CANNON FALLS WATER SYSTEM EVALUATION

CANNON FALLS, MINNESOTA

JUNE 2025

I hereby certify that this plan, specification or report was prepared by me or under my direct supervision and that I am a duly Licensed Professional Engineer under the laws of the State of Minnesota.

Preliminary Only

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Date_____ License No. 17597

whks

engineers + planners + land surveyors

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Background

The City of Cannon Falls and its consulting engineer, WHKS & Co., have completed capacity evaluations of Cannon Falls' water and wastewater systems to determine the unallocated capacity that can be reserved for potential Tract Development. This report outlines the water evaluation, and a separate report outlines the wastewater system evaluation.

On May 8, 2025, WHKS personnel met with City of Cannon Falls staff to conduct hydrant flow testing on the City's water distribution system. Testing results were used to calibrate the City's water distribution model.

The water system was evaluated under the assumption that Tract Development would connect to the distribution systems on the north side of town. This report evaluates the capacities of the water storage system, well supply, and booster pump stations.

Contact Information

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Population Served

The City of Cannon Falls has a population of 4,220 according to the 2020 US Census, reflecting an 8.5% increase from 3,890 in the 2000 Census and a 3.4% increase from 4,082 in the 2010 census.

The City currently serves four Significant Industrial Users (SIUs): Lorentz Meats, Gemini, Inc. and Cannon Equipment, LLC (two locations). Copies of SIU agreements are not available. Based on discussions with City staff, it is unclear whether formal agreements exist for Gemini or Cannon Equipment, but conversations regarding usage have occurred. There have been no recent conversations with Lorentz Meats about usage. The City plans to pursue formal agreements with these industries in the future. For this evaluation, the industrial data is derived from water usage records rather than allocated agreements. See the spreadsheet in Appendix A.1 for water usage records of the top ten users over the past ten years.

The City's drinking water system currently serves six large industrial water users. The large industrial users are:

- Lorentz Meats
- Cannon Equipment Company (West)
- Henkel Corporation
- Mayo Clinic Facilities Management Utilities
- Twin City Container Inc.
- Cannon Equipment Company (East)

Based on discussions with City staff, this analysis utilizes a 2045 population equivalent value of 6,000. This is a conservative approach that provides flexibility as the City grows. Six of the top water users were excluded from growth projections as their usage is independent of the commercial growth that is typically associated with domestic growth. These users are highlighted on the attached spreadsheet.

System Information

Existing Water Usage

Table 1 shows the annual well flow data for the City over the past ten years. This data is taken from Minnesota Department of Natural Resources annual water use reports as well as City records. Flows are shown in gallons per year (GPY). Based on this data, the City of Cannon Falls has an average water usage of approximately 149 million gallons per year (MGY).

Table 1: Annual Well Total Records 2015-2024

YEAR	WELL #3 FLOW (GPY)	WELL #4 FLOW (GPY)	WELL #5 FLOW (GPY)	COMBINED FLOW (GPY)
2015	50,221,000	58,654,000	42,476,000	151,351,000
2016	42,201,000	50,947,000	58,216,000	151,364,000
2017	42,591,000	55,299,000	50,958,000	148,848,000
2018	56,581,000	25,690,000	61,909,000	144,180,000
2019	41,079,000	23,512,000	70,845,000	135,436,000
2020	55,102,000	46,515,000	47,530,000	149,147,000
2021	54,713,000	55,948,000	54,440,000	165,101,000
2022	79,917,000	2,665,000	68,419,000	151,001,000
2023	73,649,000	3,731,000	79,928,000	157,308,000
2024	44,686,000	51,879,000	41,934,000	138,499,000
Average	**54,502,111**	**37,484,000**	**59,495,375**	**149,223,500**

System Components

Table 2 shows City storage tanks and their capacities. The City has two storage tanks which together provide a combined storage capacity of 1.5 million gallons.

Table 2: Storage Capacities

STORAGE	CAPACITY (GALLONS)
North Reservoir	500,000
South Tower	1,000,000
Combined Storage Capacity	1,500,000

Table 3 shows City wells and their capacities. The City has three wells, with a combined total capacity of 5.04 million gallons per day (GPD). The firm capacity (with the largest well out of service) is 3.31 million gallons per day.

Table 3: Well Capacities

WELLS	CAPACITY (GPD)
Well #3	1,584,000
Well #4	1,728,000
Well #5	1,728,000
Combined Well Capacity	3,312,000 (Firm) 5,040,000 (Total)

Table 4 shows City booster stations and their pumping capacities. The City has three booster stations. Firm capacities shown below are with the largest pump for each booster station out of service. Locations of each booster station are shown in Appendix A.2.

