**Annexure- 1**

**Terms of Reference**

**HIRING AN INDEPENDENT VERIFICATION AGENCY (IVA) FOR THE WORK OF "PROVIDING FIVE LARGE SURFACE WATER SUPPLY SCHEME TO VILLAGES OF DISTRICTS PATIALA, FATEHGARH SAHIB, GURDASPUR & AMRITSAR" UNDER PUNJAB RURAL WATER & SANITATION SECTOR IMPROVEMENT PROJECT.**

1. **Background**:

IBRD (The World Bank) has approved a loan amount of Rs. 2200 crore to Punjab Government for the implementation of Punjab Rural Water and Sanitation Sector Improvement Project (PRWSSIP). The objective of PRWSSIP is “to improve water and sanitation service levels, reduce open defecation, and strengthen service delivery arrangements of water supply in targeted villages in Punjab”. The project is under implementation by the Department of Water Supply and Sanitation (DWSS) Punjab since 2015. Now the Government of Punjab (GoP) intends to apply part of the available proceeds of this loan for hiring the services of an Independent Verification Agency (IVA) to support DWSS in implementation and operation of the Multi Village Water Supply Schemes to be contracted out on Design Build, Operate and Transfer (DBOT) basis as noted below:

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Sr. No.** | **Project Description** | **Estimated Cost in Crores** | **WTP Capacity MLD** | **Distribution Line(Km)** |
|  | Design, Build Surface Water Supply System & all Appurtenant Structures and allied works; and Operation and Maintenance of complete Works including supply of surface water to 204 villages of Block Rajpura, Ghanour, Sanour & Patiala District Patiala for a period of 10 years. | Rs. 241.18 | 35 | 342 |
|  | Design, Build Surface Water Supply System & all Appurtenant Structures and allied works; and Operation and Maintenance of complete Works including supply of surface water to 112 villages of Block Rajpura, Patiala & Sirhind District Patiala and Fatehgarh Sahib for a period of 10 years. | Rs. 121.32 | 13 | 164 |
|  | Design, Build Surface Water Supply System & all Appurtenant Structures and allied works; and Operation and Maintenance of complete Works including supply of surface water to 93 villages of Block Khera & Bassi Pathana, District Fatehgarh Sahib for a period of 10 years. | Rs. 111.53 | 11 | 143 |
|  | Design, Build Surface Water Supply System & all Appurtenant Structures and allied works; and Operation and Maintenance of complete Works including supply of surface water to 40 villages of Block Fatehgarh Churian District Gurdaspur for a period of 10 years. | Rs. 61.14 | 8 | 70 |
|  | Design, Build Surface Water Supply System & all Appurtenant Structures and allied works; and Operation and Maintenance of complete Works including supply of surface water to 112 villages of Block Chogwan, Harsha Chhina, Ajnala &Attari District Amritsar for a period of 10 years. | Rs. 120.00 | 19 | 183 |

1. **Objective of Hiring IVA:**

The objective of this consultancy shall be to undertake Independent Assessment of the Designs, Specifications, Quality Assurance of Construction Activities and Technical Guidance to DWSS in ensuring quality, standards and providing timely recommendations to ensure that the schemes deliver intended performance objectives.

1. **Scope of Work:**

The scope of the Independent Verification Agency (IVA)is to support DWSS in implementation and operation of the Multi Village Water Supply Scheme in above noted five Schemes in Patiala, Fatehgarh Sahib, Gurdaspur, and Amritsar Districts to be contracted out under individual DBOT contract (likely Design& Build period: 30 months, O&M period: 120 months) is broadly organized along the following categories:

1. Review of Design Build Documents.
2. Independent quality control over material and constructions activities during the Design Build Period,
3. Independent check during completion of works for the Water Supply System;
4. Periodic check during Operation and Maintenance Period (if falls within IVA contract duration) to assess service delivery with respect to performance standards.

In performing the above role, the IVA shall perform checks on sample basis to ensure broad coverage of all works, at critical junctures, and to verify achievement of performance indicators. All reports prepared by the IVA shall be submitted to the DWSS with the copy to the concerned Design Build Operations Engineer.

### Review of Design-Build documents

* Examine the schedule submitted by the Operator for the entire design–build period starting from submission of documents to project completion period, analyse the same for its feasibility with respect to the overall project schedule and advise on modifications, if required.
* Review design-build documents including, specifications, analysis, designs, drawings, work plan, etc., submitted by the Operator for its correctness, completeness and implementation point of view. One set of approved technical documents for the Design Build activities including the work plan shall be available with the IVA for regular monitoring.
* Review and advise on applicability of design specifications and design criteria adopted for the project as per contract document and Indian and/or International standards and best engineering practices. In the absence of Indian standards advise the Operator and DWSS on international standards to be adopted
* Ensure that the Debris Disposal Plan, EDS and EMP submitted by the contractor follows the Environmental Code of Practices as per Indian legislation and the World Bank/ IBRD Loans guidelines.
* Identify documents necessary to assess progress of Operator’s compliance with contract and suggest the same to DWSS.

### Independent quality control over material and constructions activities

* Review Operator’s quality assurance documents and procedures as per IS specifications and best engineering practices.
* Assess the Operator’s progress of works against the milestones under the contract.
* Verify setting out of critical works (such as fixing of levels of intake, level of different components of treatment plant units, OHSRs, Solar Power System, etc.) by the operator against the design build document during execution. In case of occurrence of any error in the position, level or alignment of the site by the operator, rectification of the same shall be closely examined by the IVA.
* Field review exploratory excavations for checking the exact position/location/co-ordinate of the existing services & verification of adequacy of arrangements made by the service provider for any diversion or removal of services required.
* Advise on specific problems/issues related to quality of construction.
* To perform sample checks and tests for ensuring quality of works and materials as specified in the contract document and best engineering practices.
* Report to DWSS and Design Build Operations Engineer any instances of non-conformity with regard to non-compliance of construction parameters.
* Review and advise on the progress reports submitted by the Operator.
* Review one set of “as built” Design –Build documents, in reproducible form, to check the correctness and completeness of deviations from the submitted design.

### Independent checks during completion of works

* Examine and advise on the test schedule, detailed test procedures and method statements for tests to be conducted by the Operator.
* Assess and ascertain whether the project or relevant part can attain technical standards set out in contract by witnessing tests conducted by the Operator.
* Witness and assess critical tests such as pre-completion tests, completion test and guarantee tests or inspections either at any part of the project/ worksite as per the contract document.
* Witness Operator’s demonstration of ability of SCADA system to meet functional guarantee continuously for a period of three month. SCADA operation should be demonstrated for each equipment individually and as a complete system.
* Approval of the formats for various reports to be submitted to the Design Build Operations Engineer.
* Advise on acceptance/rejection of work in case of test /survey report indicating deviation from specified limits.
* Advise on Issuance of Operational Acceptance Certificate to the Operator within specified time after completion of tests on completion are completed.

### Periodic check during Operation and Maintenance Period to assess service delivery with respect to performance standards:

* Check whether the plant can be operated in accordance with the O&M Manual submitted by the Operator and meets the requirements of the contract document.
* Develop a schedule for conducting periodic check on operation and maintenance of the system
* Conduct regular tests to ensure that the Water Supply System is meeting the performance standards.
* Review and check the maintenance of appropriate records that present the verification of the performance indicator.
* Conduct sample checks on water quality for all parameters as per IS Standards
* Witness whether the system pressure tests are carried out by the operator on a systematic basis
* On request, determining the impact on achievement of performance standards, due to non-availability of power during regular pumping hours and advise the owner on the effect of payment for operator services
* The periodicity for IVA to perform sample tests and checks as mentioned above shall be once in every month.
* **The task of the IVA will include, but not necessarily be limited to the following:**

