

**Request for Proposal
For
Operation & Maintenance of 12 nos. of Water
ATM for a period of Four (4) Years in Guwahati,
Assam
Under
Guwahati Smart City Mission**

Volume II: SCOPE OF WORK AND SPECIFICATIONS



1) BACKGROUND

These water ATMs are very useful and do enable citizens/ visitors to access safe drinking water at various locations of a city. To meet the safe drinking water requirements at public places in Guwahati, potable water was proposed to be supplied to the consumer through his/ her drinking bottle/ container or through paper cups (in selected public locations) through Water ATMs. GSCL have completed successful installation of 20 number of Water ATM with a contractor M/s Swajal Water Pvt. Ltd. in the month of July 2018. The O&M period, for 12 nos. being a year ends. Currently the O&M services are being provided by the contractor. To carry on O&M further, GSCL hereby wishes to invite reputed firms (Applicants) to operate and maintain the installed water ATMs for providing access to safe drinking water at public places for Four years. The location of public places of all 20 nos. of Water ATMs are given in **Annexure I**.

2) SCOPE OF WORK FOR BIDDER

The bidders will be responsible for:

- 2.1. Operating and maintaining of Water ATMs in all respect and submitting weekly test report of output water to the Engineer-in-Charge. The operation of the plant shall be with the Contractor for 4 years.
- 2.2. Continuance of Quality control and monitoring systems of the Water ATM location as per the following:

EMBEDDED DEVICE FOR AUTOMATION FOR FOLLOWING PURPOSES

2.2.1 Quantitative Monitoring

- i. Number of Glasses of water dispensed in a day
- ii. Number of Bottles of water dispensed in a day
- iii. Water level in the tank

2.2.2 Water Quality Monitoring

- i. TDS level of water
- ii. Temperature of water
- iii. Hardness
- iv. pH values of water

2.2.3 Backend Wireless Communication

- i. GPRS Module for communication with backend web server
- ii. GPS module for Kiosk Location information

2.2.4 Data Logger

- i. Flash Memory bank for logging Sensor/ dispensing data
- ii. Relay Logged info to Server using communication channel

2.2.5 Multi-Processor Integrated Control System with Interface cables/ connectors for integration to provide for the following features:

- i. GPRS based TCP/ IP connectivity with web-based Server system
- ii. GPS location system
- iii. Flash based transaction data Logging
- iv. Relay Unit for controlling water dispensing nozzles as per the location requirements
- v. Interface for connecting coin-acceptors
- vi. Interface for Card Reader
- vii. Interface for Temperature Monitoring
- viii. Interface for TDS Monitoring
- ix. Interface for pH Monitoring
- x. Interface for Ultra-Sonic Water Level Monitoring
- xi. Controller for displaying water purity parameters on LCD/LED display monitor
- xii. Media Controller For HDMI based 32" display Monitor of 14" screen (diagonal)
- xiii. Built in power supply to connect with 48 v battery

2.2.6 Sensors for the purpose of:

- i. Temperature Monitoring
- ii. TDS Monitoring
- iii. pH Monitoring
- iv. Ultra-Sonic Water Level Monitoring
- v. Water Dispensing from Three Nozzles through Coin Acceptor
- vi. Support of 2 rupee and 5 rupee coins
- vii. Water Dispensing using NFC cards
- viii. Cards to work for Rs. 2 and Rs.5
- ix. Support for Card 'Balance' Rechargeable
- x. Sensors support for Monitoring Water Temperature, TDS, PH and Water Level in the tank
- xi. Display of Water purity parameters on LCD Display of 14" size
- xii. Ability to backup data for 48 hours in-case of server/connectivity outage
- xiii. LED display on controller panel box to indicate System Status.
- xiv. Uploading of Transactions and Water parameters data to Server over TCP/IP using GPRS.
- xv. Fall back to SMS in case GPRS connectivity to server is lost temporarily for reliability purpose, these sensors may be tested by GSCL through an institution of repute like IIT.

2.2.7 Other Features

- i. System operation can be enabled/ disabled from server
- ii. Dispense quantities re-configurable from server
- iii. Operator Log-in, log-out feature
- iv. System to operate after successful operator login only.
- v. All card Recharge transactions to be uploaded to server
- vi. All water dispensing transactions to be uploaded to server
- vii. All Water refill transactions to be uploaded to server
- viii. Each dispensing unit shall be independently manageable from the server for coin or card operation of any value

2.3. Disposal of waste water to GSCL sewerage system.

2.4. Making own arrangement during non availability of piped water. GSCL is not liable to supply water to ATMs during such period. It is in the obligation of the Contractor to arrange raw water to ATM's, during Non availability of water and the source and quality of raw water shall be approved by GSCL. However, charges shall be reimbursed by GSCL to the Contractor at actual on submission of invoice with necessary supporting bills etc. The source and quality of raw water shall be approved by GSCL.

2.5. The water before being dispensed to the public shall be treated with suitable filtration process to meet BIS 14543 standard at all times.

2.6. Any other related works/ activities as may be necessary for its successful operation.

2.7. The Bidder shall utilize Reverse Osmosis (RO) technology with UV Treatment system to treat water to provide potable water at each ATM location. The treatment shall be completely in accordance with BIS 14543 Annexure -3.

Depending upon level of Contamination in water, alternate superior updates can be adopted only after approval from GSCL.

2.8. The successful bidder shall maintain in-built litter spaces in each water ATM.

2.9. Advertising space shall be provided on Panels of ATW Machine. Provision for LED screen Advertisement to be made.

2.10. LED signage showing Authority's and Water ATM of appropriate size shall be installed at every Water ATM unit.

2.11. Specifications:

- i. Each ATM should be equipped to dispense water of 250 ml (eco-friendly biodegradable cups/ glass of minimum 170 GSM paper to be provided by the Contractor at the ATM in the cost of water). 1 litre, 5 litre and 20 litre water will be taken by customers in their own containers.
- ii. Filling Speed: about 10-12 litre/ minute.
- iii. Operational Time – 6 AM to 10 PM every day, which may be amended in consultation with GSCL.
- iv. The ATM shall have the provisions for Float valve for overflow control.

3. GENERAL REQUIREMENTS

- 3.1. The Contractor is advised to analyse the potable water of requisite sample size on their own before quoting their rates in **Financial Bid, Volume IV**. No extra claim will be entertained after the allotment of the work on this account.
- 3.2. The output water quality characteristics are given in **Annexure-II**.
- 3.3. The Contractor has to operate and maintain the Water ATMs for Four years. The Contractor will maintain a safe, clean and hygienic environment in and around the Water ATM.
- 3.4. The Contractor should have their own testing facilities for water testing process. The Contractor should analyse the water sample for all parameters as per BIS 14543 norms in a daily, weekly manner or as and when required by the Authority, from the Lab as approved by Authority. Frequency of Water testing shall be as mentioned in BIS 14543. Contractor shall maintain proper record in this regard. The Attendant of Contractor shall be available at the Water ATM during the operation time. A LED/ LCD digital screen of at least 14 inch diagonal showing 4 key parameters of BIS 14543 standards namely pH, hardness, TDS & temperature on a real time basis in an interval of 2-5 minutes.
- 3.5. The maintenance of pipelines etc. from point of connection onwards to the Water ATMs shall be responsibility of Contractor during the Contract Period.
- 3.6. The cost of filtration process at each ATM, to ensure quality of water as per BIS 14543 standard, shall be the responsibility of the Contractor.
- 3.7. Disposal of waste generated at each Water ATM:-
The disposal of waste generated at each ATM shall be disposed by the contractor at his own cost to the nearest GSCL system. In case of performance severe penalties would be levied on the Contractor by GSCL as applicable under existing laws related to littering in public areas.

- 3.8. The Contractor shall maintain the same for a period of four years, as per the conditions prescribed in this document, and in the time, frame prescribed at his own cost.
- 3.9. After completion of Contract period, the Contractor shall handover the Water ATM in Good working conditions complete to the satisfaction of Authority.
- 3.10. The Contractor shall perform all routine maintenance to ensure that all water ATMs shall remain in working condition.
- 3.11. The Contractor will depute duly trained Operators at each water ATM. The Contractor shall ensure routine inspection of the equipment by the equipment supplier.
- 3.12. The output water shall be distributed daily between 6:00 am to 10:00 pm on all days from water ATMs. However, GSCL may increase or decrease the working hours, if so desired, in order to provide adequate water to the public. The Contractor shall have to provide all the services during the extended hours.
- 3.13. The Contractor will be responsible for maintaining the service levels standards otherwise penalty will be levied as per penalty clause.
- 3.14. The Contractor shall provide trained manpower to maintain the water ATMs to ensure the provision of quality services.
- 3.15. The Contractor shall maintain and replace if required, the electrical and plumbing fittings of all types at the Water ATM in good working condition.
- 3.16. The Contractor shall maintain LED boards for display of BIS 14543 water quality parameters including:
1. pH
 2. Hardness
 3. Temperature
 4. Water Level
 5. TDS
- 3.17. Contractor should ensure that all the Water ATM (in a pocket) are working all the time and annual repair/ maintenance etc. shall be carried out periodically at his own cost.
- 3.18. All expenses shall be borne by the Contractor.

- 3.19. To maintain premises clean, safe hygienic and risk free in and around the Water ATM (approx. Two meter radii) is the responsibility of Contractor. The Attendant of the Contractor shall ensure that all the eco-friendly biodegradable paper glass shall be disposed off by the user within litterbin kept at each ATM.
- 3.20. Charges against Water & Electricity supplied through department connection or raw water supplied through mobile tanker shall be reimbursed to the Contractor at actual from GSCL .
- 3.21. Online information of daily report to GSCL.
- 3.22. GSCL has reserve the right to inspect any ATM at any time.
- 3.23. GSCL has right to take sample of water at any time.
- 3.24. During the non-availability of piped water from GSCL, Contractor shall make his own arrangement for Raw Water at his cost.
- 3.25. Physical Security of Water ATM shall be responsibility of the Contractor. Insurance of Appropriate Amount as required by GSCL shall be taken by the Contractor for each water ATM Insurance shall be in the name of GSCL, required premium for same shall be paid by the Contractor.
- 3.26. The Contractor shall ensure that safe, clean and hygienic environment is maintained in and around ATM.
- 3.27. The Contractor shall indemnify, defend and hold harmless the GSCL and its officers, employees, and affiliates against any and all claims of loss, damage and expense of whatever kind and nature, including all related costs and expenses incurred in connection with
 - a) Sickness or ill health caused to user after drinking water from ATW. All the liabilities arising out shall be borne by the Contractor.
 - b) Shortfalls in Standard norms laid down by Food Safety and Standard Authority of India (FSSAI) must not occur. Contractor shall be responsible for Complying to such standard norms laid down by FSSAI.
- 3.28. The disposal of used biodegradable paper glass shall be responsibility of the Contractor and Dustbin to keep the disposable glass shall be provided.
- 3.29. Payment of water by the user is by smart card. Arrangement of same shall be done by the Contractor. The Contractor shall keep all the data of water dispensed through data logger

system or as per system approved GSCL. GSCL shall have all the rights to cross check the data at any time. GSCL shall issue the Smart card to the user, which has facility of credit (i.e. balance in account) and can be recharged. Operation of dispensing of water by inserting Coins of Rupees One, Two, Rupees Five, etc. should also be maintained. GSCL shall collect the Cash from the ATW machine either daily or on weekly basis.

3.30. During O&M period, payment to contractor shall be done only after inspection of individual machine complying to all output water quality parameters as per BIS 14543. Contractor shall submit payment statement to GSCL and payment shall be made within 30 (thirty) days from certification of payment certificate by Engineer-in-Charge.

3.31. Contractor shall quote for yearly Operation and Maintenance Charges. The same shall be paid on Quarterly instalments year wise (i.e. after every 3 months) only after satisfying Water quality output parameters as per frequency i.e. Hourly, Weekly, Monthly, Three monthly, etc. in accordance with BIS 14543 requirement and satisfactory carrying out other required tests on water as mentioned therein. Method of sampling and Testing of Drinking water shall be as per IS 10500-2012. The parameters of Drinking water shall comply with requirement of IS 10500-2012. The Bidder shall submit the Test Reports from NABL Accredited Laboratory.

4. OTHER REQUIREMENTS:

All the successful Contractors will have to ensure collection of the samples from the respective sites and meeting of the design criteria.

- I. Bidders would need to submit their O&M expenditure information to the Engineer-in-Charge on a quarterly basis for the records of GSCL.
- II. Any deviation from the proposed O&M needs to be approved by the GSCL.

5. TESTING AND INSPECTION

I. Third Party inspection

The charges for third party inspection, if any, would be borne by the Contractor.

II. Site tests

All components, equipment as described shall be tested to prove satisfactory performance and/or fulfilment of functional requirements without showing any sign of defect as individual equipment and as well as a system.

6. Penalty In case of Non-performance

In case of non-performance of more than 3 hours in a particular day between the operating hours, 1 day non-operation will be considered and penalty will be levied as per the table below.

In case the quality of water is not as per BIS 14543 standard the ATM operation of dispensing water should be stopped immediately. GSCL will impose a penalty of Rs 1000 for each such event at the Water ATM concerned.

Penalty in case of Non-operational beyond 3 hours in a day with respect to ATM shall be as follows:

- I. Up to 4 days – Rs.2000/- per day/ per ATM
- II. 4-7 days – Rs.3000/- per day/ per ATM
- III. Above 7 days – Rs.5000/- per day/ per ATM

Failure to report any information pertaining to non-operational/ not desired quality of the ATM would invite additional penalty of Rs. 1,000/- per such case per day of delayed information.

In case of non-compliance of water quality with BIS 14543 standard and/ or non-operation of ATM's beyond the stipulated days as approved by GSCL, the contract is liable for termination.

7. SCOPE OF GSCL

- I. GSCL has provided nearest Source of water, further arrangement including required plumbing works from source to water ATMs shall be maintained by the Contractor.
- II. GSCL will charge for water required for the Water ATM on commercial rates.
- III. Single phase or three phase power supply as required at one point has been provided. Maintenance of further distribution including installation of Electric meters for Water ATM's shall be in scope of Contractor. The charges of Electricity shall be reimbursed by GSCL to Contractor at actual.

- (ii) The power consumption charges & Raw Water charges shall be paid at actual to Contractor beyond contract price on submission of bills received from concerned Water & Electricity authority.
- (iii) Whenever GSCL has not been able to provide the source of water, it is in the obligation of the Contractor to maintain the arrangement for Raw water. The source and quality of Raw water shall be approved by GSCL.

8. OPERATION & MAINTENANCE REQUIREMENTS FOR WATER ATMs.

GENERAL

- i. The Contractor shall operate and maintain ATM's in such a way that material as considered for replacement should only be of Stainless Steel (minimum Grade 304) including storage and as approved by GSCL.
- ii. The Contractor shall maintain ATM's in such a way that, in case quality of incoming Water is not as per required standards, then plant/ ATM should be automatically shut down. The Contractor shall bring matter to the knowledge of the Engineer-in-charge immediately and it should be sorted out within a day itself to make ATM back in operation and use. Refunctioning of the ATMs shall be the responsibility of the Contractor.
- iii. Operation and Maintenance Manual as submitted by the previous contractor, its specifications, shape and design shall be retained by the Contractor after approval from GSCL.
- iv. The Contractor shall operate and maintain ATMs in such a way that, enough quantity for storage of water must be made available at each and every ATM but not less than the minimum quantity as approved by the GSCL, to avoid shut down of ATM's on account of no water situation, since present water supply in GSCL area is intermittent.
- v. The Contractor shall ensure that the O&M method chosen is
 - (a) Appropriate to the ATMs and ground situation.
 - (b) Having a precedent for use in a project of similar nature and size.
 - (c) Supported by the technology/ service provider for design, supply, implementation and ongoing maintenance.
 - (d) Addressing all issues of safety, including fire safety, operational safety, and environmental safety.

