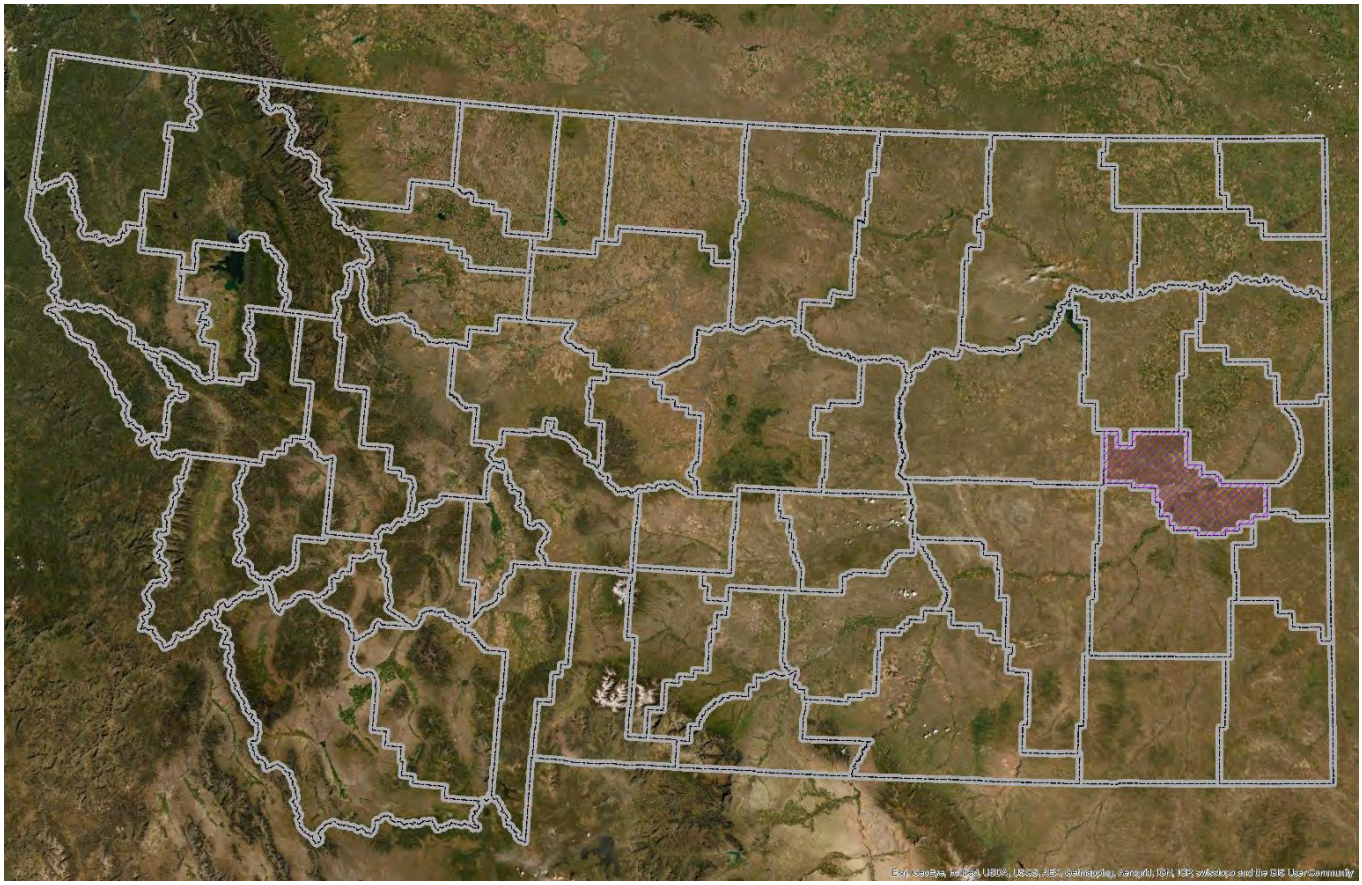
Proposed TIP Modification:

Control & Renovation of Existing Flowing Wells

Prairie County

Terry Field Office
2023 – 2027
Kathy Meidinger



Goal: To reduce the rate of ground water use from free-flowing artesian wells.

The 2023 Control & Renovation of Flowing Wells TIP was submitted for review and approved in May 2022. Based on the lack of applications and further investigation completed, the Terry Field Office is requesting a modification to the TIP to include practice 642 – Water Well for the remainder of the TIP lifespan and add one more year of signups to include 2024, 2025 and 2026, while 2027 remains available for implementation.

When the original practice list for the TIP was developed, it was unknown to staff that the bulk of the free-flowing artesian wells in the county have complex casing that is unable to be modified. The well logs list surface casing of 4", or larger, as seen in the following two examples:

Section 6: Well Construction Details

There are no borehole dimensions assigned to this well.

Casing

From	To	Diameter	Wall Thickness	Pressure Rating	Joint	Type
0	215	4				
210	1121	2				

Section 6: Well Construction Details

There are no borehole dimensions assigned to this well.

