

The Oxbow

FROM THE NORTH DAKOTA STATE WATER COMMISSION

The State-Sponsored Devils Lake Outlet: Project Update and Progress

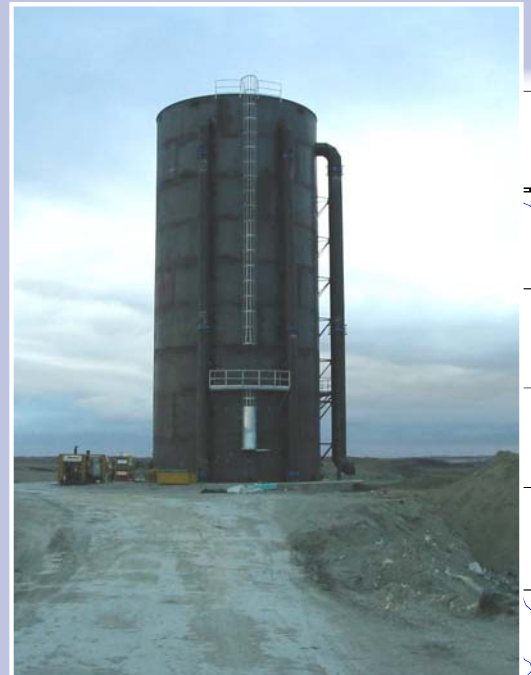
By Patrick Fridgen

Outlet Quick Facts

- Total cost is estimated at \$28 million.
- Construction began in 2002. By the end of the 2004 construction season, the project was 80 percent complete.
- Construction completion is scheduled for summer 2005, with operation to follow.
- Current design capacity is for 100 cubic feet per second (cfs) of water discharge, but could be expanded to 300 cfs in the future, with modifications and a new permit.

- The outlet will be operated in accord with permit constraints, including total flow, water quality in the Sheyenne River, and when Devils Lake is above 1445 feet above mean sea level (amsl).
- The outlet is approximately 14 miles in length - from west Devils Lake to the Sheyenne River.
- Includes 4 miles of pipeline, and 10 miles of open channel.
- Includes two pump stations – one at Round Lake, and the other south of Long Lake, named the Josephine Station.

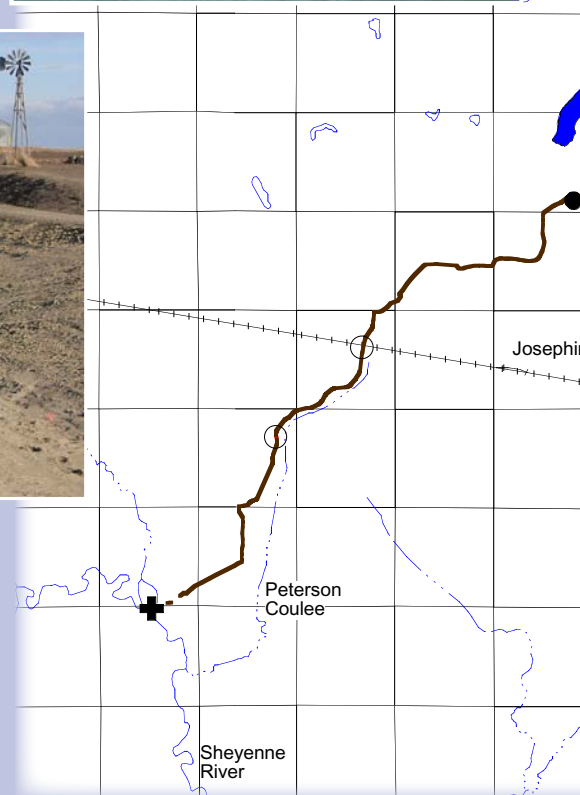
Pump Stations: The Round Lake and Josephine pump stations are 80 percent complete. Each station consists of two, 1,250 horsepower pumps, capable of pumping up to 50 cfs each, or 100 cfs together. Each station also includes a standpipe. The Round Lake standpipe is 40 feet in diameter and 75 feet high. The Josephine standpipe (pictured below) is 40 feet in diameter and 90 feet high. Both standpipes are nearly completed, with only minor construction and painting remaining.



Canal: The 10 miles of canal are being constructed under two contracts. The first canal contract is 95 percent complete, and the second is 70 percent complete. The average slope of the canal is 0.04 percent.

