			
Type	Slot Size	From	To	Type	Slot Size	From	To
Casing Record	Size	Wgt/Ft	Top	Bottom			
Surface String	12"	N/A	0'	300'			
Camera Tube							
Production String							
Liner							

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All interpretations are opinions based on inferences from electrical or other measurements and Pacific Surveys cannot and do not guarantee the accuracy or correctness of any interpretation, and we shall not, except in the case of gross or willful negligence on our part, be liable or responsible for any loss, costs, damages, or expenses incurred or sustained by anyone resulting from any interpretation made by any of our officers, agents or employees. These interpretations are also subject to Pacific Surveys' general terms and conditions set out in our current Price Schedule.

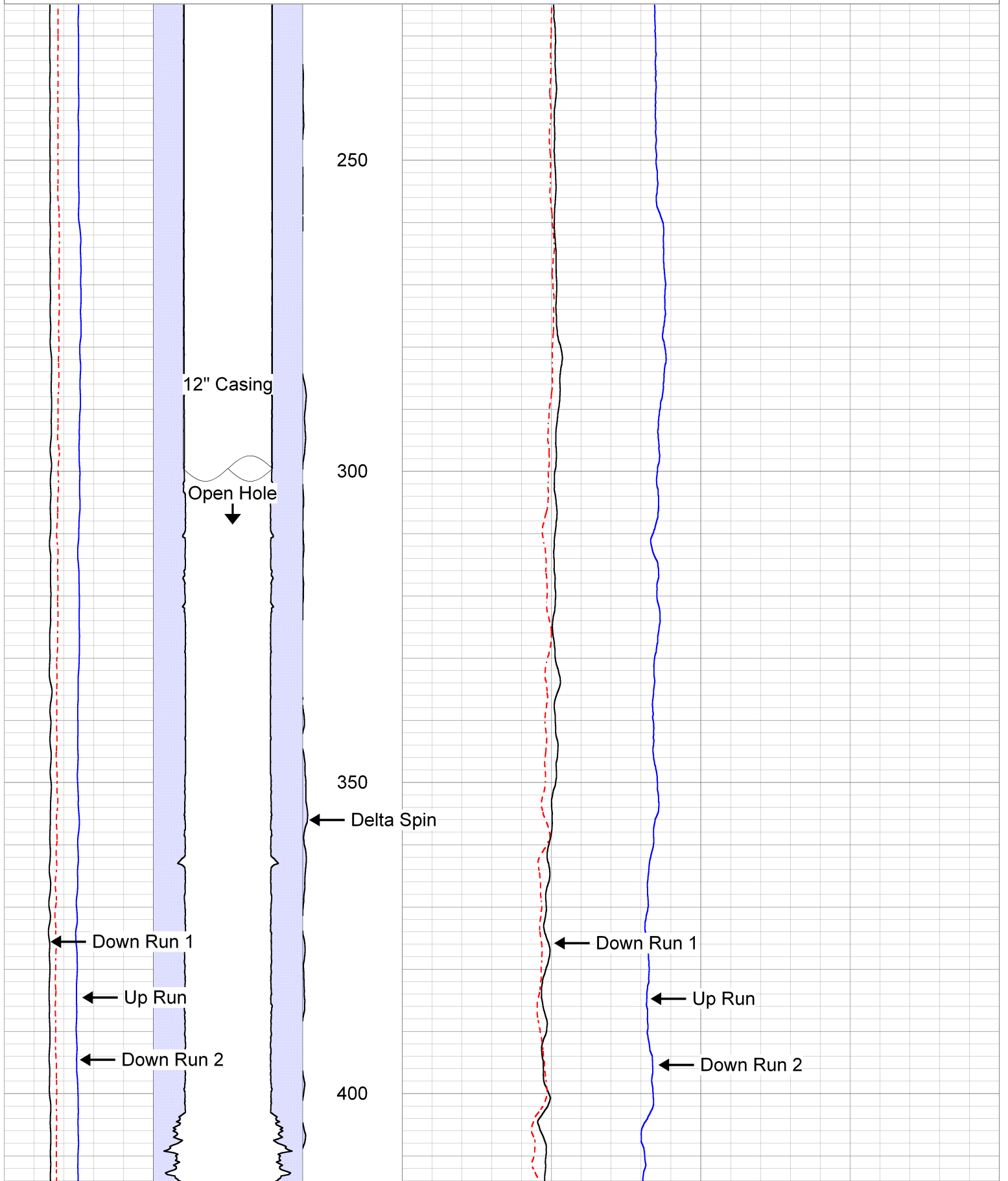
### Comments

FULL BORE  
12" OPEN HOLE BELOW 300'

Database File 23530.db  
 Dataset Pathname statD1  
 Presentation Format spinmerg  
 Dataset Creation Fri Jan 12 10:11:44 2018  
 Charted by Depth in Feet scaled 1:240

LS		
0	(ft/min)	100
LS		
0	(ft/min)	100
LS		
0	(ft/min)	-100

Delta Spin	0	Spinner Down Run (cps)	40
	0	Spinner Down Run (cps)	40
	1.5	Spinner Up Run (cps)	41.5

