



Assuring quality of implementation under JJM

Webinar



11.05.2023

Project Background & Objective

Background:

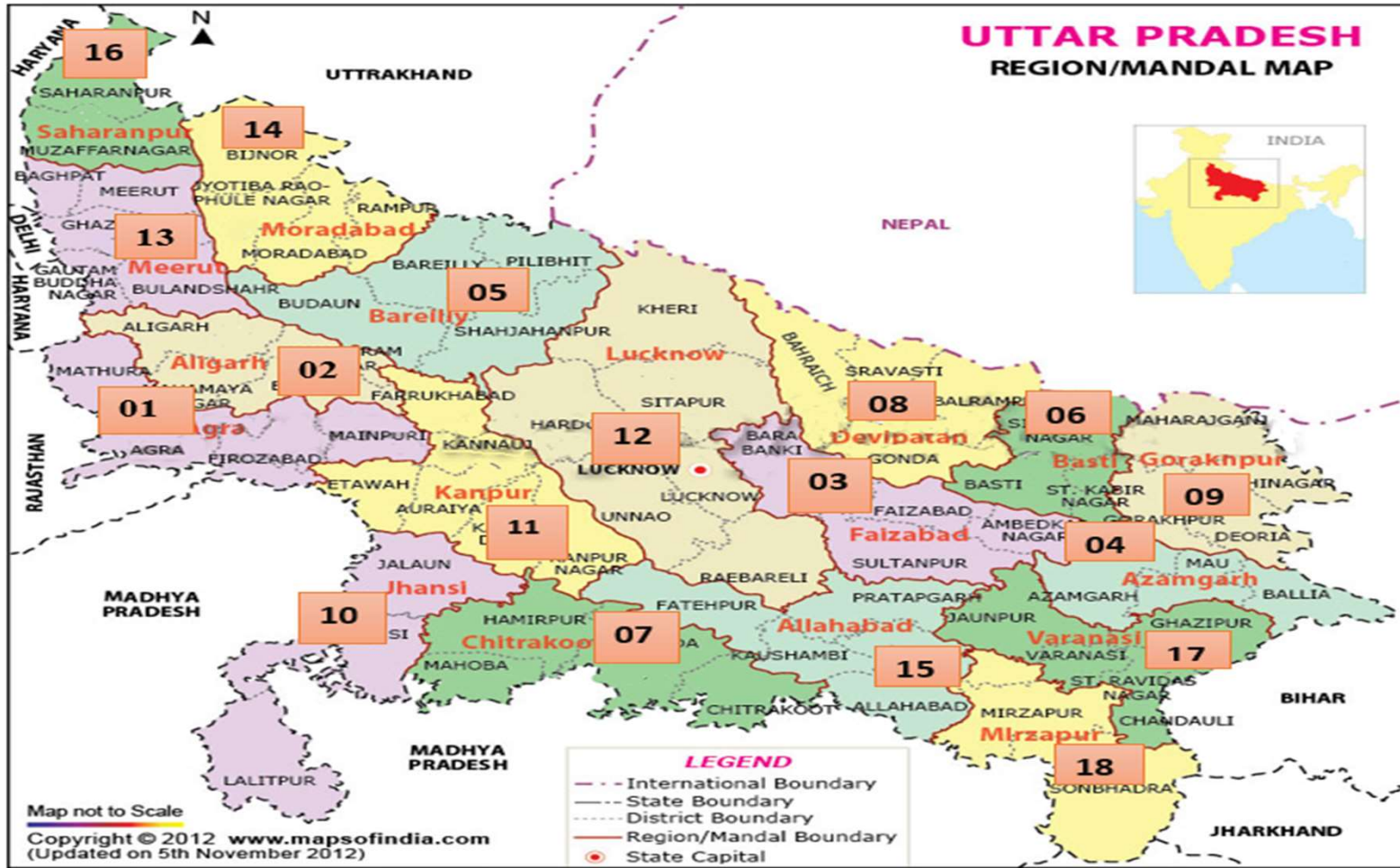
- State Water and Sanitation Mission, Department of Rural Development, GOUP (SWSM) has taken up implementation of the various Rural Water Supply Projects in the state under the Jal Jeevan Mission for all 75 districts of the state divided in 18 clusters.
- SWSM appointed consultants to provide Consultancy Services for Third Party Inspection (TPI) and Monitoring of Physical & Financial Progress of Various Rural Water Supply Projects comprising of Intake wells/tube wells, Water Treatment Plants (WTP), pipelines of rising/pressure mains, Main Pumping Stations (MPS) overhead tanks (OHT), distribution pipe lines, individual house connections, public stand posts, booster/intermediate Pumping Stations and related civil works etc.

Objective:

- The objective of the assignment is to ensure quality & quantity controls.
- The TPI also works as an extended arm of SWSM in the technical and contractual issues connected with the implementation of the project.
- The major activities involved are inspection of construction work such as checking of test reports of material used for construction, quality measures adopted in the field, safety measure adopted by the construction Agency (the Agency), quantity and quality of works executed as per Contract Bill of Quantities (BOQ) for payment claimed, checking of functioning of the infrastructure during trial run and making recommendation of the payment of work executed.



