



NORTH TREE ANNEXATION

TOWN OF CALHAN
EL PASO COUNTY, COLORADO

WATER RESOURCES & SANITARY SEWER REPORT

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GENERAL LOCATION AND PROJECT DESCRIPTION

This Preliminary Utility Report covers the demands and design of the water and sewer services for the North Tree Single Family Development (herein referred to as “the Project/Site”). This report demonstrates that the proposed water and sanitary sewer infrastructure for this Project will be sufficient to service the development. Water and sanitary sewer mainlines will be owned and maintained by the Town of Calhan and fire protection will be provided by Calhan Fire Department.

SITE LOCATION

The Project Site is located in Northeast quarter of Section 2, Township 12 South, Range 62 West of the 6th Principal Meridian, City of Calhan, County of El Paso, State of Colorado (see Vicinity Map below). More specifically, the Site is generally bound by the following:

North:	McClasky Road
East:	Single Family / Golden Street
South:	Vacated Right-Of-Way
West:	Vacant Land



Figure 1: Vicinity Map (N.T.S.)

DESCRIPTION OF PROPERTY AND LAND USE

The entire North Tree Single Family Development consists of approximately 95.02 acres of land per the pending annexation into the Town of Calhan. The proposed development will consist of 467 single family homes and tracts dedicated to parks and a potable water well. Site improvements for the development include the construction of the aforementioned buildings, utilities, storm sewer, landscaping improvements, and internal private drives. Utility easements will be provided for utilities outside the public ROW as required by the utility agencies.

INFORMATION REGARDING SUFFICIENT QUANTITY OF WATER

WATER SYSTEM LAYOUT AND DEMANDS

The project site is currently undeveloped farmland with no existing potable water wells or on-site water supply. The proposed water service will be provided by a connection to the existing water main within the Town of Calhan's water system located in Crystola Street, south of the site.

Water demand was estimated based on the potential range per single family equivalent (SFE) provided by the Town's water attorney, 0.25-0.30 ac-ft/Yr/SFE. North Tree utilized the low end of the range, as the development consists of small-lot, compact, entry level homes. This development type is in line with the *Town of Calhan Comprehensive Plan 2035* that was unanimously approved by the Board in 2025.

Table 1: SFE Based Water Demand Calculations

User Type	Unit Count (Lots)	Irrigated Area (Acres)	Unit Demand (ac-ft/Yr/SFE)	Total Demand (ac-ft/Yr)	Total Demand (ac-ft/Day)	Total Demand (GPD)
Household	467		0.25	116.8	0.320	104,243
Park Irrigation		1.605	2.46	3.9	0.011	3,525
Total				120.7	0.331	107,768

Park irrigation demand was estimated based on an irrigated area equal to 30 percent of the total 5.35-acre park area, with irrigation demand applied on a per-irrigated-acre basis. The SFE demand assumptions utilized are also in line with El Paso County's water demand generation factor of 0.26 ac-ft/yr/SFE. In addition to the water demand per household, North Tree also included estimation for park irrigation for a conservative estimate of anticipated total water demands for the development at full buildout.

AVAILABLE QUANTITY AND DEPENDABILITY OF WATER SUPPLY

Calhan holds water rights in four aquifers within the Denver Basin: Big Sandy Alluvial (BSA), Denver, Arapahoe, and Laramie-Foxhills (LFH). These aquifers include both not non-tributary and non-tributary groundwater sources, which are distinguished by the degree to which surface water influences aquifer recharge. The BSA and Denver aquifers are classified as not non-tributary, meaning they receive recharge from precipitation and surface water infiltration. The Arapahoe and LFH aquifers are classified as non-tributary, meaning they are confined, have limited connection to surface water, and recharge slowly; therefore, they are generally considered non-renewable sources. Because the BSA and Denver aquifers are renewable sources, withdrawals from these aquifers require replacement of at least 4 percent of the withdrawn volume to surface water bodies to supplement natural recharge. The Town has existing potable water wells in BSA and LFH only.

