## 15. THE RABBIT CREEK CENTER PIVOT

Despite our success with the Rabbit Creek flood irrigation system, I wanted to install a center pivot sprinkler as insurance against the lower flows of dry years on Rabbit Creek.

A center pivot irrigation system on 100 acres could run on 400 gallons a minute (GPM). Sounds like a lot, but that's less than one cubic foot per second (CFS). By comparison, we needed 4-8 CFS to make the flood irrigation system work.

In the northeast corner of the place, the Crested Wheatgrass seeding undertaken by the Williams[1], looked like an attractive site for a pivot. A pump could be located on the creek near the buildings to deliver water via pipeline to the north. A combination of the new, low pressure sprinkler nozzles and relatively low lift from the creek level would keep pumping costs low.

I went down to Boulder to see Ray Moses, the water lawyer we had used for water rights on the Tibbits Place. Raphael J. Moses III of Moses, Wittemeyer, Harrison and Woodruff, was the grand old man of water law in Colorado back then.[2]

He advised that we apply for '*an alternate point of diversion*' under our existing water right for one CFS to be pumped from the creek at the buildings. Our case number 79CW0078 was approved by the Division 1 Water Court.

From plotting on a USGS map, Kent and I identified where the center of the pivot would be located. That gave us the radius of the circle (the length of the pivot arm – about 1,235'). From that, with the help of the company that supplied the sprinkler, the elevation was surveyed, the length and diameter of the pipeline calculated and the size of the pump determined, all to carry 400 GPM after friction losses.

Kent and I designed the pump installation to filter out sediment with a rock filled trench leading to the pump station and set far enough north of the creek to be reasonably out of the way of floods.

When the trench for the pipeline was dug, the bottom foot of the trench over most of the length revealed the Fountain Formation, but so deteriorated that the trenching machine had dug through it as if it was just more sub-soil.

My assumption is that about three feet of soil (loess) had been deposited by wind more or less evenly over the conglomerate after the big ice age floods had scoured the Livermore valley (those floods are evidenced by the huge boulder deposits on the hilltops to the south and east across the valley).[3]

The deteriorated conglomerate rock exposed at the bottom of the pipeline trench looked like a gold mine of plant nutrients to me.

*NOTE: Some readers have expressed an interest seeing more details of farming and ranching practices forty years ago, so here are some details about center pivot sprinklers:*

Three quarters of a mile of 8" heavy-wall PVC pipe was installed in the trench from the pump over the top of the hill and down to the center of the pivot, together with the electrical wires to power the pivot (the wires threaded into smaller PVC pipe to protect against rodent damage). An air relief valve was located at the top of the hill so that air could escape as water came up from the pump, and a pressure relief valve to protect the pipeline against pressure surges was installed. The trench was then backfilled to cover the pipe and wires.

At the center, a heavy concrete pad was poured to anchor the pivot frame. Assembly of the pivot proceeded from the center outward.

To make the center pivot system go round, a setting on the electric control panel at the pivot center determines the percentage of time that the drive motor on the outermost tower will be running. This determines the rate of travel and water application. Electrical switches responding to alignment sensors at each of the other towers allow the drive motors for the rest of the system to play catch up with the end tower and thus stay in alignment. The sprinkler nozzles have larger orifices as they progress from the center to the outer edge of the pivot, so that water application is even.

New fangled at the time, we installed the latest low-pressure nozzles to save on pumping cost, hoping that the relatively heavy soil could soak up the water fast enough to compensate for the heavier application rates at lower pressure (turned out we got lucky).

We installed an end-gun sprinkler with an electric booster pump on the end of the pivot pipe to apply extra water at the outer perimeter. The electric booster pump was to increase the pressure necessary to operate the end gun.[4]

Not that big a deal now, but in 1979 a center pivot in Livermore was something to talk about, and our old friends at The Forks were talking. The gossip leaked back to us in a steady drip ~ mostly amusing, sometimes unsettling.