Project Area: 18 Clusters



Cluster Divisions & Districts Details

Cluster	Revenue Division	Districts
Cluster 1	Agra	Agra, Firozabad, Mainpuri & Mathura
Cluster 2	Aligarh	Aligarh, Etah, Kaganj & Hathras
Cluster 3	Ayodhya	Ayodhya, Amedkarnagar, Barabanki, Amethi & Sultanpur
Cluster 4	Azamgarh	Mau, Balia and Azamgarh
Cluster 5	Bareilly	Badaun, Bareilly, Shahjahapur & Pilibhit
Cluster 6	Basti	Sant Kabir Nagar, Sidhartnagar & Basti
Cluster 7	Chitrakoot Dham	Hamirpur, Mahoba & Chitrakoot
Cluster 8	Devi Patan	Gonda, Balrampur, Shravasti & Bahraich
Cluster 9	Gorakhpur	Gorakhpur, Mahrajganj, Kushinagar & Deoria
Cluster 10	Jhansi	Lalitpur, Jhansi & Jalaun
Cluster 11	Kanpur	Kanpur Nagar, Kanpur Dehat, Auriya, Eyawah, Kannau & Farrukhabad
Cluster 12	Lucknow	Lucknow, Hardoi, Lakhmipur, Sitapur, Unnao & Raibareli
Cluster 13	Meerut	Ghaziabad, Gautam Bugh Nagar (Noida), Hapur, Bagpat, Buland Shahar, Meerut
Cluster 14	Moradabad	Moradabad, Amroha, Rampur, Sambhal & Bijnor
Cluster 15	Prayagraj	Praygaraj, fatehpur, Pratapgarh & Kausambi
Cluster 16	Saharanpur	Muzaffar Nagar, Shamli & Saharanpur
Cluster 17	Varanasi	Varanasi, Jaunpur, Chandauli & Ghazipur
Cluster 18	Vindhyachal	Sant Ravidas Nagar, Mirzapur & Sonbhadra





Project Needs & Services

To support SWSM to monitor the quality and physical and financial progress of ongoing works during the execution of the above Projects, SWSM had appointed cluster wise Third Party Inspection (TPI) agencies. The scope of work of the TPI Consultant as per the RFP is furnished below :

Services of TPI are required in the following major activities

- Third Party inspection of construction materials & construction workmanship and submission of monthly reports.
- Inspection of Machinery & electro mechanical equipment.
- Monitoring of Physical & Financial Progress.
- Documentation of the above said activities.