Following Annexures are appended for Bidder's information & understanding of the Project.

Annexure I:- List of public places where Water ATMs are installed with photographs

Sl No.	Location
1	B. Baruah Cancer Institute
2	GMCH, Bhangagarh
3	MMCH, Pan Bazar
4	Foodvilla, Pan Bazar
5	Nehru Stadium
6	Gorchuk Vegetable Market
7	Dispur Circle Office
8	State Zoo
9	Veterinary Field, Khanapara
10	Nabagraha Temple
11	Gandhi Mandap
12	Bhootnath
13	DC Office, Pan Bazar
14	Pan Bazar, Nak Kata Pukhuri
15	Mahabir Udyan Park, Machikhowa
16	Sonaram Higher Secondary School
17	Chandmari Flyover
18	Judges Field
19	Dharapur Bazar
20	Kedar Road, Fancy Bazar

Location 1 : **B Baruah Cancer Institute**
Status of Work : **Operational since 20-09-2018.**



Location 2 : **GMCH, BHANGAGARH**
Status of Work : **Operational since 20-09-2018.**



Location 3 : **MMCH, PAN BAZAR**
Status of Work : **Operational since 20-09-2018.**



Location 4 : **FOODVILLA, PAN BAZAR**
Status of Work : **Operational since 20-09-2018.**



Location 5 : **NEHRU STADIUM**
Status of Work : Operational since 20-09-2018.



Location 6 : **Gorchuk Vegetable Market**
Status of Work : Operational since 20-09-2018.



Location 7 : **Dispur Circle Office**
Status of Work : Operational since 20-09-2018.



Location 8 : **State Zoo (Replacement for Dispur Police Station)**
Status of Work : **Operational since 20-09-2018.**



Location 9 : **Veterinary Field, Khanapara**
Status of Work : **Operational since 20-09-2018.**



Location 10 : **Nabagraha Temple (Replacement for Azara Civil Hospital)**
Status of Work : **Operational since 20-09-2018.**



Location 11 : Gandhi Mandap (Replacement for Kamakhya Temple)
Status of Work : Operational since 20-09-2018.



Location 12 : Bhootnath (Replacement for ISBT/ Kahikuchi Market)
Status of Work : Operational since 20-09-2018.



Location 13 : DC Office, PANBAZAR
Status of Work : Operational since 14-02-2019



Location 14 : Pan Bazar Nak Kata Pukhuri (Replacement for ASTC Bus Stand)
Status of Work : Operational since 14-02-2019



Location 15 : Mahabir Uddyan Park, Machkhowa
Status of Work : Operational since 14-02-2019



Location 16 : SONARAM HIGHER SECONDARY SCHOOL
Status of Work : Operational since 14-02-2019



Location 17 : CHANDMARI FLYOVER
Status of Work : Operational since 14-02-2019



Location 18 : JUDGES FIELD
Status of Work : Operational since 14-02-2019



Location 19 : DHARAPUR BAZAR
Status of Work : Operational since 14-02-2019



Location 20 : KEDAR RAOD, FANCY BAZAR
Status of Work : Operational since 14-02-2019



ANNEXURE- II: OUTPUT WATER QUALITY AS PER BIS 14543

Sl. No	DESCRIPTION	To comply
1	COLOUR	2 Max
2	ODOUR	. Agreeable
3	TASTE	Agreeable
4	TURBIDITY	2 Max
5	pH	6.5 to 8.5
6	Total Dissolved Solid	500 ppm Max
7	BARIUM	1 ppm, Max.
8	COPPER	0.05 ppm, Max
9	IRON	0.1 ppm, Max
10	MANGANESE	0.1 ppm, Max
11	NITRATE	45 ppm, Max
12	NITRITE	0.02 ppm, Max
13	ZINC	5 ppm, Max
14	ALUMINIUM	0.03 ppm, Max
15	CHLORIDES	200 ppm, Max
16	SULPHATE	200 ppm, Max
17	CALCIUM	CALCIUM
18	SULPHIDE	0.05 ppm, Max
19	ALKALINITY	200 ppm, Max
20	HENOLICCOMPOUNDS	Absent
21	MINERALOIL	Absent
22	MAGNESIUM	30 ppm, Max
23	RESIDUAL FREE CHLORIDE	0.2 ppm, Max
24	ANION.SURF.ACT.AGENTS	0.2 ppm, Max
25	ESCHERCHIACOLI	Absent
26	COLIFORMBACTERIA	Absent
27	Sulphite Reducing Bacteria	Absent
28	Pseudomonas Aeruginosa	Absent
29	Aerobic Microbial Count	20, Max at 37C & Max at 20-22C
30	YEAST & MOULD	Absent
31	Antimony	0.005 PPM ,Max

Sl. No	DESCRIPTION	To comply
32	Borate	5 PPM, Max

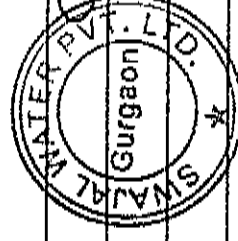
Annexure-III: Material of Construction, P & ID Diagrams of Installed water ATMs & Water Test Reports

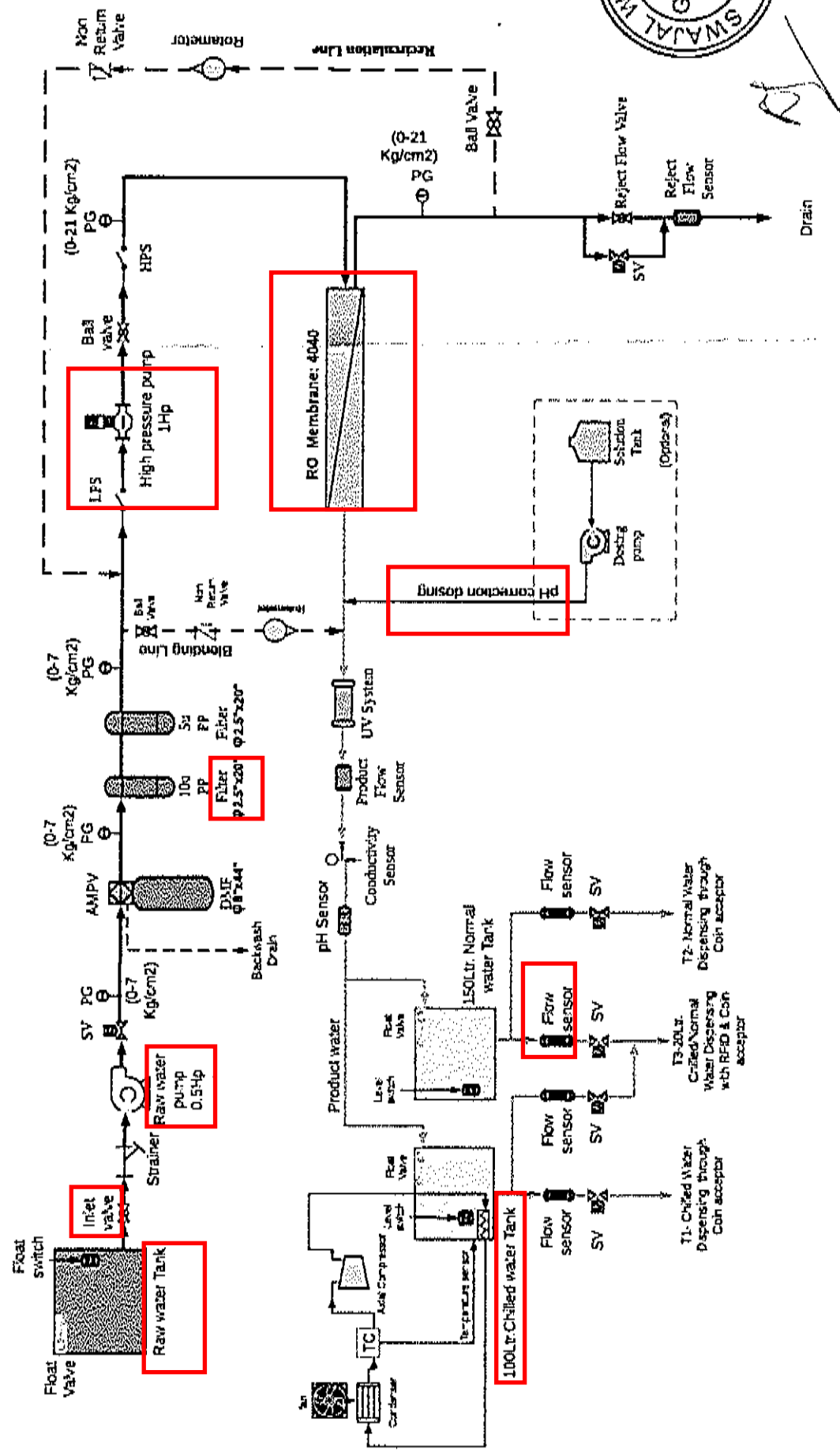
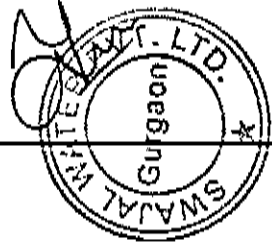
Annexure-IV: Operations and Maintenance Manual: Swajal Water Private Limited (Previous Contractor)

Annexure-V: Technical Specifications & Works Requirement of Previous Tender.

MATERIAL OF CONSTRUCTION

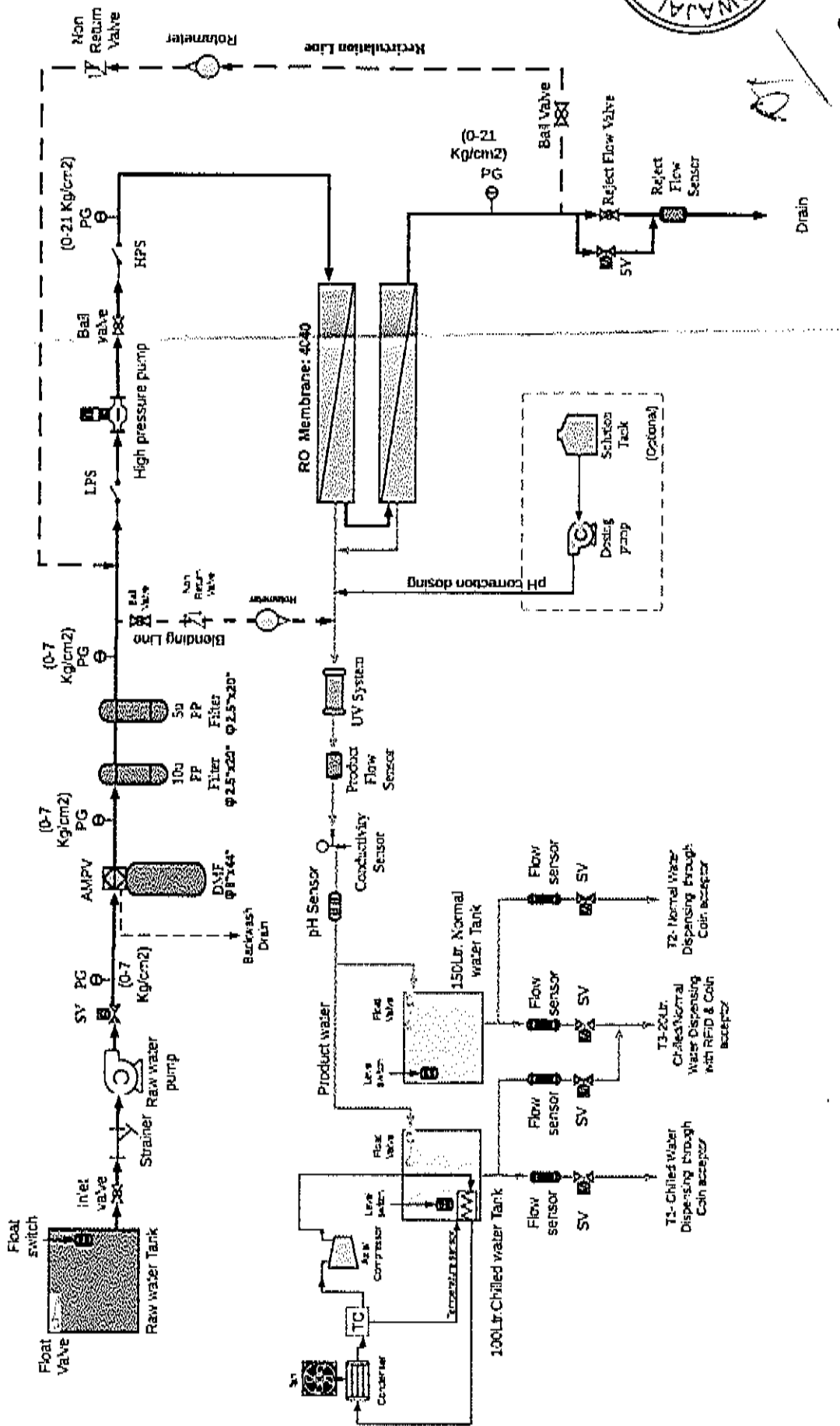
SL	DESCRIPTION	MATERIAL
1	RO MACHINE	
1.1	BODY	SS-304 THK. 0.8mm (PUF not considered due to over heating of Machine)
1.2	CHILLED WATER STORAGE TANK	INNER & OUTER WALL SS-304, THK.-0.5mm, PUF THK.50mm
1.3	NORMAL WATER STORAGE TANK	SS-304, THK.- 0.8mm
1.4	PIPING	UPVC
2	OPERATOR & RAW WATER TANK CABIN	
2.1	WALLS	INNER & OUTER WALL PPGI, THK.-0.5mm, PUF THK.50mm
2.2	ROOF	FRP SHEET
2.3	WINDOWS	ALUMINIUM AND GLASS
3	RAW WATER STORAGE TANK	UV STABILIZED HDPE
4	PLATFORM FLOOR	VITRIFIED ANTI SKID TILES