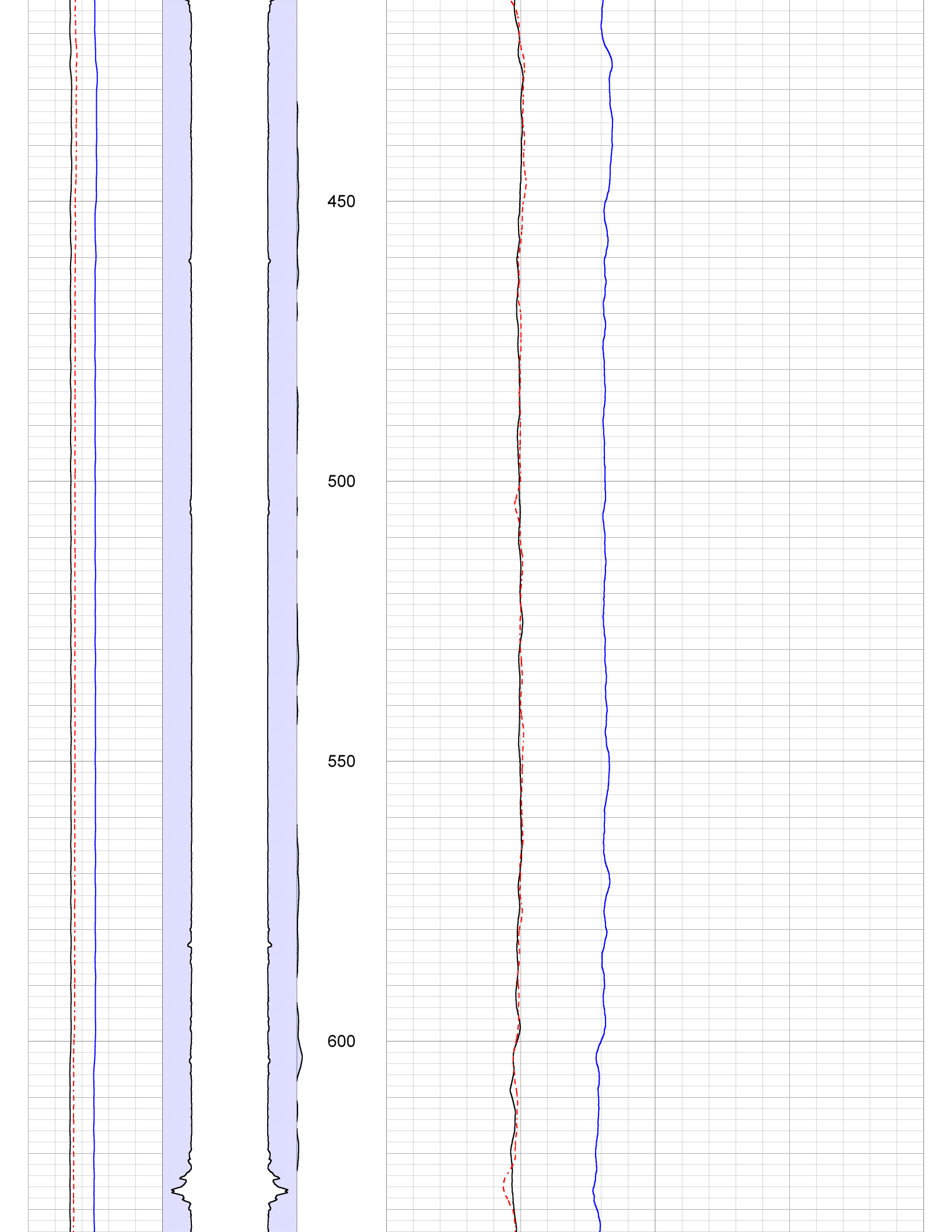


450

500

550

600





LS	Delta Spin	0	Spinner Down Run (cps)	40
0 (ft/min) 100		0	Spinner Down Run (cps)	40
LS		1.5	Spinner Up Run (cps)	41.5
0 (ft/min) 100				
LS				
0 (ft/min) -100				

Jason Melady  
Summit Water Resources, LLC

November 9, 2022

RE: Technical Memo: Static Spinner

Under non-pumping condition the spinner/flowmeter is lowered into the boring/well at a constant speed. The revolutions of the impeller are recorded as counts/sec. Once the spinner/flowmeter reaches total depth, the survey is stopped and a new survey begins with the tool ascending the boring/well. The spinner/flowmeter is raised to the surface at a constant rate and the revolutions of the impeller are recorded.

Both the down and up runs are merged onto one graph and scaled so that both spinner response overlay one another in a zone of known zero-flow. This zone is typically above all perforations. In the case of Well #2, this would be in the 12-inch casing that is set to 300ft. This zone of zero-flow demonstrates that the revolutions of the spinner is directly a result of the speed of descent/ascent of the tool.

If both the down and up run overlay one another throughout the entire boring/well, the inference would be that there is no vertical flow anywhere in the boring/well. If vertical flow was occurring, the down and up runs would diverge from one another in response to the direction of the flow (velocities are additive). In the case for Well #2, there is no significant divergence between the down and up runs, indicating zero-flow through the entire interval.

Best Regards,  
Michael Ridder

**Pacific Surveys, LLC**

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# PACIFIC SURVEYS

## STATIC SPINNER UP & DOWN RUNS NON-PUMPING CONDITION

Job No. 30460  
 Company SUMMIT WATER RESOURCES, LLC  
 Well QVGC WELL  
 Field BANKS  
 County WASHINGTON State OR

Location: 12565 NW AERTS RD  
 GPS: 45.6167 -123.0958  
 Other Services: CALIPER

Permanent Datum	G.L.	Elevation	Elevation
Log Measured From	G.L.	above perm. datum	K.B.
Drilling Measured From	N/A		D.F.
			G.L.