Table 4: Booster Pump Station Capacities

BOOSTER STATIONS	PUMPS (GPM)	FIRM CAPACITY (GPM)	TOTAL CAPACITY (GPM)
North Booster Station	Pump 1 – 600 Pump 2 - 1,500 Pump 3 – 2,000	2,100	4,100
East Booster Station	Pump 1 - 300 Pump 2 - 300 Pump 3 - 1,000 Pump 4 – 1,000	1,600	2,600
South Booster Station	Pump 1 - 500 Pump 2 – 500 Pump 3 – 500	1,000	1,500

Storage/Well Capacity Evaluation

Table 5 summarizes key water parameters for the storage and well capacity evaluation. As described in the previous section, projected domestic and commercial growth is calculated over a twenty-year period (2045).

Based on Ten State Standards, storage capacity must be able to provide average day demand. The table below indicates 935,000 GPD of remaining available capacity after considering current usage (409,000 GPD), industrial growth (0 GPD), and domestic/commercial growth (156,000 GPD).

Based on Ten State Standards, well firm capacity must be able to provide peak day demand. The table below indicates 1,714,000 GPD of remaining available firm pumping capacity after considering current usage (1,155,000 GPD), industrial growth (0 GPD), and domestic/commercial growth (443,000 GPD).

Table 5: Storage and Well Capacities

	EXISTING CAPACITY	CURRENT USAGE	INDUSTRIAL GROWTH[G]	DOMESTIC/COMMERCIAL GROWTH	REMAINING AVAILABLE CAPACITY
Storage Capacity (GPD)	1,500,000[A]	409,000[B]	0	156,000[C]	935,000
Well Capacity (GPD)	3,312,000[D] (Firm)	1,155,000[E]	0	443,000[F]	1,714,000 (Firm)

A. Capacity is based on physical volume of the existing tower and reservoir (Table 2).
B. Usage is based on the historical average daily demand over the past 10 years (See Appendix A.3).
C. Projected growth uses the 2045 population equivalent value excluding the average usage of the top six industrial users.
D. Capacity is based on rated capacities of existing pumps (Table 3).
E. Usage is based on the historical peak day demand over past 10 years (See Appendix A.3).
F. Projected growth is based on the peak usage from the 2045 population equivalent value, excluding the peak usage of the top six industrial users.
G. Existing industries are not currently planning for any major upgrades, and no future allocations are included.

Fire Flow Evaluation

Table 6 shows fire flow available in the system at the proposed development location. Fire flow results were generated through simulations within the water distribution model. Two simulations were generated, one based on the existing distribution system, and the other based on the system including a new one million gallon (MG) water tower adjacent to the proposed development location. Further discussions with the end user will be required to determine fire flow and available water volumes.

Table 6: Fire Flow/Max Flow Available

	FIRE FLOW AVAILABLE	MAX FLOW AVAILABLE
Existing	1,800 GPM[A]	N/A
With New 1 MG Tower[B]	2,700 GPM[C]	3,500 GPM (12-inch Watermain)[D] 5,500 GPM (15-inch Watermain)[D]

A. Available fire flow is based on a fire flow simulation in the water distribution model, with the largest (2,000 GPM) pump of the North Booster Station operating.
B. The new water tower was modeled with a pressure of 70 psi at its base.
C. Available fire flow was calculated through a fire flow simulation in the water distribution model, with a velocity limitation of 30 feet per second (fps) in the 6-inch hydrant lead.
D. Maximum flow available was calculated using a fire flow simulation in the water distribution model, with a velocity limitation of 10 fps. The maximum flow available in a 15-inch pipe without a velocity limitation (assuming a 30-foot hydrant lead and no booster station operating) is 7,800 GPM. Final distribution piping sizing will be determined during the design phase.

Groundwater Appropriation

Table 7 shows the City of Cannon Falls' groundwater appropriation capacity. The City has a permitted groundwater appropriation of 250 million GPY. The table below illustrates remaining available groundwater appropriation capacity of 43,664,000 GPY after considering current usage (149,224,000 GPY), industrial growth (0 GPM), and domestic/commercial growth (57,112,000 GPY).