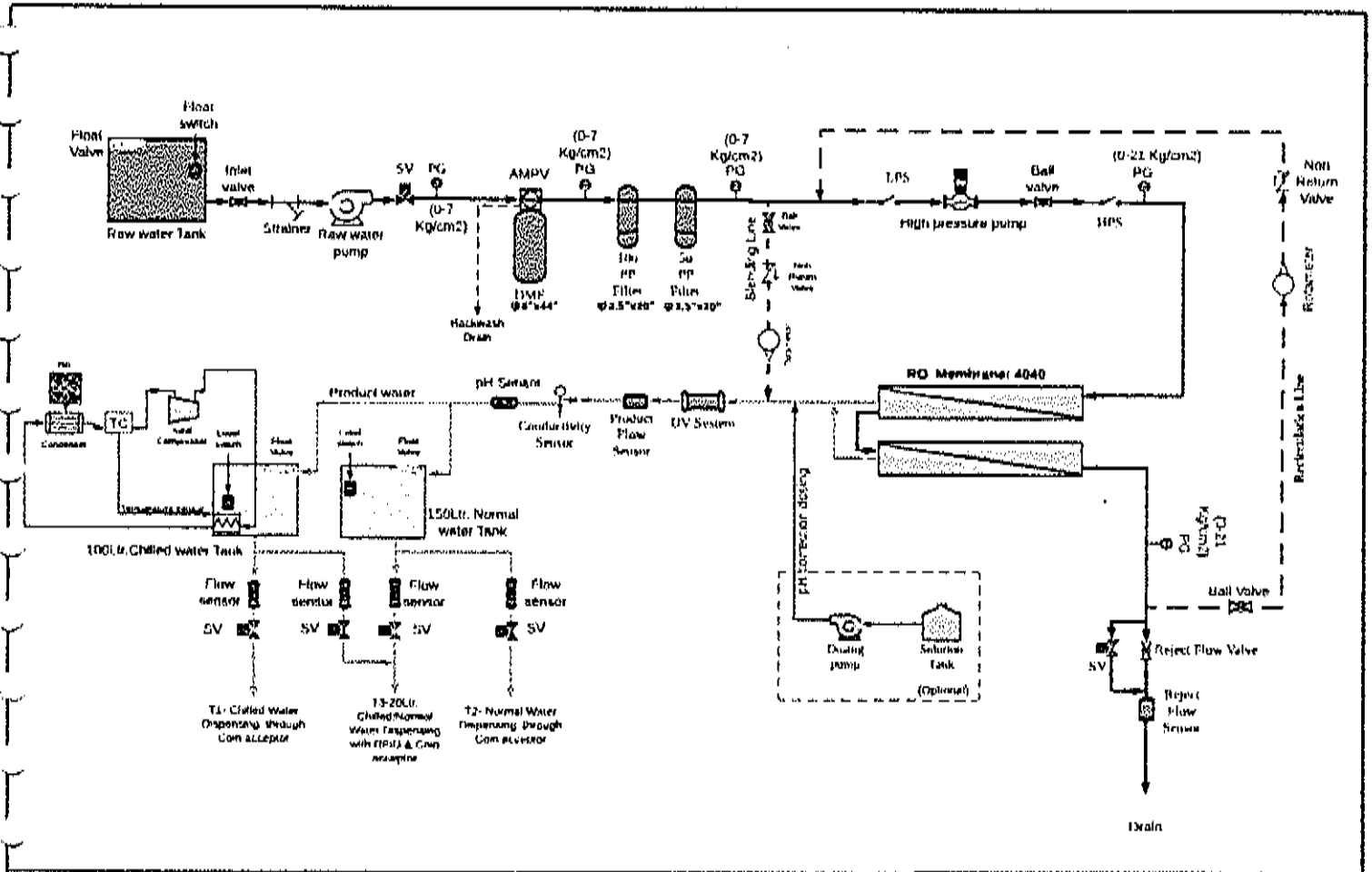


Credited & Approved by:	Legend:	AMPV: Automatic Multi Port Valve	CLIENT: GSCIL-200/250LPH-4040	TITLE: PAID FOR 200/250 LPH WATER PURIFICATION SYSTEM
	AMPV: Automatic Multi Port Valve PG: Pressure Gauge SV: Solenoid Valve DMF: Dual media Filter	LFS: Low Pressure Switch HPS: High Pressure Switch TC: Temperature controller	DRAWING NUMBER:	DESIGNED BY: SWAJAL WATER PVT LTD
			Rev-1	DATE: 17.01.18

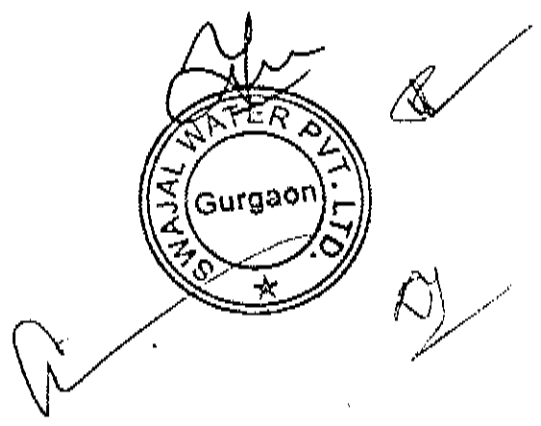
Swajal



Checked & Approved by	Legend: AMPV: Automatic Mod. Pn Valve PG: Pressure Gauge SV: Solenoid Valve DME: Dual media Filter	CLIENT: GSCL-505LFH-4340	TITLE: 500 LPH WATER PURIFICATION SYSTEM
		DRAWING NUMBER: Swajal	DATE: 17.01.18
		DESIGNED BY: SWAJAL WATER PVT LTD	REVISION



Checked & Approved by	Legend:	CLIENT: SWAJAL WATER PVT LTD	TITLE: HAID FOR 400 LPH WATER PURIFICATION SYSTEM
	AMPV: Automatic Multi Port Valve	PG: Pressure Gauge	1.5PS: Low Pressure Switch
	SV: Solenoid Valve	HPS: High Pressure Switch	TI: Temperature controller
	DMF: Dual Media Filter		
		DRAWING NUMBER:	Swajal
		DESIGNED BY: SWAJAL WATER PVT LTD	rev 1 DATE: 17.01.19





KAMAL ENVIRO & FOOD LAB. PVT. LTD

(Complete Test House for Testing of Environment, Drugs & Pharmaceuticals & Food Samples)
(AN ISO 9001-2008 CERTIFIED COMPANY)

Plot No. 254, Sector-6, I.M.T. Manesar, Distt. Gurgaon-122050 Telefax: 0124-4119624 E-mail: kamalenviro@rediffmail.com

Sample Name-Borewell Water
M/S Guwahati Smart City
Location: Pan Bazar Guwahati

Report No.KEFL/ENVT/M06011801
Receipt Date : 06/01/2018
Report Date : 10/01/2018
Sample Qty: 2 Ltrs

Reference : IS 10500-2012.

DESCRIPTION : One Borewell water sample was collected by us on 06/01/2018

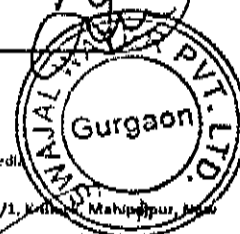
S.NO.	Parameters	Results	Requirement (Acceptable Limit)	Permissible Limits	Method of test, Ref to Part of IS 3025
(ORGANOLEPTIC AND PHYSICAL)					
1	Color (Hazen)	Less than 5	5	15	Part 4
2	Odour	Agreeable	Agreeable	Agreeable	Part 5
3	pH	7.94	6.5 to 8.5	No relaxation	Part 11
4	Conductivity ($\mu\text{mhos/cm}$)	290	-	-	Part 14
5	Turbidity(NTU)	Less than 5	5	10	Part 10
6	Total Dissolved Solids (mg/l)	172	500	2000	Part 16
(General Parameters)					
1.	Phenolphthalein Alkalinity,	20	-	-	Part 23
2.	Permanent Hardness (mg/l)	28	-	-	Part 21
3.	Temporary Hardness (mg/l)	48	-	-	Part 21
4.	Ammonia (as total ammonia - N) mg/l	BDL(0.1)	-	-	Part 34
5.	Nitrite -Nitrogen (NO_2)	BDL(0.1)	-	-	Part 34
6.	Calcium (as Ca) mg/l	13	75	200	Part 40
7.	Chlorides (as Cl) mg/l	42	250	1000	Part 32
8.	Fluorides (as F) mg/l	BDL(0.1)	1.0	1.5	Part 60
9.	Free Residual Chlorine (mg/l)	BDL(0.01)	0.2	1	Part 26
10.	Phosphate (PO_4^{3-}) mg/l	BDL(0.1)	-	-	Part 31
11.	Iron (as Fe) mg/l	BDL(0.1)	0.3	No relaxation	Part 53
12.	Magnesium (as Mg) mg/l	11	30	100	Part 46
13.	Nitrate(as NO_3) mg/l	BDL(0.1)	45	No relaxation	Part 34
14.	Sulphate (as SO_4) mg/l	128	200	400	Part 24
15.	Total Alkalinity (as CaCO_3) mg/l	120	200	600	Part 23
16.	Total Hardness (as CaCO_3) mg/l	252	200	600	Part 21
17	Cyanide (as CN) mg/l	BDL(0.01)	0.05	No relaxation	Part 27
18	Total Arsenic (as As) mg/l	BDL(0.01)	0.01	0.05	Part-37

B.D.L: Below Detection Limit.

Authorized Signatory

- Note:
1. The result listed refer only to the tested samples and applicable parameter. Endorsement of product is neither inferred nor implied.
 2. Sample will be destroyed after one month from the date of issue of test certificates unless otherwise specified.
 3. Sample not drawn by us. Total liability of this laboratory is limited to the invoice amount.
 4. This report is not be reproduced wholly or in part and cannot be used as an evidence in the court of Law and should not be used in any advertising media.

Lab: Plot No. 254, Sector-6, I.M.T. Manesar, Distt. Gurgaon-122050, Telefax: 0124-4119624 E-mail: kamalenviro@rediffmail.com Registered Office: B34/1, Kirti Nagar, Mahipalpur, New Delhi-110037 Tel.: 91-11-26788114-5 Fax: +91-11- 26781200



Permeate Blending, Concentrate Recirculation

Project name	GSCCL-500LPH	Permeate flow/train	0.45 m3/h
Calculated by	Swajal Water Pvt Ltd	Raw water flow/train	0.95 m3/h
HP Pump flow	1.40 m3/h	Permeate recovery	32.14 %
Feed pressure	7.1 bar	Total system recovery	50.00 %
Feed temperature	25.0 °C(77.0°F)	Blended flow	0.50 m3/h
Concentrate recirculation	0.50 m3/h	Element age	0.0 years
Feed water pH	7.94	Flux decline %, per year	5.0
Chem dose, mg/l, -	None	Fouling factor	1.00
Specific energy	1.09 kwh/m3	SP increase, per year	7.0 %
Pass NDP	8.6 bar	Inter-stage pipe loss	0.2 bar
Average flux rate	28.4 lmh		

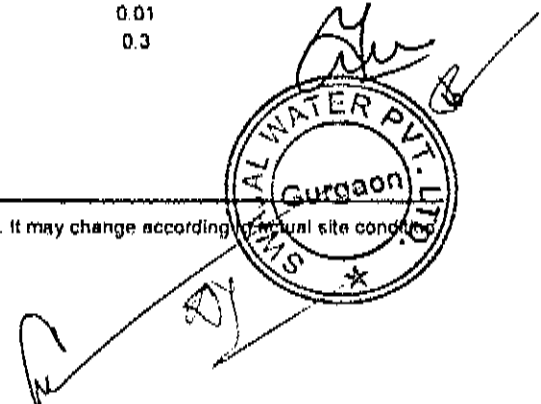
Feed type: Brackish Well Non-Fouling

Pass - Stage	Perm. Flow m3/h	Flow / Vessel Feed m3/h	Vessel Conc m3/h	Flux lmh	DP bar	Flux Max lmh	Beta	Stagewise Pressure Perm. bar	Boost bar	Conc bar	Perm. TDS mg/l	Element Type	Element Quantity	PV# x Elem #
1-1	0.2	1.4	1.2	29.4	0.2	29.4	1.18	0	0	6.9	1.2	RO-Mem-4040	1	1 x 1M
1-2	0.2	1.2	0.9	27.7	0.1	27.7	1.2	0	0	6.6	1.5	RO-Mem-4040	1	1 x 1M

Ion (mg/l)	Raw Water		Feed Water		Permeate Water		Concentrate 1		Concentrate 2		Blended Product											
	Ca	Mg	Na	K	NH4	Ba	Sr	H	CO3	HCO3	SO4	Cl	F	NO3	PO4	OH	SiO2	B	CO2	TDS	pH	
Hardness, as CaCO3	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Ca	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Mg	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Na	67.68	91.88	0.546	109.8	134.9	7.28																
K	0.00	0.00	0.00	0.00	0.00	0.00																
NH4	0.00	0.00	0.00	0.00	0.00	0.00																
Ba	0.000	0.000	0.000	0.000	0.000	0.000																
Sr	0.000	0.000	0.000	0.000	0.000	0.000																
H	0.00	0.00	0.001	0.00	0.00	0.00																
CO3	0.00	0.00	0.000	0.00	0.00	0.00																
HCO3	0.10	0.14	0.001	0.2	0.2	0.01																
SO4	0.00	0.00	0.000	0.00	0.00	0.00																
Cl	104.32	141.33	0.840	160.3	207.9	11.19																
F	0.00	0.00	0.000	0.00	0.00	0.00																
NO3	0.00	0.00	0.000	0.00	0.00	0.00																
PO4	0.00	0.00	0.000	0.00	0.00	0.00																
OH	0.00	0.01	0.000	0.00	0.00	0.00																
SiO2	0.00	0.00	0.000	0.00	0.00	0.00																
B	0.00	0.00	0.000	0.00	0.00	0.00																
CO2	0.00	0.00	0.000	0.00	0.00	0.00																
TDS	172.10	233.16	1.30	279.29	343.03	18.46																
pH	7.94	8.08	6.10	8.12	8.21	6.99																

Saturations	Raw Water	Feed Water	Concentrate	Limits
CaSO4 / ksp * 100, %	0	0	0	400
SrSO4 / ksp * 100, %	0	0	0	1200
BaSO4 / ksp * 100, %	0	0	0	10000
SiO2 saturation, %	0	0	0	140
CaF2 / ksp * 100, %	0	0	0	50000
Ca3(PO4)2 saturation index	0.0	0.0	0.0	2.4
CCPP, mg/l	0.00	0.00	0.00	
Langelier saturation index	0.00	0.00	0.00	2.5
Ionic strength	0.00	0.00	0.01	
Osmotic pressure, bar	0.1	0.2	0.3	

Membrane analysis has been done considering water TDS 172 ppm. It may change according to actual site conditions.