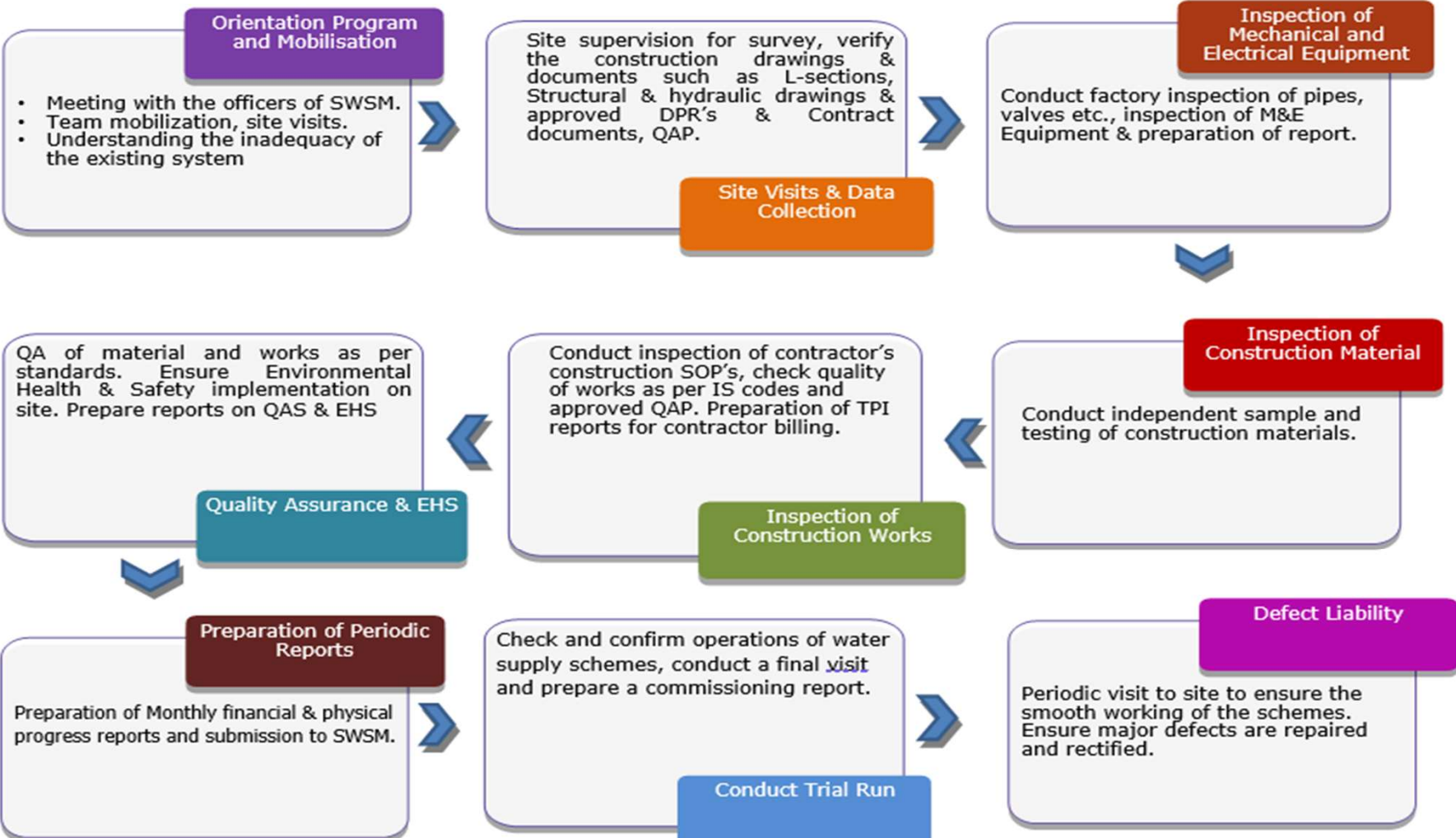


T.P.I. Agency's Overall Project Scope

- Design Review
- Scrutinize construction methods proposed by the Construction Agency
- Monitor construction work of each and every stage of contract package
- Establish quality assurance system including verification of source of all the material and certification
- Supervise the works to ensure conformance of construction works and materials to relevant IS standards/ bid specifications/designs/drawings
- Approve materials and quality of works based on test results produced by the contractor.
- Conduct factory Inspection of equipment under the project
- Monitor progress with reference to pre-fixed targets
- Maintaining the safety practices
- Ensuring environmental and social safeguard



Project Methodology Flow Chart

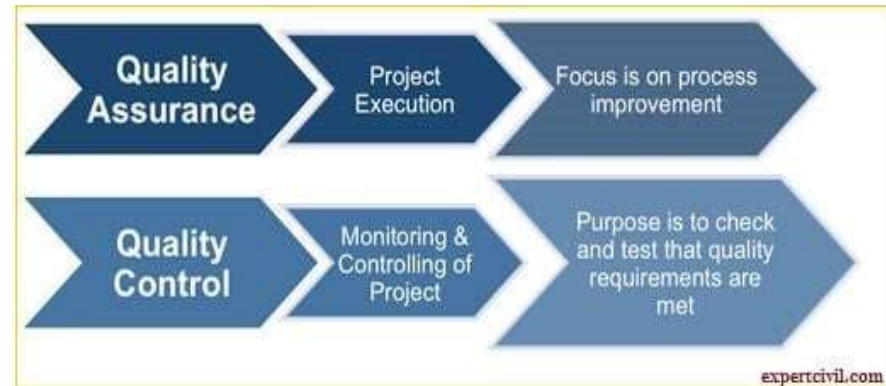


Key Activities:

- Contract Administration
- Kick-off & Periodical Meetings(SWSM, Government of UP, District Administration)
- Design Review
- Permissions / Approvals
- Third Party Inspection of Material and Construction Work
- Supervision of Electromechanical Equipment and Machinery
- Project Management and Supervision
- Quality Assurance and Quality Control
- Social, Safety and Environmental Review
- Trial Run , Commissioning & DLP



Venn Diagram



About Quality Assurance

- QA makes sure that we are doing the **"Right Things the Right Way"**.
- QA focuses on building in quality and hence **"Preventing Defects"**.
- QA deals with **PROCESS**.
- QA is for the entire **Life Cycle**.
- QA is a **Preventive Process**.
- QA is a **Staff Function**.

About Quality Control

- QC makes sure the results of **"What we've done vs What we are expected to do"**.
- QC focuses on testing for quality and hence **"Detecting Defects"**.
- QC deals with **PRODUCT**.
- QC is for **Testing Part**.
- QC is **Corrective Process**.
- QC is a **Line Function**.



Quality & Acceptance Criterion

TPI's are ensuring that -

- Acceptance for water pipes will be against pressure tests and disinfection.
- Acceptance for water Reservoirs will be done considering water tightness test & subsequent disinfection.
- Electro-Mechanical for successful commissioning – Provisional acceptance only can be given upon confirming the specification.
- Commissioning will involve gathering of all the information from manufacturer, supplier and the Construction Agency and operating instructions.
- All components will be tested for operating condition and adhere strictly to the design conditions
- Acceptance of GIS based “As Built” drawings matching to actual site conditions
- Acceptance of Operation & Maintenance Manuals submitted by the Construction Agency.





Inspection of material

- TPI has been organized its staff to ensure inspections and testing are carried out, checked for accuracy and acted upon expeditiously in order to avoid causing delay to the Contractor's progress.
- Items not covered by detailed descriptions in the specifications assessed against accepted/reasonable standards of good industry practice and workmanship.
- Pre delivery and post delivery inspection of materials are being conducted by TPI.





