



Friday, January 27, 2023

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808 E Northside Drive

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*Subject: Eagle Mountain Dam, Fort Worth, TX (USA). Cutter Soil Mixing Cut-Off Wall and Tube-à-manchette Grouting at Eagle Mountain Dam Side Channel Remediation Project Executed by BAUER Foundation Corporation*

The Eagle Mountain Spillway Dam is one of two structures that comprise Eagle Mountain Dam, located about 5 miles northwest of Fort Worth, in Tarrant County, Texas, USA. The spillway dam consists of a compacted earthfill embankment 3,500 feet long. The original 4-bay service spillway is located through the left end of the spillway dam. The 6-bay side discharge spillway is located to the left of the original spillway. The spillways are separated by approximately 250 feet of rolled earthen embankment. The spillway dam is owned and operated by the Tarrant Regional Water District (TRWD) for flood control, water supply, irrigation, and recreational purposes.

Seepage manifested on an area of the embankment between the two spillways. TRWD engaged Freese and Nichols, Inc (FNI) to investigate. Determination was made that seepage was occurring in a foundation sandstone and presented a potential hazard to the dams integrity. After evaluating a number of options, TRWD directed FNI to design a 265-foot cutoff wall extending 60 feet through the sandstone foundation and terminating in the underlying shale. Cutter Soil Mixing (CSM) was chosen as the methodology for containing and preventing water flow by intercepting the seepage from upstream.

BAUER Foundation Corporation, a subsidiary of BAUER Spezialtiefbau GmbH, was awarded the project by TRWD for the construction.

The CSM cut-off wall was constructed by BAUER between the side channel spillway and the service spillway using specialized equipment capable of advancing into the soil breaking while mixing the in-situ material with a cement-bentonite slurry, thus creating a homogeneous soil-cement mix to reduce permeability. In addition to the CSM cut-off wall, Tube-à-manchette grouting was executed to provide closure between the CSM alignment and spillway approach wall.

The project's scope of work included the following:

- 40 Cutter Soil Mixing (CSM) panels each 7.87 ft x 2.72 ft with a maximum depth of 60 ft.
- 5 Tube-à-Manchette (TAM) injection grouting locations with a maximum depth of 60 ft to connect the Cut off wall to the service spillway structure.

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Quality Control Requirements:

- Permeability no greater than  $1 \times 10^{-6}$  cm/s.
- Unconfined Compressive Strength (ASTM2166) greater than 50 psi at 28 days.
- 3 x Verification Borings

Details of the Contract

- Execution period: April-June 2022 per schedule
- Location: Fort Worth, Texas, USA.
- Geological condition: Interbedded layers of weakly cemented sandstone and shale, with the uppermost sandstone layer being highly permeable, thus favoring water infiltration from the upstream side of the dam.


Conclusion

The BAUER team was very professional in preparation and execution of the project. Quality management and control followed and adhered to the contract specifications for construction of the CSM cutoff wall and the Tube-à-Manchette grouting. Piezometers installed to monitor seepage showed an immediate reduction of pressures upon completion of the final panels.

BAUER exhibited continual and highly effective communication throughout the project. They demonstrated a proactive attitude towards seeking solutions, addressing few and infrequent issues, and answering all questions related to the project.

BAUER's maintained professional Health Safety & Environment (HSE) site control. This resulted in no safety-related personnel incidents through the project.

Regards,



Dam and Levee Safety Manager