

BMA4 (Bangkok Metropolitan Administration, Stage 4) WWTP

BMA4 wastewater treatment works, Bangkok, Thailand. **Mott MacDonald** provided design and procurement advice and reviewed the process, civil and M&E designs for the client. The multi-storey wastewater treatment plant serves the Chatuchak District and parts of Phraya Thai, Huay Kwang and Din Dang Districts of Bangkok, and uses the Sequencing Batch Reactors (SBR) activated sludge process to provide nutrient removal. The works also incorporate anaerobic digestion of the sludge and odor control facilities.

Bangkok Wastewater Project – Stage 4, Thailand



Bangkok has implemented a central system of wastewater collection and treatment, commencing in the early 1990s. This diverts sewage flows from the network of *klongs* (canals) within the urban area and the River Chao Phya to treatment plants, significantly reducing pollution of the waterways. Succeeding phases have extended the coverage of the sewer and treatment systems.

Stage 4 of the Bangkok Wastewater Project provided trunk sewers and pumping stations to intercept foul sewage flows before they reach the *klongs*, and transport this to a treatment plant forming part of this Stage. The area covered by Stage 4 is 33km² of the densely populated northern areas of Bangkok, with a 2020 population of 532,000. The design dry weather flow is 200MI/d, with the interceptor system designed for a maximum capacity of 1,000MI/d.

The lack of available land and the bisection of the project area by several major thoroughfares has demanded cutting-edge solutions for both the collection system and the treatment works. The multi-storey treatment works utilize sequencing batch reactor (SBR) technology to minimize the building footprint. Preliminary treatment and the sludge process stream are similarly housed in a multi-storey structure. The collection system includes 30km of mini-tunnelled sewers of diameters up to 2,300mm, mostly located under major highways or *klongs*. The project includes two major components, the wastewater collection system and the wastewater treatment facilities.

Mott MacDonald was the lead consultant of a joint venture involving three consultants. The JV supervised the turnkey design and construction of the works, including:

- Contract management
- Review of contractor's design proposals
- Examination and approval of the contractor's program of work
- Construction supervision (wastewater collector systems and the wastewater treatment plants)
- Material, equipment, facility tests (including inspection upon manufacture, prior to shipment)
- Supervision of Operation & Maintenance for the initial 12-month post commissioning period.

Earth Tech - BMA4 Wastewater Treatment Plant Design and Cyclic Activated Sludge System (CASSTM) - Thailand

Earth Tech Thailand is providing management, turnkey design, construction, commissioning, and operation (one year) of the wastewater collection and treatment facilities for the Bangkok Metropolitan Authority (BMA) 4 service area (33 square kilometres) located on the eastern side of the Chao Phraya River, north of central Bangkok.

The BMA 4 wastewater treatment plant is the second major multilevel wastewater facility to use the CASSTM sequencing batch reactor (SBR) process. The first project was the Yannawa WWTP facility, which has been successfully operating for more than two years, treating a wide variation in flows and loads, which were significantly different from design specifications. Like the Yannawa project, the BMA 4 plant will treat a population equivalent of 500,000, with a second phase expected to double to 1,000,000 by the year 2020.

The BMA 4 site is confined in a residential area with limited space available. The plant will comprise inlet pumping, screening and grit removal, and eight CASSTM SBR basins on four separate levels. The sludge treatment system will use belt thickening, anaerobic digestion, and belt dewatering to produce a cake for disposal. Odour control facilities will also be provided.

The technical parameters

Design Flow: Average 40 mgd (150,000 m³/d), Peak 99 mgd (375,000 m³/d)

Ultimate Design Flow: 198 mgd (750,000 m³/d)

Effluent Limits: BOD 20 mg/l, SS 30 mg/l, TKN 10 mg/l, NH₃-N 5 mg/l, and P 2 mg/l

Population Equivalent (PE) 500,000

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Kirkwood, S., Earth Tech Engineering Ltd, Cleaning up

Bangkok – BMA4 – multi storey wastewater treatment solution. CIWEM 4th Annual Conference Technical Session Programme (created 22/6/06)