1. Review & advise on Design Build specifications and drawings submitted by the Operator whereby Water Supply Scheme delivers desired flow into service reservoir(or any other arrangement)of each village at sufficient head so as to meet with the hourly demand (peak and non-peak) of all habitations during hot summer season even for tail end villages.
2. Implementation of Contractual Conditions: Assess the Operator’s progress of works against the milestones under the contract on sample basis at critical stages. Implementation of works according to the contractual conditions. Support DWSS Project engineer in implementing the schemes to the best possible quality through regular support on technical and contractual issues.
3. Verify and check the quality of material, quality of construction, plant and equipment being used.
4. Review and verify the Operator’s Quality Assurances procedures and implementation of the same.
5. Review achievement of Performance Standards on sample basis "sampling to be agreed".
6. Review & advise on the survey report and Geo-technical report.
7. Review and recommend for approval the layout plans, process designs and drawings for the intake works, raw water pumping main water treatment plant, pumping systems, sumps, reservoirs, disinfection system and transmission system with appurtenances and SCADA and all other relevant components contingent to the work submitted by the Operator from time to time.
8. Review of ESMP submitted by the contractor and various plans which are part of ESMP including safety plan, emergency response plan, environmental management related construction plan, debris disposal plan, etc.follows the Environmental Code of Practices as per Indian legislation and the World Bank/ IBRD Loans guidelines. IVA shall review contractor's/ operator's compliance of ESMP during project implementation and O&M. IVA shall give due consideration to the ESIA study undertaken for each scheme as well while reviewing environmental and social safeguards and management plan of the contractor and review regulatory compliance by contractor and DDWS.
9. IVA shall review the mandatory material tests done at the site by the agency as per contract agreement.
10. IVA shall assure overall workmanship of the works executed based on the best practices followed.
11. To review and advise on design build specifications & drawings as well as installation of solar power plant of designed capacity as per specification of Punjab Energy Development Agency (PEDA) & guidelines of Ministry of New and Renewable Energy, GoI by Operator and generation of power and its transfer to grid of Punjab State Power Corporation Limited (PSPCL) as per its net-metering policy.
12. IVA shall review & advise on adequacy of supervision mechanisms - resources, expertise and frequency of supervision and any gaps or constraints.
13. IVA shall carry out checks on designs with respect to capacities of civil including piping Works, mechanical equipment and units etc.
14. IVA shall be required to get testing of samples of selected materials done from NABL accredited Laboratories or as desired, in consultation with DWSS.
15. Witnessing/ supervising and endorsing performance tests conducted during commissioning and completion by the Contractor. Scope of work of operator is attached at Appendix-3C.
16. Witness / supervise Tests on completion and tests after “Completion and commission” of the Works and New Facilities.
17. Review & advise on the operations and maintenance manuals for all installations as submitted by the operator.
18. Review compliance by the operator for meeting the performance standards set out in appendix 3 A of Schedule.
19. Review & advise on operator’s Response Plan for emergency response in case of any Pollution Events.
20. Review & advise on any other scope of work related to the contract.
21. IVA shall attend the review meetings called by the owner.
22. Verify at the completion of the Water Supply Scheme that it delivers adequate flow and safe water into service reservoir (or any other arrangement) of each village at sufficient head so as to meet with the peak hourly demand of all habitations during hot summer season even for tail end villages.
23. **Reports/ Outputs to be submitted:**

The IVA shall submit the monthly and quarterly progress report containing consultant’s activities, staff deployed, findings and recommendations of activities mentioned in the scope of work. The contents of these reports shall be agreed with the DWSS on the commencement of the services. The IVA shall ensure timely submission of verification reports. The reports should be accurate, objective and backed-up by evidence and a clear rationale. The IVA will be required to make presentations as needed and clarify, in a timely manner, and issues and questions raised by DWSS and the World Bank.

The reporting officer for this consultancy assignment is the Secretary, DWSS. Since the task is to monitor the work of subordinate offices, IVA shall carry out the assignment under the overall supervision and control of Secretary, DWSS. However, day-to-day activities for the verification process shall be managed and coordinated by an officer/ expert to be nominated by Secretary DWSS on their behalf. To avoid conflict of interest, IVA will limit its interactions with DWSS staff. All the contract management issues will be dealt by the Secretary or any person authorized by him/her.

The consultant shall submit the following reports through hard as well as soft copy to Secretary, DWSS.

| **Sr. No.** | **Type of Report** | **Number of hard copies along with soft copy** | **Reporting frequency** |
| --- | --- | --- | --- |
| 1 | Inception Report specifying methodology including the Detailed Monitoring and Verification Strategy, Work Plan, reporting timelines/frequency **(Separate for each of 5 schemes).** | Five | Within 30 days of the commencement of the services |
| 2 | Monthly Reports **(Separate for each of 5 schemes)** with findings and recommendations including:   * Updated contract management plan on MS projects. * Detail of tests carried out on the materials and works * Photographic record of progress of works * Matters related to social safeguards, safety and environment management measures adopted by operator * Compliance of meeting the performance standards * Activities performed during the period * Staff deployed * Comments on the work progress * Comments on the contractual issues * Issues for DWSS consideration | Five | Monthly |
| 3 | Quarterly presentation on Key issues and Recommendations to improve/ assure quality **(Separate for each of 5 schemes).** | Five | Quarterly |
| 4 | Completion Report **(Separate for each of 5 schemes).** | Five | At the end of the Consultancy Period or Contract |

1. **Clients input and counterpart personnel:**

The Project teams headed by Executive Engineers, DWSS for each of five Schemes as noted in forgoing para will be available for Consultation/ Clarification in respect of Project Component and shall also provide to consultant all the relevant documents such as detail project report, design calculation sheet, drawings and agreement copy as per requirement. Design, Build& Operation Engineer will ensure coordination between Operator and IVA personnel and will provide access to the site of work.

1. **Team composition and qualification required for the key experts:**

The assignment requires a firm or consortium with skills and experience in similar assignments (Third Party Inspections/IVA) in the water and sanitation sector in India and having familiarity with the community led water supply and sanitation approaches. The team should also have diverse experience of working on similar projects. Following is the list of Key Professional positions whose CV and experience would be evaluated. The qualification and experience of experts/key personnel required is as under:

| **Description** | **Minimum Qualification** | **Minimum Experience** | **Number of person** | **Man Months Tentative** |
| --- | --- | --- | --- | --- |
| Team Leader | Graduate in Civil Engineering and Post Graduate in with Public Health Engg. / Structures/ Environmental Engg. or equivalent specialization. | * More than 15 yrs of experience in design, construction, commissioning and management of large surface based water supply projects. * Preference will be given to experience on projects financed by multinational & International agencies with capability to handle environmentally sound construction method (Discourage use of retired staff of DWSS or any other similar departments to bring fairness in judgment on quality issues). * Experience in quality assurance in design, construction and performance monitoring of water supply systems. * Experience of working on minimum two, third party quality assurance assignments of which one should be as a team leader. | 1 | 30 man months. |
| Assistant Team Leader-cum-Quality Assurance Engineer (Field) | Graduate in Civil Engineering; preferably Post graduate in Public Health Engg. / Structures / Environmental Engg. or equivalent specialization. | * 10 yrs of relevant experience in design, construction& management of large water supply schemes. * At least five years of experience in construction management and quality assurance. * Familiar with various standards/ specifications, contract procedures, design & quality controls. * Must have at-least 3 years of experience in Quality Assurance Work(Discourage use of retired staff of DWSS or any other similar departments to bring fairness in judgment on quality issues) | 5  (One for each of 5 schemes). | 5x30 = 150 man months |
| Field Engineer | Graduate in Civil Engineering | * 5 yrs of relevant experience in construction of Water Supply project. * Familiar with documentation and MS projects.(Discourage use of retired staff for DWSS or any other similar departments to bring fairness in judgment on quality issues) | 5  (One for each of 5 sch). | 5x30 = 150 man months |
| Expert Staff (to be supplied based on need/DWSS to indent) Structural Design Engineer, Hydraulic Design Engineer, Electro Mechanical Engineer, SCADA Specialist, Environment & Social Safeguard experts and Surveyor | Minimum graduation in the relevant field. | * Minimum experience of 10 years in the relevant field. |  | 34 man months. |

**Table depicting scheme wise deployment of key personnel:- The staffing plan of Key personnel & Expert staff are tentatively given as under:-**

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Sr. No.** | **Key Personnel** | **No. of Person for 5 Sch.** | | | | | | **Man Months Tentative** |
| **DBO Project Patiala cluster-1** | **DBO Project Patiala cluster-2** | **DBO Project Fatehgarh Sahib** | **DBO Project Gurdaspur** | **DBO Project Amritsar** | **Total** |
| 1 | **Key Personnel** |  |  |  |  |  |  |  |
| (i) Team Leader | 1 | | | | | 1 | 30 man-months |
| (ii) Assistant Team Leader-cum-Quality Assurance Engineer | 1 | 1 | 1 | 1 | 1 | 5 | 150 man-months |
| (iii) Field Engineer | 1 | 1 | 1 | 1 | 1 | 5 | 150 man-months |
| 2 | **Expert Staff**  **(required as per need)** |  |  |  |  |  |  | 34 man-months |
| (i) Structural Design Engineer | Should be Adequately available | | | | |  |  |
| (ii) Hydraulic Design Engineer | Should be Adequately available | | | | |  |
| (iii) Electro Mechanical Engineer | Should be Adequately available | | | | |  |
| (iv) SCADA Expert (Approx. 45 days on 1 Sch.) | Should be Adequately available | | | | |  |
| (v) Environmental & Social Safeguard Expert | 1 | 1 | 1 | 1 | 1 | 5 |
| (vi) Surveyor | Should be Adequately available | | | | |  |

**Note:**

* **In addition to above, supporting staff, Administrative Staff etc. office costs will not be paid separately.**
* **The Team/Staff shall also draw upon specific experience in carrying out its activities from Sectoral experts, as applicable.**
* **It may not be necessary that all 5 schemes are contracted for DBOT at the same time therefore resource requirement shall have to be planned accordingly.**

1. **Consultants Responsibility regarding Personnel:**

Consultant can use DWSS office in Districts Patiala, Fatehgarh Sahib, Gurdaspur & Amritsar to facilitate visits and reduce travel time & cost. Consultant will make its own arrangement for its staffs living and subsistence in these 5 districts or other suitable location as per requirement. This will include all travel and logistic arrangements required for its Team. Consultant will make his own arrangements for all the activities it has to perform in meeting the scope of services under this consultancy such as arrangements for office equipments and other essentials like computer, telephone, email connection, photocopying, Stationery, fax etc.