---

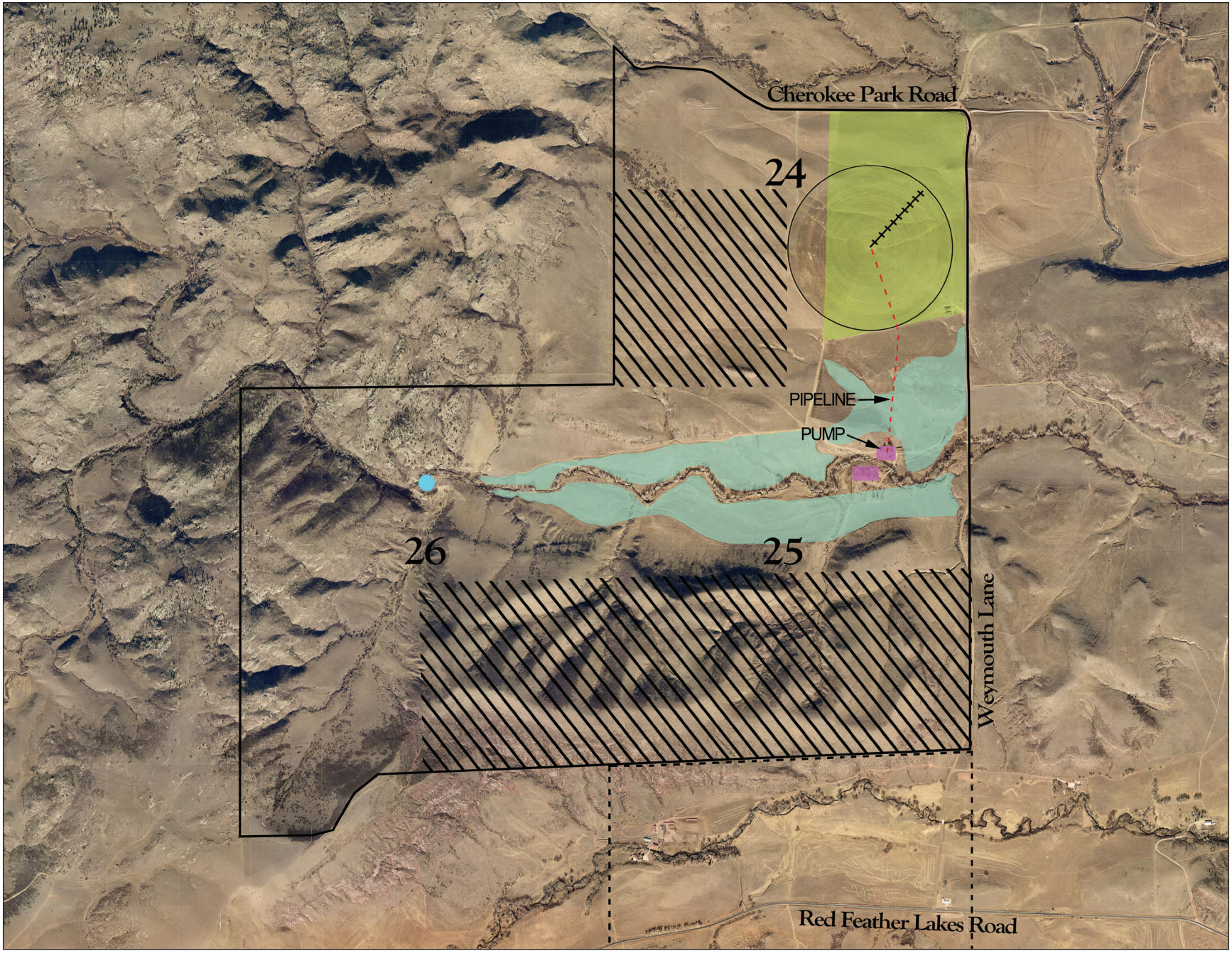
[1] In the 1950s, about 150 acres of dry pasture in the northeast corner of the ranch had been reseeded to Crested Wheatgrass (a cool season grass) with the help of the SCS, to provide early season grazing.

[2] I had chosen a Boulder water law firm in hopes of making an end run around the incestuous tangle of Fort Collins' 'leaky' water law firms, where, for a little guy like me, keeping your moves secret was a lost cause. Keeping secrets could be critical to the success of a water filing. Besides, Wittemeyer (from an old Boulder ranching family) was a good friend of good friends, Gilbert and Anne White (more about them later).

[3] More about ice age floods later.

[4] On a system the size of the Rabbit Creek pivot, every six feet of extra reach by the end gun irrigates an additional acre. Those are the cheap irrigated acres.

Graphics and layout by Nina Judson




The Rabbit Creek Center Pivot Sprinkler System

 Graphics and layout by Nina Judson