Date	11-30-2022		
Run Number	ONE		
Depth Driller	640'		
Depth Logger	641'		
Bottom Logged Interval	620'		
Top Log Interval	0'		
Static Water Level	~25'		
Depth Of Pump Bowls	N/A		
Density / Viscosity	N/A		
Max. Recorded Temp.	N/A		
Pump Rate (GPM)	N/A		
Time Well Ready	0900		
Time Logger on Bottom	0945		
Equipment Number	PS-8		
Location	SAC		
Recorded By	SCHUMACHER		
Witnessed By	R. DOUGHERTY		

Borehole Record				Tubing Record			
Run Number	Bit	From	To	Size	Weight	From	To

Casing Record	Size	Wgt/Ft	Top	Bottom
Surface String				
Prot. String				
Production String	10.25" ID	0.25" WALL	0'	315.1'
Liner				

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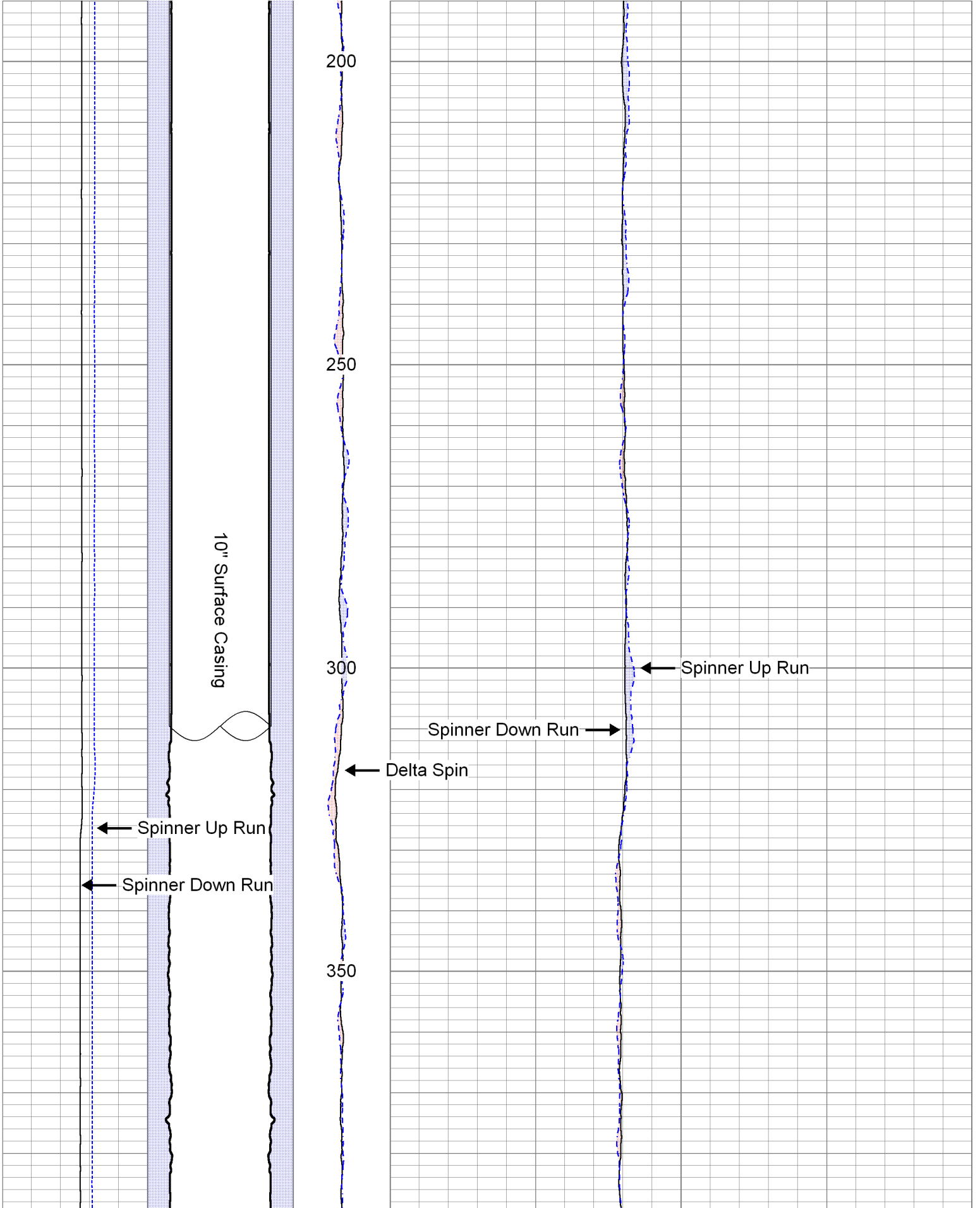
All interpretations are opinions based on inferences from electrical or other measurements and Pacific Surveys cannot and do not guarantee the accuracy or correctness of any interpretation, and we shall not, except in the case of gross or willful negligence on our part, be liable or responsible for any loss, costs, damages, or expenses incurred or sustained by anyone resulting from any interpretation made by any of our officers, agents or employees. These interpretations are also subject to Pacific Surveys' general terms and conditions set out in our current Price Schedule.