Permeate Blending, Concentrate Recirculation

Project name	GSCL-500LPH	Permeate flow/train	0.45 m3/h
Calculated by	Swajal Water Pvt Ltd	Raw water flow/train	0.95 m3/h
HP Pump flow	1.40 m3/h	Permeate recovery	32.14 %
Feed pressure	7.1 bar	Total system recovery	50.00 %
Feed temperature	25.0 °C(77.0°F)	Blended flow	0.50 m3/h
Concentrate recirculation	0.50 m3/h	Element age	0.0 years
Feed water pH	7.04	Flux decline %, per year	5.0
Chem dose, mg/l, -	None	Fouling factor	1.00
Specific energy	1.09 kwh/m3	SP increase, per year	7.0 %
Pass NDP	6.6 bar	Inter-stage pipe loss	0.2 bar
Average flux rate	28.4 l/mh		

Feed type

Brackish Well Non-Fouling

Pass -	Perm.	Flow / Vessel	Flux	DP	Flux	Beta	Stagewise Pressure			Perm.	Element	Element	PV# x
Stage	Flow	Feed	Conc		Max		Perm.	Boost	Conc	TDS	Type	Quantity	Elem #
	m3/h	m3/h	m3/h	l/mh	bar	l/mh	bar	bar	bar	mg/l			
1-1	0.2	1.4	1.2	29.4	0.2	20.4	1.18	0	0.0	1.2	RO-Mem-4040	1	1 x 1M
1-2	0.2	1.2	0.9	27.7	0.1	27.7	1.2	0	6.6	1.5	RO-Mem-4040	1	1 x 1M

Pass -	Element	Feed	Pressure	Conc	NDP	Permeate	Permeate	Beta	TDS	Permeate (Passwise cumulative)			
Stage	no.	Pressure	Drop	Osmo.	bar	Flow	Flux			Ca	Mg	Na	Cl
		bar	bar	bar	bar	m3/h	l/mh						
1-1	1	7.1	0.19	0.2	6.8	0.2	29.4	1.18	1.2	0	0	0.489	0.753
1-2	1	6.7	0.14	0.3	6.4	0.2	27.7	1.2	1.4	0	0	0.546	0.84



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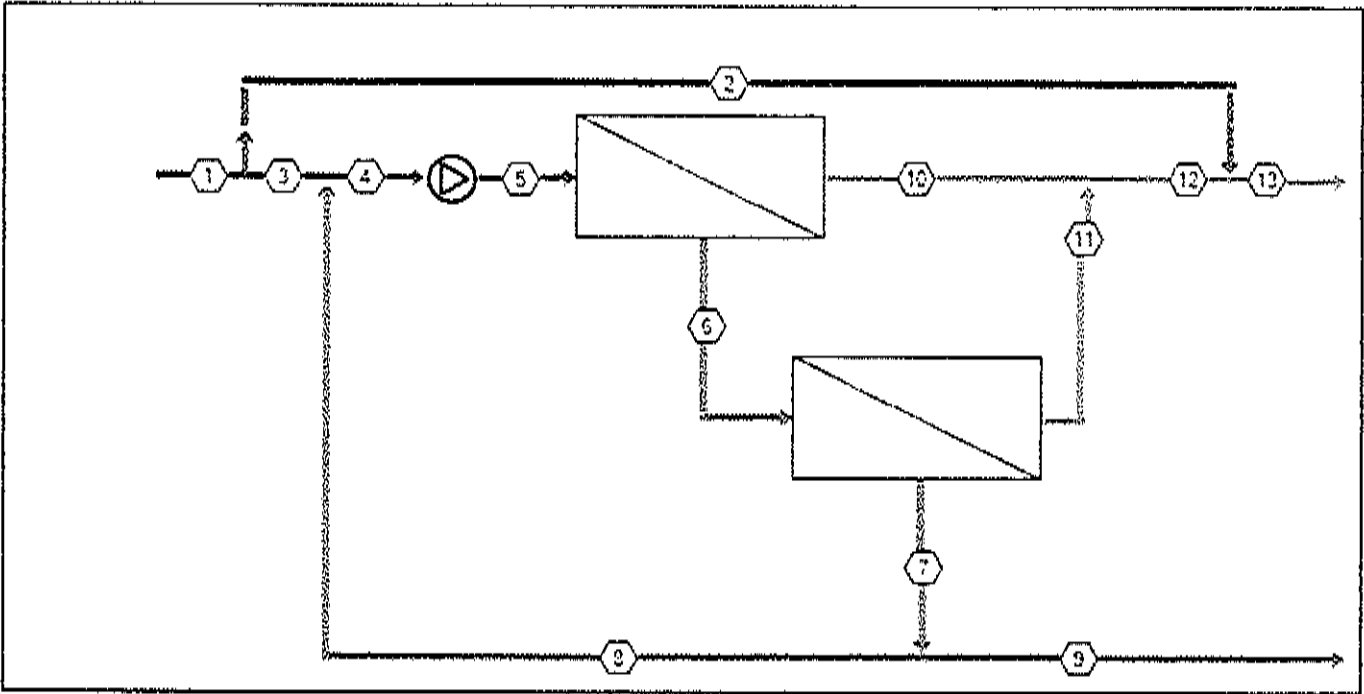
Permeate Blending, Concentrate Recirculation

Project name
Temperature

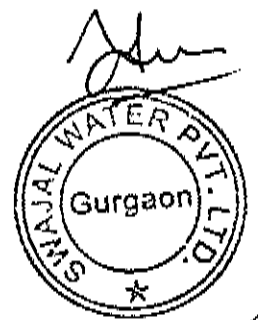
GSCL-500LPH
25.0 °C

Element age, P1:

Page: 3/4
0.0 years



Stream No.	Flow (m3/h)	Pressure (bar)	TDS (mg/l)	pH	Econd (µs/cm)
1	0.950	0	172	7.94	372
2	0.050	0	172	7.94	372
3	0.900	0	172	7.94	372
4	1.40	0	233	8.08	504
5	1.40	7.11	233	8.08	504
6	1.17	6.82	279	8.12	604
7	0.950	6.57	343	8.21	742
8	0.500	0	343	8.21	742
9	0.450	0	343	8.21	742
10	0.232	0	1.24	6.05	3.00
11	0.218	0	1.54	6.15	3.60
12	0.450	0	1.39	6.10	3.30
13	0.500	0	18.5	6.99	40.0



Permeate Blending, Concentrate Recirculation

Project name GSCL-500LPH

Page : 4/4

Calculated by	Swajal Water Pvt Ltd	Permeate flow/train	0.45 m3/h
HP Pump flow	1.40 m3/h	Raw water flow/train	0.95 m3/h
Feed pressure	7.1 bar	Permeate recovery	32.14 %
Feed temperature	25.0 °C(77.0°F)	Total system recovery	50.00 %
Concentrate recirculation	0.50 m3/h	Blended flow	0.50 m3/h
Feed water pH	7.94	Element age	0.0 years
Chem dose, mg/l, -	None	Flux decline %, per year	5.0
Specific energy	1.09 kwh/m3	Fouling factor	1.00
Pass NDP	6.6 bar	SP increase, per year	7.0 %
Average flux rate	28.4 l/mh	Inter-stage pipe loss	0.2 bar

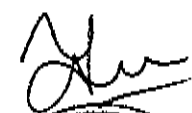
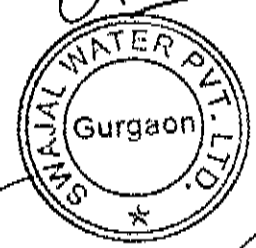



Feed type

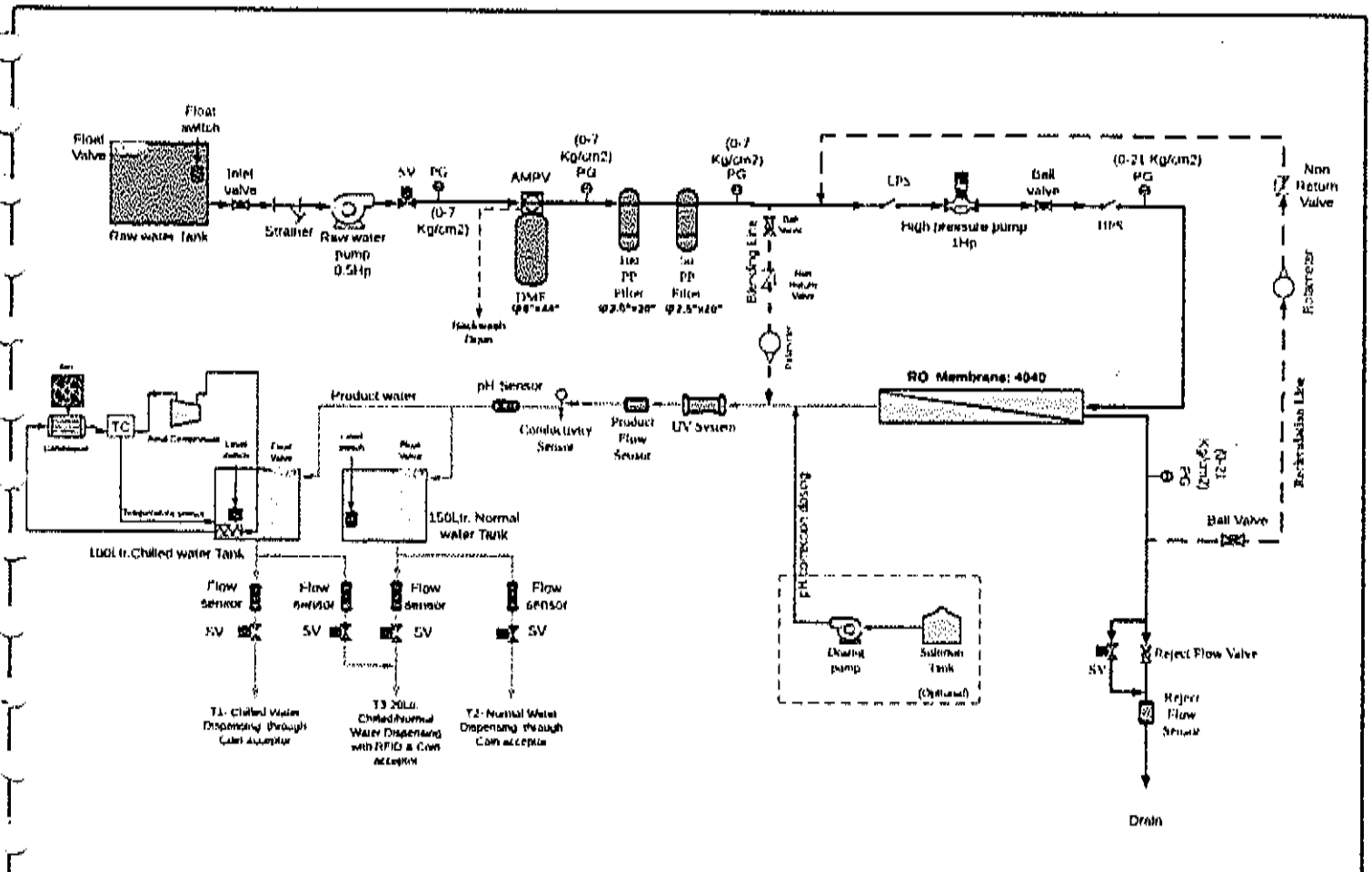
Brackish Well Non-Fouling

Pass - Stage	Perm. Flow m3/h	Flow / Vessel		Flux l/mh	DP bar	Flux Max l/mh	Beta	Stagewise Pressure			Perm. TDS mg/l	Element Type	Element Quantity	PV# x Elem #
		Feed m3/h	Conc m3/h					Perm. bar	Boost bar	Conc bar				
1-1	0.2	1.4	1.2	28.4	0.2	29.4	1.18	0	0	6.9	1.2	RO-Mem-4040	1	1 x 1M
1-2	0.2	1.2	0.9	27.7	0.1	27.7	1.2	0	0	6.6	1.5	RO-Mem-4040	1	1 x 1M

CALCULATION OF POWER REQUIREMENT

	Pass 1	Total system power
Pump/Boost pressure, bar	7.1	
Product flow, m3/h	0.5	0.5
Pump flow, m3/h	1.4	
Pump efficiency, %	67.0	
Motor efficiency, %	85.0	
VFD efficiency, %	97.0	
Pumping power, GHP	0.7	
Pumping power, kw	0.5	0.5
Pumping energy, kwh/m3		1.09

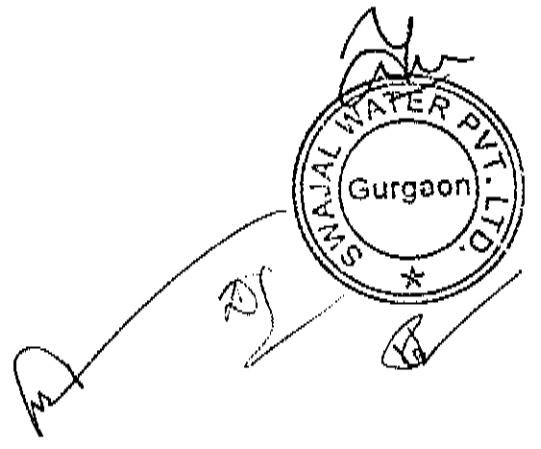








Checked & Approved by

Legend:
 AMPV: Automatic Multi Port Valve
 PG: Pressure Gauge
 SV: Solenoid Valve
 DMF: Dual Media Filter
 LPS: Low Pressure Switch
 HPS: High Pressure Switch
 TC: Temperature Controller

CLIENT: GSCL-200/260LPH-4040 TITLE: P&ID FOR 200/250 LPH WATER PURIFICATION SYSTEM
 DRAWING NUMBER: Swajal
 DESIGNED BY: SWAJAL WATER PVT LTD. Rev 1 DATE: 17.01.18





KAMAL ENVIRO & FOOD LAB. PVT. LTD

(Complete Test House for Testing of Environment, Drugs & Pharmaceuticals & Food Samples)
(AN ISO 9001-2008 CERTIFIED COMPANY)

Plot No. 254, Sector-6, I.M.T. Manesar, Distt. Gurgaon-122050 Telefax : 0124-4119624 E-mail : kamalenviro@labs@gmail.com

Sample Name-Borewell Water
M/S Guwahati Smart City
Location: Pan Bazar Guwahati

Report No.KEFL/ENVT/M06011801
Receipt Date : 06/01/2018
Report Date : 10/01/2018
Sample Qty: 2 Ltrs

Reference : IS 10500-2012.

DESCRIPTION : One Borewell water sample was collected by us on 06/01/2018

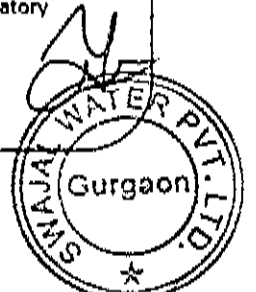
S.NO.	Parameters	Results	Requirement (Acceptable Limit)	Permissible Limits	Method of test, Ref to Part of IS 3025
(ORGANOLEPTIC AND PHYSICAL)					
1.	Color (Hazen)	Less than 5	5	15	Part 4
2.	Odour	Agreeable	Agreeable	Agreeable	Part 5
3.	pH	7.94	6.5 to 8.5	No relaxation	Part 11
4.	Conductivity (umhos/cm)	290	-	-	Part 14
5.	Turbidity(NTU)	Less than 5	5	10	Part 10
6.	Total Dissolved Solids (mg/l)	172	500	2000	Part 16
(General Parameters)					
1.	Phenolphthalein Alkalinity,	20	-	-	Part 23
2.	Permanent Hardness (mg/l)	28	-	-	Part 21
3.	Temporary Hardness (mg/l)	48	-	-	Part 21
4.	Ammonia (as total ammonia - N) mg/l	BDL(0.1)	-	-	Part 34
5.	Nitrite -Nitrogen (NO ₂)	BDL(0.1)	-	-	Part 34
6.	Calcium (as Ca) mg/l	13	75	200	Part 40
7.	Chlorides (as Cl) mg/l	42	250	1000	Part 32
8.	Fluorides (as F) mg/l	BDL(0.1)	1.0	1.5	Part 60
9.	Free Residual Chlorine (mg/l)	BDL(0.01)	0.2	1	Part 26
10.	Phosphate (Po ₄ ³⁻) mg/l	BDL(0.1)	-	-	Part 31
11.	Iron (as Fe) mg/l	BDL(0.1)	0.3	No relaxation	Part 53
12.	Magnesium (as Mg) mg/l	11	30	100	Part 46
13.	Nitrate(as NO ₃) mg/l	BDL(0.1)	45	No relaxation	Part 34
14.	Sulphate (as SO ₄) mg/l	128	200	400	Part 24
15.	Total Alkalinity (as CaCO ₃) mg/l	120	200	600	Part 23
16.	Total Hardness (as CaCO ₃) mg/l	252	200	600	Part 21
17.	Cyanide (as CN) mg/l	BDL(0.01)	0.05	No relaxation	Part 27
18.	Total Arsenic (as As) mg/l	BDL(0.01)	0.01	0.05	Part-37

B.D.L: Below Detection Limit.