Construction Supervision

The Primary Objective is to stick up to the Specifications, continuous monitoring of site activities, avoid delays, propose corrective/alternate measures and act as an extended arm to SWSM and Government of UP. Some major activities are listed below,

- Setting up Action Plan, QA/QC Plan, Detailed Construction Program, Manpower Histogram inline with Bid and Contract agreement from the Agency
- Checking and finalization of Designs submitted by Contractor and procurement plans
- Third Party Inspection of Quality of Works
- Monitor and Supervise Site Set-up of the Agency
- Checking the Agency's Equipment, Installations, Plants and Labs
- Setting up a process of Inspection Procedure
- Checking of price breakup for lump sum items



Infrastructure Supervision

Checking and Confirming the Civil Works are being supervised as follows

- Construction Methods
- Excavation depths & its extent
- Fill material for compactness and quality
- Reinforcement as per approved structural design
- Concrete for mix, pouring, vibration and curing
- Assessment of Physical progress.

Checking and Confirming the Pipe Laying work are being supervised as follows

- Pipe for material, inventory, storage
- Joints and fittings, depth of excavation, beddings, gradient
- Positioning of valves, thrust blocks, surge protection, corrosion possibility
- Protection measures like painting
- Assessment of Physical progress.





Infrastructure Supervision

Checking and Confirming the Electro-Mechanical Works

- Confirmation of the specification of equipment.
- Process of installation of the equipment as per manufacturer's manual/guidelines.
- Testing of the equipment after installation.
- Ensuring protection arrangement for over-run, voltage differences, dry run etc.
- Close supervision during commissioning period.
- Monthly, Quarterly and as and when required Progress Reports to SWSM / Authorities.
- Assessment of Physical progress.



Material Quality Tests are being Performed & Frequency of Tests

Sr. No.	Title	Doc. No.	Frequency of Test / Check	Relevant IS Codes
1.	Soil / Borrow Material			IS 2720
	➤ Core cutter test / Sand Replacement test	Approved Format	<ul style="list-style-type: none"> At every 100 m² of compacted area for small plinth filling At every 500 m³ of compacted earth filling for mass filling work 	
	➤ Standard Proctor Test	Approved Format	<ul style="list-style-type: none"> Once for each source of earth 	
	➤ Soil Penetration Test	Approved Format	<ul style="list-style-type: none"> Once for each source of earth 	
	➤ Sand Content test	Approved Format	<ul style="list-style-type: none"> Two tests per 3000 cum of soil 	
	➤ Plasticity test	Approved Format	<ul style="list-style-type: none"> Two tests per 3000 cum of soil 	
	➤ CBR Test	Approved Format	<ul style="list-style-type: none"> One test per 3000 cum of soil 	
	➤ Density Test	Approved Format	<ul style="list-style-type: none"> 2 tests per 3000 cum of soil 	
	➤ Moisture Content test	Approved Format	<ul style="list-style-type: none"> One test per 250 cum of soil 	
	➤ Grading test	Approved Format	<ul style="list-style-type: none"> One test per 1500 cum of soil 	
	➤ Free Swell Index	--	<ul style="list-style-type: none"> One test per each sample 	



Sr. No.	Title	Doc. No.	Frequency of Test / Check	Relevant IS Codes
2.	Coarse Aggregate / Fine Aggregate			
	➤ Specific gravity	Approved Format	<ul style="list-style-type: none"> Once or Charge in source 	IS 2386
	➤ Bulkage of Sand	-	<ul style="list-style-type: none"> In monsoon/Rainy season when concreting is done by volumetric batching this test is to be performed daily and necessary Bulkage corrective to be applied 	
	➤ Dry/Loose Bulk density	-	<ul style="list-style-type: none"> As and when required 	
	➤ Silt content in Sand	Approved Format	For each source <ul style="list-style-type: none"> If the source explored between 501-1500 cum take one gross sample at each 100 cum. If the source explored between 1501-5000 cum, take one gross sample at each 200 cum. 	
	➤ Aggregate impact value	Approved Format		
	➤ Sieve analysis of aggregate			
	➤ Aggregate crushing value			
	➤ Flakiness Index Thickness Test			
	Additional test for Infra Project			
	➤ Water Absorption	Approved Format	<ul style="list-style-type: none"> One set of 3 representative specimens for each source 	



Sr. No.	Title	Doc. No.	Frequency of Test / Check	Relevant IS Codes
3.	Bricks			IS 3495-1992
	➤ Visual Check	-	<ul style="list-style-type: none"> Total 20 Nos. of Bricks to be selected from three trucks (i.e.; 6 to 7 bricks from each Truck) 	
	➤ Dimensioned Check	-		
	➤ Water absorption	Approved Format	<ul style="list-style-type: none"> For each source Random 3 Nos. to be tested from 20 Nos. of bricks as selected 	
➤ Compressive strength				
4.	Solid / Hollow Block			IS 2185
	➤ Visual Check	-	<ul style="list-style-type: none"> Total 20 Nos. of Blocks to be selected from 5000 Nos. Blocks 	(Part 1-2005 & Part 2-1983)
	➤ Dimensioned Check	-		
	➤ Water absorption	Approved Format	<ul style="list-style-type: none"> For each source Random 3 Nos. to be tested from 20 Nos. of blocks as selected 	
➤ Compressive strength				



