State of Utah

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Department of
Environmental Quality

L. Scott Baird
Executive Director

DIVISION OF DRINKING WATER
Marie E. Owens, P.E.
Director

August 25, 2020

Rodger Smith
Highland Subdivision Water System
5880 North Highland Drive
Mountain Green, Utah 84050

Subject: **Source and Storage Evaluation**, Safe Yield Determination and System Source Capacity Evaluation;
Highland Subdivision, System #15005, File #12203

This is not Plan Approval for Construction.

Dear Mr. Smith:

The Division of Drinking Water (the Division) received your request for technical assistance in evaluating your water systems source and storage capacities on July 21, 2020. Details were discussed with Highland Subdivision water system staff during the Division's August 4, 2020 site inspection. Specifically, how the Division would be reanalyzing the capacity calculations for the water system utilizing Division of Water Rights (DWRi) water use data.

The Division requested source water use information to verify the safe yield of the Gordon Creek Spring 2, identified as WS002 within the Division's database and Gordon Creek Spring 7, identified as WS003 within the Division's database.

State of Utah Administrative Rules for Public Drinking Water Systems, Rule ***R309-515-7(5)(b), Information Required after Spring Development***, dictates that:

"Immediately after spring development, the water system shall collect monthly spring flow data during operating seasons when the spring is reasonably accessible, as a minimum, for three years, and submit spring flow data to the Director for determination of spring yield. After evaluating the spring flow information including seasonal and annual variations, the Director will determine a spring yield, which will be used in assessing the number of and type of connections that can be served by the spring. The spring yield typically is set at the 25th percentile of the spring flow data. If the spring exhibits significant seasonal or annual variations, the spring yield may be assessed on a case-by-case basis."

Rodger Smith requested and the Division agreed to use ten years of recorded water use data rather than the rule-stipulated three years to account for annual hydrologic variations. The Division received copies of the DWRi information for the past 10 years on August 6, 2020, from Rodger.

Per R309-515-7(5)(b), safe yield or the 25th percentile of the total spring flow data from Gordon Creek Spring 2 (WS002) and Gordon Creek Spring 7 (WS003) from 2009 to 2019 is 60.1 gpm.

The Division requested updated fire flow documentation to meet ***State Statute 19-4-114(4) (d)***:

"The Director shall include, as part of system-specific standards necessary, fire storage capacity in accordance with the state fire code adopted under Section 15A-1-403 and as determined by the local fire code official."

On August 24, 2020, the Division received a letter from Brian Brendel, Chief of the Mountain Green Fire District. The letter details the fire suppression water supply analysis performed by the Fire Chief for fire suppression based on the National Fire Protection Association Standard on Water Supplies for Suburban and Rural Fire Fighting (NFPA 1142). Based on the Fire Chief's calculations, a minimum of 420,000 gallons of water are required for fire suppression at all times.

Our understanding is that from the previous 2018 sanitary survey 50 Improvement Priority System (IPS) points were assessed towards your system for lacking more than 20% of the required source capacity, which is a significant deficiency.

We have reviewed the fire chief's letter for conformance with the applicable portions of Utah's Administrative Rules for Public Drinking Water Systems in R309, and have reviewed the capacity calculations.

Our records indicate that your water system service area consists of 333 residential connections, serving approximately 1,200 people. Based on the DWRi water use reported for 2019, the number of residential connections was 398 and 15 other connections (including industrial or institutional). The 15 additional other connections had a combined total equivalent residential use of 69 residential connections based on the residential use submitted to DWRi for that year. The total number of residential connections utilized in the Division's calculation, based on DWRi water use data, is 467 Total Equivalent Residential Connections (ERC).

The attached Excel spreadsheet contains detailed calculation information. Below is the summary of the calculations.

