

Partnering with Houston to Deliver the Nation's Largest Progressive Design-Build WTP Project

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The City of Houston, in association with four regional water authorities, is expanding its Northeast Water Purification Plant (NEWPP) from 80 million gallons per day (mgd) to 400 mgd, dramatically increasing its ability to support steady residential and commercial growth while complying with a regional mandate to reduce dependency on groundwater. The Houston Waterworks Team (HWT), a joint venture between CDM Smith and CH2M, is delivering this \$1.7 billion (+/-), nine year, project in partnership with the City and the four authorities. The NEWPP project is the largest progressive design-build project of its kind presently underway in the U.S.

As part of the expansion, the HWT is designing and constructing a new raw water intake facility, including: intake, pumping and conveyance systems to withdraw raw water from Lake Houston and deliver it about 1.5 miles to the expanded NEWPP. The raw water from Lake Houston is challenging to treat because of its “flashy” nature, meaning that its characteristics vary widely as a result of the Lake’s multiple tributaries and its relatively small volume. During rain events, raw water turbidity and TOC levels can easily top 250 NTU and 20 mg/L, respectively; while alkalinity levels drop below 10 mg/L. These variabilities make the water extremely difficult to treat using a single treatment process alone.

To help the City nimbly adapt to the extremely variable raw water conditions, the HWT helped develop two basic recipes for water treatment, a wet-weather recipe and a dry-weather recipe. The basic treatment process will include: chlorine dioxide for mussel and manganese control; alum or ACH coagulation/flocculation/sedimentation via lamella plate settlers for turbidity and TOC removal; settled water ozonation for primary disinfection, taste & odor control, and filtration optimization; biologically active filtration for further turbidity and TOC removal; free-chlorine/chloramines for back-up primary disinfection and distribution system residual maintenance; gravity thickeners for sludge thickening; centrifuges for recuperative thickening and sludge dewatering; liquid residuals equalization; and a high rate liquid residuals flocculation/clarification process to treat the liquid residuals prior to recycle to the head of the Plant.

The Project will be implemented in phases, with the first phase increasing the capacity of the NEWPP from its present 80 mgd to 160 mgd by July of 2022, and the second phase increasing the overall facility production capacity to 400 mgd by December of 2024. Early work construction packages are also contemplated to assist the HWT in achieving the contract required production milestones.

The Project has just completed its 30% design definition milestone. During 2018, the HWT will commence early work construction activities, advance the remaining design definition to the 60% milestone stage, and tender its associated Guaranteed Maximum Pricing to the City.