Authorized Signatory

- Note:
1. The result listed refer only to the tested samples and applicable parameter. Endorsement of product is neither inferred nor implied.
 2. Sample will be destroyed after one month from the date of issue of test certificates unless otherwise specified.
 3. Sample not drawn by us. Total liability of this laboratory is limited to the invoice amount.
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Lab: Plot No. 254, Sector-6, I.M.T. Manesar, Distt. Gurgaon-122050, Telefax. 0124-4119624 E-mail: kamalenviro@labs@gmail.com Registered Office: 834/1, K-Block, Mahipalpur, New Delhi-110037 Tel.: 91-11-26788114-5 Fax: +91-11- 26781200



Permeate Blending, Concentrate Recirculation

Project name	GSCS-250LPH	Permeate flow/train	0.22 m3/h
Calculated by	Swajal water pvt ltd	Raw water flow/train	0.76 m3/h
HP Pump flow	1.23 m3/h	Permeate recovery	17.89 %
Feed pressure	0.7 bar	Total system recovery	30.00 %
Feed temperature	25.0 °C(77.0°F)	Blended flow	0.25 m3/h
Concentrate recirculation	0.50 m3/h	Element age	0.0 years
Feed water pH	7.84	Flux decline %, per year	7.0
Chem dose, mg/l	None	Fouling factor	1.00
Specific energy	1.85 kwh/m3	SP increase, per year	10.0 %
Pass NDP	6.5 bar		
Average flux rate	27.8 lmh		

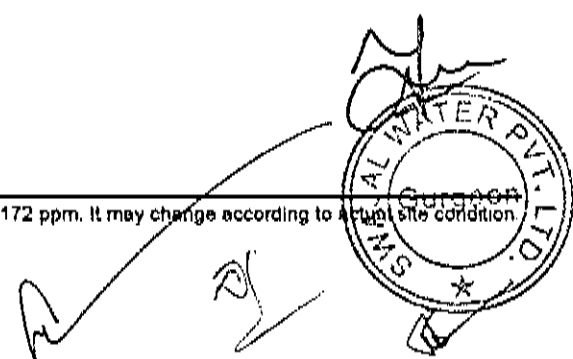
Feed type: Brackish Surface Conventional

Pass - Stage	Perm. Flow m3/h	Flow / Vessel Feed m3/h	Conc m3/h	Flux lmh	DP bar	Flux Max lmh	Beta	Stagewise Pressure Perm. bar	Boost bar	Conc bar	Perm. TDS mg/l	Element Type	Element Quantity	PV# x Elem #
1-1	0.2	1.2	1	27.8	0.2	27.8	1.19	0	0	6.6	1.2	RO Mem-4040	1	1 x 1M

Ion (mg/l)	Raw Water	Feed Water	Permeate Water	Concentrate 1	Blended Product
Hardness, as CaCO3	0.00	0.00	0.000	0.0	0.00
Ca	0.00	0.00	0.000	0.0	0.00
Mg	0.00	0.00	0.000	0.0	0.00
Na	87.68	79.43	0.463	96.6	8.53
K	0.00	0.00	0.000	0.0	0.00
NH4	0.00	0.00	0.000	0.0	0.00
Ba	0.000	0.000	0.000	0.0	0.00
Sr	0.000	0.000	0.000	0.0	0.00
H	0.00	0.00	0.001	0.0	0.00
CO3	0.00	0.00	0.000	0.0	0.00
HCO3	0.10	0.12	0.001	0.1	0.01
SO4	0.00	0.00	0.000	0.0	0.00
Cl	104.32	122.44	0.713	148.9	13.15
F	0.00	0.00	0.000	0.0	0.00
NO3	0.00	0.00	0.000	0.0	0.00
PO4	0.00	0.00	0.000	0.0	0.00
OH	0.00	0.01	0.000	0.0	0.00
SiO2	0.00	0.00	0.000	0.0	0.00
B	0.00	0.00	0.000	0.0	0.00
CO2	0.00	0.00	0.00	0.00	0.00
TDS	172.10	202.00	1.18	245.66	21.89
pH	7.94	8.01	8.05	8.00	7.07

Saturations	Raw Water	Feed Water	Concentrate	Limits
CaSO4 / ksp * 100, %	0	0	0	400
SrSO4 / ksp * 100, %	0	0	0	1200
BaSO4 / ksp * 100, %	0	0	0	10000
SiO2 saturation, %	0	0	0	140
CaF2 / ksp * 100, %	0	0	0	50000
Ca3(PO4)2 saturation index	0.0	0.0	0.0	2.4
CCPP, mg/l	0.00	0.00	0.00	
Langelier saturation index	0.00	0.00	0.00	2.5
Ionic strength	0.00	0.00	0.00	
Osmotic pressure, bar	0.1	0.2	0.2	

Membrane analysis has been done considering water TDS 172 ppm. It may change according to actual site condition.



Permeate Blending, Concentrate Recirculation

Project name	GSCL-250LPH	Permeate flow/train	0.22 m3/h
	Swajal water pvt ltd	Raw water flow/train	0.76 m3/h
Calculated by		Permeate recovery	17.89 %
HP Pump flow	1.23 m3/h	Total system recovery	30.00 %
Feed pressure	6.7 bar	Blended flow	0.25 m3/h
Feed temperature	25.0 °C(77.0°F)	Element age	0.0 years
Concentrate recirculation	0.50 m3/h	Flux decline %, per year	7.0
Feed water pH	7.94	Fouling factor	1.00
Chem dose, mg/l, -	None	SP Increase, per year	10.0 %
Specific energy	1.85 kwh/m3		
Pass NDP	0.5 bar		
Average flux rate	27.8 l/mh		

											Feed type				Brackish Surface Conventional		
Pass -	Perm.	Flow / Vessel		Flux	DP	Flux	Beta	Stagewise Pressure			Perm.	Element	Element	PV# x			
						Max											
Stage	Flow	Feed	Conc					Perm.	Boost	Conc	TDS	Type	Quantity	Elem #			
	m3/h	m3/h	m3/h	l/mh	bar	l/mh		bar	bar	bar	mg/l						
1-1	0.2	1.2	1	27.8	0.2	27.8	1.10	0	0	0.6	1.2	RO-Mem-4040	1	1 x 1M			

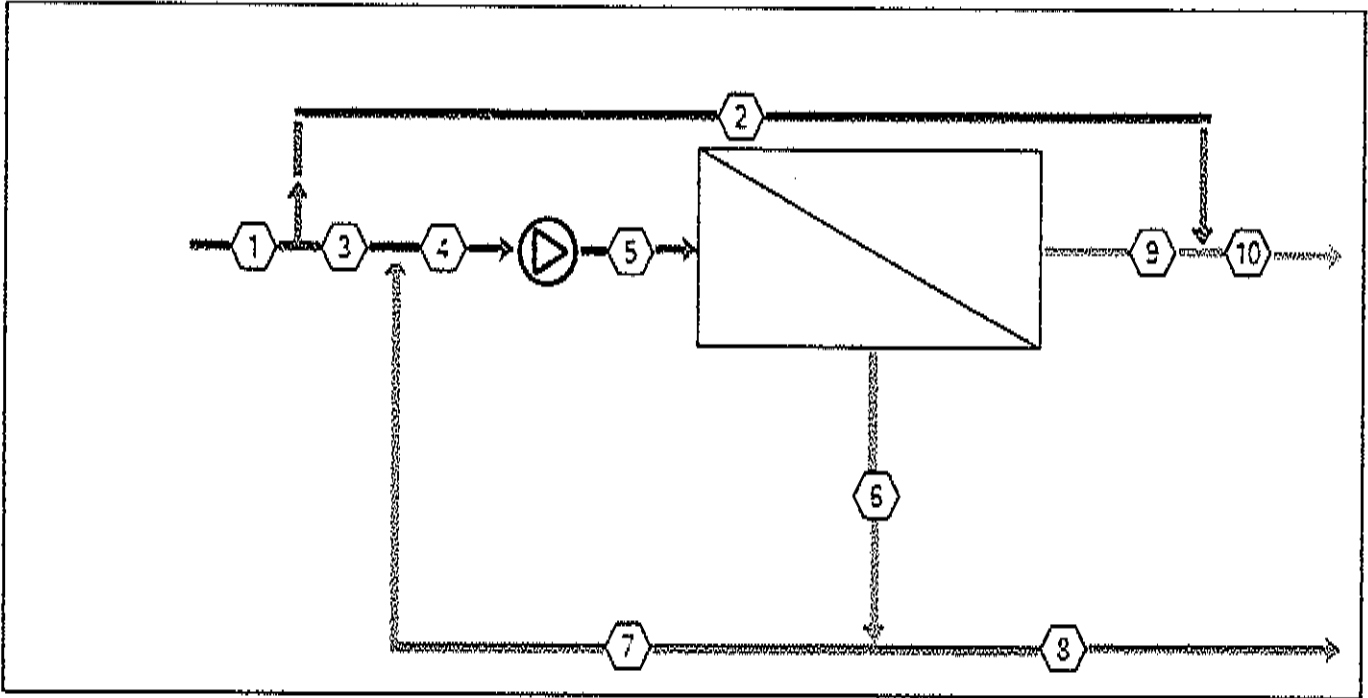
Pass -	Element	Feed	Pressure	Conc	NDP	Permeate	Permeate	Beta	Permeate (Passwise cumulative)					
Stage	no.	Pressure	Drop	Conc.	bar	Flow	Flux		TDS	Ca	Mg	Na	Cl	
		bar	bar	bar	bar	m3/h	l/mh							
1-1	1	6.7	0.10	0.2	6.5	0.2	27.8	1.10	1.2	0	0	0.403	0.712	

Swajal Water Pvt. Ltd.
Gurgaon

Permeate Blending, Concentrate Recirculation

Project name: GSCL-250LPH
 Temperature: 25.0 °C

Element age, P1: 0.0 years



Stream No.	Flow (m3/h)	Pressure (bar)	TDS (mg/l)	pH	Econd (µs/cm)
1	0.760	0	172	7.94	372
2	0.030	0	172	7.94	372
3	0.730	0	172	7.94	372
4	1.23	0	202	8.01	437
5	1.23	6.71	202	8.01	437
6	1.01	6.55	246	8.09	531
7	0.500	0	246	8.09	531
8	0.510	0	246	8.09	531
9	0.220	0	1.18	0.05	2.90
10	0.250	0	21.7	7.07	46.9



Permeate Blending, Concentrate Recirculation

Project name GSCL-250LPH

Page : 4/4

Calculated by	Swajal water pvt ltd	Permeate flow/train	0.22 m3/h
HP Pump flow	1.23 m3/h	Raw water flow/train	0.76 m3/h
Feed pressure	6.7 bar	Permeate recovery	17.00 %
Feed temperature	25.0 °C(77.0°F)	Total system recovery	30.00 %
Concentrate recirculation	0.50 m3/h	Blended flow	0.25 m3/h
Feed water pH	7.94	Element age	0.0 years
Chem dose, mg/l, -	None	Flux decline %, per year	7.0
Specific energy	1.85 kwh/m3	Fouling factor	1.00
Pass NDP	6.5 bar	SP increase, per year	10.0 %
Average flux rate	27.8 lmh		

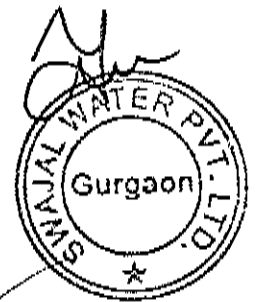
Feed type

Brackish Surface Conventional

Pass - Stage	Perm. Flow m3/h	Flow / Vessel		Flux lmh	DP bar	Flux Max lmh	Beta	Stagewise Pressure			Perm. TDS mg/l	Element Type	Element Quantity	PV# x Elem #
		Feed m3/h	Conc m3/h					Perm. bar	Boost bar	Conc bar				
1-1	0.2	1.2	1	27.8	0.2	27.8	1.19	0	0	6.6	1.2	RO-Mem-4040	1	1 x 1M

CALCULATION OF POWER REQUIREMENT

	Pass 1	Total system power
Pump/Boost pressure, bar	6.7	
Product flow, m3/h	0.2	0.25
Pump flow, m3/h	1.2	
Pump efficiency, %	87.0	
Motor efficiency, %	85.0	
VFD efficiency, %	97.0	
Pumping power, BHP	0.5	
Pumping power, kw	0.4	0.4
Pumping energy, kwh/m3		1.85



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Operation And Maintenance Manual

Swajal Water Purification System

Plot No. 230, Udyog Vihar Phase-1, Gurgaon-122016, Haryana, India

Phone: +91-124-4001137, 4060219



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Introduction

Drinking water treatment plants are used to remove particles and organisms that lead to diseases and protect the public's welfare and supply pure drinkable water to the environment, people and living organisms. In addition, they also provide drinking water that is pleasant to the senses: taste, sight and smell and provide safe, reliable drinking water to the communities they serve.

Swajal Water Purification systems are designed to provide the commercial and industrial user with the most trouble free, cost effective and reliable form of water treatment available by providing every option necessary for a successful installation. RO Systems utilize stainless steel pressure vessels, stainless steel frame and skids, solid state controls, integral conductivity monitors, flow controls, pressure gauges, throttling valves, high pressure relief valves, dual stage pre-filters, low suction pressure cut off controls and recirculation loops on most models for high recovery rates and optimum performance.

Specifications

S.No.	Item	Unit	Quantity
1	Control Panel	No.	1
2	Raw Water Pump	No.	1
3	Solenoid Valve A/C	No.	1
4	Pressure Gauge with connector	No.	2
5	Cartridge Housing	No.	2
6	Cartridge Filter	No.	1
7	Carbon Filter	No.	1
8	Low Pressure Switch	No.	1
9	High Pressure Pump	No.	1
10	High Pressure Switch	No.	1
11	Membrane Housing	No.	1
12	RO Membrane	No.	1
13	Pressure Gauge with connector	No.	2
14	Reject Flow Sensor	No.	1
15	Permeate Flow Sensor	No.	1
16	UV System	No.	1
17	Float Switch	No.	1
18	Temperature Meter/controller	No.	1
19	Socket Board Plug With 2 Top	No.	1
20	Water Dispensing Unit	No	4
21	Dispensing Nozzle	No	4
22	Solenoid Valve D/C	No	4
23	LED Display	No.	2
24	Water Kiosk	No.	1



Objective of the Project

Three basic purpose of installing Water ATMs are as follows:

- To produce water that is safe for human consumption
- To provide water at public places in minimum prices.
- To minimize the use of plastic by providing handy and low cost paper cups those are environment friendly.