Indoor Water Use:

MINIMUM REQUIREMENTS FOR INDOOR WATER USE			
Source		Storage	
Required Per ERC	Total	Required Per ERC	Total
(gpd/ERC)	(gpm)	(gallons/ERC)	(gallons)
800	259.4	400	186,800

Outdoor Water Use:

MINIMUM REQUIREMENTS FOR OUTDOOR WATER USE			
Source		Storage	
Required Per ERC	Total	Required Per ERC	Total
(gpd/ERC)	(gpm)	(gallons/ERC)	(gallons)
806	234.6	375	156,957

Fire Suppression:

Required Fire Suppression Storage (gallons) = 420,000 gallons

Disinfection credit:

Required volume for disinfection 25,000 gallons

Total Water System Requirements:

MINIMUM REQUIREMENTS FOR WATER SYSTEM			
Source		**Storage**	
Required Per ERC	**Total**	Required Per ERC	**Total**
(gpd/ERC)	**(gpm)**	(gallons/ERC)	**(gallons)**
1,606	**494.1**	775	**763,757**

Source

Our estimate indicates this water system needs a minimum of 494.1 gpm for drinking water source to meet total water demands based on water use reported to DWRi. Per R309-515-7(5)(b), safe yield or the 25th percentile of the total spring flow data from Gordon Creek Spring 2 (WS002) and Gordon Creek Spring 7 (WS003) from 2009 to 2019 is 60.1 gpm. The source capacity of the new Highlands Well #1 (WS005) is 265 gpm. The Highlands total source capacity of 325.1 gpm is ***deficient*** **by 169 gpm**. The existing total source capacity of the Highland Subdivision is only **65.8% of the required source capacity**.

We encourage you to continue to collect flow data throughout the year, especially during low spring flow conditions such as summer and fall, so the spring safe yield can be updated to reflect changes in the spring flow data.

We thereby conclude that the safe yield of your three water sources, i.e., 325.1 gpm, is insufficient source capacity to serve your community. Therefore, **your water system is deemed to be in noncompliance with the minimum requirements of our Rule *R309-510-7, Source Sizing***.

Storage

Our estimate indicates this water system needs a minimum storage volume of 763,757 gallons to meet the indoor, outdoor, and fire suppression water demands. The water system currently has four storage tanks for a combined volume of 1,190,000 gallons. With a required fire storage of 420,000 gallons and a required 25,000 gallons to be maintained to achieve proper disinfection, the water system has ***sufficient*** storage capacity of 152.5% of total required storage volume.

Conclusions

Based on these calculations, the Highland Subdivision water system's facilities are inadequate to serve the system's demands. The 50 IPS points assessed for lacking source capacity during the 2018 survey will remain in the Division's database.

If you have any questions regarding this letter, you can contact me either by phone at (385) 271-7039 or e-mail chparker@utah.gov.

Sincerely,

Cheryl Parker, P.E.
Environmental Engineer III

CP/mrn/nl/mdb

Enclosures – 1. PWS Capacity Calculations
2. DWRi 25th Percentile Calculations
3. Updated IPS Report

cc: Rodger Smith, Highland Subdivision water system, rodgersmithone@hotmail.com
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Marjalee Smith, Highland Water Company, marjaleesmith@hotmail.com
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DDW-2020-018988

Division of Drinking Water — Water System Capacity Calculation Sheet (Last Update 3/30/2017)

Enter the green cells only

System Name: Highland Water Co. | System Number: 15005

1.1 Indoor Water Use

Convert "Number of other connections" (Cell E9) to ERCs here. *[ERCs of other connections = peak day demand of other connections in gal per day / 800 gpd]*

Number of residential connections: 398

Number of other connections: 15

ERCs of other connections: 69.0 (Example: water use of 2 factories equals to water use of 55 homes.)

Enter number of non-residential connections, e.g., 2 industrial connections.

Total Equivalent Residential Connections (ERCs): **467.0**

MIN. REQUIREMENTS FOR INDOOR WATER USE			
Source		Storage	
gpd/ERC	Total (gpm)	Gallons/ERC	Total (gallons)
800	**259.4**	400	**186,800**

1.2 Outdoor Water Use

Enter estimated irrigated acre

Is the drinking water used for outdoor irrigation? ☑ Yes ☑ No

Residential ERCs using drinking water for irrigation: 398

Percentage of Residential ERCs using DW for irrigation: 100%

Average irrigated acreage **per residential connection**: 0.20

Total irrigated acreage of **other connections** (park, school, etc.): 4.20

Enter **total** irrigated acres of **other connections** here.

Irrigation zone: 2

Select Irrigated Zone # **from the pick list**. See "Irrigation Demands & Map" tab on the bottom of the screen or WaterLink.