Testing on three existing permitted Town of Calhan wells was performed from late May to early June of 2026 by Moore Engineering and was observed by Kimley-Horn. The purpose of this testing was to assess available quantity of water supply using existing infrastructure and quality of water produced. As part of this testing, constant rate tests, step tests, and water quality tests were performed on the Railroad alluvial well (RRA), Permit No. 9692-F; the Railroad Laramie-Foxhills (LFH) well, Permit No. 24166-F; and the Tower LFH well, permit 9691-FR. Findings from the tests performed are summarized in **Table 2**.

Table 2: Summary of Water Availability from Moore Engineering Study

Well	Permit No.	Aquifer	Water Right		Tested Availability	
			(ac-ft/yr)	(gpm)	(ac-ft/yr)	(gpm)
Railroad Alluvial (RRA)	9692-F	Upper Big Sandy	77	48	Unknown	Unknown
Railroad	24166-F	Laramie-Foxhills	160	100	160+	100+
Tower	9691-RF	Laramie-Foxhills	175	109	45	30
Gordon	12104-FP	Laramie-Foxhills	127	70	Not Tested	Not Tested
Total			539	327	200-225	120-140

During testing, it was discovered that RRA well was not functional and had no pump installed due to its antiquated condition. Improvements, such as installation of new casing, submersible pump, or replacement of raw water lines can be completed along with further testing and evaluation to confirm the well's production capability. Similarly, it was found that the Tower LFH well had much lower production rates than outlined in Permit No. 9691-RF, likely attributable to degradation of the well since its installation in 1992. In contrast, the Railroad LFH well was able to produce water at rates exceeding its maximum permitted capacity at a high efficiency. Because the Railroad and Tower LFH wells are within close proximity of each other and pull out of the same aquifer, it is anticipated that the poor performance of the Tower LFH well is not due to poor aquifer conditions in the area and can instead be attributed to well degradation. Additionally, the Moore Engineering study found that the well pumps in both the Railroad and Tower LFH wells sit substantially above the bottom of each well.

In addition to the tested wells, the Town of Calhan also owns and operates a third potable water well within the LFH aquifer, the Gordon LFH well (Permit No. 12104-FP). Due to the variability in yield observed between the two tested LFH wells, the Gordon LFH well yield was not estimated as part of the study. However, the well is permitted to produce up to approximately 70 gpm. Further testing and evaluation will be needed to confirm the well's current production capability. Between the 3 currently operated LFH wells, as shown in Table 3, the Town of Calhan is permitted to draw a maximum of 462 ac-ft/yr. Based on the testing performed on the Tower and Railroad LFH wells, it is estimated that these two wells are capable of producing 200-225 ac-ft/yr. Based on the reported capability of the Gordon LFH well, it is estimated by Moore Engineering that the current LFH instantaneous production rate is likely in the range of 250-275 ac-ft/yr. This production rate may decrease with increased usage and degradation of the older wells. The Moore Engineering report identified several solutions to maximize the currently permitted wells including:

- Evaluating rehabilitation and/or redrilling of the RRA and/or Tower LFH wells.
- Lowering the pumps in the Railroad and/or Tower LFH wells to create more favorable pumping conditions and potentially boost production.
- Testing the Gordon LFH well to confirm current pumping capacity.

Additionally, to increase potential water supply, the Town could also develop its existing Denver and Arapahoe water rights, of which there is anticipated to be 300 ac-ft/yr cumulatively available, not including the estimated supply associated with the proposed North Tree Annexation.

Table 3, below, shows the amount of single-family equivalents (SFEs) that could be supported under different water rights development scenarios. The first scenario assumes that the Town of Calhan water supply is equivalent to the estimated current capacity of the LFH wells. The second scenario assumes that the Town of Calhan is able to redrill or rehabilitate the current LFH wells to meet their full permitted capacity. The third scenario assumed that the Town of Calhan is able to utilize the full permitted supply from all 3 LFH wells and RRA. The fourth scenario assumes that the Town of Calhan is able to utilize the full permitted supply from all 3 LFH wells and RRA and is able to obtain and develop 300 ac-ft of annual supply from their currently undeveloped Denver and Arapahoe water rights. The fifth and final scenario assumes that, in addition to the supplies identified in scenario four, the Town is also able to develop the water rights that they would obtain during the annexation of North Tree, estimated to be 65 ac-ft/yr from the Denver and Arapahoe aquifers. It was assumed that 0.25 ac-ft/yr would be used for each compact, small-lot, entry-level unit proposed at North Tree.