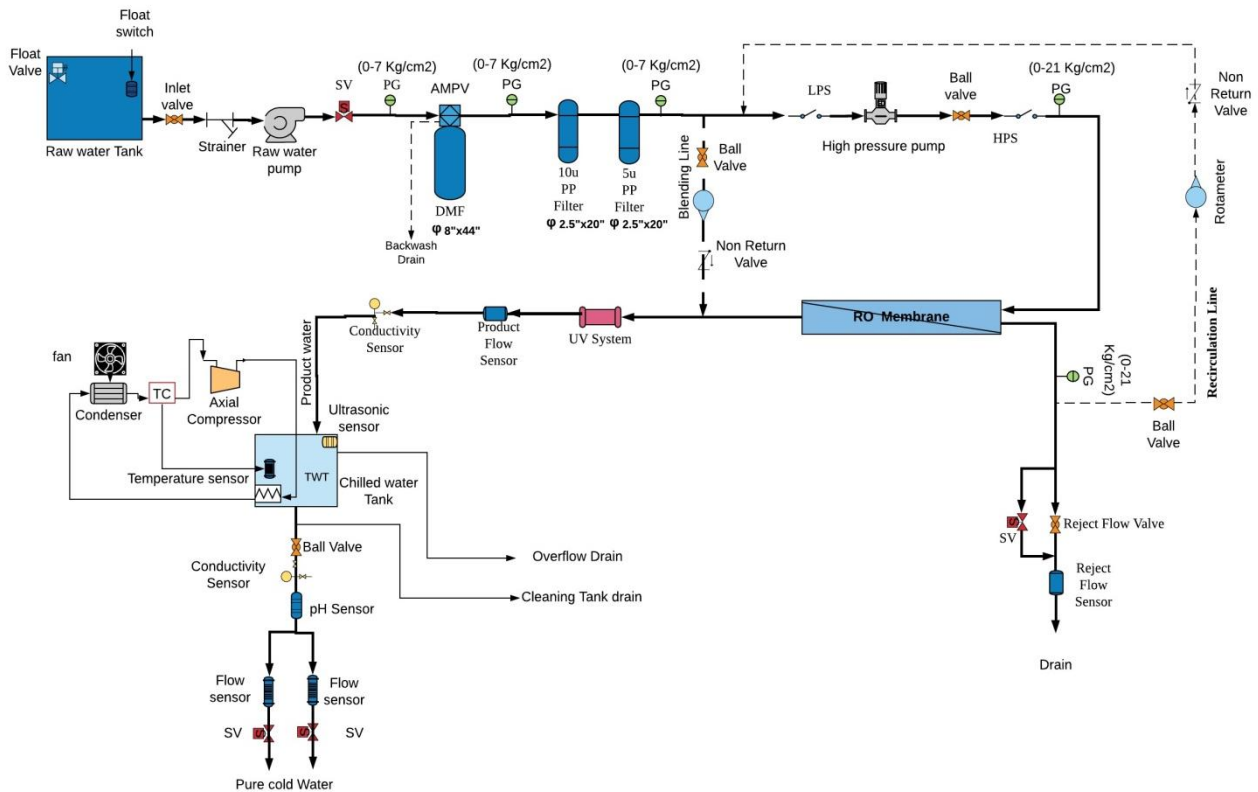
Production of biologically and chemically safe drinking water and providing it at low cost at public places is the overall objective of installing the water ATMs. A properly designed water ATM is not only a requirement to guarantee safe drinking water, but also skillful operation and maintenance of water ATM are equally important. To meet the required parameters and skillful operation we are appointing technically advanced team and supervisors to manage the operation of machines.

The second basic objective of this ATM installation is to providing pure drinking water at minimum cost of Rs. 1 for 250 ml and Rs. 5 for 1 Litre that is appealing to the consumer. Ideally, appealing water is one that is clear and colorless, pleasant to the taste, odorless, and cool so we are installing RO & UF based water purification system which is working on the sensors and automatically advanced system to comply BIS standards of water. The consumer is principally interested in the quality of water delivered at the tap, not the quality at the machine. Therefore, we will display the quality and other parameters of purified water in the machine itself so that consumer can understand the difference between normal tap water and purified water and distribution of water will be easy to the consumer. Storage and distribution system would be designed and operated to prevent biological growths, corrosion, and contamination by cross-connections. In the design and operation of machine and distribution system, the control point for the determination of water quality should be the customer's tap.

The third basic objective of this water ATM project is to minimize the wastage of the water, resources and use of plastic so we have designed a unique solution to provide purified drinking water facility at machine which delivers IS 10500 standard purified water with low water wastage. We are providing technologically advanced fully automatic water ATM machine which works only if treated water is complying standards and having facility to auto cut off in case of water tank is full or the set temperature is achieved. There are three water dispensing units which works on coin and RFID card for dispensing of water @ Rs. 1 for 250 ML, Rs. 5 for 1 Litre, Rs 10 for 5 L, Rs 25 for 20 L.



Process Flow



Process work Flow

- 1- Raw water will be stored in 2000 Liter PVC tank which is equipped with float valve and float switch for automatic operation and prevention of overflow.
- 2- Water will be passed through strainer to remove leafs or other things from water prevent chocking of the system.
- 3- Water will be passed through inlet valve to the MGF Filter through raw water pump as it will be monitored through inlet flow sensor and pressure gauge. It will process water only as per the requirement and if low pressure is there then solenoid valve will work automatically according to this.
- 4- We have given pressure gauge at every stage of machine which will monitor the water pressure.
- 5- At next stage, water will be passed through 10 micron PP filter to trap sediments in raw water.
- 6- Water will be send to RO Membrane through High Pressure Pump to maintain the pressure as per the requirement and we have also added a blend line to maintain the required level of parameters. Water will be recirculated to minimize the wastage of water.

- 7- There are Solenoid valves and flushing lines for cleaning of Ultra-filtration membrane.
- 8- After purification, water will be passed through UV system which will remove all bacterial particles from water.
- 9- Treated water will be stored in 250 Litre food grade SS304 tank and automatically supply to cold water tank and Normal water tank respectively as per the consumption.
- 10- We have given separate tanks for normal and cold water from which we can dispense water separately on requirement.
- 11- Chilled water as well as normal water can be dispensed through coin and RFID card which are connected with dispensing nozzles.

Scope of Work of Swajal

- 1- Keep all Water ATMs up and running till the project tenure.
- 2- Handle complaints received by Customer or Official regarding non operation of machine.
- 3- Regular visit to ATMs to check if there is any issue in the machines.
- 4- Cleaning of Machines
- 5- Regular visits to check the quality of water.
- 6- To ensure proper supply of water and electricity in machine



Annexure - : Maintenance Schedule

MAINTENANCE SCHEDULE	
Frequency	Activity
Daily	1. Check Raw Water Tank Water Level.
	2. Check Pipe Condition from Raw Water Tank to Machine Inlet
	3. Check leakages in Machine
	4. Check Control panel switches conditions.
	5. Check Dosing tank filling with chemical adding.
	6. Check the any fault indication on panel.
	7. Check Pure water tank level.
	8. Clean machine sink.
Weekly	1. Check all wiring for loose or burn issue.
	2. Clean drain line.
Monthly	1. Backwash the machine manually.
	2. Test water parameters - TDS and pH
	3. Replace PP filter.
	4. Check Control Panel functions.
	5. Check earthing condition.
	6. Check all Machine Components.
Quarterly	1. Replace the media.
	2. Clean Membrane.
	3. Collect Water Sample for detailed parameters testing.
Yearly	1. Check Membrane condition.
	2. Check Pumps performance.

Annexure - : Operator Log Book

RO LOG BOOK															Month:	Year:			
Date	Time	Pressure(Kg/Cm2)						Flow (LPH)				Product pH	Input Voltage (V)	RWP Current (Amp)	HPP Current (Amp)	Dosing Chemical Stock (Kg)	Operator name	Remarks	
		MGF In	MGF Out	IRF Out	ACF Out	Cartridge Filter Out	Cartridge Filter In	RO Product	RO Reject	RO	RO								TDS RO



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Operation and Maintenance

Weekly Inspection List

S.No.	List	Check
1	Raw water Supply	
2	Electricity supply	
3	Raw water TDS	
4	Product water TDS	
5	Water ATM	
6	Control Panel	
7	Raw water pump	
8	Solenoid valve	
9	FRP vessels	
10	Media	
11	AMPV	
12	Pressure Gauge	
13	Cartridge housing	
14	PP filter	
15	Low pressure switch	
16	High pressure pump	
17	High pressure switch	
18	RO Membrane	
19	Pipe fitting	
20	Water leakage	
21	Compressor	
22	Condenser & Fan	
23	Temperature meter	
24	Temperature sensor	
25	Backwash pump	
26	Ultrasonic sensor	
27	Temperature controller	
28	LCD display working	
29	ATM surrounding cleanliness	
30	UV	
31	Coin and RFID Card selector	
32	Water dispenser nozzle	
33	Water Storage Tank	

Quarterly Inspection List

S. No.	List	Check
1	Water ATM working	
2	Multi grade filter media	
3	Permeate water TDS	
4	Machine wiring	
5	UV lamp check	
6	Tank cleaning	
7	MGF backwash	
8	Micron cartridge change	
9	RO cleaning	
10	Flow meter cleaning	
11	AMPV & control panel wiring	
12	Dosing pump service	
13	High pressure pump service	
14	Chiller service	
15	All Sensors	
16	Backwash pump service	
17	UV	
18	Water Dispenser	
19	LCD display	
20	ATM Surrounding	



Yearly Inspection List

S. No.	List	Check
1	Water ATM working	
2	Multi grade filter media change	
3	Permeate water TDS	
4	Machine wiring	
5	UV lamp check	
6	Tank cleaning	
7	MGF backwash	
8	Micron cartridge change	
9	RO cleaning	
10	Flow meter cleaning	
11	AMPV & control panel wiring	
12	Dosing pump service	
13	High pressure pump service	
14	Chiller service	
15	Backwash pump service	
16	Instrument Calibration	
17	Raw water pump service	
18	Solenoid valves Cleaning	
19	Water Dispenser	
20	Sensors	



Water quality monitoring and assessment

- GSM based monitoring of all machines to ensure that data should be collected on time and without any connectivity issue.
- Product Flow rate and reject flow rate work in a ratio of 40:60. i.e at inlet if 1000L is supplied then 400L will go to product tank and 600L will be rejected.
- Collection and checking data offline with the help of supervisor to ensure that water quality is matching with the given parameters.
- Checklist for the machine operations will be given to supervisor who will fill this checklist manually after ensuring the working of that part.
- Our technical team visit regularly as per the schedule to open and check machine to minimize the chances of breakdown of machines.
- Ensure that all sensors should work properly so we have given both automatic and manual valve which can be operated according to requirement.
- The analytical quality of the data would be regularly checked through internal and external control.
- Machines are designed in such a way if input water quality goes down then RO system will start work automatically to meet the quality parameter.
- Display of basic water parameters through LED Display.



TROUBLESHOOTING

Following, is a trouble-shooting guide for customers to diagnose most problems that may occur. In addition, our customer service personnel can help with specific problems or questions. Help is available at +91-(124)-4001137 and you can also write us at info@swajal.in.

RO Plant Troubleshooting

Problem	Probable Cause	Corrective Action
System making less water	<p>Water temperature too low</p> <p>Low water supply pressure</p> <p>Low RO Pump Pressure.</p> <p>RO Membrane are fouled</p> <p>High product back pressure.</p> <p>Feed water TDS Level is too high.</p> <p>Brine Seal damaged</p>	<p>Control Water temperature.</p> <p>Check raw water pump</p> <p>Check pre-filters, replace if required</p> <p>Check membranes and replace, if required</p> <p>Increase pressure by adjusting</p> <p>Check the source water, Need to upgrade system.</p> <p>Replace the brine seal.</p>
System making more water	<p>O-ring-bypass in membrane vessel</p> <p>Membrane pore size open</p> <p>Water temperature too High.</p> <p>Passage of chlorine</p>	<p>Replace or relocate the O-ring.</p> <p>Replace the membrane.</p> <p>Control Water temperature.</p> <p>Replace the membrane</p>
High System Pressure	<p>Chocking Reject Valve.</p> <p>Inaccurate pressure gauge</p> <p>Restricted or reduced</p>	<p>Remove and clean it.</p> <p>Calibrate or replace.</p> <p>Examine the reject line for</p>

	Reject/Permeate flow rate	obstacle, If required then repair or replace.
Low Feed Flow	Chocking Cartridge filters RW Pump outline block Membrane dirty Raw Water Pump Problem	Filters should be replaced. Check the Solenoid valve or clean the line. Clean it by chemicals or high pressure water. Check the Raw Water Pump, Replace it if required

RO Control Panel Troubleshooting

Machine is supplied with intelligent control panel for automatic operation of Swajal water purification system. It can detect a range of problems and indicate the issues on the in-built LCD display. Following table gives details action required for various messages displayed on the panel:

LED Blinking	Message on Display	Cause & Action
LPS!	LOW PRESSURE!!	Check, is it C NO Contact ? If NOT make it.
		Pressure Lower than set value. Increase Pressure or reduce set point.
		LPS not connected.
HPS!	HI PRESSURE!!	Pressure higher than set value. Reduce pressure or increase set point.
		Check, is it C NO Contact? If NOT make it.
FLOATY(Level) -	TW TANK FULL!!	Actually Tank is full.
		Floaty is not connected. Short floaty terminal by an external wire link.
		Check, is it C NC Contact? If NOT make it.
	HI CONDUCTIVITY !	High Conductivity in the line or set point is LOW in that case increase the set point.
Raw Water Pump	RW OVERLOAD	More current than normal ratings. Set overload current accordingly.
		Motor is drawing more current than normal.
		Check motor.
	RW SINGLE PHASING	If there is mismatch between the R-Y-B phase currents drawn by pump. Increase the phase unbalance value.
RW DRY RUNNING		If current drawn by the pump is less then the
		set value. If tank is empty. SET the currents

		by Panel setting.
High Pressure Pump	HPP OVERLOAD	More current than normal ratings. Set overload current accordingly.
		Motor is drawing more current than normal. Check motor.
	HPP SINGLE PH	If there is mismatch between the R-Y-B phase currents drawn by pump. Increase the phase unbalance value.
	HPP DRY RUNNING	If current drawn by the pump is less then the set value. SET the currents by Panel setting.
-----	FR:0000 (Flow rates remains zero)	Remove sensor from line & check for any obstacle. Check FR by blowing in sensor.
		Check Connections.