Table 7: Groundwater Appropriation

	EXISTING CAPACITY	CURRENT USAGE	INDUSTRIAL GROWTH[E]	DOMESTIC/COMMERCIAL GROWTH	REMAINING AVAILABLE CAPACITY
Groundwater Appropriation (GPY)	250,000,000[A]	149,224,000[B]	0	57,112,000[C]	43,664,000[D]

A. Existing capacity is based on the City's groundwater appropriation permit.
B. Current usage is based from the average well usage data over the past 10 years (Table 1).
C. Projected domestic/commercial growth is based on City's 2045 population equivalent value, excluding the average usage of the top six industrial users.
D. Additional capacity could be applied for through the Minnesota Department of Natural Resources.
E. Existing industries are not currently planning for any major upgrades, and no future allocations are included.

There is an existing irrigation well at the proposed Tract Development site. It has a permitted groundwater appropriation of 40 million GPY. City and consultant staff met with the Minnesota Department of Natural Resources on June 12, 2025 to discuss options for this well. Further discussions will be needed to determine opportunities associated with this well.

Recommendations

Capacity Available for Industry

The following table describes the required system upgrades at certain flow demands requested by Tract Development.

Table 8: Summary of Capacity Limits

UPGRADE	REMAINING CAPACITY AVAILABLE	ASSOCIATED TRACT EXCEEDING DEMANDS
New Well Needed	1.71 MGD Peak Daily Flow	2031 Demand (Interim) Peak Daily Flow
Booster Station Upgrade[A]	2,100 GPM Peak Hourly Flow	2031 Demand (Interim) Peak Hourly Flow
New Water Tower (1 MG)[B]	0.93 MGD Average Daily Flow 2,100 GPM Peak Hourly Flow	2031 Demand (Interim) Peak Hourly Flow
Request Additional Groundwater Appropriations	43.66 MGY Annual Usage	2034 Demand (Full Buildout) Annual Usage

A. Booster Station upgrades would not be required if a new water tower is constructed.
B. A new water tower would serve as an alternative to upgrading the booster station for peak hourly demand and fire flow requirements.

There is 1.71 MGD of available Peak Daily Demand. However, an additional well is needed to meet the interim and full buildout peak daily demands for the City's distribution system. Additionally, the North Booster Station is limited to a firm capacity of 2,100 GPM. There will need to be improvements to the North Booster Station to meet the interim and full buildout peak hourly demands requested from the City distribution system. Operating the high-pressure zone of the City's water system under these high peak hourly demands would be difficult to manage without a water tower to buffer the flows/demands.

A new water tower near the proposed Tract Development site may potentially be a more effective alternative to booster station improvements . If constructed, there is no need to make booster station improvements for peak hourly demand or fire flow, and it would also minimize the operational difficulties. The City's current storage capacity meets the projected average daily demand from Tract Development. However, the existing North Reservoir, constructed in 1972, may be nearing the end of its useful life. Decommissioning this reservoir after constructing a new 1 MG water tower may be preferred by the City to minimize future costs involved with maintaining the North Reservoir.

With 43.66 MGY of available capacity for the proposed Tract Development, the City may need to request additional groundwater appropriations to meet the full buildout demand. This item is subject to change after further discussion with the Minnesota Department of Natural Resources.

Based on these capacity findings, City Staff, WHKS, and Tract Development need to discuss the required system upgrades to meet Tract Development's usage demands.

Appendix

A.1 : Top 10 Industrial Users Usage Spreadsheet

A.2 : Map of Major System Components

A.3 : Annual Well Usage Summary

Appendix A.1: Top 10 Industrial Users Usage Spreadsheet

Cannon Falls Top 10 Industrial Users Yearly Water Usage

	2024	2023	2022	2021	2020	2019	2018	2017	2016	2015	Average	Avg GPD
Lorentz Meats	6,172,925	8,470,942	7,713,913	7,720,644	8,020,613	7,506,703	6,039,772	5,108,446	5,994,141	5,834,806	6,858,291	18,790
Cannon Equipment Company (West)	2,176,832	3,400,647	3,280,955	1,824,499	2,410,971	2,434,907	2,929,372	3,794,121	1,828,988	3,284,696	2,736,599	7,498
Henkel Corporation	83,780	80,788	4,214,527	7,933,093	6,640,457	2,223,210	561,788	2,132,697	246,858	168,312	2,428,551	6,654
Mayo Clinic Facilities Management Utilities	1,655,438	1,520,042	1,549,963	1,611,306	1,497,601	1,636,738	2,412,468	2,289,041	1,730,244	1,533,505	1,743,635	4,777
Twin City Container Inc	1,300,864	1,352,478	1,477,402	2,197,029	1,832,728	1,825,994	1,333,777	1,288,147	1,160,230	1,393,620	1,516,227	4,154
The Gardens of Cannon Falls	240,124	497,454	1,526,025	1,276,924	1,512,561	1,873,869	1,857,414	1,625,518	1,778,869	2,088,561	1,427,732	3,912
Cannon Mall Car Wash	1,003,139	1,084,676	1,078,692	1,117,591	969,475	1,018,099	1,627,761	1,711,544	1,722,016	2,024,228	1,335,722	3,660
Sweet Harvest Foods	2,065,371	1,701,819	721,121	585,725	763,014	905,891	1,157,237	1,551,460	1,748,196	1,951,668	1,315,150	3,603
Cannon Equipment Company (East)	614,899	407,688	445,092	666,514	1,055,500	1,083,180	819,866	748,052	925,340	598,442	736,457	2,018
Valley View Recovery Center	868,488	979,199	906,639	550,565	353,829	430,879	391,231	849,041	947,781	1,040,540	731,819	2,005