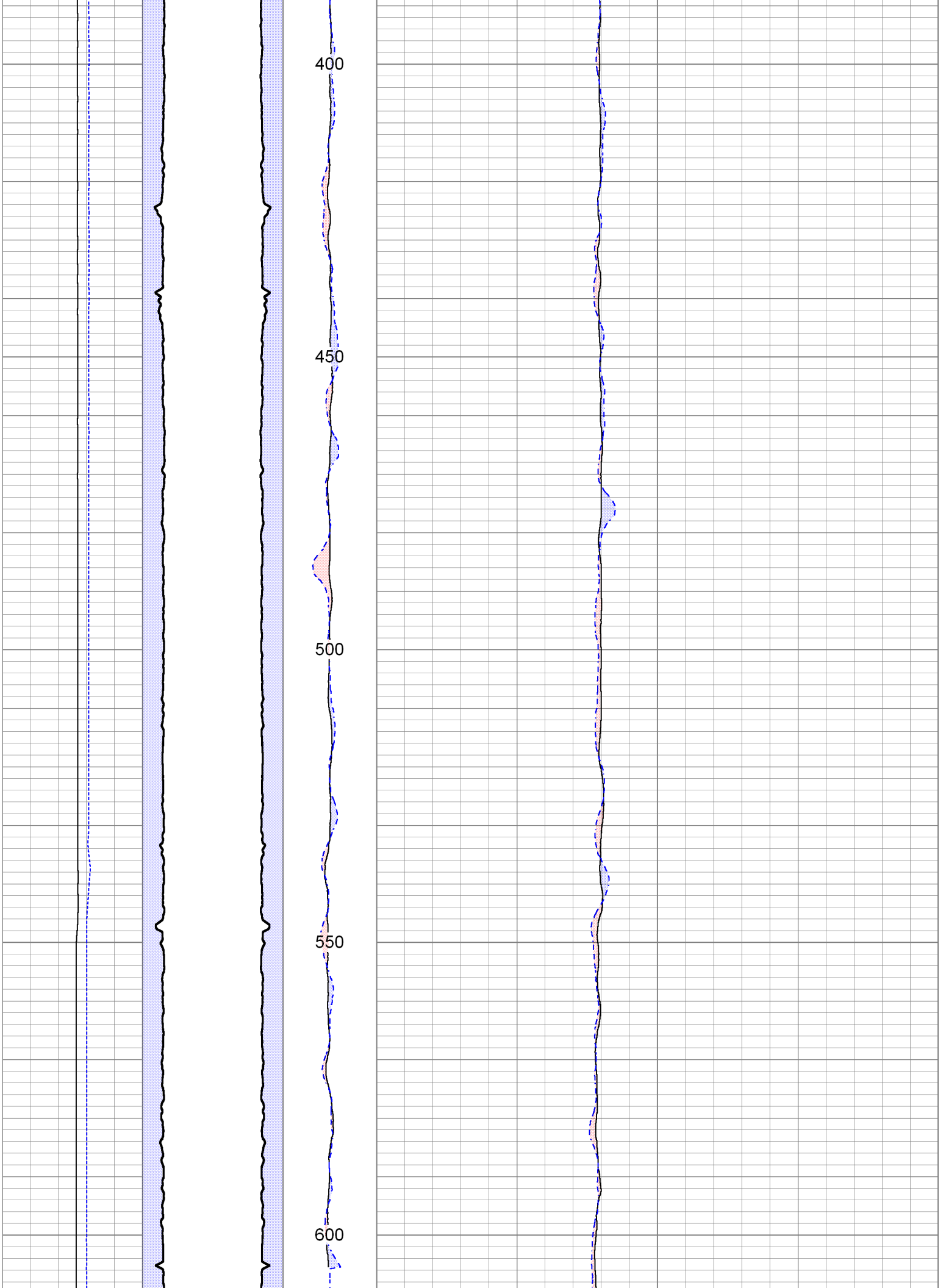
### Comments

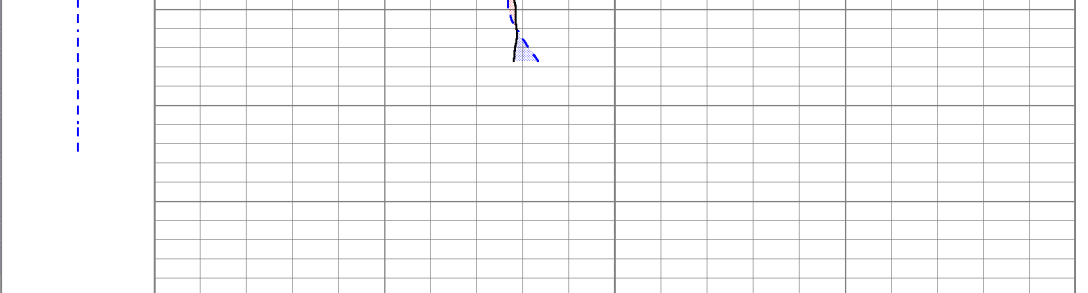
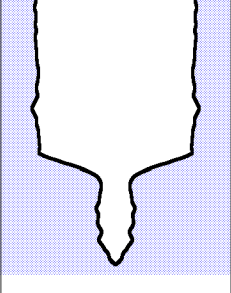
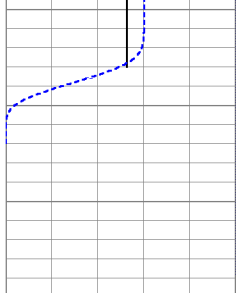
OPEN HOLE FROM 315.1 FT TO APPROX. 645 FT.

Database File 30460.db  
 Dataset Pathname spn\_d4  
 Presentation Format spinnerg  
 Dataset Creation Wed Nov 30 11:05:14 2022  
 Charted by Depth in Feet scaled 1:240

LS		Borehole Caliper	Delta Spin	0	Spinner Down Run (cps)	50
0	(ft/min) -100	Image	Delta Spin	-1.2	Spinner Up Run (cps)	48.8
LS						
0	(ft/min) 100					







LS 0 (ft/min) -100	Borehole Caliper Image	Delta Spin	0	Spinner Down Run (cps)	50
LS 0 (ft/min) 100		Delta Spin	-1.2	Spinner Up Run (cps)	48.8

# Pacific Surveys, LLC

*A full service geophysical well logging company*

Ryan Dougherty  
Summit Water Resources, LLC

December 14, 2022

RE: Static Spinner

On November 30<sup>th</sup>, 2022, we performed a static spinner survey on the Quail Valley Golf Course Well in Banks, OR. Only one down and up run were required for this survey, as both the down and up run overlaid one another throughout the entire cased and open-hole portions of the well, with no significant divergence. This corresponds with the Temperature Log performed on this well from November 2020, which, similarly, revealed no significant divergence from the expected geothermal gradient. Therefore, it appears that there is no vertical flow in the boring/well.