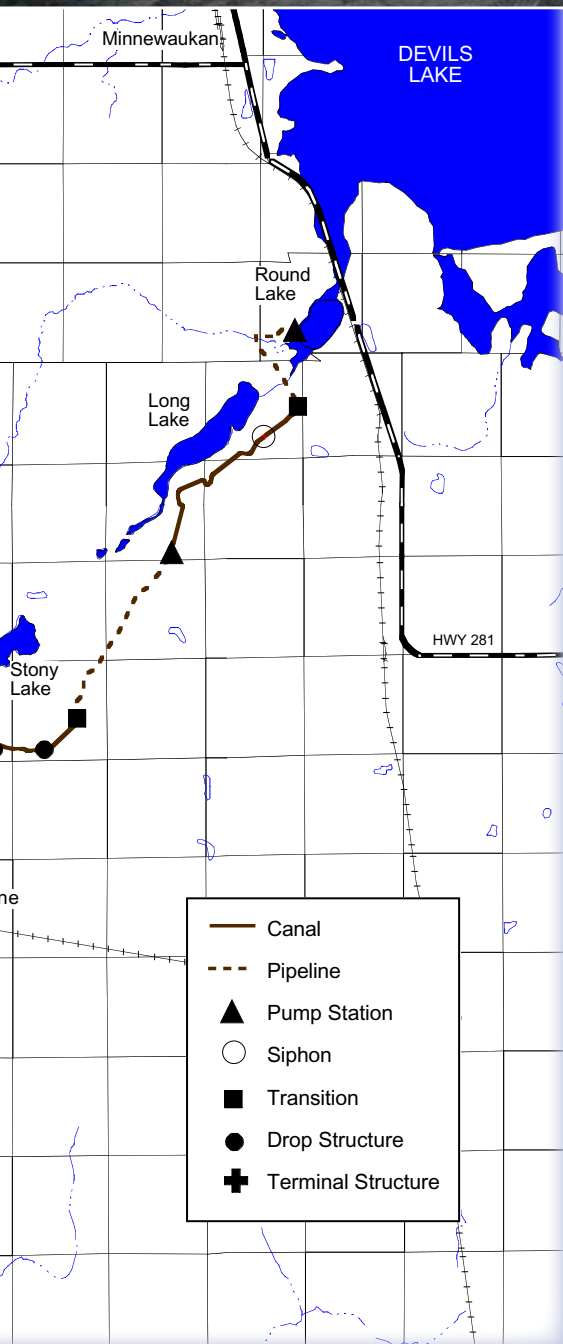


Pipeline: The approximately 4 miles of pipeline are 95 percent complete. Both 64- and 54-inch ductile iron pipe are being installed.





Siphons: A small amount of work remains on the siphon inlet and outlet structures, but all pipeline work has been completed. The siphons are constructed of three side-by-side 6-foot diameter reinforced concrete pipes.



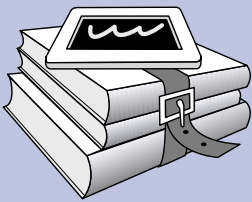
Transitions: There are two transition structures included in the outlet design. They mark the areas where pipeline connects with canal. Transition #2 is complete, and transition #1 is substantially complete, with only minor construction and clean-up remaining.



Drop Structures: Both drop structures are completed. One involves a 15-foot drop, the other is slightly larger at 17 feet of drop.



Terminal Structure: The terminal structure marks the end of the outlet, where water is discharged into the Sheyenne River. Construction on the outlet portion of the terminal structure is complete.



THE WATER PRIMER

North Dakota Water Facts

By Michael Noone and Patrick Fridgen

- There are 660,097 total acres of lakes and reservoirs; 121,542 acres natural, and 538,555 acres man-made.
- There are 54,427 total river miles.
- There are 427 miles of river-border miles.
- There are 220 lakes and reservoirs. Of that total, 89 are natural, and 131 are man-made.
- The State of North Dakota contains 2,490,000 acres of wetlands.
- The average yearly rainfall ranges from 22 inches in the southeastern portion of the state, to 14 inches in the southwest.
- The lowest point in the state is 750 feet above mean sea level (amsl), where the Red River crosses the United States/Canada border.
- Total miles of rivers and streams by basin: Red River (includes Devils Lake) 11,881, Souris River 3,645, Missouri River (including Lake Sakakawea) 36,094, James River 2,753.
- Devils Lake is the largest natural lake. At an elevation of 1,449 feet amsl, which it reached in June of 2004, it covered 139,431 acres.

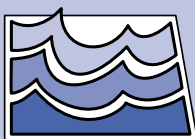
- The Red River is the longest river at 400 miles.
- Lake Sakakawea is the largest reservoir and body of water. At a maximum operating pool (elevation 1,854 feet amsl), Lake Sakakawea covers 380,000 acres.
- At its normal operating pool, Lake Sakakawea has more shoreline than the California coast at 1,340 miles.
- Garrison Dam is 210 feet high and 11,300 feet long.
- The average annual discharges of the Missouri, Red, Souris, and James Rivers are: 22,200 cubic feet per second (cfs), 3,874 cfs, 128 cfs, and 309 cfs, respectively.
- The highest recorded peak flow on the Red River at Grand Forks in the last 100 years was 137,000 cfs on April 18, 1997.
- The lowest average monthly flow of the Red River at Grand Forks in the last 100 years was not quite 3 cfs in 1937.
- The largest rainfall event in a 24-hour period was 10.05", recorded in June 2000 in Gilby, North Dakota.
- Devils Lake derives its name from the Native American name Miniwaukan. Early explorers incorrectly

translated the word to mean Bad Spirit.

- Out of North Dakota's 68,994 square miles in area, the Missouri River basin (which includes the James River) encompasses 57 percent, the Red River (which includes Devils Lake) is 30 percent, and the Souris River is 13 percent.
- The total combined annual flow of the Red River at Fargo, the Sheyenne River at Valley City, the James River at Jamestown, and the Souris River at Minot, is less than 4 percent of the annual flow of the Missouri River at Bismarck.
- The largest water use in the state is for power generation, at 72 percent. However, 97 percent of water use for power generation is nonconsumptive.
- Total water use can be attributed to:

Power generation	72%
Irrigation	11%
Multi-use	11%
Municipal	4%
Industrial	1%
Rural Water	1%
- It is estimated that 60 million acre-feet of water is stored in the major unconsolidated aquifers in the state.
- Approximately 160,000 North Dakotans are served by rural water systems; including almost 300 cities, 21 subdivisions, and 90,000 rural residents.

- Ninety-seven percent of the total normal reservoir storage in the state is within Lake Sakakawea and Lake Oahe.



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