Do's and Don't

Following points must be ensured for operating the machine-

Do's:

1. Ensure the 10 mi. Interval to turn ON the RO system at each power failure cycle.
2. Ensure the machine cleaning is performed every day.
3. Ensure the main supply from changeover is OK.
4. Ensure consistent voltage (230V Single phase supply, 50Hz).
5. Ensure the reject control valve is valve is fully open before switching on the MCM from the RO panel.
6. Ensure the MCB is in ON Condition.
7. Ensure the RO control panel is turned ON.
8. Ensure the all switch on control panel is at automatic mode.
9. Ensure the raw water tank having enough water and all valves are open.
10. Ensure residual chlorine is zero in the feed to RO system.
11. Vent air from piping and equipments before start up of high pressure pump.
12. Ensure that pump has sufficient pressure at the suction required pressure at the inlet of the micron filter is 1.5 kg/cm².
13. Calibrate conductivity meter and other instruments as a matter of routine.
14. Ensure the RO control panel is not showing any fault alarm.
15. Ensure the Auto MPV's are showing time or backwash or resin at a time.
16. Ensure the earthing wire properly connected with the machine before starting the RO control panel.
17. Ensure your hand and shoes are not wet before touching the electrical switches.
18. Ensure there is no leakage in piping or machine.

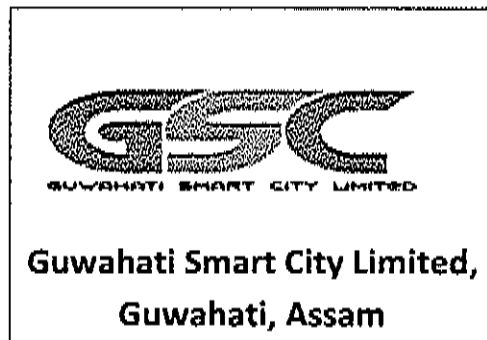
Do not:

19. Don't start the machine quickly after the power supply is turned ON.
20. Don't touch the machine with wet hand or shoes on faults.
21. Don't alter the switches or wire or program.
22. Don't run the machine with valves closed.
23. Don't run the pump dry. This will cause irreversible damage to the pump.
24. Don't adjust the setting of the low/high pressure switch.
25. Don't change raw water supply source.
26. Don't operate the system at a recovery rate higher than recommended viz.
27. Don't try to backwashing, scrubbing and cleaning of cartridge filter for reuse.
28. Don't operate the unit at a pressure higher than recommended.
29. Don't leave the machine door open.



**Request for proposal for Setting up of Water
ATM for Safe Drinking Water including
Designing, Constructing / Installation, Operating
and Maintenance of Water ATMs for Period of
Five Years**

Volume II: SCOPE OF WORK AND SPECIFICATIONS



Doc. No. : 10477A-CV-6169-3701-R1-Vol.2

Guwahati Smart City

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1) BACKGROUND

To meet the safe drinking water requirements at public places in Guwahati, potable water is proposed to be supplied to the consumer through his/her drinking bottle/ container or through paper cups (in selected public locations). This proposal will be essential for betterment of the urban environment as the usage of consumer's own bottle/ container would result in minimizing the high usage of plastic/ bottles for drinking water purposes. The water ATMs would also enable citizens/ visitors to access safe drinking water at various locations within Guwahati.

GSCL hereby wishes to invite reputed firms (Applicants) to develop and install water ATMs for providing access to safe drinking water at public places including Operation and Maintenance of the ATMs for Five years.

Locations of public places in GSCL area as per **Annexure I**.

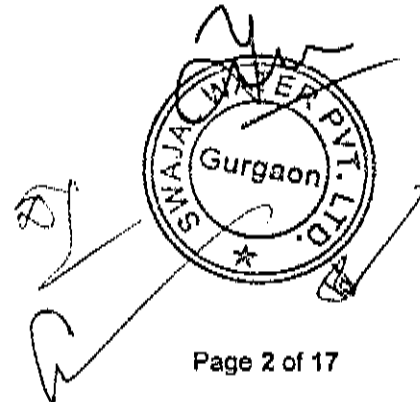
2) SCOPE OF WORK FOR BIDDER

The bidders will be responsible for:

- 2.1. **Designing, constructing / installing, operating and maintaining of Water ATMs at Public Places** along with water storage tanks of Stainless Steel (minimum Grade 304) and submitting weekly test report of output water to the Engineer-in-Charge. The operation of the plant shall be with the Contractor for 5 years.
- 2.2. Making Power connection at Water ATMs and all electrical fittings up to the power meter; power connection & external electrification charges will be borne by the Contractor.
- 2.3. Quality control and monitoring systems to be incorporated at each ATM location as per the following:

EMBEDDED DEVICE FOR AUTOMATION FOR FOLLOWING PURPOSES

- 1) Quantitative Monitoring
 - i. Number of Glasses of water dispensed in a day
 - ii. Number of Bottles of water dispensed in a day
 - iii. Water level in the tank
- 2) Water Quality Monitoring
 - i. TDS level of water
 - ii. Temperature of water
 - iii. Hardness
 - iv. pH values of water



3) Backend Wireless Communication

- i. GPRS Module for communication with backend web server
- ii. GPS module for Kiosk Location information

4) Data Logger

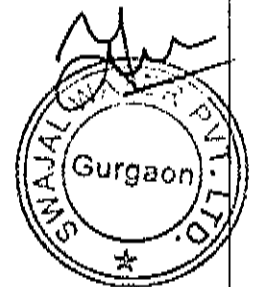
- i. Flash Memory bank for logging Sensor / dispensing data
- ii. Relay Logged info to Server using communication channel

5) Multi-Processor Integrated Control System with Interface cables/connectors for integration to provide for the following features:

- i. GPRS based TCP/IP connectivity with web based Server system
- ii. GPS location system
- iii. Flash based transaction data Logging
- iv. Relay Unit for controlling water dispensing nozzles as per the location requirements
- v. Interface for connecting coin-acceptors
- vi. Interface for Card Reader
- vii. Interface for Temperature Monitoring
- viii. Interface for TDS Monitoring
- ix. Interface for pH Monitoring
- x. Interface for Ultra-Sonic Water Level Monitoring
- xi. Controller for displaying water purity parameters on LCD/LED display monitor
- xii. Media Controller For HDMI based 32" display Monitor of 14" screen (diagonal)
- xiii. Built in power supply to connect with 48 v battery

6) Sensors for the purpose of:

- i. Temperature Monitoring
- ii. TDS Monitoring
- iii. pH Monitoring
- iv. Ultra-Sonic Water Level Monitoring
- v. Water Dispensing from Three Nozzles through Coin Acceptor
- vi. Support of 2 rupee and 5 rupee coins
- vii. Water Dispensing using NFC cards
- viii. Cards to work for Rs. 2 and Rs.5
- ix. Support for Card 'Balance' Rechargeable
- x. Sensors support for Monitoring Water Temperature, TDS, PH and Water Level in the tank
- xi. Display of Water purity parameters on LCD Display of 14" size



- xii. Ability to backup data for 48 hours in-case of server/connectivity outage
- xiii. LED display on controller panel box to indicate System Status.
- xiv. Uploading of Transactions and Water parameters data to Server over TCP/IP using GPRS.
- xv. Fall back to SMS in case GPRS connectivity to server is lost temporarily for reliability purpose, these sensors may be tested by GSCL through an institution of repute like IIT.

7) OTHER FEATURES

- i. System operation can be enabled/disabled from server
- ii. Dispense quantities re-configurable from server
- iii. Operator Log-in, log-out feature
- iv. System to operate after successful operator login only.
- v. All card Recharge transactions to be uploaded to server
- vi. All water dispensing transactions to be uploaded to server
- vii. All Water refill transactions to be uploaded to server
- viii. Each dispensing unit shall be independently manageable from the server for coin or card operation of any value

2.4. Disposal of waste water to GSCL sewerage system.

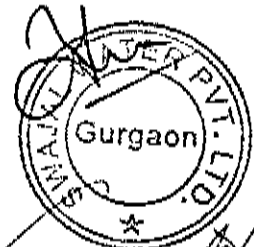
2.5. Making own arrangement during non availability of piped water. GSCL is not liable to supply water to ATMs during such period, and nothing is payable by GSCL to the Contractor during such periods. It is in the obligation of the Contractor to arrange raw water to ATM's, during Non availability of water and the source and quality of raw water shall be approved by GSCL.

2.6. The water before being dispensed to the public shall be treated with suitable filtration process to meet BIS 14543 standard at all times.

2.7. Any other related works/activities as may be necessary for its successful operation.

2.8. Users may carry water up to 20 litres capacity jerry can. The Contractor may have suitable vending place in ATM for filling a container of 20 litre capacity.

2.9. ATM will be constructed as per the layout approved by the GSCL.



2.10. Water ATM should be equipped with provision for chilled water (water with temperature around 15 degrees Celsius during summers). Water ATM shall serve both Chilled as well as non chilled water

2.11. The Bidder shall use Reverse Osmosis (RO) technology with UV Treatment system to treat water in order to provide potable water at each ATM location. The treatment shall be completely in accordance with BIS 14543 Annexure -3.

Depending upon level of Contamination in water, alternate superior technology can be adopted only after approval from GSCL

2.12. The successful bidder shall provide in-built litter spaces in each water ATM.

2.13. Advertising space shall be provided on Panels of ATW Machine. Provision for LED screen Advertisement to be made.

2.14. LED signage showing Authority's and Water ATM of appropriate size shall be installed at every Water ATM unit.

2.15. Specifications:

i. Each ATM should be equipped to dispense water of 250 ml (eco-friendly biodegradable cups/glass of minimum 170 GSM paper to be provided by the Contractor at the ATM in the cost of water). 1 litre, 5 litre and 20 litre water will be taken by customers in their own containers.

ii. Filling Speed: about 10-12 litre/minute

iii. Operational Time – 6 AM to 10 PM every day, which may be amended in consultation with GSCL.

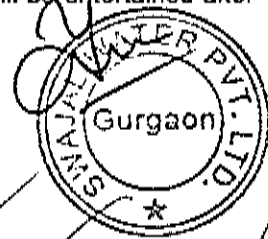
iv. ATM Unit Dimension: Cubical/cylindrical in shape with base area up to 20 sq. Feet or as approved by GSCL

v. The ATM shall have the provisions for Float valve for overflow control

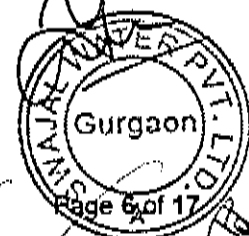
3. GENERAL REQUIREMENTS

3.1. The Contractor is advised to analyse the potable water of requisite sample size on their own before quoting their rates in **Financial Bid, Volume III**. No extra claim will be entertained after the allotment of the work on this account.

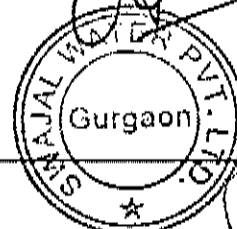
3.2. The output water quality characteristics are given in **Annexure-II**.



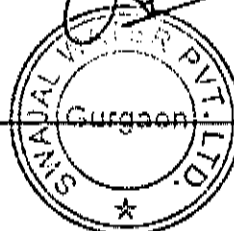
- 3.3. The Contractor has to design supply, install, commission, and maintain the Water ATMs for Five years. The Contractor will maintain a safe, clean and hygienic environment in and around the Water ATM.
- 3.4. The Contractor should have their own testing facilities for water testing process. The Contractor should analyse the water sample for all parameters as per BIS 14543 norms in a daily, weekly manner or as and when required by the Authority, from the Lab as approved by Authority. Frequency of Water testing shall be as mentioned in BIS 14543. Contractor shall maintain proper record in this regard. The Attendant of Contractor shall be available at the Water ATM during the operation time. A LED/ LCD digital screen of at least 14 inch diagonal showing 4 key parameters of BIS 14543 standards namely pH, hardness, TDS & temperature on a real time basis in an interval of 2-5 minutes.
- 3.5. The maintenance of pipelines etc. from point of connection onwards to the Water ATMs shall be responsibility of Contractor during the Contract Period
- 3.6. Making connection for raw water:-
The Contractor shall be responsible for executing works for making connection for Water ATMs from the source provided by the GSCL including cost of all material and labour etc. The cost of filtration process at each ATM, to ensure quality of water as per BIS 14543 standard shall be the responsibility of the Contractor.
- 3.7. Disposal of waste generated at each Water ATM:-
The disposal of waste generated at each ATM shall be disposed by the contractor at his own cost to the nearest GSCL system. In case of performance severe penalties would be levied on the Contractor by GSCL as applicable under existing laws related to littering in public areas.
- 3.8. The Contractor shall install the required equipment and maintain the same for a period of five years from the date of commissioning of water ATMs, as per the conditions prescribed in this document, and in the time frame prescribed at his own cost.
- 3.9. After completion of Contract period the water ATMs will become the property of the GSCL. The Contractor shall handover the Water ATM in Good working conditions complete to the satisfaction of Authority
- 3.10. The Contractor shall perform all routine maintenance to ensure that all water ATMs shall remain in working condition.



- 3.11. The Contractor will depute duly trained Operators at each water ATM. The Contractor shall ensure routine inspection of the equipment by the equipment supplier.
- 3.12. The output water shall be distributed daily between 6:00 am to 10:00 pm on all days from water ATMs. However, GSCL may increase or decrease the working hours, if so desired, in order to provide adequate water to the public. The Contractor shall have to provide all the services during the extended hours.
- 3.13. The Contractor will be responsible for maintaining the service levels standards otherwise penalty will be levied as per penalty clause.
- 3.14. The Contractor shall provide trained manpower to maintain the water ATMs to ensure the provision of quality services.
- 3.15. The Contractor shall provide and maintain the electrical and plumbing fittings of all types at the Water ATM in good working condition.
- 3.16. The Contractor shall provide LED boards for display of BIS 14543 water quality parameters including:
1. pH
 2. Hardness
 3. Temperature
 4. Water Level
 5. TDS
- 3.17. Contractor should ensure that all the Water ATM (in a pocket) are working all the time and annual repair/maintenance etc. shall be carried out periodically at his own cost.
- 3.18. All expenses shall be borne by the Contractor.
- 3.19. To maintain premises clean, safe hygienic and risk free in and around the Water ATM (approx. Two meter radii) is the responsibility of Contractor. The Attendant of the Contractor shall ensure that all the eco-friendly biodegradable paper glass shall be disposed off by the user within litterbin kept at each ATM.
- 3.20. Water & Electric supplied through connection by the GSCL (if any), will be charged from Contractor on Commercial rates applicable from time to time.
- 3.21. Online information of daily report to GSCL.



- 3.22. GSCL has reserve the right to inspect any ATM at any time during the
- 3.23. GSCL has right to take sample of water at any time.
- 3.24. During the non-availability of piped water from GSCL, Contractor shall make his own arrangement for Raw Water at his cost.
- 3.25. The water storage capacity at each ATM should be as approved by GSCL which can be increased as per the requirement.
- 3.26. Physical Security of Water ATM shall be responsibility of the Contractor. Insurance of Appropriate Amount as required by GSCL shall be taken by the Contractor for each water ATM. Insurance shall be in the name of GSCL, required premium for same shall be paid by the Contractor
- 3.27. The Contractor shall ensure that safe, clean and hygienic environment is maintained in and around ATM
- 3.28. The Contractor shall indemnify, defend and hold harmless the GSCL and its officers, employees, and affiliates against any and all claims of loss, damage and expense of whatever kind and nature, including all related costs and expenses incurred in connection with
- a) Sickness or ill health caused to user after drinking water from ATW. All the liabilities arising out shall be born by the Contractor.
 - b) Shortfalls in Standard norms laid down by Food Safety and Standard Authority of India (FSSAI). Contractor shall be responsible for Complying to such standard norms laid down by FSSAI
- 3.29. The disposal of used biodegradable paper glass shall be responsibility of the Contractor.
- 3.30. Payment of water by the user shall be by smart card. Provision of same shall be done by the Contractor. The Contractor shall keep all the data of water dispensed through data logger system or as per system approved GSCL. GSCL shall have all the rights to cross check the data at any time. GSCL's shall issue the Smart card to the user, which has facility of credit (i.e balance in account) and can be recharged. Provision of dispensing of water by inserting Coins of Rupees Two, Rupees Five ..etc should also be made . GSCL shall collect the Cash from the ATW machine either daily or on weekly basis.



