

**GREATER ACCRA REGION – WEIJA-BAMAG System Profile System
R01A/S05 No 2B**

1. General

The Weija water supply system is divided in three sub-systems: Weija-Adam Clark (Canadian-New Works), Weija- Candy and Weija-Bamag.

The common raw water source of the three sub-systems is the impoundment created by Weija Dam, with a storage volume of 115 Mcm.

The reservoir supplies 2 No. raw water pumping stations, the Canadian Pump House and the Old Pump House.

The three treatment plants are all of conventional type, including aerator (not all), clarifiers, filters, chemical plants, storage. The treated water is supplied by gravity to the service area.

2. Population and Water Demand

Weija supplies Accra Rurals D and E and with New Kpong the Accra metropolitan area as shown in the table below.

The population served by Weija is not known when preparing this system profile, however this proposal considers only the rehabilitation of the system to restore its design capacity.

SYSTEM NAME	No.	LOCALITY NAME	ESTIMATED POPULATION					PROJECTED WATER DEMAND (M3/DAY)			
			2005	2007	2011	2015	2025	2005	2,007	2011	2015
Old Kpong	1	Accra Rurals A	232,891	249,830	287,597	331,228	472,424	10,647	11,716	15,099	18,289
Old Kpong	1	Accra Rurals B	80,971	85,458	95,209	106,099	139,245	4,056	4,359	5,746	6,774
Old Kpong	1	Accra Rurals C	70,158	73,723	81,406	89,891	115,184	4,606	4,913	5,852	7,218
Weija	2	Accra Rurals D	32,842	35,522	41,556	48,615	71,962	2,080	2,628	3,410	4,135
Weija	2	Accra Rurals E	28,126	30,224	34,914	40,353	58,077	1,673	1,826	2,203	2,654
		Total Accra Rurals	444,989	474,757	540,682	616,185	856,891	23,063	25,442	32,310	39,070
New Kpong	1	Accra Met	649,340	695,589	798,205	915,958	1,292,050	58,645	64,095	78,064	93,039
Weija	2	Accra Met	1,106,016	1,184,792	1,359,576	1,560,145	2,200,739	95,312	104,141	125,850	155,418
New Kpong & Weija	1&2	Accra Met	215,000	230,313	264,290	303,278	427,804	19,512	21,275	26,013	30,930
		Total Accra Met	1,970,356	2,110,695	2,422,071	2,779,382	3,920,593	173,468	189,511	229,927	279,387

3. Existing Surface Water Supply System

3.1 Dam and Intake

See Weija – Adam Clark sub-system.

3.2 Old RWPS

This plant supplies both Bamag and Candy water treatment plants.

**GREATER ACCRA REGION – WEIJA-BAMAG System Profile System
R01A/S05 No 2B**

It includes 4 No. deep well turbine pumps with asynchronous electric motors of slipping ring type, all supplied on 3.3 kV. During the visit, 3 No. pumps were operated. The characteristics of the equipment are the following:

-4 No. Worthington pumps, Q=1,000 m³/h, H=125m, n=1,435 rpm, powered by Alstom motors, P=500 kW.

Three of the pumps are operative and one pump (including its motor) is faulty.

The Venturi flowmeter installed on the discharge pipe is not operative.

3.3 Bamag Water Treatment Plant

This was constructed in the 1960's.

The plant design capacity is 30,240 m³/day (5.5 mgd). It receives the raw water from the older (then) West German raw water pumping station (Old RWPS). After dosing of alum in a flash mixer tank, clarification takes place in 2 No Clarifiers. Some 0.5 mgd of clarified water is transferred to the Patterson Candy treatment plant filters. Filtration is through 5 No rapid gravity filters, and stored temporarily in a 4,500m³ (1 mg) clear water reservoir. Flow to the supply area of the plant (Accra West, Central and Kasoa and beyond) is by gravity.

Construction and Operational Details:

-The raw water reaches the open raw water tank, cylindrical, made of reinforced concrete, with a capacity of 4,500 m³; downstream, a distribution chamber is provided, where a dry alum feeding installation is installed.

-The 2 No. clarifiers are of circular type, provided with a scraper bridge, central flocculator and manual desludging valves; the clarifiers can not be totally drained, rendering the periodical cleaning difficult;

-The sludge from the clarifiers, as well as the waste backwash water from the filters is not recycled;

-The 5 No. filters are of rapid gravity type, with one central distribution channel, of "false floor" and nozzles type. The flow regulating system is out of order. All valves are manual. The filters main control panel is completely out of order. The backwash system is by means of scour air and backwash water. The following equipment is installed in the filters bottom gallery:

-2 No. scour air blowers Roots-Holmes Dresser;

-2 No. backwash pumps of suction end type, Jeumont Schneider with electric motors Brook Crompton;

**GREATER ACCRA REGION – WEIJA-BAMAG System Profile System
R01A/S05 No 2B**

-2 No. service water pumps of vertical multistage type, installed during the last rehabilitation are scrap.