Table 3: Calhan Potable Water System Capacity for New Single-Family Homes

Scenario	Available Supply (ac-ft/yr)	Current Town usage (ac-ft/yr)	Remaining Available Supply (ac-ft/yr)	Usage (ac-ft/yr/SFE)	Supportable SFEs
Current LFH Capacity	250	80	170	0.25	680
Permitted LFH	462	80	382	0.25	1,528
Total Active Permit	539	80	459	0.25	1,836
Total Active Permits + Current Town Owned Undeveloped Denver and Arapahoe rights	839	80	759	0.25	3,036
Total Active Permits + Current Town Owned Undeveloped Denver and Arapahoe Supply + Additional Denver and Arapahoe Supply from Annexation	904	80	824	0.25	3,296

INFORMATION REGARDING SUFFICIENT WATER QUALITY

During Moore Engineering's testing, water quality samples from the RRA and Railroad LFH wells were analyzed for primary and secondary drinking water MCLs, general cations/anions, and TDS. Results indicated that LFH water quality is generally better than the alluvial supply, with the Railroad LFH well meeting all tested MCLs and exhibiting low TDS. The RRA well showed manganese above the secondary MCL and elevated TDS, which are not anticipated to pose health concerns at current concentrations but may affect taste or cause staining. If alluvial supplies are developed, blending with LFH water is recommended to reduce manganese and TDS concentrations or additional treatment measures should be installed at the alluvia well sites.

SANITARY SEWER SYSTEM

EXISTING SANITARY SEWER SYSTEM

The project site currently consists of vacant farmland and does not have any existing sanitary sewer infrastructure. An existing wastewater treatment plant is located east of the site and would receive flows from the proposed development.

The wastewater treatment plant has a permitted hydraulic capacity of 0.08 MGD (80,000 GPD). Based on operational data from 2025, the facility generally operates between 68 and 78 percent of permitted capacity. Sustained flows above approximately 64,000 GPD (80 percent of capacity) would require coordination with CDPHE regarding capacity planning or system upgrades.

PROPOSED SANITARY SEWER SYSTEM

Wastewater generated by the development will be conveyed through proposed sanitary sewer infrastructure throughout the site before being collected by the existing infrastructure adjacent to the development and ultimately discharging to the existing wastewater treatment plant.

The proposed layout for the sanitary sewer system was determined by evaluating the existing grade, the flow direction in the areas of the proposed housing plots, and the existing sanitary sewer infrastructure.

In general, the existing grade facilitates flow towards the northeast corner of the site, towards the intersection of McClasky Road and proposed access point. The flow would then be collected into the proposed sewer main along McClasky Road, and flow eastward into the existing lagoon treatment facility.

The proposed sanitary sewer alignments were evaluated for feasibility using surveyed existing manhole elevations, existing grades, and proposed grading information. The layout was developed based on a minimum slope of 0.5 percent and a minimum cover of 7 feet. Based on the available data and applicable design criteria, the proposed alignment is feasible, and flows are anticipated to discharge directly to the treatment facility through the proposed piping without impacting the existing collection system.

SANITARY SEWER FLOWS

Sanitary sewer demand calculations were prepared under the assumption that 80 percent of the total household water demand would be returned to the sanitary sewer system. 80 percent of the unit water demand generation factor was implemented. Results from this calculation are shown in **Table 4**, below.

