

### The Consultant's Project Experience in the Detailed Design of Infrastructure System

No.	Project Name	Project Area	Project Description	Project Duration	Client	Project Cost (MB)
1.	Detailed Design of Infrastructure System for Chuan Chuen Park Ville, Bangkok.	Supanburi-Bangbuathong Rd, Housing Estate of 700 units, project area approx. 800 rais (130 ha).	<ul style="list-style-type: none"> <li>• Detailed design of wastewater collection system and pumping station               <ul style="list-style-type: none"> <li>- The system consists of PVC pipe with pipes size ranges from 200 mm. dia. up to 300 mm. dia. Total length of the system approximately 16,000 m. The number of manholes is approximately 1,200 sets and 4 pumping stations.</li> </ul> </li> <li>• Detailed design of drainage system               <ul style="list-style-type: none"> <li>- The system consists of RC pipe with pipes size 400 mm. dia. Total length of the system approximately 18,000 m. The number of manholes is approximately 1,500 sets.</li> </ul> </li> <li>• Detailed design of flood protection system</li> <li>• Detailed design of wastewater treatment system               <ul style="list-style-type: none"> <li>- Activated sludge with a capacity of 6,000 cu.m./day</li> </ul> </li> </ul>	Dec.1987 to May 1988	Mancon Co.,Ltd.	34.407
2.	Detailed Design on Infrastructure for Suranaree Industrial Zone	Nakhon Ratchasima project area approx. 840 rais (140 ha).	<ul style="list-style-type: none"> <li>• Detailed design of water supply system               <ul style="list-style-type: none"> <li>- Water treatment plant with a capacity of 7,200 cu.m./day ; The system consists of raw water pumping station, flocculation tank, sedimentation tank, filtration tank, clear well, elevated tank and sludge storage pond.</li> <li>- Water Distribution System ;The system consists of Asbestos cement pipes with the total length approximately 18,000 m.</li> </ul> </li> <li>• Detailed design of wastewater collection system ; The system consists of PVC pipe with pipes size ranges from 350 mm. dia. up to 400 mm. dia. Total length of the system approximately 12,000 m. The number of manholes is approximately 340 sets.</li> <li>• Detailed design of wastewater treatment system, activated sludge with a capacity of 6,000 cu.m./day</li> </ul>	Aug.1988 to Apr.1990	Civil Design Co., Ltd.	120.0
3.	Detailed Design on Infrastructure for Kabinburi Industrial Zone	Kabinburi Industrial Zone, Amphoe Kabinburi, Prachinburi project area approx. 2,400 rais. (380 ha).	<ul style="list-style-type: none"> <li>• Detailed design of surface water treatment plant, with a capacity of 21,000 cu.m./day, consists of raw water pumping station, flocculation tank, sedimentation tank, sand filters, clear well and a pump station, and sludge lagoons.</li> <li>• Detailed design of water distribution system, consists of an elevated tank and a distribution network with the total pipe length of 40 km.</li> <li>• Detailed design of wastewater collection system, consists of GRP pipe, 43 km. long and 7 lift stations.</li> <li>• Detailed design of drainage system consists of RC pipe, 20 km. long, and RC ditch, 26 km long.</li> <li>• Detailed design of an aerated lagoon wastewater treatment plant, with a capacity of 20,000 cu.m./day at BOD concentration of 500 mg/l. The treatment process consists of the following units:               <ul style="list-style-type: none"> <li>- Pumping Station - 3 Aerated Lagoon connected in series - Polishing Pond</li> </ul> </li> <li>• Detailed design of flood protection system, consists of dike and drainage ditch connected to public canal.</li> <li>• Prepared the tender documents and carried out cost estimation.</li> </ul>	May 1990 to Jan.1991	Kabinburi Industrial Zone Co., Ltd.	450.0
4.	Detailed Design of Infrastructure System for Chuan Chuen Flora Ville, Pathum Thani.	Amphoe Lamlookga, Pathum Thani, Housing Estate of 200 units, project area approx.1,000 rais (160 ha).	<ul style="list-style-type: none"> <li>• Detailed design of wastewater collection system ; The system consists of PVC pipes with the total length of approximately 5,940 m., and manholes</li> <li>• Detailed design of storm drainage system ; The system consists of RC pipe with total length approximately 7,957 m. and manholes.</li> <li>• Detailed design of pumping station, 1 cu.m./sec</li> <li>• Detailed design of water distribution system ; The system consists of AC pipe with total length approximately 6,220 m.</li> <li>• Detailed design of wastewater treatment system, aerated lagoon with a capacity of 300 cu.m./day</li> </ul>	May 1990 to June.1991	Mancon Co.,Ltd.	34.0