Sr. No.	Title	Doc. No.	Frequency of Test / Check	Relevant IS Codes
5.	Cement			
	➤ Fineness of cement	Manufacturer	<ul style="list-style-type: none"> For each batch received at site 	IS4031(P-1)-1996
	➤ Standard consistency of cement	Test certificate		IS4031(P-4)-1996
	➤ Setting time	or		IS4031(P-5)-1996
	➤ Compressive strength	Outside laboratory or		IS4031(P-6)-1996
➤ Soundness	Approved Format	IS4031(P-3)-1996		
6.	Reinforcement Steel			IS 1786-2008
	➤ Rolling margin	Approved Format	<ul style="list-style-type: none"> One sample for each lot received at site One sample consists of 03 Nos. of bars of at least 0.5m length 	
	➤ Tensile Test ➤ Elongation ➤ Bend – Rebend test	Manufacturer Test Certificate or Test Report from outside laboratory	<ul style="list-style-type: none"> If MTC is received or steel supplied by client, one sample for receipt of ten consecutive lots of each category at site. One sample consists of 3 Nos. of bars of at least 1m length If MTC is not received, one sample for each lot received at site. One Sample consists of 03 Nos. of bars of at least 01 m length. 	



7. Concreting Work

Sl. No.	Activity / Process	Characteristics to be checked	Method of Check	Quantum of Check	Ref. Doc. / Code	Acceptance criteria
1	Raw Material- Cement	Make, type, Grade, Batch no	Review of MTC/ As & when required	Per lot	IS 269	IS 269
2	Raw Material- Coarse Aggregate -10mm, 12.5mm & 20 mm size	Gradation & Flakiness Index Elongation Index	Lab Test	Minimum once in 200 Cum of concrete	Specification / IS 383	IS 383:2016 Table 7, Combined FI & EI- 40% max
3	Raw Material- Coarse Aggregate	Impact Value	Lab Test	Minimum once in 100 Cum of concrete	IS 2386/ IS 383	upto 30% for wearing surfaces as pavement road, 45% for others as structural work
4	Raw Material- Fine Aggregate	Gradation,	Lab Test	Minimum once in 100 Cum of concrete	IS 2386/ IS 383	IS 383:2016 Table 9 & 5% other than 600 micron sieves
5	Raw Material- Fine Aggregate	Fineness Modulus Silt content	Lab Test	Minimum once in 100 Cum of concrete	IS 2386/ IS 383	FM- not less than 2.2 or more than 4.2 Silt- As per IS 383
6	Raw Material- Construction Water	As per IS 456	External Lab test	Once in a year for all major structure	IS 456	IS 456
7	Raw Material- Admixture	Make, type, Chloride, Batch no	Review of MTC	Per lot	IS 9103	IS 9103
8	Concrete (during mixing)	Slump test	Visual, Review of Documents	As required	IS 456 & Mix design of concrete	± 10% of max slump obtain mix design of concrete
9	Finished Concrete after deshuttering	Surface of Finished concrete	Visual	100%	As per tech. spec., Approved drawings	No segregation &, honeycombing, if any then to be repair at the earliest
10	Finished Concrete	Compressive Strength	150*150* 150mm cube sample test	1-5 Cum: 1sample* 06-15: 2 sample 16-30 Cum: 2 set 31-50 Cum: 3 set above 51 cum: 4 set + 1 set additional for each 50 cum	IS 516 & IS 456	At 28 days test For M20- 20 N/sqmm For M25- 25 N/sqmm For M30- 30 N/sqmm
11	Finished Concrete	Curing	Visual	If required	As per tech. spec., IS 456	7 days minimum

Note: * 1 sample include 3 nos cube for 28 days test, Extra 1 sample are being taken for 7 days test



Sr. No.	Title	Doc. No.	Frequency of Test / Check	Relevant IS Codes
8.	Structural Steel ➤ Rolling Margin ➤ Tensile test ➤ Elongation ➤ Bend test	➤ Approved Format ➤ Manufacturer Test Certificate or Test Report from outside laboratory	<ul style="list-style-type: none"> • One sample for each lot received at site • One sample consists of 03 Nos. of bars of at least 0.5m length • If MTC is received or steel supplied by client, one sample for receipt of ten consecutive lots of each category at site. • One Sample consists of 03 Nos. of sections of at least 1 m length • If MTCs are not received, one sample for each lot received at site. • One sample consists of 03 Nos. of section of at least 1 m length. 	IS 2062-2011
9.	G.S.B. ➤ Gradation ➤ Density ➤ Atterberg limits for material Passing through 425 micron ➤ Moisture content prior to compaction	Approved Format --	a. One test per 200 cum of aggregate One test per 500 sqm & One test means three samples a. One test per 200 cum of aggregate One test per 250 cum of aggregate	