1. **Consultancy duration:**

The Consultancy duration from start to commissioning of each of five schemes shall be 30 months and can be further extended with the mutual consent of both the parties on the same terms & conditions.

1. **Selection Criteria for Evaluating the Proposal:**

Criteria, sub-criteria, and point system for the evaluation of the Full Technical Proposals would be as under:

|  |  |  |
| --- | --- | --- |
|  |  | **Points** |
| (i) | Specific experience of the Consultant (as a firm) relevant to the Assignment: | 20 |
| (ii) | Adequacy and quality of the proposed methodology, and work plan in responding to the Terms of Reference | 40 |

*{Notes to Consultant: the Client will assess whether the proposed methodology is clear, responds to the TORs, work plan is realistic and implementable; overall team composition is balanced and has an appropriate skills mix; and the work plan has right input of Experts} Criteria for distribution of 40 marks is as under:-*

|  |  |  |
| --- | --- | --- |
| a) | Methodology | 25 |
| b) | Work plan | 15 |

(iii) Key Experts’ qualifications and competence for the Assignment:

Distribution of 40 marks for the key experts for the evaluation of technical proposal would be as under:

|  |  |  |
| --- | --- | --- |
| a) | *Team Leader*(1 No.\* 10 marks) | 10 |
| b) | Assistant Team Leader cum Quality Assurance Engineer(5 No.\* 3 marks) | 15 |
| c) | Field Engineer(5 No.\* 3marks) | 15 |

**Total points for criterion (iii) 40**

The number of points to be assigned to each of the above positions shall be determined considering the following three sub-criteria and relevant percentage weights:

1. General qualifications – meeting minimum qualifications (general education, training, and experience):*30 % weightage*
2. Additional qualifications for the Assignment such relevant education, training relevant work, specialised experience and number of similar assignments undertaken (based on evidence)*: 65% (it is not about just experience but relevance is important)*
3. Relevant experience in the region (working level fluency in local language(s)/knowledge of local culture or administrative system, government organization, etc.): *5%*

**Total weight: 100%**

**Total points*:* 100**

**The minimum technical score (St) required to pass is***:70*

**Note: CV of the key personnel should be submitted on the curriculum vitae form Annexure-2.**

1. **Terms of Payment:**

|  |  |  |
| --- | --- | --- |
| **Sr. No.** | **Deliverables** | **Payment** |
| 1 | Submission and acceptance of agreed monthly reports (30 months) - | **Based on actual man days used plus fixed cost minus 10% of total monthly Amount.** |
| 2 | Submission and acceptance of Final report | Release 10% on hold. |

**Note: Sample testing of materials, if required will be paid as per actual.**

1. **Ownership:**

The consultancy is funded by GoP and therefore DWSS is the owner of the consultancy output. The consultant will have no right or claim to the consultancy after its completion. The Consultant shall not use the outputs of consultancy without prior consent of DWSS.

**OFFICE OF HEAD**

**DEPARTMENT OF WATER SUPPLY & SANITATION**

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## Appendix 3 A:

**Performance Standards**

### Coverage

The Operator shall ensure that it has covered 100% of the villages, in accordance with the , by Operational Acceptance of the scheme.

### Continuity of Service

The Operator shall ensure that water is always available at all the villages served by the Water Supply System for 24 hours supply 7 days a week .He shall make his own assessment of equipment and works to be part of the project to ensure such requirements.

The Operator may temporarily interrupt supplies referred to above whenever:

1. the Operator reasonably wishes to examine, alter, repair, maintain or construct works, provided the Operator has informed the Design Build Operations Engineer and the concerned village (s) in writing and on telephone / at least 48 hours in advance of the date upon which, and times between which, the supply will be interrupted; and such interruptions shall not exceed two in a consecutive period of 12 months; or
2. there is, or is reasonably likely to be, a risk that would endanger human life or any part of the environment, or compromise the health or safety of any person, or the safety of any works.
3. The Operator shall not be deemed to have failed to comply with the provision above whenever an interruption to supply occurs, because of:
   1. the action of a third party over which the Operator has no control;
   2. failure of the national grid electricity supply system for more than 12 hours at any of the Operator’s head works, treatment works or pumping stations
   3. an act of God (force majeure).

**Provided the Operator has informed the Design Build Operate Engineer / Owner’s Representative in writing of such event within 12 hours of occurrence of such event.**

### Quality of Treated Water

The Operator shall treat all water supplied to in compliance with the Indian Standard Specifications for Drinking Water (IS: 10500, as amended). By adopting below mentioned frequency of analyzing/ testing of water sample, the Operator shall ensure that the quality of water throughout the Water Supply System does not exceed the acceptable given in IS:10500:2012. The guidelines of Uniform Drinking Water Quality Monitoring Protocol (2013) and Schedule 4 shall be followed for ensuring quality of treated water.

### Pressure of Water Supplies

The Operator shall ensure that the pressure at the Existing Village Water Works of every village covered under the Water Supply System complies with

* Manual on Water Supply and Treatment (third edition - revised and updated) by Government of India Ministry of Urban development, New Delhi, March 1999.
* the pressure in the Water Supply System is always sufficient to prevent back-siphoning or infiltration of water into the system;
* Minimum terminal pressure at bulk supply point will be 3.0 meters at all time.

### Availability of supply

The Operator shall ensure that compulsory water restrictions are not imposed in the Water Supply System for more than once in one year.

### Maintenance and Repairs

The Operator shall on all works covered under the Operation and Maintenance agreement:

maintain and keep the works in good repair and working condition;

ensure that the Water Supply System operates effectively/ efficiently at all times; and

take appropriate action within shortest time but not exceeding five hours for any failure in any part of the Water Supply System being discovered by it, or brought to its attention.

### Physical Losses

The Operator shall ensure that physical losses on the network are as follows

1. Losses in raw water conveyance and at the water treatment plant primarily associated with backwash operations are less than 5 per cent per reporting period;
2. Losses on the clear water conveyance system (including service reservoirs)are less than 5% per reporting period.

### Prevention of pollution

The Operator shall comply with all state and national legislation in relation to discharges or disposal of any matter for which a waste discharge permit is required.

### Customer Service

A representative of the Operator shall be available at “Complaint Redressal office at Treatment Plant” for minimum of 12 hours (7AM to 7 PM)per day to receive users who wish to make enquiries or submit complaints during the Operation and Maintenance Period. The Operator shall comply with the minimum performance level set out in the following table:

| **Indicator** | **Minimum**  **Performance Level** |
| --- | --- |
| * Complaints to be resolved within 24 hours: Complaints related to water quality, no water. * Complaints to be resolved within 48 hours: Complaints related to low pressure, leaks in transmission lines./ Defect in BF valve / Bulk metre repair or replacement | 90% for all the indicators |

### Maintenance and Repairs

The Operator shall on all works (including machines, equipment, etc) covered under this Operation and Maintenance Schedule:

1. maintain and keep the works and equipment in good repair and working condition;
2. All reservoirs will be cleaned at least once per year or as necessary in order to prevent contamination of water supplies
3. ensure that the Water Supply System operates effectively at all times; and
4. take appropriate action within five hours of any failure in any part of the Water Supply System being discovered by it, or brought to its attention.

### Environmental Compliance

The Operator shall prepare and include Environmental Management Plan in Schedule 0 following the Environmental Code of Practice set out in Schedule 4 and as subsequently updated. The initial Environmental Management Plan shall be approved by the Design Build Operations Engineer and IVA.

The Operator shall follow the Environmental Code of Practice set out in Environmental Management Framework and take all reasonable steps to protect the environment and to mitigate damage and nuisance to people and property resulting from pollution, noise and other negative impacts resulting from the services. The Operator shall ensure that air emissions and surface discharges in respect of the Project shall not exceed the standards prescribed by Applicable Laws and the Environment Management Plan. The Operator will be required to implement all aspects of this Environment Management Plan and for ensuring compliance with the Environment Management Plan by Sub-Contractors involved in implementing obligations of the Operator under the Operations And Maintenance Services.

The Operator shall comply with all state and national legislation in relation to discharges or disposal of any matter for which a waste discharge permit is required.

During the duration of Operations And Maintenance Services, the Operator shall indemnify and hold harmless the Owner against any fines or penalties imposed under the Applicable Laws in respect of environmental laws other than in the event of a Pollution Event. During operation and maintenance he will ensure that the Environmental Management Plan is followed.