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No.	Project Name	Project Area	Project Description	Project Duration	Client	Project Cost (MB)
5.	Detailed Design on Infrastructure System for Jong Satit Industrial Park	Ekachai Rd., Amphone Muang, Samut Sakhon, project area approx. 640 rais (100 ha).	<p>The detailed of the design services are as follows:</p> <ul style="list-style-type: none"> <li>• Land Preparation</li> <li>• Roads and Bridges</li> <li>• Storm Drainage System ;The system consists of RC pipes with pipe size ranges from 500 mm. dia. up to 1,500 mm. dia. Total length of the system is 8,097 m.</li> <li>• Flood Protection System</li> <li>• Wastewater Collection System ; The system consists of PVC pipes with pipe size ranges from 150 mm. dia. up to 400 mm. dia. Total length of the system is 6,530 m.</li> <li>• Wastewater Treatment Plant ; Activated Sludge Process with a capacity of 4,200 cu.m/d comprising primary treatment system and secondary treatment system. Primary treatment system consists of pumping station, aerated grit chamber, and equalization tank. Secondary treatment system consists of aeration tank, sedimentation tank and disinfection tank. Sludge treatment system consists of sludge thickening and sludge disposal system.</li> <li>• Solid Waste Disposal</li> <li>• Water Treatment Plant and Distribution System ; The capacity of the treatment system is approximately 5,000 cu.m/d. The distribution system consists of AC pipes with pipe size ranges from 50 mm. up to 250 mm. dia. Total length of the system is 4,606 m.</li> <li>• Power Supply System</li> <li>• Telephone System</li> </ul>	Aug.1990 to May 1991	Tandem Architects Co., Ltd.	200.0
6.	Detailed Design on Infrastructure System for Thanyathanee Country Club	Amphoe Lamlookga, Pathum Thani, Golf Club and Housing Estate, project area approx. 600 rais (100 ha).	<ul style="list-style-type: none"> <li>• Detailed design of water supply system <ul style="list-style-type: none"> <li>– Water Treatment System with a capacity of 1,000 cu.m/day.</li> <li>– Water Distribution System : The system consists of Asbestos cement pipes with total length approximately 14,905 m.</li> </ul> </li> <li>• Detailed design of storm drainage system : The system consists of RC pipe with total length approximately 25,122 m. and manholes.</li> <li>• Detailed design of wastewater collection system : The system consists of PVC pipes with the total length of approximately 16,140 m., manholes and 7 pumping stations</li> <li>• Detailed design of wastewater treatment system, aerated lagoon with a capacity of 750 cu.m./day</li> <li>• Cost estimation</li> <li>• Tender documents preparation</li> </ul>	Jan.1991 to Aug. 1991	Biofile Land and House Co.,Ltd.	306.0
7.	Detailed Design on Infrastructure System for Chuan Chuen Flora Ville 2, Pathum Thani.	Bangkok-Pathum Thani Rd., Pathum Thani. Housing Estate of 200 units, project area approx. 500 rais (80 ha).	<ul style="list-style-type: none"> <li>• Detailed design of storm drainage system ; The system consists of RC pipe with total length approximately 8,648 m. and manholes.</li> <li>• Detailed design of wastewater collection system ; The system consists of PVC pipes with the total length of approximately 6,440 m., and manholes</li> <li>• Detailed design of golf course irrigation and sprinkler systems</li> <li>• Detailed design of wastewater treatment system, activated sludge with a capacity of 400 cu.m./day</li> <li>• Detailed design of flood protection system</li> <li>• Detailed design of pumping station, 3.0 cu.m./sec</li> <li>• Detailed design of power supply system</li> </ul>	Nov.1991 to Apr.1992	Mancon Co.,Ltd.	50.0
8.	Detailed Design on Infrastructure System for Cariberg Brewery (Thailand) Co., Ltd.	Amphoe Sena, Phra Nakhon Sri Ayuttaya	<ul style="list-style-type: none"> <li>• Detailed design of water treatment system with a capacity of 12,000 cu.m/day</li> <li>• Detailed design of raw water transmission system</li> <li>• Detailed design of water distribution system</li> <li>• Detailed design of flood protection and storm drainage systems</li> <li>• Detailed design of fire protection system</li> </ul>	Apr.1993 to Sept.1993	Preecha Nanakhit Co.,Ltd.	60.0