Best Regards,  
Mike Schumacher

**Pacific Surveys, LLC**

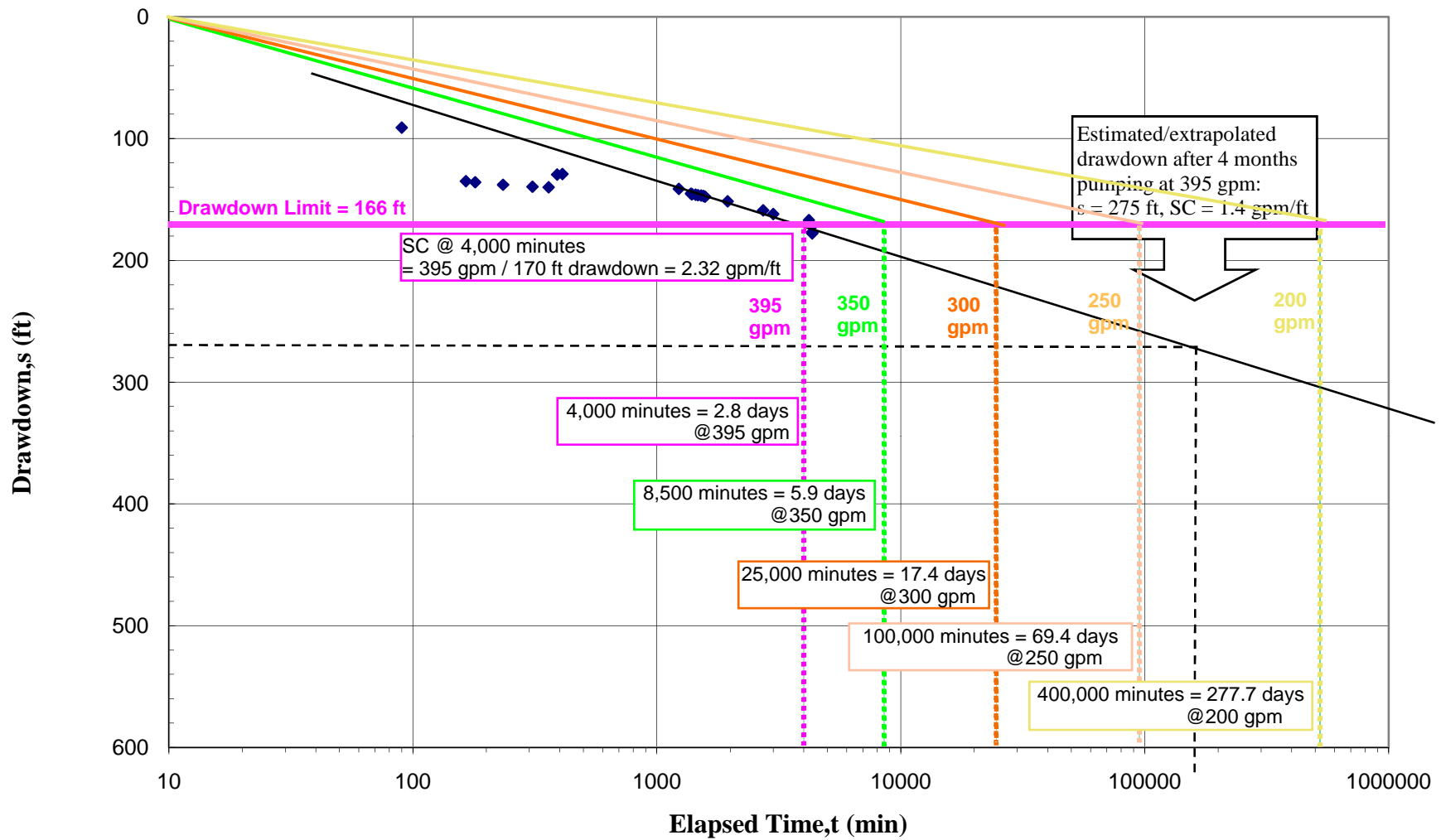
1785 West Arrow Route  
Bldg D Suite 3 & 4  
Upland, Ca 91786  
800 919-7555

**Attachment 2**  
**Well 2 Aquifer Testing Data**

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Pump Intake Set Depth = 283 feet  
 Seasonal Low Static Water Level = 102 feet bgs (8/30/2017)  
 Pump Submergence Requirement = 15 feet

Drawdown Limit = 166 feet



Banks Municipal Well Field  
 Banks, Oregon

◆ Well 2 Drawdown

**Cooper-Jacob Straight Line Extrapolation  
 November 2005 Well #2 72-hr Pumping Test**

JOB NUMBER:	073-99731	DATE:	27-Feb-08
DRAWN BY:	JTI	FIGURE NO.:	<b>10</b>

AGREEMENT REGARDING TVID-HELD OR MANAGED WATER RIGHTS  
APPURTENANT TO HOLT DEVELOPMENT PROPERTY

This AGREEMENT REGARDING TVID-HELD OR MANAGED WATER RIGHTS APPURTENANT TO HOLT DEVELOPMENT PROPERTY (“Agreement”) is made this 15<sup>th</sup> day of May 2024, by and between The Holt Group, Inc. (“Holt”) and the Tualatin Valley Irrigation District (“TVID”) (collectively, the “parties”).

RECITALS

A. Holt is pursuing residential and related development of a portion of the golf course property currently owned by Quail Valley Golf Corporation (“QVGC”) within the City of Banks, Oregon. The residential and related development may also include adjacent property located to the west of golf course property, which is commonly referred to as the Van Dyke Family Property. (The golf course property and the adjacent Van Dyke Family Property are collectively referred to herein as the “Development Property”). A copy of the current phased development plan is attached hereto and incorporated herein as Exhibit A. The parties acknowledge that the development plan is subject to modification, pending approvals by those local, state, and federal agencies and other authorities with jurisdiction over the development efforts and other factors that may affect the details and timing of the development plan.