(Enter notes here regarding whether and what % of irrigation water is supplied by PWS.)

MIN. REQUIREMENTS FOR IRRIGATION USE			
Source		Storage	
gpd/ERC	Total (gpm)	Gallons/ERC	Total (gallons)
806	**234.6**	375	**156,957**

1.3 Fire Flow Water Use

Enter fire flow in gpm.

Does the water system provide fire protection? ☑ Yes ☐ No

Maximum fire **flow** demand (in gpm) for *water system* or *pressure zone*: NA

Maximum fire suppression **duration** (in hours) for *water system* or *pressure zone*: NA

Required Fire Suppression Storage (in gallons): **420,000**

Enter duration in hours.

(Verify req'd fire flow and duration with local fire code officials. *Enter notes here, e.g. fire official contact info or comments.)*

2. Summary of Water System Capacity Requirements

MINIMUM REQUIREMENTS FOR WATER SYSTEM			
Source (indoor + outdoor)		**Storage** (indoor + outdoor + fire)	
gpd/ERC	Total (gpm)	Gallons/ERC	Total (gallons)
1,606	**494.1**	775	**763,757**

2.1 Does this system have adequate source capacity (per R309-510-7)?

This source capacity assessment is a general overall system calculation. It may not reflect the variations in individual areas or pressure zones.

Required Source Capacity	494.1	***gpm***
Existing Source Capacity	325.1	***gpm***
Source Capacity Deficit	**169.0**	***gpm***
Existing % of Total Req'd	**65.8%**	

Autolink to 2 "Total Source" cell above.

Autolink to 4.2 "Total Existing Source Capacity" cell below.

Source deficit indicates that: (1) additional source capacity is needed, and (2) source deficiency should be assessed.

Less than 100% indicates: (1) additional source capacity is needed, and (2) source deficiency should be assessed.

2.2 Does this system have adequate storage capacity (per R309-510-8)?

This storage capacity assessment is a general overall system calculation. It may not reflect the variations in individual areas or pressure zones.

Total Required Storage	763,757	***gal***	Autolink to 2 "Total Storage" cell above.
Existing Storage Capacity	1,165,000	***gal***	Autolink to 4.3 "Total Existing Storage Capcity" cell below.
Storage Capacity Deficit	**None**	***gal***	Storage deficit indicates that: (1) additional storage volume is needed, and (2) storage deficiency should be assessed.
Required Fire Storage	420,000	***gal***	
Is storage deficiency solely due to fire storage?	**Not Applicable**		If NO, answer one of question set 2.01 to 2.05 in ESS. If YES, answer one of question set 2.06 to 2.10 in ESS.
Existing % of Total Req'd	**152.5%**		Less than 100% indicates: (1) additional storage capacity is needed, and (2) storage deficiency should be assessed.

3. Transient PWS Indoor Water Use — ERC Calcuation *(See R309-510, Tables 510-1, 2, & 4 for other facility types.)*

	MINIMUM REQUIREMENTS FOR INDOOR USE						
	Source		Storage				
Facility Type	GPD/person*	GPD/site or pad	Gallons/person	Gallon/site or pad	ERC/site or pad	**Total # of sites/pads**	**ERCs**
Modern Recreation Camp	60	0	30	0	**0.00**		**0.0**
Semi-Developed Camp *w/ flush toilets*	20	0	10	0	**0.00**		**0.0**
Semi-Developed Camp *w/o flush toilets*	5	0	2.5	0	**0.00**		**0.0**
RV Park	N/A	100	N/A	50	**0.13**		**0.0**
Number of people per camp site							

If applicable, enter number of people per camp site here.

	Source (GPD/vehicle)	Storage (Gal./vehicle)	ERC/1000 vehicles served	Vehicles served/day	**ERCs**
Roadway Rest Stop *w/ flushometer valves*	7	3.5	8.8		**0.0**

If applicable, use this number in cell I8 or cell I9 on Page 1.

4. Data Input for Calculating ERCs, Source and Storage

Highland Water Co.

4.1 Projected ERCs Calculation (optional)

Total Projected ERCs	**1**
Existing Residential Connections	*1*
Obligated **Future** ERCs *(enter below)*	
Armormax 1?	*1*

Use this number in Cell I8 ("Number of residential connections") on Page 1 to calculate PROJECTED demand & req'ts (including both existing & future connections).