### Pollution Events

If there is a Pollution Event at any Raw Water intake, the Owner shall hold the Operator harmless of any legal and financial consequences arising from the Pollution Event provided that the Operator has:

* informed the Corporation of the Pollution Event within 2 hours of it being triggered;
* initiated the Emergency Response in accordance with the Agreed Emergency Response Plan; and
* exercised due care in the operation and maintenance of the Facilities and used all reasonable efforts to mitigate the impact of the Pollution Event.

A Pollution Event will be considered as an Allowable Exclusion in any related Performance Requirement under the Agreement.

## Appendix 3B: Water Supply Area

The Operator shall for the duration of the Contract have obligation and rights to supply water upto the Existing Village Water Works for the villages as detailed in the table below.

**Patiala Cluster-1**

| **Sr.**  **No.** | **District** | **Development Block** | **Habitation** | **Population (2019)** |
| --- | --- | --- | --- | --- |
|  | **Water supply area** | |  |  |
| 1 | Patiala | Ghanour | 1. Sone Majra (928)  2. Sogalpur (683) | 1717 |
| 2 | Patiala | Ghanour | 1.Baghoura (1384) 2. Majri Fakiran (396) | 1897 |
| 3 | Patiala | Ghanour | Ulana (1909) | 2035 |
| 4 | Patiala | Ghanour | Sanoulian (1120) | 1194 |
| 5 | Patiala | Ghanour | Kami Kalan (1972) | 2102 |
| 6 | Patiala | Ghanour | 1. Harpalpur (3297) 2. Bhur Majra (34) | 3550 |
| 7 | Patiala | Ghanour | 1. Ghungran (229) 2. Shahpur Raian (153) 3. Sheikhpur Rajputan (373) | 805 |
| 8 | Patiala | Ghanour | Mandouli (3371) | 3593 |
| 9 | Patiala | Ghanour | Kutha Kheri (2013) | 2146 |
| 10 | Patiala | Ghanour | Lohakheri (512) | 546 |
| 11 | Patiala | Ghanour | Kohle Majra (1048) | 1117 |
| 12 | Patiala | Ghanour | 1.Alawal Majra (794) 2. Mehmoodpur (720) | 1614 |
| 13 | Patiala | Rajpura | Khairpur Jattan (1176) | 1254 |
| 14 | Patiala | Rajpura | 1. Saidkheri (8334) 2. Gazipur (460) | 9372 |
| 15 | Patiala | Rajpura | Neelpur (8391) | 8942 |
| 16 | Patiala | Rajpura | 1. Khandouli (2017) 2. Bhadak (807) | 3010 |
| 17 | Patiala | Rajpura | Khanpur Gandian (1979) | 2109 |
| 18 | Patiala | Rajpura | Kheri Gandian (1790) | 1908 |
| 19 | Patiala | Rajpura | Mehma (838) | 894 |
| 20 | Patiala | Ghanour | 1. Suron (1913) 2. Paharipur (874) | 2970 |
| 21 | Patiala | Rajpura | Khanpur Baring (1615) | 1722 |
| 22 | Patiala | Rajpura | Bhoglan (1326) | 1414 |
| 23 | Patiala | Rajpura | Jandoli (4352) | 4638 |
| 24 | Patiala | Rajpura | Kharajpur (2490) | 2654 |
| 25 | Patiala | Ghanour | Kaboolpur (1162) | 1239 |
| 26 | Patiala | Ghanour | Hassanpur Jattan (928) | 989 |
| 27 | Patiala | Ghanour | Salempur Sekhan (3151) | 3358 |
| 28 | Patiala | Ghanour | Nogawan (923) | 984 |
| 29 | Patiala | Ghanour | Chatar Nagar (606) | 646 |
| 30 | Patiala | Ghanour | 1. Jakhepal (506) 2. Bibipur (260) | 817 |
| 31 | Patiala | Ghanour | 1. Khairpur Sekhan (961) 2. Hashampur (459) | 1514 |
| 32 | Patiala | Ghanour | Faridpur Jattan (957) | 1020 |
| 33 | Patiala | Ghanour | 1. Sahal (1294) 2. Lochwan (1215) | 2674 |
| 34 | Patiala | Ghanour | 1. Mandiana (1502) 2. Dharamgarh (302) | 1924 |
| 35 | Patiala | Ghanour | 1. Bathonia Khurd (1473) 2. Bathonia Kalan (1864) 3. Gandian (456) | 4043 |
| 36 | Patiala | Ghanour | 1. Lachhru Kalan (1703) 2. Lachhru Khurd (369) | 2209 |
| 37 | Patiala | Ghanour | Chamaru (1691) | 1803 |
| 38 | Patiala | Ghanour | Kami Khurd (1439) | 1534 |
| 39 | Patiala | Ghanour | Jand Mangoli (1565) | 1668 |
| 40 | Patiala | Ghanour | Untsar (834) | 889 |
| 41 | Patiala | Ghanour | Samaspur (727) | 775 |
| 42 | Patiala | Ghanour | Lohsimbli (3248) | 3462 |
| 43 | Patiala | Ghanour | 1. Raipur (389) 2. Nanheri (726) | 1189 |
| 44 | Patiala | Ghanour | Ballopur (480) | 512 |
| 45 | Patiala | Ghanour | Mirjapur (530) | 565 |
| 46 | Patiala | Ghanour | Sandharsi (1705) | 1817 |
| 47 | Patiala | Ghanour | Pipal Mangoli (1035) | 1103 |
| 48 | Patiala | Ghanour | Gadapur (902) | 962 |
| 49 | Patiala | Ghanour | Baprour (2271) | 2421 |
| 50 | Patiala | Ghanour | Sanjarpur (868) | 925 |
| 51 | Patiala | Ghanour | Mehmadpur (663) | 707 |
| 52 | Patiala | Ghanour | Mardanpur (2451) | 2612 |
| 53 | Patiala | Ghanour | 1. Khalaspur (354) 2. Uksi (598) | 1015 |
| 54 | Patiala | Ghanour | Dahrian (1426) | 1520 |
| 55 | Patiala | Ghanour | Shambhu Khurd (665) | 709 |
| 56 | Patiala | Ghanour | Mugal Sarai (475) | 507 |
| 57 | Patiala | Ghanour | Naushera (825) | 880 |
| 58 | Patiala | Ghanour | Ali Majra (1575) | 1679 |
| 59 | Patiala | Ghanour | Shambhu Kalan (3589) | 3825 |
| 60 | Patiala | Ghanour | Ram Nagar Sainian (2025) | 2158 |
| 61 | Patiala | Ghanour | Rajgarh (1756) | 1872 |
| 62 | Patiala | Ghanour | Tepla (3029) | 3228 |
| 63 | Patiala | Rajpura | 1. Basma (2699) 2. Jhajjon (766) | 3693 |
| 64 | Patiala | Ghanour | Nanhera (1983) | 2114 |
| 65 | Patiala | Rajpura | 1. Gharama Kalan (1355) 2. Gharama Khurd (192) | 1649 |
| 66 | Patiala | Rajpura | Nandgarh (856) | 913 |
| 67 | Patiala | Rajpura | Lohand (316) | 337 |
| 68 | Patiala | Rajpura | Mohi Kalan (1063) | 1133 |
| 69 | Patiala | Rajpura | Kheri Gurna (1841) | 1962 |
| 70 | Patiala | Rajpura | Surajgarh (971) | 1035 |