B. TVID currently holds and/or manages water rights that are appurtenant to the Development Property, and otherwise delivers water to the Development Property for irrigation purposes.

C. Holt desires to maintain and utilize the TVID-held or managed water rights currently being utilized for golf course and other irrigation purposes in furtherance of the residential and related development planned for the Development Property. In particular, Holt anticipates that the TVID-held or managed water rights will be used primarily for public open spaces. Similarly, TVID desires to maintain the TVID-held or managed water rights and ensure that they are not subject to forfeiture for non-use, that they are utilized in a manner consistent with TVID rules and regulations and TVID’s contract with the U.S. Bureau of Reclamation (“Reclamation”), and that they continue to provide a basis for charges and assessments that contribute to TVID’s operations and maintenance obligations.

D. Holt and TVID wish to document their agreement regarding TVID-held or managed water rights, along with TVID’s delivery of water to the Development Property, as the Development Property is developed and ultimately transitioned from the existing golf course and other agricultural use to residential and related development use.

Therefore, based on the foregoing Recitals, which are incorporated herein by this reference, the mutual covenants provided for in this Agreement, and for good and valuable consideration, the receipt and sufficiency of which are hereby acknowledged, Holt and TVID agree to the following:

## 1. AGREEMENT

1.1 Water Delivery and Water Use in 2024. Holt, along with QVGC, anticipate that the golf course will continue to operate, and TVID will continue to deliver irrigation water to the golf course, through the end of the irrigation season in 2024. Similarly, Holt anticipates that the Van Dyke Family Property will continue to receive irrigation water, and TVID will continue to deliver irrigation water to the Van Dyke Family Property for irrigation, through the end of the irrigation season in 2025. The parties anticipate that such water delivery will be consistent with current TVID-held or managed water rights in terms of authorized uses, places of use, and points of delivery.

### 1.2 Water Delivery and Water Use Beyond 2024.

1.2.1 Pursuant to the current phased development plan, attached hereto and incorporated herein as Exhibit A, Holt and QVGC anticipate that the golf course will close prior to the start of the 2025 irrigation season. Further, Holt and the owners of the Van Dyke Family Property anticipate that the current irrigation use on the Van Dyke Family Property will conclude prior to the start of the 2026 irrigation season. Assuming that water is delivered and used on the golf course and the Van Dyke Family Property in 2025 in a manner that is consistent with the terms and conditions of TVID-held or managed water rights, then as provided in ORS 540.610 et seq., those TVID-held or managed water rights (and in particular, those portions of the TVID-held or managed water rights appurtenant to the Development Property), would not be subject to a presumption of forfeiture for non-use until after five consecutive years of non-use, or the end of the 2029 irrigation season.

1.2.2 When Holt is prepared to receive water from TVID and put such water to beneficial use for irrigation purposes on lands that are not included within the current authorized place of use, and when the use of such water will occur prior to the end of the 2029 irrigation season or prior to the anticipated one-year development period under an approved district transfer order, Holt will prepare (in conjunction with Reclamation if and as required) the appropriate district water right transfer applications. Once approved by TVID, TVID will submit such applications to the Oregon Water Resources Department (“OWRD”) for approval prior to the end of the 2029 irrigation season. Consistent with TVID policies, Holt will pay the application fees associated with such district water right transfer applications. In particular, Holt will work with TVID to identify agricultural lands within TVID’s boundary that are eligible to receive TVID assessed acreage water, and the district water right transfer applications will change the authorized place of use from the Development Property to such other identified eligible lands within the District for all 44.4 assessed acres currently within the Development Property. In turn, TVID will deliver and Holt will use TVID interruptible water on the open space and parks lands within the Development Property as identified in Exhibit A, consistent with TVID’s held or managed water rights. The number of acres within the Development Property to receive TVID interruptible water shall not exceed the current number of acres that receive TVID assessed acreage water and TVID interruptible water within the Development Property. In the event approvals for such delivery and use from OWRD are required, Holt and TVID agree to work together to prepare and submit applications to OWRD for such approvals.

Holt shall have priority for delivery of TVID interruptible water over other non-agricultural users of TVID interruptible water that make new requests for TVID interruptible water after the date of this Agreement.

1.2.3 The actions set forth in Section 1.2.2 above are intended to minimize the number and complexity of district water right transfer applications in anticipation of the phased development plan, which the parties acknowledge will take longer than the end of the 2029 irrigation season to complete. In addition, Holt intends to beneficially use interruptible water under the TVID-held or managed water rights on the same number of acres at the completion of the development on the Developed Property as compared to the number of TVID interruptible water acres irrigated on the golf course and the Van Dyke Family Property prior to the development.

1.2.4 Holt expressly acknowledges that TVID-delivered water is not potable or otherwise subject to use for domestic purposes, and Holt agrees that TVID-delivered water will not be used for any potable purpose, and instead, will only be used for irrigation of open spaces and parks within the Development Area. Further, TVID shall not be liable to Holt for the quality or improper use of any water delivered to the Development Property.