- 3.31. During installation period, payment to contractor shall be done only after testing and commissioning of individual machine complying to all output water quality parameters as per BIS 14543. Contractor shall submit payment statement to GSCL and payment shall be made within 30 (thirty) days from certification of payment certificate by Engineer-in-Charge. After completion of all works and on issuance of Completion certificate, the Contractor shall submit Final payment certificate to the GSCL and Payment shall be made not later than 60 days from date of submission of Final payment certificate
- 3.32. Contractor shall quote for yearly Operation and Maintenance Charges. The same shall be paid on Quarterly instalments year wise (i.e after every 3 months) only after satisfying Water quality output parameters as per frequency i.e Hourly, Weekly, Monthly , Three monthly....etc in accordance with BIS 14543 requirement and satisfactory carrying out other required tests on water as mentioned therein.

4. OTHER REQUIREMENTS:

All the successful Contractors will have to ensure collection of the samples from the respective sites and meeting of the design criteria.

- I. Bidders would need to submit their O&M expenditure information to the Engineer-in-Charge on a quarterly basis for the records of GSCL.
- II. Any deviation from the proposed design needs to be approved by the GSCL.

5. TESTING AND INSPECTION

I. Third Party inspection

The charges for third party inspection, if any, would initially be borne by the Contractor.

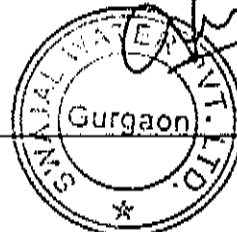
II. Site tests

After erection at site, all components, equipment as described shall be tested to prove satisfactory performance and /or fulfilment of functional requirements without showing any sign of defect as individual equipment and as well as a system.

6. DELIVERY/COMMISSIONING

The commissioning of all the water ATMs is 3 months (90 days) from the date of the confirmed Letter of intent or handing over of site whichever is later.

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7. Penalty In case of Non-performance

In case of non-performance of more than 3 hours in a particular day between the operating hours, 1 day non-operation will be considered and penalty will be levied as per the table below. In case the quality of water is not as per BIS 14543 standard the ATM operation of dispensing water should be stopped immediately. GSCL will impose a penalty of Rs 1000 for each such event at the Water ATM concerned.

Penalty in case of Non-operational beyond 3 hours in a day with respect to ATM shall be as follows:

- I. Up to 4 days – Rs.2000/- per day/per ATM
- II. 4-7 days – Rs.3000/- per day/per ATM
- III. Above 7 days – Rs.5000/- per day/per ATM

Failure to report any information pertaining to non-operational/not desired quality of the ATM would invite additional penalty of Rs. 1,000/- per such case per day of delayed information.

In case of non-compliance of water quality with BIS 14543 standard and / or non-operation of ATM's beyond the stipulated days as approved by GSCL, the contract is liable for termination.

8. SCOPE OF GSCL

- I. GSCL will provide nearest Source of water, further arrangement including required plumbing works from source to water ATMs shall be borne by the Contractor.
 - II. GSCL will charge for water required for the Water ATM on commercial rates.
 - III. Single phase or three phase power supply as required at one point further distribution including installation of Electric meters for Water ATM's shall be in scope of Contractor
- (ii) The power consumption charges shall be charged on Commercial rates basis.
- (iii) Whenever GSCL is not able to provide the source of water, it is in the obligation of the Contractor to arrange for Raw water. The source and quality of Raw water shall be approved by GSCL. The charges for Raw water and its transportation shall be in scope of Bidder.



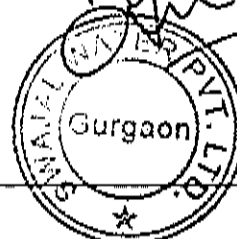
9. CONSTRUCTION REQUIREMENTS FOR Water ATMs.

GENERAL

- i. The Contractor shall design ATM's in such a way that material considered for design and construction should only be of Stainless Steel (minimum Grade 304) including storage.
- ii. The Contractor shall design ATM's in such a way that, in case quality of incoming Water is not as per required standards, then plant/ ATM should be automatically shut down. The Contractor should brought matter be to the knowledge of the Engineer-in-charge immediately and it should be sorted out within a day itself to make ATM back in operation and use.
- iii. Specifications, Shape and design of the ATM shall be provided by the
- iv. Contractor for each and every location (Please refer to Annexure III & IV for illustrative design) before start of work and only after obtaining clearance from GSCL, ATM's should be installed at respective locations.
- v. Contractor shall design ATM's in such a way that, sufficient quantity for storage of water should be made at each and every ATM but not less than the minimum quantity as specified in Financial Bid, to avoid shut down of ATM's on account of no water situation, since present water supply in GSCL area is intermittent.

Provided that the Contractor shall ensure that the technology chosen is

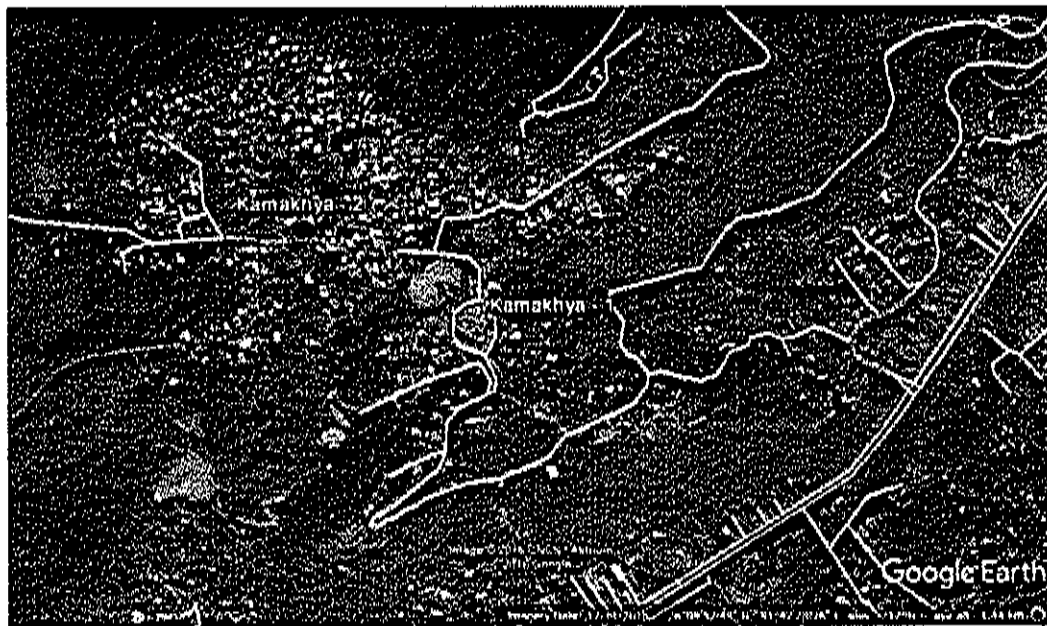
- (a) Appropriate to the site and ground situation
- (b) Has a precedent for use in a project of similar nature and size
- (c) Is supported by the technology/service provider for design, supply, implementation and ongoing maintenance
- (d) Addresses all issues of safety, including fire safety, operational safety, and environmental safety



Proposed Location of Water ATM's



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SMANJAL WATER PVT. LTD.
Gurgaon
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Annexure I:- List of public places where Water ATMs are to be Installed

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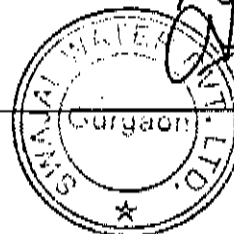
Proposed Location of ATW		
Sl No.	Location	Nos. of ATW to be Installed
1	kamakhya Temple	2
2	Fancy Bazar	4
3	Pan Bazar	2
4	Nehru Park/Cotton College	1
5	Sukreswar Ghat	1
6	Dighli Pukhuri	1
7	Paltan Bazar	2
8	Chandmari	3
9	Silpukhuri	1
10	DC Office	1
11	Guwahati High court	1
12	Bharalu	1
Total Nos. to be installed-		20

ANNEXURE- II: OUTPUT WATER QUALITY AS PER BIS 14543

Sl. No	DESCRIPTION	To comply
1	COLOUR	2 Max
2	ODOUR	. Agreeable
3	TASTE	Agreeable
4	TURBIDITY	2 Max
5	pH	6.5 to 8.5
6	Total Dissolved Solid	500 ppm Max
7	BARIUM	1 ppm, Max.
8	COPPER	0.05 ppm, Max
9	IRON	0.1 ppm, Max



Sl. No	DESCRIPTION	To comply
10	MANGANESE	0.1 ppm, Max
11	NITRATE	45 ppm, Max
12	NITRITE	0.02 ppm, Max
13	ZINC	5 ppm, Max
14	ALUMINIUM	0.03 ppm, Max
15	CHLORIDES	200 ppm, Max
16	SULPHATE	200 ppm, Max
17	CALCIUM	CALCIUM
18	SULPHIDE	0.05 ppm, Max
19	ALKALINITY	200 ppm, Max
20	HENOLICCOMPOUNDS	Absent
21	MINERALOIL	Absent
22	MAGNESIUM	30 ppm, Max
23	RESIDUAL FREE CHLORIDE	0.2 ppm, Max
24	ANION.SURF.ACT.AGENTS	0.2 ppm, Max
25	ESCHERCHIACOLI	Absent
26	COLIFORMBACTERIA	Absent
27	Sulphite Reducing Bacteria	Absent
28	Pseudomonas Aeruginosa	Absent
29	Aerobic Microbial Count	20, Max at 37C & Max at 20-22C
30	YEAST &MOULD	Absent
31	Antimony	0.005 PPM ,Max
32	Borate	5 PPM, Max



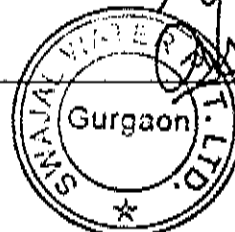
Annexure-3: Specifications for the ATM Unit and Development of Site

1. General requirements

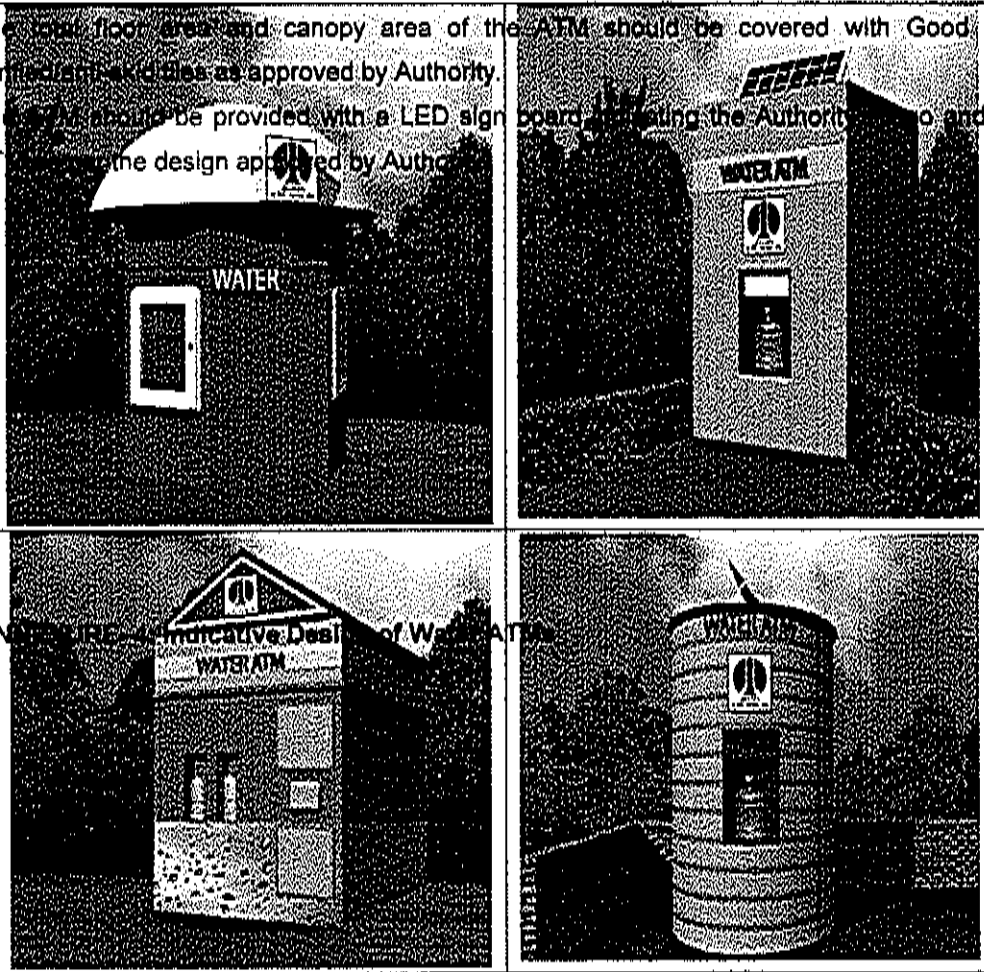
- 1.1. General requirements and specifications for ATM Unit –space requirement for accommodating system.
- 1.2. Maximum covered area of ATM Unit shall be 24 sq. Ft or as approved by the Authority
- 1.3. Indicative design for each water ATM are annexed at however the final drawing design submitted by contractor shall be as approved by the Authority.
- 1.4. It is mandatory for every bidder to submit layout plan showing the above maximum area requirement along with their bids. Bids of the bidders not complying with this are liable to be rejected.
- 1.5. Water Storage Tank shall be placed inside the ATM Structure.

2. Units of ATMs:

- 2.1. ATM Housing structure shall be of Stainless Steel (minimum Grade 304) with puff in between.
- 2.2. Thickness of Stainless Steel (Inner & Outer) should be minimum 0.5 mm duly filled with puff of 40 to 50 mm thickness. The outer design should aesthetically gel with the surroundings.
- 2.3. Ensure the structural stability and safety of the ATMs.



- 2.4. The structure should be appropriate to protect the whole ATM system, including its equipment and accessories in all weather conditions and it should withstand the extreme climatic variations.
- 2.5. The roof material of canopy should be PP reinforced UV stabilized Poly Vinyl/FRP covering.
- 2.6. The floor area and canopy area of the ATM should be covered with Good quality vitrified tiles as approved by Authority.
- 2.7. The ATM should be provided with a LED sign board indicating the Authority logo and water ATM as per the design approved by Authority.



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