Sr. No.	Title	Doc. No.	Frequency of Test / Check	Relevant IS Codes
10.	Bitumen ➤ Rate of spread of Binder, Aggregate & Bitumen content ➤ Temperature of Bitumen ➤ Softening point ➤ Absolute viscosity ➤ Ductility ➤ Elastic recovery of modified bitumen	Approved Format Approved Format 	<ul style="list-style-type: none"> • One test per 500 sqm and not less than two tests per day • Minimum Half hourly • For each lot • For each lot • As directed by Engineer In charge • As directed by Engineer In charge 	IS 73-2006
11.	W.B.M. ➤ Gradation ➤ Impact value ➤ Flakiness & Elongation Index	--	<ul style="list-style-type: none"> • One test per 100 cum of aggregate • One test per 200 cum of aggregate • One test per 200 cum of aggregate 	



Quality Tests are being Performed for Pipes

Sl. No.	Material	Test to be performed	IS Code	No. of Samples to be tested (as per IS Code)	
For Material Procured at Factory					
1	HDPE Pipes	1) Visual and Dimensional 2) Reversion Test 3) Hydraulic Pressure Tests 4) Over all Migration Test 5) Density at 27°C (Base Density) 6) Melt Flow Rate 7) Carbon Black Content and Dispersion	IS:4984 – 2016	As per approved QAP	
2	DI Pipes	1) Visual and Dimensional 2) Hydrostatic Test 3) Mechanical properties 4) External Zinc coating 5) Internal Cement Mortar Lining 6) Seal Coat (Bituminous/Epoxy)	IS: 8329-2000	As per approved QAP	
4	Fittings for House Service Connections	MDPE Pipes	1) Visual and Dimensional 2) MFR 3) CBC 4) Density 5) Hydrostatic Strength 6) Longitudinal Reversion	ISO: 4427: 2007	As per approved QAP
		Specials (Fittings)	1) Visual and Dimensional 2) Hydraulic Pressure Test 3) Tensile Strength 4) MFR	IS:2692 ISO 14236 BSEN 12201-Part 3 ISO: 13955: 1997	As per approved QAP
5	MS Pipes	1) Visual and Dimensional 2) Mechanical Tests 3) Hydraulic Tests 4) Cement Mortar material Tests	IS: 1916-1989 IS: 3589-2001 IS: 4258	As per approved QAP	



D.I PIPE LAYING AND JOINTING

Sl. No.	Activity / Process	Characteristics to be checked	Method of Check	Quantum of Check	Reference Document/Code	Acceptable Criteria
		Inspection after Received at site				
1	D.I. PIPE & FITTINGS	Visual Inspection for surface condition , batch No , class or grade verification	Visual	100%	Inspection report, MTC	it shall be free from surface defect (cracks , pin holes, paint damaged, bend ,damage etc.)
2		Dimension (External Diameter/Wall thickness/Length/Ovality)	Mesurement	100%	Tech. Spec/I.S-8329:2000, IS 9523:2000 , Inspection report	I.S-8329:2000, IS 9523:2000
3		Strightness & dia. Of pipe	Visual	100%	Tech. Spec/I.S-8329:2000, IS 9523:2000 , supplier records	I.S-8329:2000, IS 9523:2000
		Inspection during pipe laying				
4	Fitt-up Inspection & laying	Rubber seating rings	Visual	100%	Tech. Spec/I.S-5382:1985	I.S-5382:1985
5		Trench alignment ,lenth ,width & depth	measurement	100%	Contract. Spec/ IS 12288:1987	IS 12288:1987
6		Socket Joint and rubber gasket placing	Visual	100%	Tech. Spec/I.S-8329:2000, IS 9523:2000	I.S-8329:2000, IS 9523:2000
7		pipe insertion marking	measurement	100%	IS 12288:1987	insert up to marking., IS 12288:1987
8		trench back filling	Measurement/ Surface finish	100%	Tech. Spec/I.S-8329:2000, IS 9523:2000	Back filling soil should be free from stone, debries and other hard materials from pipe top to 150mm height. Or As per drawing, IS 12288:1987
9	Hydrostatic Pressure Testing	Pressure drop or Leakage test at maximum 12kg/cm2 for 60 minutes or 1.5 times of maximum working pressure upto 1hr holding time.	measurement/ Visual	100%	IS 12288:1987	1. if no leakage/ pressure drop in 60 min then test pass. 2.Test pass if leakge is within Re-store water limit as per CPHEEO guide lines.