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No.	Project Name	Project Area	Project Description	Project Duration	Client	Project Cost (MB)
9.	The Design and Preparation of Tender Documents for The Central Utilities for the Second Bangkok International Airport	Nang Nhu Hao, Samut Prakarn, project area approx. 32 km <sup>2</sup>	<ul style="list-style-type: none"> <li>• Detailed design of wastewater treatment plant with recycled water treatment process.               <ul style="list-style-type: none"> <li>– Wastewater treatment plant is activated sludge system with biological nitrogen and phosphorus removal facilities.</li> <li>– Wastewater treatment plant capacity is 9,000 cu.m/d. that can serve the number of passengers of 30 MAPs, the planning for future expansion is also provided.</li> <li>– Treated water from wastewater treatment plant will pass to recycled water system. The recycled water can be used for irrigation and in cooling tower. So zero discharge system can be achieved.</li> </ul> </li> <li>• Detailed design of water treatment plant               <ul style="list-style-type: none"> <li>– Water treatment plant capacity of 20,000 cu.m/d. consists of physiochemical system, sedimentation and filtration system and disinfection system.</li> </ul> </li> <li>• Detailed design of water supply station comprised a 40,000 cu.m. storage reservoir and a pump station.</li> <li>• Detailed design of temporary water distribution system and wastewater collection system for construction site.</li> <li>• Cost estimation and tender document preparation.</li> </ul>	20 Apr.1995 to 6 Aug.1997	New Bangkok International Airport Co.,Ltd. (NBIA)	1,100.0
10.	The Design and Preparation of Tender Documents for The Utilities Distribution Systems (Water Distribution and Wastewater Collection) for the Second Bangkok International Airport	Nang Nhu Hao, Samut Prakarn, project area approx. 32 km <sup>2</sup>	<ul style="list-style-type: none"> <li>• Detailed design of a combined potable and fire fighting water system at the operating pressure at 22 bar and 6 bar for normal and fire situations, respectively. Steel pipes were selected with pipe sizes ranging from 100 mm to 800 mm and total pipe length of 28 km.</li> <li>• Detailed design of recycled water supply system for cooling water make-up and irrigation uses. HDPE supply pipes with pipe sizes ranging from DN 150 to 630 and total pipe length of 20 km. Were designed. The design also include the recycled water pump station with a 5,000 cu.m. storage reservoir.</li> <li>• Detailed design of wastewater collection system to collect wastewater from various facilities and deliver to the central wastewater treatment plant of the airport designed under a separate design contract. The system consists of 16 pump pits and collection pipes with total length of 18 km. The sizes vary from DN 80 up to 560. In addition, the design included the aircraft sewage disposal building with odor control using soil bed filter system.</li> <li>• Cost estimation and tender document preparation.</li> </ul>	8 Dec.1995 to 27 Oct.1999	New Bangkok International Airport Co.,Ltd. (NBIA)	734.0
11.	Detailed Design of Central Utility System for Rayong Larp Industrial Park	Nam Daeng rd., Amphoe Pluak Daeng, Rayong, project area approx. 4,500 rais	<ul style="list-style-type: none"> <li>• Detailed design of water treatment plant with a capacity of 24,000 cu.m./day</li> <li>• Detailed design of water distribution and fire fighting systems</li> <li>• Detailed design of drainage system</li> <li>• Detailed design of wastewater collection system</li> <li>• Detailed design of wastewater treatment plant, an activated sludge process with a capacity of 23,000 cu.m./day</li> <li>• Prepare technical specifications</li> <li>• Estimate the capital cost of the project</li> <li>• Concepts of utility design for this project are consistency of the system in phase 1 and phase 2, cost effectiveness for future expansion and modular design concept to facilitate phasing.</li> </ul>	26 Apr.1996 to 26 Oct.1996	Rayong Larp Co., Ltd.	610.0