Table 4: EPC Land Development based Sewer Return Rate

User Type	Unit Count	Unit Demand		Total Average Daily Demand		
	(Lots)	(AC-FT/Yr/Lot)	(AC-FT/Yr)	(AC-FT/Day)	(GPD)	(MGD)
Household	467	0.20	93.4	0.26	83,394	0.08

EXISTING CAPACITY ANALYSIS

The Calhan WWTF operates under a permitted hydraulic capacity of 0.08 million gallons per day. Under its existing permit, current hydraulic capacity of the plant is calculated as a 30-day average. Based on available flow monitoring data, highest 30-day average capacity recorded at the facility was 0.0624 MGD, representing approximately 78 percent of the permitted capacity.

Per CDPHE regulations, when a wastewater treatment plant reaches 80 percent of its permitted hydraulic or organic capacity, a schedule for planning for a facility expansion must be developed unless it can be proven that the exceedance was an anomaly. The difference between 80 percent of the permitted hydraulic capacity and the current peak month hydraulic capacity is 2 percent, or approximately 0.001593 MGD (1,593 GPD). This represents the amount of flow that can be added from the proposed development before a plan to upgrade the wastewater treatment facility must be developed.

Per CDPHE regulations, when a wastewater treatment plant reaches 95 percent of its permitted hydraulic or organic capacity, a schedule for construction of a facility expansion must be developed unless it can be proven that the exceedance was an anomaly. The difference between 95 percent of the permitted hydraulic capacity and the current peak capacity yields a remaining available hydraulic capacity of approximately 0.01359 MGD (13,559 GPD). This represents the amount of flow that can be added from the proposed development before a schedule for construction for wastewater treatment facility upgrades must be developed.

The number of additional single-family residential units the facility could support within its existing permitting capacity before CDPHE would require the development of planning and construction timelines was estimated and results are shown in **Table 5**. To calculate these values, the aforementioned methods of calculating the projected sanitary sewer flows were utilized. On this basis, per the most conservative estimate calculated, the Calhan WWTF could support 7 single-family residential units before hitting 80 percent hydraulic capacity and 67 single-family residential units before hitting 95 percent hydraulic capacity. In other words, it is estimated that 7 single-family residential units could be brought online before design for an upgraded or new facility must be started and it is estimated that 67 single-family residential units could be brought online before construction of a new facility or existing facility upgrades must be started.

Table 5: Calhan WWTF Capacity for New Single-Family Houses

% Capacity of Existing Plant	Available Capacity (GPD)	SFEs before capacity reached
80%	1,593	8
95%	13,593	73

Note that these estimations are based solely on hydraulic capacity and do not take into account the permitted organic capacity. No exceedances of the permitted hydraulic or organic capacity were observed in the monitoring data provided from January 2025 to December 2025, however, data for the existing facility on the CDPHE website indicates that there have been several exceedances of the organic capacity limit in previous years. It is assumed that the prior exceedances were anomalies and that the hydraulic capacity of the existing WWTF is the limiting factor when analyzing available capacity.

CONCLUSION

Based on the available information, the Town of Calhan has sufficient permitted water supply to serve the proposed North Tree development, particularly if existing LFH sources are maintained, rehabilitated, or supplemented with undeveloped Denver and Arapahoe water rights. Current active water permits are estimated to support more than 1,800 additional SFEs, which exceeds the 467 SFEs proposed for the development. Available sanitary sewer treatment capacity is more limited, with the existing WWTF operating near the 80 percent planning threshold. Calhan is currently pursuing state grant funding for WWTF improvements, and newly installed flow meter data is being reviewed in coordination with Moore Engineering to verify treatment plant capacity. As a result, water supply appears adequate for the proposed development, while sanitary sewer capacity will require continued coordination, flow verification, and planning for treatment facility upgrades to support full buildout.

REFERENCES

How We Use Water, EPA, August 2025.

Town Of Calhan – Existing Water Lines, HR Green, August 2024.

Town of Calhan Comprehensive Plan 2035, HR Green, May 2025.

Water Master Plan, El Paso County, 2019 February.

Land Development Code, El Paso County, Revised February 2024.

Regulation NO. 43 - On-Site Wastewater Treatment System Regulation, State of Colorado, June 2025