| 71 | Patiala | Rajpura | Gardi Nagar (863) | 920 |
| 72 | Patiala | Rajpura | Mohi Khurd (1885) | 2009 |
| 73 | Patiala | Rajpura | 1. Rampur Khurd (923) 2. Bal Majra (352) | 1359 |
| 74 | Patiala | Rajpura | Jalalpur (953) | 1016 |
| 75 | Patiala | Rajpura | Ram Nagar (1269) | 1353 |
| 76 | Patiala | Rajpura | Kalo Majra (852) | 908 |
| 77 | Patiala | Rajpura | Changera (1218) | 1298 |
| 78 | Patiala | Rajpura | Buta Singh Wala (2328) | 2481 |
| 79 | Patiala | Ghanour | Bhuri Majra (414) | 442 |
| 80 | Patiala | Ghanour | Ghaggar Sarai (1843) | 1964 |
| 81 | Patiala | Ghanour | Chalheri (2123) | 2263 |
| 82 | Patiala | Ghanour | Madanpur (2515) | 2681 |
| 83 | Patiala | Rajpura | 1. Chamaru ® (2763)  2. Mehtabgarh (132) | 3086 |
| 84 | Patiala | Rajpura | Thuha (2583) | 2753 |
| 85 | Patiala | Rajpura | Nepran (1112) | 1186 |
| 86 | Patiala | Rajpura | Shamdoo (3912) | 4169 |
| 87 | Patiala | Rajpura | Alampur (1157) | 1233 |
| 88 | Patiala | Ghanour | Darwa (571) | 609 |
| 89 | Patiala | Ghanour | Marrian (568) | 606 |
| 90 | Patiala | Ghanour | Naraingarh (838) | 894 |
| 91 | Patiala | Ghanour | Harpalan (964) | 1028 |
| 92 | Patiala | Ghanour | Jamitgarh (1521) | 1621 |
| 93 | Patiala | Ghanour | Jabbo Majra (1029) | 1097 |
| 94 | Patiala | Ghanour | Rampur (1294) | 1379 |
| 95 | Patiala | Ghanour | Sounta (859) | 916 |
| 96 | Patiala | Ghanour | 1. Kapoori (1731)2. Kamalpur (248)3. Jharwan (247) | 2373 |
| 97 | Patiala | Ghanour | Sarala Kalan (1882) | 2006 |
| 98 | Patiala | Ghanour | Sarala Khurd (1378) | 1469 |
| 99 | Patiala | Ghanour | Mehdudan (870) | 928 |
| 100 | Patiala | Ghanour | Ghanouri Khera (1370) | 1460 |
| 101 | Patiala | Ghanour | Manjoli (2077) | 2214 |
| 102 | Patiala | Ghanour | 1. Hari Majra (1807) 2. Jogi Majra (74) 3. Balheri (308) | 2333 |
| 103 | Patiala | Ghanour | Harigarh (756) | 806 |
| 104 | Patiala | Ghanour | Salempur Jattan (734) | 783 |
| 105 | Patiala | Ghanour | Rurki (889) | 948 |
| 106 | Patiala | Ghanour | 1. Sialoo (534) 2. Rurka (835) | 1459 |
| 107 | Patiala | Ghanour | 1. Nasirpur (289) 2. Alamdipur (1050) | 1427 |
| 108 | Patiala | Ghanour | 1. Haripur Jhungian (995) 2. Katlahar (257) 3. Rasulpur (196) | 1544 |
| 109 | Patiala | Ghanour | Zarikpur (693) | 739 |
| 110 | Patiala | Ghanour | Chhapar (2534) | 2701 |
| 111 | Patiala | Sanour | Rathian (1502) | 1601 |
| 112 | Patiala | Ghanour | 1. Sheikhupur (884) 2. Maggar (413) | 1383 |
| 113 | Patiala | Ghanour | Bhat Majra (1547) | 1649 |
| 114 | Patiala | Ghanour | 1. Bahawalpur (248) 2. Lanjan (155) 3. Sultanpur (109) | 546 |
| 115 | Patiala | Ghanour | Ajrawar (4176) | 4451 |
| 116 | Patiala | Ghanour | Nathu Majra (596) | 636 |
| 117 | Patiala | Ghanour | Nardu (2227) | 2374 |
| 118 | Patiala | Ghanour | Ghumana (969) | 1033 |
| 119 | Patiala | Ghanour | 1. Lakho Majra (884) 2. Rao majra (385) | 1353 |
| 120 | Patiala | Patiala | Muradpur (1038) | 1107 |
| 121 | Patiala | Rajpura | 1. Dhindsa (926) 2. Jakhran (594) | 1620 |
| 122 | Patiala | Patiala | Bir Kauli (700) | 746 |
| 123 | Patiala | Ghanour | 1. Pandtan Kheri (1036) 2. Shahpur afgana (141) | 1255 |
| 124 | Patiala | Ghanour | Seel (2180) | 2324 |
| 125 | Patiala | Ghanour | Kheri Mandlan (779) | 831 |
| 126 | Patiala | Patiala | Chamarheri (939) | 1001 |
| 127 | Patiala | Patiala | Mithu Majra (623) | 664 |
| 128 | Patiala | Patiala | Dharreri Jattan (1167) | 1244 |
| 129 | Patiala | Patiala | Bathlan (447) | 509 |
| 130 | Patiala | Patiala | 1. Mehmadpur Jattan (T/Well No. 3) (1748) 2. Farm Bahadurgarh (T/Well No. 1) (597) 3. Kasba Rurki (T/Well No. 2) (10509) | 13695 |
| 131 | Patiala | Patiala | Raipur Mandlan (2561) | 2730 |
| 132 | Patiala | Sanour | Jalalpur (2028) | 2162 |
| 133 | Patiala | Patiala | 1. Budanpur (691) 2. Samaspur (821) | 1612 |
| 134 | Patiala | Sanour | Noor Kherian (2052) | 2187 |
| 135 | Patiala | Patiala | Karheri (2766) | 2948 |
| 136 | Patiala | Sanour | 1. Therri (4046) 2. Deelwal (1555) | 5969 |
| 137 | Patiala | Patiala | Nasirpur & Professor Enclave (238) | 254 |
| 138 | Patiala | Patiala | Sekhupur Kamboan (2284) | 2434 |
| 139 | Patiala | Patiala | 1. Safdipur (750) 2. Mehmoodpur Araian (194) | 1006 |
| 140 | Patiala | Patiala | Falouli (308) | 329 |
| 141 | Patiala | Patiala | Bir Bahadurgarh (370) | 395 |
| 142 | Patiala | Sanour | Choura (4656) | 4962 |
| 143 | Patiala | Sanour | Malikpur Jattan (605) | 645 |
| 144 | Patiala | Sanour | 1. Karanpur (1224) 2. Nagar (285) | 1609 |
| 145 | Patiala | Sanour | 1. Mehargarh Batta (729) 2. Mehargarh Batti (488) 3. Kotla Gehru (575) | 1910 |
| 146 | Patiala | Sanour | Bolri (390) | 416 |
| 147 | Patiala | Sanour | 1. Jogipur (1666) 2. Bosar kalan (1540) | 3417 |
| 148 | Patiala | Sanour | Punia Jattan (583) | 622 |
| 149 | Patiala | Sanour | 1. Kartarpur (529) 2. Bosar Khurd (228) 3. Assarpur (1315) | 2209 |
| 150 | Patiala | Sanour | Bolar Kalan (2136) | 2277 |
| 151 | Patiala | Sanour | 1. Ballan (842) 2. Balamgarh (1200) | 2177 |
| 152 | Patiala | Sanour | Ganour (574) | 612 |
| 153 | Patiala | Sanour | Lalina (772) | 823 |
| 154 | Patiala | Sanour | 1. Khuda (1806) 2. Shadipur (185) | 2122 |
| 155 | Patiala | Sanour | Fatehpur Rajputtan (1546) | 1648 |
| **Total** | | | **204 VILL.** | **287237** |