Casing

From	To	Diameter	Wall Thickness	Pressure Rating	Joint	Type
0	318	4				STEEL
318	638	2				STEEL

Based on this data, we assumed that the typical modification of adding a pitless adapter and valve to the 4" casing would be feasible. This operation would allow those wells to be shut off when not in use and be protected from frost damage in the winter. However, what we have found is that quite often, the 2" deep casing extends to the surface and is encased in concrete inside of the larger surface casing. The following is an example of this situation:

To further complicate the renovations, and assuming the well contractor could effectively stop water flow with a pressurized bladder, use heavy machinery to excavate around the well, cut the entire surface casing at a depth of 6', and grind off all surrounding concrete to get to the smaller metal casing, there is no manufacturer available that makes a 2" pitless adapter so there is no way to valve the well.
In an effort to find an alternative during discussions with drillers, it was proposed that the well be lined with one size smaller pipe, sealed between the two and valved at the surface. This would not provide

frost protection, but would allow the flow to be reduced considerably, thereby reducing aquifer drawdown while still allowing use of the well. It was during these discussions that the drillers pointed out that often the 2" casing below the concrete-filled surface casing has degraded, and part of what's free-flowing to the surface is not entirely water from the artesian aquifer but also water leaking into the casing from any smaller aquifers nearer to the surface. Aquifer contamination discussion aside, if the liner pipe were installed, it would eliminate all leaking water. Free flow would likely stop due to the lowered artesian aquifer water level. There is no submersible pump available small enough to be inserted into casing under 3" in diameter so the only remaining alternative would be to decommission the well that we've just put a lot of time, effort and money into renovating. Further, the increased pressures associated with these wells may cause water to come to the surface around the casing after liner installation, as that is often the path of least resistance, and now we've created a leaking well and a bigger problem than what we started with.

While those complications are likely the worst-case scenario situations, producers are reluctant to participate in the TIP due to the inability to receive financial assistance to replace the well if the renovation fails. Therefore, we propose adding 642 – Water Well into the TIP as an assurance for those producers interested but who are fearful of the potential to lose the water source entirely. In the event that a driller or contractor discovers any of the potential issues discussed during investigation, the existing well would be decommissioned and a replacement drilled to an adequate depth to provide water according to the MT-ENG-20.

The specific goals for the original TIP still apply - to reduce the rate of ground water use from free-flowing artesian wells. Going forward, practices in the tip will include:

Core Practice:

- 800 – Controlling Existing Flowing Wells

Supporting Practices:

- 224 – Aquifer Flow Test
- 351 – Well Decommissioning
    - Drilled well, greater than 300-foot depth
- 355 – Groundwater Testing
    - Basic water quality test
- 516 – Livestock Pipeline
    - Below frost PVC, HDPE, IPS, PE
- 533 – Pumping Plant
    - Photovoltaic-powered pump
- 614 – Watering Facility
    - Permanent drinking with storage
    - Storage tank
    - Winter with storage
- 642 – Water Well
    - Shallow Well, 50 to-100-foot depth
    - Typical Well, 100- to 600-foot depth with 4-inch casing
    - Typical Well, 600- to 1000-foot depth with 6-inch casing
    - Typical Well, 1000-foot depth or greater with 4-inch casing
    - Typical Well, 1000-foot or greater with 6-inch casing

The addition of 642 – Water Well will increase the expected financial assistance associated with these contracts. Further, those items have increased slightly in cost from the 2022 to the 2023 payment rates.

Cost Estimate (Artesian TIP Modification)					
EXAMPLE				*Average Well Depth = 708 ft*	
By: Terry Field Office		Checked By:		Date:	
Item		*Unit*	*Amount*	*PR Unit Cost*	*Total Cost*
*Well Decommissioning (351) ***if needed******					
	Drilled Well, greater than 300-foot depth	ft	708	$7.32	$5,182.56
Groundwater Testing (355)					
	Basic Water Quality Test	ea	1	$214.83	$214.83
Livestock Pipeline (516)					
	Below Frost PVC, HDPE, IPS, PE	ft	1320	$2.54	$3,352.80
Pumping Plant (533)					
	Photovoltaic-Powered Pump, greater than 400 ft total head	No	1	$6,903.55	$6,903.55
Watering Facility (614)					
	Permanent Drinking with Storage, 1,000 to 5,000 Gallons	gal	1400	$2.59	$3,626.00
Water Well (642)					
	Typical Well, 600- to 1000-foot depth with 6 inch casing	ft	708	$73.99	$52,384.92
Controlling Existing Flowing Wells (800)					
	Standard Flowing Well	ea	1	$12,175.82	$12,175.82
				Total Cost Per System	$83,840.48

Our original goal was to address Groundwater Depletion on fifteen systems; we expect fewer than that at this time. If interest increases after completion of this TIP, another will be written to continue efforts.

TIP Funds Requested			
Fiscal Year	**Number of Contracts**	**Average Expected Cost Per System**	**Total**
2024	3	$83,840.48	$251,521.44
2025	3	$83,840.48	$251,521.44
2026	3	$83,840.48	$251,521.44
TOTALS	**9**		**$754,564.32**

There will be no change to the ranking or prioritization previously approved.

Respectfully submitted,
Kathy Meidinger, Supervisory DC
Terry/Jordan/Circle Work Unit