1.3 TVID Charges and Assessments. During the development of the Development Property, Holt will continue to pay all charges and assessments to TVID consistent with TVID policies regardless of whether water under TVID-held or managed water rights appurtenant to the Development Property is being delivered in a particular irrigation season, except that once the TVID assessed acreage water has been transferred to the other identified eligible agricultural lands with the District, the landowners receiving such TVID assessed acreage water will be responsible for the charges and assessments for said water. Meanwhile, Holt will pay TVID for interruptible water delivered to Holt for Holt's use on the open space and park lands within the Development Property as identified in Exhibit A. In the event that Reclamation classifies the irrigation of the Development Property as municipal and industrial ("M&I") use under TVID's contract with Reclamation (e.g., because the land being irrigated is green space rather than commercial crops), then Holt agrees to pay the appropriate Reclamation M&I rate. A copy of the interruptible water contract between TVID and QVGC is attached hereto and incorporated herein as Exhibit B, and the parties agree that the terms and conditions of the annual interruptible water contract between TVID and Holt shall be substantially similar to the terms and conditions set forth in the TVID and QVGC annual interruptible water contract, except that TVID may adjust the rate for its interruptible water supplies from time to time, consistent with TVID's authorities and requirements for rate-setting.

1.4 Temporary Irrigation Storage Bulge Ponds. The parties agree that water delivered to the Development Property, whether as TVID assessed acreage water or TVID interruptible water, may continue to be delivered to the temporary irrigation storage bulge ponds on the Development Property, from which water may then be directed to authorized places of use, during the development of the Development Property and once the development of the Development Property is completed.

1.5 Improvements to TVID Water Delivery System. In the event that the development of the Development Property necessitates improvements to the TVID water delivery system (such as pipeline replacement, etc.), the parties agree to work in good faith with one another to determine the appropriate scope and costs of such improvements in advance of the improvements being undertaken. The parties anticipate that any improvements to TVID's water delivery system will be made by Holt at TVID's direction, and that Holt will reimburse TVID for TVID's costs associated with such improvement work, based on the prior, mutually agreed upon scope and costs. At the same time, TVID and Holt agree to work toward a single, common point of delivery for TVID water at the edge of the Development Property, such that Holt would own, manage, and be responsible for all water delivery works beyond the point of delivery, and any improvements would be made by Holt at Holt's sole discretion and at Holt's sole cost. For all existing irrigation lines, existing turnouts, and easements that cross the Development Property beyond the common point of delivery, TVID would abandon or vacate such lines, turnouts, and easements. To the extent such abandonment or vacation requires the consent or action of Reclamation, the parties agree to coordinate to obtain such consent or action. Currently, the parties have identified the single, common point of delivery for TVID water to Holt as turnout N5A7-1, located roughly 330 feet west of NW Aerts Road at 45°36'59.8"N 123°05'45.6"W, but the parties agree to relocate this common point of delivery to or near the location shown in Exhibit A. When Holt owns, manages, and is responsible for all water delivery works beyond the point of delivery, Holt will also be responsible for maintaining the delivery works across the Development Property for the delivery of TVID interruptible water to the cemetery adjacent to the Development Property. TVID water to be delivered to the cemetery will not be included as part of the TVID interruptible water supply delivered to Holt, and TVID and Holt agree to coordinate regarding meter readings and invoicing as needed to facilitate water use by the cemetery.

1.6 Development Project Delay or Termination. Holt's obligations as set forth in this Agreement are based on the current phased development plan attached hereto and incorporated herein as Exhibit A. Holt's obligations as set forth in this Agreement shall be triggered only if Holt proceeds with its development plan. In the event that Holt's development plan is delayed, whether due to pending approvals by those local, state, and federal agencies and other authorities with jurisdiction over the development efforts or due to any other factor that may affect the details and timing of the development plan, Holt's obligations under this Agreement shall be triggered only at the time Holt proceeds with its development plan. The decision to proceed with its development plan, or to modify the development plan, shall be solely in Holt's discretion.

## 2. GENERAL PROVISIONS.

2.1 Binding Effect. This Agreement is binding on and inures to the benefit of the parties and their respective heirs, personal representatives, successors, and assigns.

2.2 Assignment. Neither this Agreement nor any of the rights, interests, or obligations under this Agreement may be assigned by any party without the prior written consent of the other party, which consent will not be unreasonably withheld.

2.3 No Third-Party Beneficiaries. Nothing in this Agreement, express or implied, is intended or may be construed to confer on any person, other than the parties to this Agreement, any right, remedy, or claim under or with respect to this Agreement.

2.4 Notices. All notices and other communications under this Agreement must be in writing and will be deemed to have been given if delivered personally, sent by electronic mail, mailed by certified mail, or delivered by an overnight delivery service (with confirmation) to the parties at the following addresses or electronic mail addresses (or at such other address or electronic mail address as a party may designate by like notice to the other party):

To: Tualatin Valley Irrigation District  
Attention: Bobby Nuvolini, Manager  
2330 Elm Street  
Forest Grove, OR 97116

Email: [bobby.nuvolini@tvid.org](mailto:bobby.nuvolini@tvid.org)

To: The Holt Group, Inc.  
Attention: Jim Reinhart  
P.O. Box 61426  
Vancouver, WA 98666

Email: [jim.reinhart@holthomes.com](mailto:jim.reinhart@holthomes.com)

Any notice or other communication will be deemed to be given (a) on the date of personal delivery, (b) at the expiration of the fifth day after the date of deposit in the United States mail, or (c) on the date of confirmed delivery by electronic mail or overnight delivery service.

2.5 Amendments. This Agreement may be amended only by an instrument in writing executed by all the parties, which writing must refer to this Agreement.

2.6 Counterparts. This Agreement may be executed in counterparts, each of which will be considered an original and all of which together will constitute one and the same agreement.

2.7 Electronic Signatures. Electronic transmission of any signed original document, and retransmission of any signed electronic transmission, will be the same as delivery of an original. At the request of any party, the parties will confirm electronic transmitted signatures by signing an original document.

2.8 Further Assurances. Each party agrees to execute and deliver such other documents and to do and perform such other acts and things as any other party may reasonably request to carry out the intent and accomplish the purposes of this Agreement.

2.9 Time of Essence. Time is of the essence with respect to all dates and time periods set forth or referred to in this Agreement.