HDPE PIPE LAYING AND JOINTING

Sl. No.	Activity / Process	Characteristics to be checked	Method of Check	Quantum of Check	Reference Document/Code	Acceptable Criteria
HDPE pipes Inspection at Receipt						
1	Visual Inspection for surface condition	Surface finish/Defects	Visual	100%	Inspection reports, MTC	Tech. Spec/I.S-4984:2016
2	Dimensional	Measurement	Measuring Tape/Vernier calliper	10%	Inspection reports, MTC	Tech. Spec/I.S-4984:2016
HDPE pipes Post delivery Inspection as per Contract						
3	Sampling of pipe from stock yard	All Acceptance test as per IS 4984:2016	Measurement	Per Lot	Contract. Spec/ IS 4984:2016	IS 4984:2016
Trench excavation & Pipe Laying						
4	Excavation	Depth , width & length of trench	Measurement	100%	As Per approved design drawing	As Per approved design drawing/ IS 7634 :2000
5	Pipeline Laying/Alignment	straightness as per layout drawing	Measurement/Visual	100%	As Per approved design drawing	As Per approved design drawing/ IS 7634 :2000
6	Backfilling of trench	soil type and free from stones or any sharp materials	Visual	100%	As per Contract Specification	As per Contract Specification
HDPE pipe Jointing by butt fusion process						
7	cleaning of pipe line before fusion	Cleaning	Visual	100%	Approved drawings/ Tech. Spec/IS 7634-Part-II	Approved drawings/ Tech. Spec/IS 7634-Part-II
8	Pipe surface preparation and alignment	Fit-up inspection	Visual	100%	Approved drawings/ Tech. Spec/IS 7634-Part-II	Approved drawings/ Tech. Spec/IS 7634-Part-II
9	Butt fusion parameters	Welding temperature , jointing pressure	Visual	100%	Approved drawings/ Tech. Spec/IS 7634-Part-II	Approved drawings/ Tech. Spec/IS 7634-Part-II
Hydraulic test of HDPE pipe						
10	Hydro test	Pressure drop & Leakage test at 1.5 times of working pressure	Visual and measurement	100%	Approved drawings/ Tech. Spec/IS 7634-Part-II	Approved drawings/ Tech. Spec/IS 7634-Part-II
Butt fusion Operator Qualification Test						
11	Bend Strap Test	Soundness of Butt joint and operator skill	Visual and bend Test	Every New operator/ change of operator	Tech. Spec/IS 7634-Part-II	Tech. Spec/IS 7634-Part-II



TUBEWELL WORK

REFERENCE DOCUMENTS.	RESOURCES	EQUIPMENT REQUIRED	SEQUENCE OF WORK	TYPES OF TEST
Tender Technical Specification Government of Uttar Pradesh - STATE WATER & SANITATION MISSION (SWSM)	Casing Pipe	Rotary Drilling Set	Selection of Bore well Sites	Types of Tests
IS 4270:2001 – Steel Tubes Used for Water Wells - Specification	M S Housing (Plain) Pipe & M S Slotted Pipe (Fe410 Grade)	Compressor	Marking the points where the tube well to be installed	Measurement of Well (Water level)
IS 4270:2001 – Steel Tubes Used for Water Wells - Specification	Housing Pipe Clamp (M S Flat-16mm)	O.P. Unit	Drilling of borehole	Sand/Sediment Content Measurement in well & water
Rolled Steel made from Structural Steel	M S Plate& Pipe	Suitable Packers	Logging of borehole	Verticality/Plumb and Alignment
MS Plate FE410	WELL CAP (M S Flat-6mm Thick)	Water level measurement Meter	Logging of borehole	Water Quality Tests
MS Flat Strip IS 226 :1975	Centre Guide (M S Flat Strip)	Suitable Pumps	Pea Gravel Packing	
Gravel IS 4097-1967	M S Ring	New generation hydra		
Code of practice for construction and testing of tube wells IS 2800 (Part-I)- 1991	M S Bail	Diesel Generator		
	MS Reducer	Chain Pulley Block		
	MS Clamps	Dewatering Pump		
	Submersible Pump	Mud Pump		
	Gravel	End covers (Temporary to close out the drilled hole for safety purpose)		
		Welding & Grinding Machine		
		Hand tools		
		Sign Boards & Hard Barrication		



WATER-QUALITY TEST REPORT

Process Control-Daily

Plant Sampling	Qty.	Sampling Bottle	Frequency	Method of Testing
Stage-1				
Raw Water	5 L	Plastic Bottle	Twice in each shift	BIS-3025/APHE
	2 L	-do-	Every hour	
Stage-2				
Clarifier Water	500 ml	Glass bottle	Every 4 hour	BIS-3025
Stage-3				
Final Water	500 ml	Glass bottle	Hourly	BIS-3025
Bacteriological Raw Water	150 ml	Sterilized Glass bottle	Twice in day shift	BIS-1622
Clarifier Water				
Filtered Water	-do-	-do-	-do-	BIS-1622
Final Water	-do-	-do-	-do-	BIS-1622
Alum Dose in RW	5 L	Plastic Bottle	Once in each shift	CPHE BIS-3025
Chlorine Demand RW	2 L	Plastic Bottle	-do-	

CHEMICAL REQUIRED FOR SMOOTH RUNNING OF WATER TREATMENT PLANT

SL.NO	TYPE OF CHEMICAL	UNIT	Daily Consumption	Supply Lead Time	Quantity Available In Stock	Quantity Required (DC*GLT*2)
1	NON FERRIC ALUM/PACI/PE					
2	LIME					
3	CHOLORINE GAS/HYPO					
4	Replacement Filter Media					



Chemical Testing Parameters of Raw Water

S No.	PARTICULAR	UNIT	METHOD OF TESTING	RECORD
1	Colour	Hazen	BIS-3025/APHE	
2	Odour	---	BIS-3025	
3	Turbidity	NTU	-do-	
4	pH Value	---	-do-	
5	Conductivity	Micro mho	-do-	
6	Total dissolved solid	Mg/L	-do-	
7	Total alkalinity	-do-	-do-	
8	Total Hardness	-do-	-do-	
9	Calcium Hardness	-do-	-do-	
10	Chloride	-do-	-do-	
11	Disolve Oxygen			
12	Alum Dose	PPM	CPHE	
13	Lime Dose	PPM	-do-	
14	Clorine Demand	PPM	-do-	
15	Total Suspended Solid	Mg/L	-do-	
BACTERIOLGICAL TEST				
1	Total Coliform	BIS-1622	BIS-1622	
2	Faecal Coliform	-do-	-do-	