**Patiala Cluster-2**

| **Sr.**  **No.** | **District** | **Development Block** | **Habitation** | **Population (2019)** |
| --- | --- | --- | --- | --- |
|  | **Water supply area** | |  |  |
| 1 | Patiala | Rajpura | Pabra (1315) | 1402 |
| 2 | Patiala | Rajpura | Takhtu Majra (1002) | 1068 |
| 3 | Patiala | Rajpura | Sehra (1447) | 1542 |
| 4 | Patiala | Rajpura | Sehri (752) | 802 |
| 5 | Patiala | Rajpura | Tehalpura (517) | 551 |
| 6 | Patiala | Rajpura | 1. Akar (1331) 2. Akri (596) 3. Ditupur Fakiran (342) 4. Bathli (294) | 2732 |
| 7 | Patiala | Rajpura | 1. Gopalpur ( 1805) 2. Badoli Gujran (818) | 2796 |
| 8 | Patiala | Rajpura | Abdulpur (408) | 435 |
| 9 | Patiala | Patiala | Shankarpur (1110) | 1183 |
| 10 | Patiala | Patiala | Gounspur (389) | 415 |
| 11 | Patiala | Patiala | Mohabatpur (330) | 352 |
| 12 | Patiala | Patiala | 1. Kauli (2328) 2. Multanpur (979) | 3525 |
| 13 | Patiala | Patiala | Fatehpur Jattan (299) | 319 |
| 14 | Patiala | Patiala | Alampur (1219) | 1300 |
| 15 | Patiala | Patiala | Daun Kalan (3482) | 3711 |
| 16 | Patiala | Patiala | Bhateri (806) | 859 |
| 17 | Patiala | Patiala | Rasulpur Joura (839) | 895 |
| 18 | Patiala | Patiala | Daulatpur Fakiran (557) | 594 |
| 19 | Patiala | Patiala | Shadiwal urf Jaffarnagar(487) | 519 |
| 20 | Patiala | Patiala | 1. Boharpur (578) 2. Janheria (1237) | 1935 |
| 21 | Patiala | Patiala | 1. Panoudian (724)2. Sunarheri urf Gobindpur(194) | 979 |
| 22 | Patiala | Patiala | Daun Khurd (1330) | 1418 |
| 23 | Patiala | Patiala | Mirjapur (P) (440) | 469 |
| 24 | Patiala | Patiala | Reetkheri (822) | 876 |
| 25 | Patiala | Patiala | Nandpur Kesho (1463) | 1560 |
| 26 | Patiala | Patiala | 1. Kalwa (1187) 2. Faridpur (246) | 1528 |
| 27 | Patiala | Patiala | Majri Akalia (927) | 988 |
| 28 | Patiala | Sirhind | Jago Chanarthal (808) | 862 |
| 29 | Patiala | Rajpura | Pabri (1457) | 1553 |
| 30 | Patiala | Rajpura | Mandwal (1114) | 1188 |
| 31 | Patiala | Rajpura | Damanheri (1742) | 1857 |
| 32 | Patiala | Rajpura | 1. Devi Nagar (513) 2. Khanpur Khurd (850) | 1453 |
| 33 | Patiala | Rajpura | Pilkhani (2013) | 2146 |
| 34 | Patiala | Rajpura | 1. Uksi Sainian/Jattan (1728) 2. Kanwarpur (58) | 1904 |
| 35 | Patiala | Rajpura | 1. Jai Nagar (1465) 2. Safdarpur (703) | 2311 |
| 36 | Patiala | Rajpura | Bhedwal Jhungian (1425) | 1519 |
| 37 | Patiala | Rajpura | Dharamgarh (HB-24) (436) | 465 |
| 38 | Patiala | Rajpura | Aluna(1313) | 1400 |
| 39 | Patiala | Rajpura | Basantpura (1351) | 1440 |
| 40 | Patiala | Rajpura | 1. Chanduan Khurd (504) 2. Ram Nagar Urf Saunti (321) | 880 |
| 41 | Patiala | Rajpura | 1. Ugana (310)2. Parao (448) | 808 |
| 42 | Patiala | Rajpura | Uppalheri (1295) | 1381 |
| 43 | Patiala | Rajpura | 1. Bhateri (1310) 2. Akbarpur (610) 3. Faridpur Gujran (258) | 2321 |
| 44 | Patiala | Rajpura | Dhakansu Majra (580) | 619 |
| 45 | Patiala | Rajpura | 1. Dhakansu Kalan (3792) 2. Dhakansu Khurd (255) | 4313 |
| 46 | Patiala | Rajpura | Harion (525) | 560 |
| 47 | Patiala | Rajpura | Bakshiwala (1453) | 1549 |
| 48 | Patiala | Rajpura | 1. Sarai Banjara (897) 2. Chack Kalan (544) | 1536 |
| 49 | Patiala | Rajpura | 1. Balsuan (752) 2. Chandu Majra (707)  3. Chack khurd Urf Gobindpura (226) | 1796 |
| 50 | Patiala | Rajpura | Ugani (587) | 626 |
| 51 | Patiala | Rajpura | Naina (479) | 511 |
| 52 | Patiala | Rajpura | 1. Sural Kalan (1921) 2. Sural Khurd (385) | 2458 |
| 53 | Patiala | Rajpura | Rangian (693) | 739 |
| 54 | Patiala | Rajpura | 1. Bhappal (1977) 2. Mangpur (554) | 2698 |
| 55 | Patiala | Rajpura | Nalas Kalan (2631) | 2804 |
| 56 | Patiala | Rajpura | Nalas Khurd (1046) | 1115 |
| 57 | Patiala | Rajpura | Kotla (1131) | 1206 |
| 58 | Patiala | Rajpura | 1. Dhabali Kalan (796) 2. Dhabali Khurd (423) | 1300 |
| 59 | Patiala | Rajpura | 1. Mirjapur (1347)  2. Wazirabad (267) | 1720 |
| 60 | Patiala | Rajpura | Gado Majra (944) | 1006 |
| 61 | Patiala | Rajpura | 1. Pehar Kalan (1078) 2. Pehar Khurd (660) | 1853 |
| 62 | Patiala | Rajpura | Niamatpura (959) | 1022 |
| 63 | Patiala | Rajpura | Jansua (3650) | 3890 |
| 64 | Patiala | Rajpura | Jansui (827) | 882 |
| 65 | Patiala | Rajpura | Kharola (2143) | 2284 |
| 66 | Patiala | Rajpura | Urdan (2056) | 2191 |
| 67 | Patiala | Rajpura | 1. Faridpur (951) 2. Bhatiras (313) | 1347 |
| 68 | Patiala | Rajpura | Jhansla (1935) | 2063 |
| 69 | Patiala | Rajpura | Fatehpur Garhi (1152) | 1228 |
| 70 | Patiala | Rajpura | Jhansli (932) | 994 |
| 71 | Patiala | Rajpura | Gobindpura urf Jangpura (2166) | 2309 |
| 72 | Patiala | Rajpura | Hulka (1366) | 1456 |
| 73 | Patiala | Rajpura | Khanpur Banger (1256) | 1339 |
| 74 | Patiala | Rajpura | Uchha Khera (918) | 979 |
| 75 | Patiala | Rajpura | Kaloli (2030) | 2164 |
| 76 | Patiala | Rajpura | Lehlan (523) | 558 |
| 77 | Patiala | Rajpura | Urna (1350) | 1439 |
| 78 | Patiala | Rajpura | Dhuma (702) | 749 |
| 79 | Patiala | Rajpura | 1. Sadhrour (834) 2. Rai Majra (100) | 996 |
| 80 | Patiala | Rajpura | 1. Khera Gajju (4552) 2. Hadaitpura (700) | 5597 |
| 81 | Patiala | Rajpura | 1. Gurditpura (1457) 2. Kehargarh (166) | 1730 |
| 82 | Patiala | Rajpura | Manakpur (3734) | 3980 |
| 83 | Patiala | Rajpura | Devi Nagar Abrawan (2068) | 2204 |
| 84 | Patiala | Rajpura | Tasoli (1903) | 2028 |
| **Total** | | | **112 VILL.** | **130079** |

