



2023

Columbus Area Recharge Report



Platte
County
Nebraska



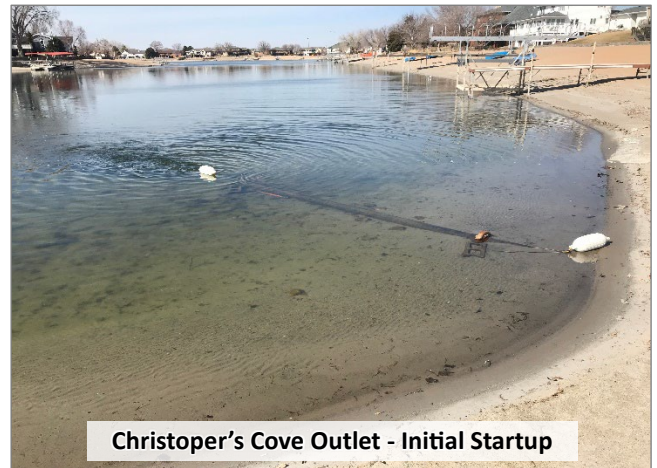
Christopher's Cove
Homeowners
Association

Project Description

The project partners, consisting of the Lower Loup Natural Resources District (LLNRD), Archers Daniel Midland (ADM), City of Columbus, Platte County, and the Christopher’s Cove Homeowners Association, worked collectively to develop and complete the Columbus Area Recharge Project. The project transfers water from the nearby Loup Tailrace Canal and discharges it into the Lost Creek channel near the city. The water infiltrates into the mostly dry creek channel, recharging the area’s groundwater. The project also discharges recharged water from an auxiliary well into Christopher Cove, which is a nearby water body used by the project for additional groundwater recharge storage. The recharged water provided by the project offers more stable groundwater levels for public use, especially in dry years. Construction of the project was started in 2021 and completed in 2022. The LLNRD began pumping recharge water in June 2022 following construction.

Project Operations

The surface water intake site operated between March 20, 2023, and October 20, 2023, for approximately 129 days. The pumping was achieved throughout multiple periods where runtime varied from a few days up to a few weeks. The surface water intake is equipped with a variable speed pump which allows some flexibility with pumping volume. The pump was operated between 1500 gpm to 2400 gpm with an average pumping rate of approximately 1750 gpm.



The auxiliary well site operated between March 20, 2023, and December 12, 2023, for approximately 226 days. The pumping was achieved throughout multiple periods where runtime varied from a few days up to several weeks. The auxiliary well is a single speed pump with an output of approximately 540 gpm. The auxiliary well operated for more days than the surface water intake because the surface water intake was shutdown multiple times for channel maintenance during which the well continued pumping as allowed in operating procedure.

Project Operations Data			
Pump Location	Description	Historic Average (2022)	2023 Data
Surface Intake	Pumping Days	86 days	129 days
	Average Pumping Rate	2300 gpm	1750 gpm
	Pumping Total	878 Ac-Ft	998 Ac-Ft
Auxiliary Well	Pumping Days	73 days	226 days
	Average Pumping Rate	522 gpm	544 gpm
	Pumping Total	169 Ac-Ft	545 Ac-Ft

Project Operational Cost

The primary operational cost for the 2023 season consisted of water delivery by the Loup Power District and the electrical service powering both the surface water intake and auxiliary well delivery by the Loup Power District. The LLNRD personnel time and channel maintenance expenses have not been included in the reported project operation cost for 2023.

Project Operational Cost			
Pump Location	Description	Historic Cost (2022)	2023 Cost
Surface Intake	Electric	\$8,016	\$9,750
	Water	\$8,780	\$9,980
Auxiliary Well	Electric	\$3,677	\$7,783

Project Groundwater Recharge

The estimated groundwater recharge amounts are based on data collected throughout the 2023 operating season. The calculations consider volume of water pumped, recharge area, evapotranspiration rates, and other factors that may affect groundwater recharge. The recharge estimates do not consider amounts from Christopher’s Cove although groundwater recharge is evident when comparing pumped volumes to measured lake water levels. Project groundwater modeling demonstrated Christopher’s Cove effectively retains and retimes water in the project area. The benefits are realized through enhanced groundwater recharge and reduced conflict among groundwater users during periods of drought.