Cannon Falls Top 10 Industrial Users Monthly Water Usage

	January	February	March	April	May	June	July	August	September	October	November	December
Lorentz Meats	572,532	591,505	652,975	616,769	603,229	540,842	588,418	536,503	521,766	535,755	562,311	536,278
Cannon Equipment Company (West)	177,900	159,471	280,968	216,786	209,529	222,172	272,067	289,197	277,752	227,333	189,407	190,753
Henkel Corporation	198,642	179,464	204,592	196,738	221,648	217,384	282,539	206,911	187,986	184,395	138,390	173,025
Mayo Clinic Facilities Management Utilities	158,043	149,610	154,548	141,083	124,251	137,941	169,658	158,437	133,228	132,106	146,169	142,429
Twin City Container Inc	128,461	129,413	144,075	129,413	135,921	114,228	114,602	114,976	117,743	118,043	127,992	119,552
The Gardens of Cannon Falls												
Cannon Mall Car Wash												
Sweet Harvest Foods												
Cannon Equipment Company (East)	56,852	53,588	55,057	48,175	62,238	79,294	80,715	72,411	84,680	57,750	50,643	48,773
Valley View Recovery Center												

Highlighted are the six large industrial water users that were excluded from growth projections

Appendix A.2: Map of Major System Components


Legend
2000 ft
Water Wells
Water Storage
Water - Booster
Water PRVs
North Reservoir
North Booster Station & Well #3
Well #4
Well #5
East Booster Station
South Booster Station
South Tower
Cannon Falls
Simons Arena
Lake Byllesby Campground
Lake Byllesby Dam
Lake Byllesby Goodhue County Park
Cannon Valley Trail - Archie Swenson...
St Ansgar's Lutheran Church
Cannon Falls Township Clerk
280th St E
295th St E
County 17 Blvd
County 29 Blvd
County 24 Blvd
Rochester Blvd
Hogan Ave
5th St N
4th St N
4th St
4th St S
Colvill Mem Hwy
Cannon River
Google

Appendix A.3: Well Usage Summary

Cannon Falls Annual Well Usage Summary

Year	Well #3	Well #4	Well #5	Combined	Notes
2024 totals	44,686,000	51,879,000	41,934,000	138,499,000	Max Pumped - 774,000 gallons
2023 totals	73,649,000	3,731,000	79,928,000	157,308,000	Max Pumped - 930,000 gallons
2022 totals	79,917,000	2,665,000	68,419,000	151,001,000	Max Pumped on: 9/20/22 - 1,155,000 gallons
2021 totals	54,713,000	55,948,000	54,440,000	165,101,000	Max Pumped - 829,000 gallons
2020 totals	55,102,000	46,515,000	47,530,000	149,147,000	Max Pumped - 851,000 gallons
2019 totals	41,079,000	23,512,000	70,845,000	135,436,000	Max Pumped on: 7/2/2019 - 731,000 gallons
2018 totals	56,581,000	25,690,000	61,909,000	144,180,000	Max Pumped on: 10/10/18 - 873,000 gallons
2017 totals	42,591,000	55,299,000	50,958,000	148,848,000	Max Pumped on: 6/20/17 - 1,009,000 gallons
2016 totals	42,201,000	50,947,000	58,216,000	151,364,000	Max Pumped on: 5/26/16 - 1,061,000 gallons
2015 totals	50,221,000	58,654,000	42,476,000	151,351,000	Max Pumped on: 4/17/15 - 891,000 gallons
Average	54,502,111	37,484,000	59,495,375	149,223,500	Average Day Demand = 149,223,500 / 365 = 409,000 gpd