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No.	Project Name	Project Area	Project Description	Project Duration	Client	Project Cost (MB)
12.	Detailed Design on Infrastructure of 13 <sup>th</sup> Asian Games at Thammasat University, Rungsit Campus	Thammasat University, Rungsit Campus, Pathum Thani, project area approx. 1,800 rais	<ul style="list-style-type: none"> <li>• Detailed design of traffic system</li> <li>• Detailed design of water supply system consists of 3 deep wells each capacity of 100 cu.m./h., water treatment plant of 3,000 cu.m./d. and distribution pipe system that comprises of pipes range from 150-400 mm.</li> <li>• Detailed design of wastewater treatment plant, aerated lagoon with a capacity of 3,000 cu.m./d.</li> <li>• Detailed design of solid waste management system</li> <li>• Detailed design of power supply system consists of high voltage, low voltage system and lighting system</li> <li>• Detailed design of communication system, consists of telephone, data transmission, CATV and public address.</li> <li>• Prepare technical specification and tender documents</li> <li>• Estimate the capital cost of the project</li> </ul>	30 May 1996 to 23 Sept.1996	Ministry of Finance	521.63
13.	Detailed Design of Wastewater Treatment and Water Supply Systems for Bangkok Polyester Co.,Ltd.	Amphoe Nikompattana, Rayong	<ul style="list-style-type: none"> <li>• Detailed design of wastewater treatment plant with a capacity of 260 cu.m./day. at BOD concentration of 10,000 mg/l. The treatment system is designed as activated sludge process</li> <li>• Detailed design of water treatment plant with a capacity of 100 cu.m./hr.</li> <li>• Detailed design of water distribution and fire fighting systems</li> <li>• Prepare technical specifications and tender documents</li> <li>• Estimate the capital cost of the project</li> </ul>	July 1996 to Oct.1996	Bangkok Polyester Co.,Ltd.	54.0
14.	Detailed Design of Central Utilities System for Sing Buri Pattana Industrial Park	Amphoe Inburi, Sing Buri, project area approx.1,200 rais	<ul style="list-style-type: none"> <li>• Detailed design of water treatment plant with a capacity of 9,000 cu.m./day</li> <li>• Detailed design of water distribution and fire fighting systems</li> <li>• Detailed design of drainage system</li> <li>• Detailed design of wastewater collection system</li> <li>• Detailed design of wastewater treatment plant , activated sludge with a capacity of 8,500 cu.m./day</li> <li>• Prepare technical specifications and tender documents</li> <li>• Estimate the capital cost of the project</li> </ul>	18 Sept.1996 to 18 Feb.1997	Sing Buri Pattana Industrial Park Co.,Ltd.	220.0

### The Consultant's Project Experience in the Detailed Design of Infrastructure System (cont.)

No.	Project Name	Project Area	Project Description	Project Duration	Client	Project Cost (MB)
15.	Modifications to the Design of the Water Distribution and Wastewater Collection Systems for Second Bangkok International Airport Project (Suvarnabhumi Airport)	Nang Nhu Hao, Samut Prakarn, project area approx. 32 km <sup>2</sup>	<ul style="list-style-type: none"> <li>• Review of the current design for the Water Distribution &amp; Wastewater Collection Systems based on analysis of the latest design condition of the SBIA Project</li> <li>• Modifications to the existing design, i.e. preparation of revised design documents</li> <li>• Modifications to the existing tender documents, i.e. revised preparation of revised drawings, specifications and revised bill of quantities</li> <li>• Modifications to the existing construction cost estimates, i.e. preparation of revised priced bills of quantities</li> <li>• Modifications of Water Distribution and Wastewater Collection Systems including :               <ul style="list-style-type: none"> <li>- Overall review of piping distribution systems for Potable Water and for the Wastewater Collection systems due to the modification of the Airport Master Plan, comprising the introduction of various new facilities and subsequent relocation of other facilities.</li> <li>- Review of header piping sizes for delivery of Potable Water to the CFZ Zone and passenger terminal complex by demand of water volume.</li> <li>- Review of Piping Header sizes for delivery to the TG facilities include Thai City, Aircraft Maintenance Facilities, AOT and AIMS Buildings and The Passenger Terminal Complex by demand of water volume.</li> <li>- Review of connection points and work demarcation for all facilities and buildings which are to be connected with the potable water distribution system and the wastewater collection system.</li> <li>- Review of connection points and work demarcation for all facilities and buildings which are to be connected with the potable water distribution system and the wastewater collection system.</li> <li>- Review of impacts on Water Storage Reservoir due to additional demand of water volume (including supply to Cogeneration Facilities).</li> <li>- Review of header piping sizes and collector lines for the Wastewater Collection System between all Facilities, Buildings and the Wastewater Treatment Plant by increased volume of effluents.</li> <li>- Review locations of Sewage Pump Pits and connections from the sewage collection boxes in all areas in consideration of locations of new facility.</li> <li>- Assess header piping sizes and connection tees for delivery to additional end users.                   <ul style="list-style-type: none"> <li>- Review requirements for measuring devices for consumption controlling management purposes in each facility (Potable Water).</li> </ul> </li> </ul> </li> <li>• Review coordination of interfaces with all facilities.</li> </ul>	24 June 2003 to 19 Dec.2003	New Bangkok International Airport Co.,Ltd. (NBIA)	767.0