4.2 Summary - Existing Sources *(enter in green cells below)*

Total Existing Source Capacity (in gpm) **325**

WS002	*Gordon Creek Sp #2**	
WS003	*Gordon Creek SP #7**	
	DWRi safe yeild	*60.1*
WS005	*Highlands Well****	*265*

**Springs flows safe yeilds established in 1999*

****Test capacity 2150 gpm, 2017 PA proposed equip with 265 gpm, 2020 OP request stated*

Maximum ERCs (assuming indoor use only) *585.18*

Diaphragm or air pressure tanks shall NOT be considered effective storage volume for (1) community systems, or (2) NTNC with significant demand UNLESS an exception has been granted.

4.3 Summary - Existing Storage Tanks *(enter below)*

Total Existing Storage Cap. (in gallons) **1,165,000**

ST001	*Tank #1*	*80,000*
ST002	*160k Tank*	*160,000*
ST003	*250k Gordon Creek no 1*	*250,000*
ST004	*700k Gordon Creek no 2*	*700,000*
	Reduce volume for CT	*-25,000*

(Enter notes here. If additional space is needed, click the "Additional Notes" tab on the bottom of the screen.)

System: Highland Water Co.
tem No.: 15005
Source: Gordon Creek Springs 2 and 7
ource ID: WS002 and WS003

Percenti 0.25
Unites o ac-ft/mo

25th Percentile of Totals

Year	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual Total
2019	7.85	6.09	6.38	7.82	11.67	36.55	53.28	51.99	35.69	14.33	9.22	8.5	249.37
2018	7.97	7.38	8.97	8.96	26.61	51.14	63.49	36.2	26.31	10.86	5.91	6.92	260.72
2017	10.63	10.69	22.64	10.45	18.6	56.37	62.27	56.23	33.62	10.38	6.38	7.56	305.82
2016	9.33	6.77	7.35	9.21	11.12	45.38	40.44	57.59	34.56	11.58	8.28	12.05	253.66
2015	6.34	6.3	8.45	8.21	9.18	36.44	49.46	44.87	35.41	14.9	7.41	7.74	234.71
2014	7.03	7.37	8.43	9.68	24.99	50.68	49.08	38.35	32.86	12.95	11.22	7.57	260.21
2013	6.22	7.97	9.16	11.19	31.45	39.74	52.99	46.94	23.26	12.56	5.78	8.21	255.47
2012	9.74	8.07	8.8	11.73	33.17	47.69	56.1	43.24	27.79	17.19	7.47	7.34	278.33
2011	18.61	7.9	17.58	14.16	12.7	26.29	53.79	44.31	37.27	12.3	8.1	8.79	261.8
2010	9.26	7.24	7.78	7.38	10.49	32.3	57.77	49.32	34.53	16.36	7.3	9.14	248.87
2009	6.74	6.15	6.75	9.01	19.28	28.42	49.91	46.82	31.68	9.41	6.62	6.66	227.45

ac-ft		gpm	
21.5	Avg	160	Avg
63.5	Max	472	Max
5.78	Min	43.0	Min

8.1 ac-ft per month
96.93 ac-ft per year
0.3 ac-ft per day
60.1 gpm

Utah Department Of Environmental Quality
Division Of Drinking Water

HIGHLAND SUBDIVISION (MORGAN)	PWS ID: UTAH15005	Rating: Approved	02/16/1988	Active

Legal Contact

HIGHLAND SUBDIV (MORGAN)
RODGER A SMITH
5880 N HIGHLAND DR
MOUNTAIN GREEN, UT 84050
Phone: 801-876-3494
County: MORGAN COUNTY
System Type: Community
Population: 1,200

Site Updates

Last Inventory Update: 06/15/2020
Last Surveyor Update: 08/14/2018
Surveyor: ELDEN L OLSEN
Operating Period: 1/1 - 12/31
Last IPS Update: 08/28/2020 07:00:00

Consumptive Use Zone

Irrigation Zone: 2
Date: 02/15/2013

Admin Contacts

Name	Title	Office	Emergency	Email
SMITH, RODGER A		801-876-2510		rodgersmithone@hotmail.com