**Fatehgarh Sahib**

| **Sr.**  **No.** | **District** | **Development Block** | **Habitation** | **Population (2019)** |
| --- | --- | --- | --- | --- |
|  | **Water supply area** | |  |  |
| 1 | Fatehgarh Sahib | Bassi Pathana | Alampur (220) | 235 |
| 2 | Fatehgarh Sahib | Bassi Pathana | Nanowal (341) Sikandarpur (269) | 651 |
| 3 | Fatehgarh Sahib | Bassi Pathana | Badwala (726) Jawandha (691) Lachhmangarh (52) | 1566 |
| 4 | Fatehgarh Sahib | Bassi Pathana | Lullon (1221) | 1302 |
| 5 | Fatehgarh Sahib | Khera | 1. Rajindergarh (1630) 2. Sadhugarh (157) | 1905 |
| 6 | Fatehgarh Sahib | Khera | Chunni Majra (516) | 550 |
| 7 | Fatehgarh Sahib | Khera | 1. Bhaini Kalan (650) 2. Dhollan (370) 3. Naraingarh (209) | 1310 |
| 8 | Fatehgarh Sahib | Khera | 1. Bhaini Khurd (214) 2. Patarsi Kalan (419) | 675 |
| 9 | Fatehgarh Sahib | Khera | Patarsi Khurd (267) | 285 |
| 10 | Fatehgarh Sahib | Khera | Kheri Bhai Ki (723) | 771 |
| 11 | Fatehgarh Sahib | Khera | Brass (2264) | 2413 |
| 12 | Fatehgarh Sahib | Khera | Rampur (1109) | 1182 |
| 13 | Fatehgarh Sahib | Khera | Rasulpur (1372) | 1463 |
| 14 | Fatehgarh Sahib | Khera | Chunni Kalan (2813) | 2998 |
| 15 | Fatehgarh Sahib | Khera | 1. Bassian (980) 2. Mehdudan (287) | 1351 |
| 16 | Fatehgarh Sahib | Khera | Jhampur (1318) | 1405 |
| 17 | Fatehgarh Sahib | Khera | Bhagrana (2851) | 3039 |
| 18 | Fatehgarh Sahib | Khera | Bhua Kheri (464) | 495 |
| 19 | Fatehgarh Sahib | Khera | Mehtabgarh (468) | 499 |
| 20 | Fatehgarh Sahib | Khera | 1. Dolatpur (150) 2. Bhagatpur (590) 3. Tajpura (386) | 1200 |
| 21 | Fatehgarh Sahib | Khera | 1. Patton (744) 2. Naraina (524) | 1352 |
| 22 | Fatehgarh Sahib | Khera | Pawala (1974) | 2104 |
| 23 | Fatehgarh Sahib | Khera | Manhera Jattan (734) | 783 |
| 24 | Fatehgarh Sahib | Khera | Jamitgarh (742) | 791 |
| 25 | Fatehgarh Sahib | Khera | Nadiali (503) | 537 |
| 26 | Fatehgarh Sahib | Khera | 1. Khanpur Behlan (1064) 2. Khanpur Bir (253) | 1404 |
| 27 | Fatehgarh Sahib | Khera | Sir Kapra (636) | 678 |
| 28 | Fatehgarh Sahib | Khera | Timberpur (949) | 1012 |
| 29 | Fatehgarh Sahib | Khera | 1. Sindran (463) 2. Salempur (695) | 1235 |
| 30 | Fatehgarh Sahib | Khera | Cholti Kheri (425) | 453 |
| 31 | Fatehgarh Sahib | Khera | 1. Loha Kheri (528) 2. Dadu Majra (1586) | 2253 |
| 32 | Fatehgarh Sahib | Khera | Badali Mai Ki (778) | 830 |
| 33 | Fatehgarh Sahib | Khera | Harna (713) | 760 |
| 34 | Fatehgarh Sahib | Khera | Haripur (248) | 265 |
| 35 | Fatehgarh Sahib | Khera | 1. Hansali (802) 2. Khera (1060) | 1985 |
| 36 | Fatehgarh Sahib | Khera | Ramgarh Sainian (621) | 662 |
| 37 | Fatehgarh Sahib | Khera | 1. Balari Khurd (613) 2. Raipur Gijran (629) | 1324 |
| 38 | Fatehgarh Sahib | Khera | Balara (865) | 922 |
| 39 | Fatehgarh Sahib | Khera | 1. Dubhali (868) 2. Dangherian (1089) | 2086 |
| 40 | Fatehgarh Sahib | Khera | 1. Balari Kalan (1707) 2. Bombay Majra (160) | 1990 |
| 41 | Fatehgarh Sahib | Khera | 1. Hindupur (878) 2. Bibipur (765) | 1751 |
| 42 | Fatehgarh Sahib | Khera | 1. Mukaronpur (614) 2. Iserhail (967) | 1685 |
| 43 | Fatehgarh Sahib | Khera | Badali Ala Singh (1984) | 2115 |
| 44 | Fatehgarh Sahib | Khera | 1. Ghel (1227) 2. Kale Majra (353) 3. Niamu Majra (313) | 2018 |
| 45 | Fatehgarh Sahib | Khera | Sampla (873) | 931 |
| 46 | Fatehgarh Sahib | Khera | 1. Gadhera (824) 2. Mahmadpur (1535) | 2514 |
| 47 | Fatehgarh Sahib | Khera | 1. Dufera (923) 2. Bhaganpur (509) | 1527 |
| 48 | Fatehgarh Sahib | Khera | 1. Peer Jain (799) 2. Kotla Fazal (1109) | 2034 |
| 49 | Fatehgarh Sahib | Bassi Pathana | 1. Rupalheri (1120) 2. Kasumbri (1040) | 2302 |
| 50 | Fatehgarh Sahib | Bassi Pathana | Kheri Bir Singh (640) | 683 |
| 51 | Fatehgarh Sahib | Bassi Pathana | Shergarh Bara (517) | 551 |
| 52 | Fatehgarh Sahib | Bassi Pathana | Main Majri (1027) | 1095 |
| 53 | Fatehgarh Sahib | Bassi Pathana | Kamali (1224) | 1305 |
| 54 | Fatehgarh Sahib | Khera | 1. Pamour (1331) 2. Sampli (1243) | 2743 |
| 55 | Fatehgarh Sahib | Khera | Chunni Khurd (1998) | 2130 |
| 56 | Fatehgarh Sahib | Bassi Pathana | Dadiana (878) | 936 |
| 57 | Fatehgarh Sahib | Bassi Pathana | 1. Kalour (2106) 2. Nandpur (2880) | 5314 |
| 58 | Fatehgarh Sahib | Bassi Pathana | Marwa (866) | 923 |
| 59 | Fatehgarh Sahib | Bassi Pathana | 1. Raillon (1373) 2. Shivdaspur (194) | 1670 |
| 60 | Fatehgarh Sahib | Bassi Pathana | 1. Baher (1371) 2. Sehzadpur (426) | 1915 |
| 61 | Fatehgarh Sahib | Bassi Pathana | 1. Gunia Majri (321) 2. Bhanguan (494) | 869 |
| 62 | Fatehgarh Sahib | Bassi Pathana | Ghumandgarh (1014) | 1081 |
| **Total** | | | **93 VILL.** | **86813** |

**Gurdaspur**

| **Sr.**  **No.** | **District** | **Development Block** | **Habitation** | **Population (2019)** |
| --- | --- | --- | --- | --- |
|  | **Water supply area** | |  |  |
| 1 | Gurdaspur | Fatehgarh Churrian | Parowal | 1497 |
|  |  |  | Kotli Dhadian | 1054 |
| 2 | Gurdaspur | Fatehgarh Churrian | Khaira | 2686 |
| 3 | Gurdaspur | Fatehgarh Churrian | Qila Desa Singh | 2537 |
|  |  |  | Mansandwal | 2261 |
|  |  |  | New Mansandwal | 324 |
|  |  |  | Sekhwan | 1694 |
| 4 | Gurdaspur | Fatehgarh Churrian | Thatha | 2151 |
| 5 | Gurdaspur | Fatehgarh Churrian | Shamsherpur | 4955 |
|  |  |  | Chitorgarh Pindi | 1182 |
| 6 | Gurdaspur | Fatehgarh Churrian | Dadujodh | 989 |
|  |  |  | Dhande | 466 |
| 7 | Gurdaspur | Fatehgarh Churrian | Badowal Kalan | 1773 |
| 8 | Gurdaspur | Fatehgarh Churrian | Tarpala | 819 |
|  |  |  | Gharkian | 632 |
|  |  |  | Samrai | 877 |
| 9 | Gurdaspur | Fatehgarh Churrian | Lale Nangal | 464 |
| 10 | Gurdaspur | Fatehgarh Churrian | Doger | 1624 |
|  |  |  | Khusar Tahli | 567 |
| 11 | Gurdaspur | Fatehgarh Churrian | Veela teja | 4718 |
| 12 | Gurdaspur | Fatehgarh Churrian | Teja Kalan | 1283 |
|  |  |  | Teja Khurd | 585 |
| 13 | Gurdaspur | Fatehgarh Churrian | Kala Afgana | 5260 |
| 14 | Gurdaspur | Fatehgarh Churrian | Malewal | 1053 |
|  |  |  | Alawalwala | 454 |
| 15 | Gurdaspur | Fatehgarh Churrian | Pabarali | 2347 |
|  |  |  | Pabarali Khurd | 1851 |
| 16 | Gurdaspur | Dera Baba Nanak | Talwandi Rama | 2588 |
|  |  |  | Rupowali | 1051 |
| 17 | Gurdaspur | Dera Baba Nanak | Nikko Sarai | 2523 |
|  |  |  | Kathial | 1054 |
| 18 | Gurdaspur | Dera Baba Nanak | Shahpur Jajan | 4653 |
|  |  |  | Mohlowali | 776 |
|  |  |  | Rampur | 234 |
| 19 | Gurdaspur | Dera Baba Nanak | Malukwali | 421 |
| 20 | Gurdaspur | Dera Baba Nanak | Mulowali | 636 |
|  |  |  | Mangian | 1114 |
| 21 | Gurdaspur | Dera Baba Nanak | Bomb | 270 |
| 22 | Gurdaspur | Dera Baba Nanak | Abdal | 834 |
| 23 | Gurdaspur | Dera Baba Nanak | Ratta | 1167 |
| **Total** | | | **40 VILL.** | **63424** |