Project Groundwater Recharge Estimates	
Historic Average Recharge (2022)	2023 Recharge
466 Ac-Ft (Conservative)	958 Ac-Ft (96% Pumped Volume)

Project Maintenance

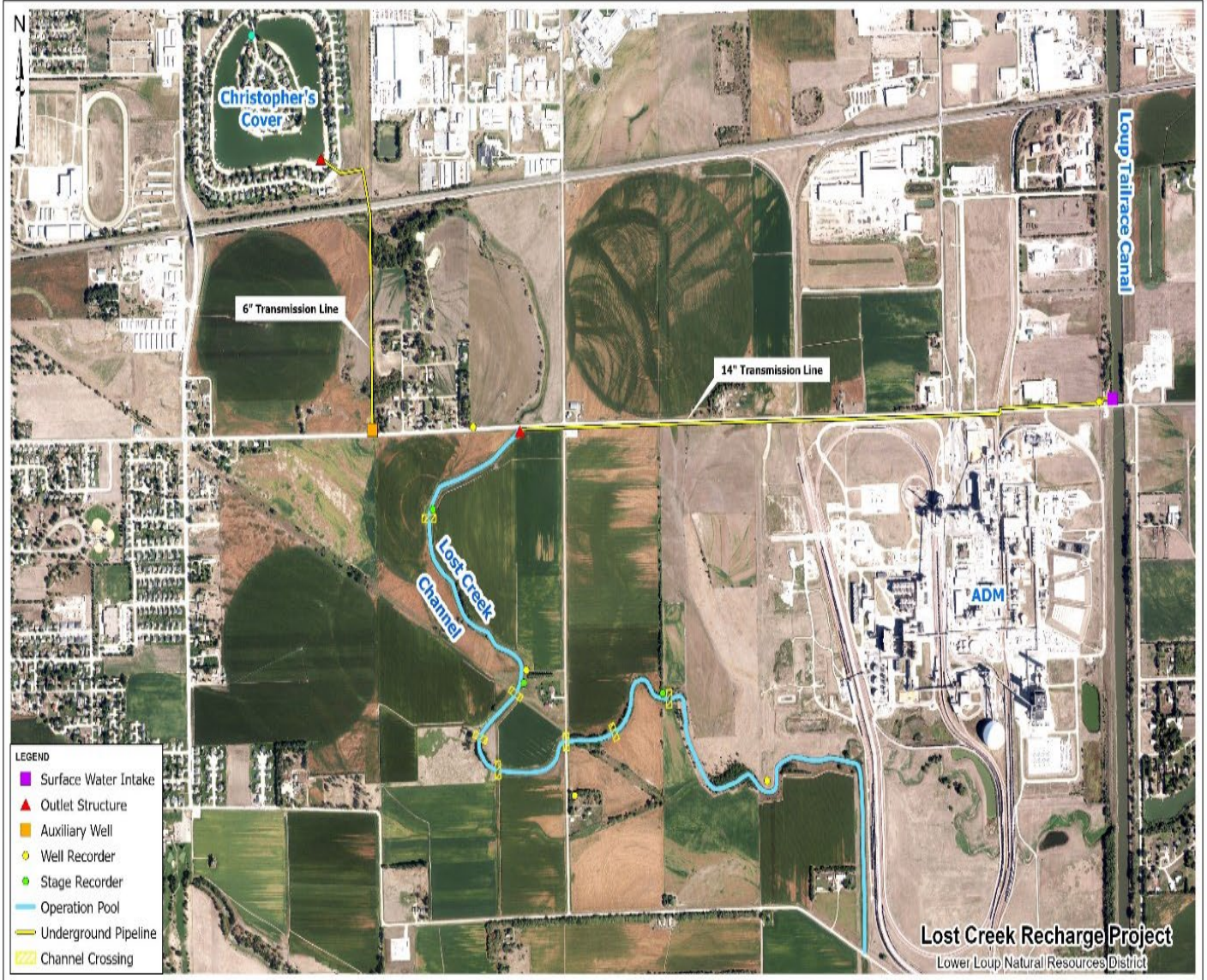
The LLNRD performed Lost Creek channel maintenance throughout the 2023 season to promote groundwater recharge and to ensure that the channel could provide adequate storm water drainage. The channel was cleaned of debris, mowed, and undesirable vegetation was controlled. The LLNRD installed Flexamat erosion control at the channel outlet to repair erosion damage and control future surface water runoff erosion. The channel bottom was deep tilled to loosen the soil structure and promote water infiltration. The LLNRD will continue channel maintenance to maintain function and enhance groundwater recharge.



Flexamat Erosion Control – Channel Outlet



Fall Channel Bottom Tillage



Protecting Lives,
Protecting Property,
Protecting the Future.