IPS 2020 Report

IPS 2020 Summary		Total IPS Pts: 115
Admin & Physical Facilities	**Quality & Monitoring**	**Significant Deficiency**
65	**0**	**50**

Physical Facility Points 2020 — Total Pts: 65

Facility	Facility Name	Status	Points Effective
DS001	UTAH15005 DISTRIBUTION SYSTEM	A	50.0

Code	Description	Severity	Comments	Determined Date	Not Assessed	Assessed
M001	CURRENT EMERGENCY RESPONSE PROGRAM	REC		07/07/2009		0
S094	SYSTEM LACKS MORE THAN 20% OF REQUIRED SOURCE CAPACITY	SIG	THIS YEAR THEY HAVE 48% OF REQUIRED CAPACITY. THE OPTIONS AND RECOMMENDATION FOR THE CAPACITY DEFICIENCY TO BO 1) CONTEST THE FINDINGS, 2) ENTER INTO A CAP AGREEMENT WITH DDW BEFORE 120 DAY DEADLINE, AND 3) GET ADDITIONAL CAPACITY APPROVED WITHIN 120 DAYS. THE CAP WILL NEED TO INCLUDE A DISTINCT PLAN TO GET THE SITUATION RESOLVED BUT CAN EXTEND THE 120 DAY DEADLINE. THE PLAN FOR THE CAP COULD INCLUDE 1) VALIDATING THAT THE SPRING YIELD FROM THIS YEAR IS NOT REPRESENTATIVE, 2) REQUESTING A SYSTEM SPECIFIC SOURCE SIZING STANDARD WHICH WILL REQUIRE AN ENGINEERING STUDY, OR 3) OTHER OPTION PRESENTED ADN ACCEPTED BY THE DIVISION.	08/14/2018		50

ST002	160K TANK	A	15.0	

Code	Description	Severity	Comments	Determined Date	Not Assessed	Assessed
V021	STORAGE TANK ROOF OR SIDEWALLS SHOW SIGNS OF MILD OR MODERATE DETERIORATION	MIN	SMALL CRACKS ON TOP OF TANK	08/14/2018		15

ST003	250 K GORDON CREEK NO. 1	A	0.0	

Code	Description	Severity	Comments	Determined Date	Not Assessed	Assessed
V017	STORAGE TANK SUBJECT TO CONTAMINATION DUE TO UNSEALED OPENINGS ON TANK ROOF OR SIDEWALLS	SIG	EXCESSIVE SEEPAGE	08/04/2020	100	0

WS005	JOHNSON WELL 1	P	0.0	

Code	Description	Severity	Comments	Determined Date	Not Assessed	Assessed
S001	UNAPPROVED SOURCE IN SERVICE	SIG	TEMPORARY OPERATING PERMIT ISSUED 8/24/2020. SYSTEM MUST OBTAIN PERMANENT OPERATING PERMIT BY 9/30/2020.	08/24/2020	200	0

Significant Deficiency Violations — Total Pts: 50

ID	Violation	Code	Deficiency	Determined	Point Effective
DS001	45 FAILURE ADDRESS DEFICIENCY (GWR)	S094	SYSTEM LACKS MORE THAN 20% OF REQUIRED SOURCE CAPACITY	05/14/2020	50

Operator Certification

Type	Level Required	Highest Certificate
Distribution	Small System	Dist 2
Treatment		

Open Compliance Schedule

Type	Required Activities	Severity	Created	Due
ERROR:PBCU	SUBMIT LCR SAMPLING SITE PLAN		06/15/2020	09/30/2020
ERROR:PBCU	SUBMIT CC STUDY PROPOSAL		06/15/2020	10/31/2020
Corrective Action Plan	SOURCE CAPACITY DEFICIENCY-CORRECT		12/12/2018	11/01/2019
DEFY	SYSTEM LACKS >40% OF REQUIRED SOURCE CAPACITY	SIG	08/14/2018	11/01/2019
DEFY	STORAGE TANK SUBJECT TO CONTAMINATION DUE TO UNSEALED OPENINGS ON TANK ROOF OR SIDEWALLS	SIG	08/19/2020	09/19/2020
DEFY	UNAPPROVED SOURCE IN SERVICE	SIG	08/24/2020	09/30/2020