2.10 Waiver. Any provision or condition of this Agreement may be waived at any time, in writing, by the party entitled to the benefit of such provision or condition. Waiver of any

breach of any provision will not be a waiver of any succeeding breach of the provision or a waiver of the provision itself or any other provision.

2.11 Governing Law. This Agreement will be governed by and construed in accordance with the laws of the state of Oregon, without regard to conflict-of-laws principles.

2.12 Attorney Fees. If any arbitration, suit, or action is instituted to interpret or enforce the provisions of this Agreement, to rescind this Agreement, or otherwise with respect to the subject matter of this Agreement, the party prevailing on an issue will be entitled to recover with respect to such issue, in addition to costs, reasonable attorney fees incurred in the preparation, prosecution, or defense of such arbitration, suit, or action as determined by the arbitrator or trial court, and, if any appeal is taken from such decision, reasonable attorney fees as determined on appeal.

2.13 Injunctive and Other Equitable Relief. The parties agree that the remedy at law for any breach or threatened breach by a party may, by its nature, be inadequate, and that in addition to damages, the other party or parties will be entitled to a restraining order, temporary and permanent injunctive relief, specific performance, and other appropriate equitable relief, without showing or proving that any monetary damage has been sustained.

2.14 Venue. Any action or proceeding seeking to enforce any provision of this Agreement or based on any right arising out of this Agreement must be brought in Washington County of State of Oregon or, subject to applicable jurisdictional requirements, in the United States District Court for the District of Oregon, and each party consents to the jurisdiction of such courts (and of the appropriate appellate courts) in any such action or proceeding and waives any objection to such venue.


2.15 Severability. If any provision of this Agreement is deemed to be invalid or unenforceable in any respect for any reason, the validity and enforceability of such provision in any other respect and of the remaining provisions of this Agreement will not be impaired in any way.

2.16 Entire Agreement. This Agreement (including the documents and instruments referred to in this Agreement) constitutes the entire agreement and understanding of the parties

with respect to the subject matter of this Agreement and supersedes all prior understandings and agreements, whether written or oral, between the parties with respect to such subject matter.

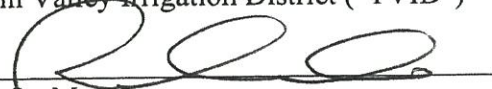
THIS AGREEMENT is effective as of the date set forth above.

The Holt Group, Inc., a Washington Corporation ("Holt")  
By: Holt Group Holdings, LLC, a Delaware limited liability company  
Its: Sole Member

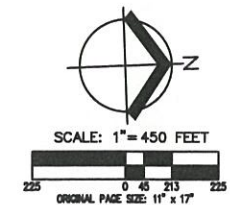
By:   
Name: Mike Loomis  
Its Authorized Signer

Date: 5/15/2024

Tualatin Valley Irrigation District ("TVID")

By:   
Its Manager

Date: 5/14/2024



- APPROXIMATE OPEN SPACE AREA:
- QUAIL VALLEY 40.7 ACRES
    - WETLAND/POND AREA: 8.8 ACRES
    - REMAINING OPEN SPACE: 31.6 ACRES
  - VAN DYKE: 7.2 ACRES
    - CITYWIDE PARK OPEN SPACE: 6.5 ACRES
    - REMAINING OPEN SPACE: 0.7 ACRES

- EXISTING/RELOCATED INTERRUPTIBLE SERVICE AREA WITHIN OPEN SPACE/STORM FACILITIES/LANDSCAPING:
- QUAIL VALLEY: 42.9 ACRES
  - VAN DYKE: 6.0 ACRES
- TOTAL INTERRUPTIBLE SERVICE AREA: 48.9 ACRES  
 EXCESS INTERRUPTIBLE SERVICE AREA: 12.5 ACRES

- REMOVED ASSESSED SERVICE AREA:
- QUAIL VALLEY: 33.4 ACRES
  - VAN DYKE: 10.0 ACRES

DWG: 4920-01 TMD SITE USAGE | 11X17

DATE: 3/8/2024 AKS JOB: 4920-01  
 AKS ENGINEERING & FORESTRY, LLC  
 12965 SW HERMAN RD, STE 100  
 TUALATIN, OR 97062  
 503.563.6151 WWW.AKS-ENG.COM



QUAIL VALLEY & VAN DYKE TVID RELOCATED SERVICE AREA CONCEPT

# QUAIL VALLEY

BANKS, OREGON

EXHIBIT A



Tualatin Valley Irrigation District  
 2330 Elm Street  
 Forest Grove, OR 97116-1564  
 Phone: (503) 357-3118  
 Fax: (503) 359-9510  
 WWW.TVID.ORG

JUN 30 2023

## Interruptible Water Supply Contract

QUAIL VALLEY GOLF COURSE  
 ATTN: DON KILGRAS  
 PO BOX 200  
 BANKS, OR 97106

Customer# 2307  
 QUAIL VALLEY

Acres Awarded  
 62.60

Thursday, June 8, 2023

Current Year Interruptible Acres Have Been Awarded as Follows:

Turnout	Mapped Acres	Owner
N5A7-1	96.00	QUAIL VALLEY

Rate Type	Rate	Acres Awarded	Charge
Pipeline	\$116.00	62.60	\$7,261.60
Total Charge			\$7,261.60

This agreement must be SIGNED and returned with FULL PAYMENT to begin Interruptible service.

I understand that once interruptible acres have been awarded as described above, I must return this agreement, SIGNED and with FULL PAYMENT within 15 days of the invoice date or the above described acres will be returned to the "Interruptible Pool". I further understand that I may not be eligible for any future requests unless approved and authorized by the Board.

Doug Hixson  
 Landowner and / or Representative

6/27/2023  
 Date

Doug Hixson  
 PRESIDENT

**EXHIBIT B**