**Amritsar**

| **Sr.**  **No.** | **District** | **Development Block** | **Habitation** | **Population (2019)** |
| --- | --- | --- | --- | --- |
|  | **Water supply area** | |  |  |
|  | Amritsar | Chogawan | Chuchakwal (525) | 560 |
|  | Amritsar | Chogawan | Kalowal | 1476 |
|  | Amritsar | Chogawan | Khiala Kalan | 4400 |
|  | Amritsar | Chogawan | Bhilowal Kakeza (1229) | 1310 |
|  | Amritsar | Chogawan | Bachiwind (4204) | 4481 |
|  | Amritsar | Chogawan | Dala (1503) | 1602 |
|  | Amritsar | Chogawan | Bhagupur Bet (1143) | 1219 |
|  | Amritsar | Chogawan | Kotli Dosandi (1723) | 1837 |
|  | Amritsar | Chogawan | Rai (1109) | 1182 |
|  | Amritsar | Chogawan | Sarangra (3536) | 3769 |
|  | Amritsar | Chogawan | Audhar (125) | 134 |
|  | Amritsar | Chogawan | Dhariwal (517) | 551 |
|  | Amritsar | Chogawan | Chawinda Kalan (1688) | 1798 |
|  | Amritsar | Chogawan | Chawinda Khurd (1299) | 1385 |
|  | Amritsar | Chogawan | Kohali | 5411 |
|  | Amritsar | Attari | Dhanoa Kalan | 2058 |
|  | Amritsar | Chogawan | Lopoke | 6521 |
|  | Amritsar | Harcha Chhina | Kot Sidhu (702) | 749 |
|  | Amritsar | Chogawan | Lanven (356) | 380 |
|  | Amritsar | Chogawan | Beharwal (985) | 1050 |
|  | Amritsar | Chogawan | Saurian (1156) | 1232 |
|  | Amritsar | Chogawan | Tarin (258) | 275 |
|  | Amritsar | Chogawan | Nurpur (1075) | 1146 |
|  | Amritsar | Chogawan | Bhindi Saidan | 7234 |
|  | Amritsar | Chogawan | Chak Fateh Khan (133) | 142 |
|  | Amritsar | Chogawan | Jeoke (186) | 200 |
|  | Amritsar | Chogawan | Udher (187) | 201 |
|  | Amritsar | Chogawan | Cheleke (341) | 364 |
|  | Amritsar | Chogawan | Kakkar Kalan (3479) | 3707 |
|  | Amritsar | Chogawan | Ranian | 1307 |
|  | Amritsar | Chogawan | Khusupura | 786 |
|  | Amritsar | Chogawan | . Dhandal (343) | 366 |
|  | Amritsar | Ajnala | Bakraur (441) | 470 |
|  | Amritsar | Chogawan | Chak Mishri Khan | 2440 |
|  | Amritsar | Harcha Chhina | Chak Kamal Khan | 843 |
|  | Amritsar | Chogawan | Manj (1600) | 1706 |
|  | Amritsar | Chogawan | Brar | 2471 |
|  | Amritsar | Chogawan | Awan Lakha Singh | 911 |
|  | Amritsar | Chogawan | Mudh Bhilowal (2036) | 2169 |
|  | Amritsar | Attari | Hardo rattan | 929 |
|  | Amritsar | Attari | Modey | 2504 |
|  | Amritsar | Chogawan | Variah | 944 |
|  | Amritsar | Chogawan | Maure (1889) | 2014 |
|  | Amritsar | Chogawan | Motla (910) | 970 |
|  | Amritsar | Chogawan | Pandori (854) | 911 |
|  | Amritsar | Chogawan | Makhanpura (80) | 87 |
|  | Amritsar | Chogawan | Vehra (943) | 1005 |
|  | Amritsar | Chogawan | Tur (896) | 955 |
|  | Amritsar | Chogawan | Kutiwala (598) | 638 |
|  | Amritsar | Chogawan | Chogawan | 2667 |
|  | Amritsar | Chogawan | Bhilowal Pakka (2509) | 2673 |
|  | Amritsar | Chogawan | Veroke (987) | 1052 |
|  | Amritsar | Chogawan | Miadi Kalan (993) | 1059 |
|  | Amritsar | Chogawan | Kotli Mughan | 441 |
|  | Amritsar | Chogawan | Panju Kalal (461) | 492 |
|  | Amritsar | Chogawan | Bhindi Aulukh Khurd (1198) | 1277 |
|  | Amritsar | Chogawan | Shahura | 2741 |
|  | Amritsar | Chogawan | Mohleke (1056) | 1126 |
|  | Amritsar | Harcha Chhina | Dharamkot | 1196 |
|  | Amritsar | Chogawan | Bhangwan | 1219 |
|  | Amritsar | Chogawan | Sidwan (180) | 192 |
|  | Amritsar | Chogawan | Panju Rai (744) | 793 |
|  | Amritsar | Chogawan | Lelian ((415) | 443 |
|  | Amritsar | Attari | Dhanoa Khurd | 1271 |
|  | Amritsar | Chogawan | Tapiala | 533 |
|  | Amritsar | Chogawan | Burj (1203) | 1281 |
|  | Amritsar | Chogawan | Hetampura | 1456 |
|  | Amritsar | Chogawan | Manawala | 2827 |
|  | Amritsar | Chogawan | Bhullar | 3970 |
|  | Amritsar | Harcha Chhina | Alampur (186) | 200 |
|  | Amritsar | Harsha Chhina | Shahpur (618) | 659 |
|  | Amritsar | Harcha Chhina | Karial (2498) | 2661 |
|  | Amritsar | Chogawan | Chak Allah Baksh (444) | 475 |
|  | Amritsar | Chogawan | Dial Rangarh (92) | 100 |
|  | Amritsar | Chogawan | Dial | 384 |
|  | Amritsar | Chogawan | Chhanna | 671 |
|  | Amritsar | Chogawan | Bhagupur Uttar (296) | 316 |
|  | Amritsar | Chogawan | Mandianwala (2421) | 2579 |
|  | Amritsar | Harcha Chhina | Kotli Suraj Lohar (706) | 753 |
|  | Amritsar | Chogawan | Thathi (1439) | 1534 |
|  | Amritsar | Ajnala | Hassanpura | 823 |
|  | Amritsar | Chogawan | Shahliwal (253) | 270 |
|  | Amritsar | Ajnala | Majhi Meun | 408 |
|  | Amritsar | Chogawan | Padri | 2961 |
|  | Amritsar | Chogawan | Mulakot (236) | 252 |
|  | Amritsar | Harsha Chhina | Awan Basau | 1326 |
|  | Amritsar | Chogawan | Jafarkot (1013) | 1080 |
|  | Amritsar | Ajnala | Punga (870) | 928 |
|  | Amritsar | Attari | Ranike (2059) | 2195 |
|  | Amritsar | Attari | Rangarh (1154) | 1230 |
|  | Amritsar | Chogawan | Mehmadpura (565) | 603 |
|  | Amritsar | Chogawan | Jasraur | 2311 |
|  | Amritsar | Harsha Chhina | Nepal (1408) | 1501 |
|  | Amritsar | Harsha Chhina | Kotli Khera (339) | 363 |
|  | Amritsar | Harsha Chhina | Bhalot (122) | 131 |
|  | Amritsar | Ajnala | Barlas (303) | 323 |
|  | Amritsar | Chogawan | Deshmesh Nagar (714) | 761 |
|  | Amritsar | Chogawan | Muzafarpur (312) | 333 |
|  | Amritsar | Chogawan | Malagiri (573) | 611 |
|  | Amritsar | Chogawan | Wanieke | 2673 |
|  | Amritsar | Chogawan | Bhindi Aulukh Kalan (1326) | 1414 |
|  | Amritsar | Chogawan | Dalleke (917) | 978 |
|  | Amritsar | Chogawan | Kohala | 2799 |
|  | Amritsar | Chogawan | Madoke | 1192 |
|  | Amritsar | Chogawan | Dug | 1434 |
|  | Amritsar | Chogawan | Tut | 643 |
|  | Amritsar | Chogawan | Saidpur Kalan (692) | 738 |
|  | Amritsar | Chogawan | Talla | 710 |
|  | Amritsar | Chogawan | Tanana | 1378 |
|  | Amritsar | Chogawan | Kamaske | 1248 |
|  | Amritsar | Chogawan | Kakar (831) | 886 |
|  | Amritsar | Ajnala | Saidpur Khurd | 1034 |
| Total | | | **112 VILL.** | **155378** |

**Appendix-3C**

**Scope of Work of Operators for five Schemes**

The scope of work of the Operator shall include but not be limited to the following activities;

* Carry out detailed assessment of the proposed Water Supply System as per the Project Feasibility Report;
* Verification of Google Survey drawings on Auto CAD provided by DWSS as per site conditions, data acquisition and processing for GIS base maps through GPS ground control survey for providing sufficient control points evenly distributed over the area and carry out Geo technical survey wherever required;
* Establish and confirm organic and inorganic content of the existing raw water source;
* Prepare detailed designs of new works and processes required to fulfil the output requirements for the defined water treatment plant, pumping systems, sumps, reservoirs, disinfection system and transmission system with appurtenances.;
* Prepare detailed design for the SCADA for monitoring Water Supply System;
* Supply all materials for the construction and installation of the plant with supplying and installation of all pipes and controls required for the water facilities;
* Provide and install required mechanical and electrical equipment for full operation of the specified SCADA system;
* Supply and install all cabling and control panels for safe and effective operation of the plant and equipment;
* Supply and install all storage facilities, pumping requirements, transmission piping, valves and bulk metering;
* Prepare operations and maintenance manuals for all installations;
* Carry out Tests on Completion and Tests after Completion and commission the Works and New Facility;
* Recruit and train water supply personnel in the operation and maintenance of the Works and New Facility;
* Provide lubricants and tools for routine maintenance;
* Provide spare parts for all items of equipment including filter media and other accessories; and
* Operate and maintain the complete water supply and transmission system for the period defined in the Contract.
* Prepare the Response Plan for detailing the emergency response in case of any Pollution Event at any Raw Water intake. The final Response Plan agreed between the Operator and the Owner shall be the Agreed Response Plan.

The design, construction and completion / commissioning of the Water Supply System shall be executed in compliance with international best practices and all relevant Indian legislation.