-1 No. manual overhead crane.

All the equipment is in good order with the exception of the service pumps.

-Chemical preparation/ dosing plant (common for Bamag and PC plants):

-2 No. alum preparation tanks (installed outdoors, in the open), each with 2 No. electric stirrers; they are not operational (now not used- dry alum dosing used);

-2 No. lime preparation tanks (installed outdoors, in the open), each with 2 No. electric stirrers, operational;

-2 No. HTH preparation tanks, each with an electric stirrer, operational (now not used- chlor gas installation used);

-The existing dosing pumps (of screw type) are not satisfactory (as a matter of fact, all are scrap);

-The existing electric panel of the plant (made by Klockner Moeller) is partially out of order and spares difficult to provide.

-Chlor gas installation (common for Bamag and PC plants): it includes a chlorine drums room and chlorinators room; in the chlorinators room, beside the chlorinators, the motive water piping and valves are installed; the motive water pumps and their supply tank are installed near the HTH preparation tanks; initially, chlorinators both for pre-chlorination and disinfection were installed; presently, only disinfection chlorinators are installed.

-Clear Water Tank: it is an underground reinforced concrete structure, with a capacity of 4,500 m³.

3.4 Transmission, Storage and Distribution

This system was briefly described in Weija-Adam Clark water treatment plant.

3.5 Rehabilitation / Expansion Works Carried out/on going/Planned

Presently there are not on-going rehabilitation/ expansion contracts for this sub-system.

4. Proposed Rehabilitation (2008) and Expansion (2011)

4.1 General

The system will continue to be based on surface water abstraction, pumping, conventional treatment, storage and distribution.

The capacity of the system will be restored to the design one of 30,240m³/day, by means of the recommended rehabilitation/expansion works.

The system will continue to serve the same service area.

**GREATER ACCRA REGION – WEIJA-BAMAG System Profile System
R01A/S05 No 2B**

During the rehabilitation/ expansion proposed works, remedial works will be carried out in the RWPS and treatment plant. The transmission mains, storage and distribution system are being developed under an on-going construction contract (see Weija-Adam Clark system profile; since details of this contract are not available, no recommendations are given here for this part of the system.

4.2 Supply Vs Demand

Year	2008	2011	2015	2025
Water demand (m3/day)				
Present design capacity (m3/day/ mgd)	30,240/6.66			
Present water production (m3/day/ mgd)	25,000/5.5			
Expected water capacity after rehabilitation/ expansion (m3/day/ mgd)	30,240/6.66	30,240/6.66		

4.3 Dam, Intake and RWPS

The recommended works for the Dam and Intake have been included in Weija-Adam Clark system profile.

Rehabilitation 2008:

- Supply and install a new deep well turbine type raw water pump, Q=1,000 m3/h, H=125m, P=500kW.
- Supply mechanical and electrical spare parts including electrical panels components.
- Supply and install an ultrasonic type raw water flowmeter.

Expansion 2011:

- Supply and install a power factor compensating installation.

4.4 Bamag Water Treatment Plant

Rehabilitation 2008:

- Supply spares such as clarifiers desludging valves, tyres for scraper bridges, etc.
- Supply and install filters flow control system and main control panel.
- Supply and install complete system of dosing pumps and appurtenances for alum, lime and HTH preparation/ dosing plants.
- Supply and install complete system of sampling pumps and appurtenances.
- Supply spare mixers of several types for the chemical plant to replace the faulty ones;
- Replace the chemical plant incomer and electric panel;

***GREATER ACCRA REGION – WEIJA-BAMAG System Profile System
R01A/S05 No 2B***

- Supply and install complete new starters for air blowers and backwash pumps;
- Supply a submersible pump for the emptying (and cleaning) of clarifiers;
- Supply 2 No. chlorinators, ejectors and auxiliary equipment for prechlorination.

Expansion 2011: no works are recommended.

5. Scheme Components and Estimated Costs

The basic data and cost estimates of rehabilitation and expansion of Weija Bamag treatment plant are shown in Tables 2B.0, 2B.1 and 2B.2.

6. Proposed Scheme for 2015 and 2025