Chemical Testing Parameters of Clear Water

S No.	PARTICULAR	UNIT	METHOD OF TESTING	RECORD
1	Colour	Hazen	BIS-3025	
2	Odour	----	-do-	
3	pH Value	----	-do-	
4	Turbidity	NTU	-do-	
5	E Conductivity	Micro/mho	-do-	
6	Total Dissolved Solid	Mg/L	-do-	
7	Total Alkalinity	-do-	-do-	
8	Total Hardness	-do-	-do-	
9	Disolve Oxygen	-do-	-do-	
10	Calcium Hardness	-do-	-do-	
11	Chloride	-do-	-do-	
12	Residual Alumina	-do-	-do-	
13	Residual Chlorine	PPM	-do-	
BACTERIOLOGICAL TEST				
1	Total Coliform	MPN/100 ml	BIS-1622	
2	Faecal Coliform	-do-	-do-	





Disinfection Process for Pipelines and Water Bearing Structures

Disinfection shall be effected by filling the pipeline with water heavily dosed with chlorine, and shall be carried out simultaneously while filling the pipeline with water for carrying out the hydraulic test on pipeline segment and on completion. Alternative methods may be adopted subject to the approval of the Engineer. The level of chlorine dosing shall be such as to make available 50 mg/l of free chlorine throughout the pipeline.

In case of simultaneous installation of FHTCs along with the laying of pipeline for immediate relief to the consumers, the Hydraulic Test should be clubbed with the Disinfection and Flushing of pipeline segments. However the bacterial test and minimum residual chlorine (0.2 to 0.5 mg/l) test, will be mandatory before allowing the consumption of drinking water.

The clear water, heavily dosed with chlorine, shall stand in the pipeline for a period of 24 hours or for such longer period as the Engineer shall require and all valves in the system shall be operated at least once during this period.

At the termination of the required period, chlorine residual tests shall be taken at the end of the pipeline farthest from the point of injection and test shall be repeated if necessary until the residual is not less than 10 mg/l. The site testing procedure shall be as approved by the Engineer.

The the Agency shall obtain the Engineer's approval to the method to be adopted for disposing off the chlorinated water and the time when such disposal shall take place on completion of disinfection.

In-situ testing of residual chlorine and samples for bacterial test shall be sent to Government accredited labs under Client's custody. The fee will to be paid by the Construction the Agency/the Agency. Once the Bacterial Test results attributes "Passed for Drinking," and residual chlorine ascertained within the range of 0.2 to 0.5 mg/l range the beneficiary would be allowed to consume the drinking water from FHTC.

Every leakage repair/change or open maintenance of valves, fittings etc. will be subjected to disinfection process of the segment affected.

Same disinfection procedure shall be applicable for all the Water Bearing Structures integral in water supply system.





Completion Report

Draft & Final Completion Report

TPI, shall obtain completion reports from the Agency. TPI will then prepare the draft contract completion report of the scheme within two months following the commissioning of the scheme for submission to the SWSM for review and discussion so as to finalize the draft contract Completion Report. This report will include the following.

- A chronology of the construction works.
- A description of the main design changes made during the course of the project
- A review of the Agency's claims and contractual ways in which they were settled.
- Recommendations as to additional works needed and the justifications thereof.
- The financial balance of accounts for the Contract.
- Schedule for procurement of water treatment chemicals, replacement filter media, spares etc. provided by the Agency.
- Copies of important project correspondence.
- Graphic representation of physical, actual and scheduled implementation and financial, actual and scheduled expenditures.
- Plan for achieving Service Level Bench Marks and Leakage Detection System provided by the Agency.
- Other pertinent issues.





Defect Liability Period and Contract Closure

- Transfer of Scheme from Construction team to O&M team of the Agency during Defects Liability Period (DLP)
- Supervision and confirmation for removal of obstacles, plants and materials from site
- Quarterly inspection work during DLP.
- Taking over certificate of all the components to be issued and the Agency will be responsible for 12 months DLP thereafter.
- Site reinstating will be insured before performance certificate.
- Contract will be completed upon signing of Performance Certificate.
- Consultant (TPI) will submit Project Completion Report





Progress Monitoring

- Modern supervision techniques involve gathering, summarizing and evaluating large volumes of data on a monthly basis.
- Computerized project 'Management Information System (MIS) has been developed to produce comprehensive, well organized and timely management reports.
- Key elements of the MIS will include reports for tracking construction schedules of the contracts, quality and cost control and monthly progress, as well as the database applications for correspondence logs, contract drawings, payments and variation orders.
- The MIS is allowing all technical and managerial data to be summarized for timely transmission of monthly progress reports to SWSM.
- Leak detection system and reporting Service Level Bench Marks.



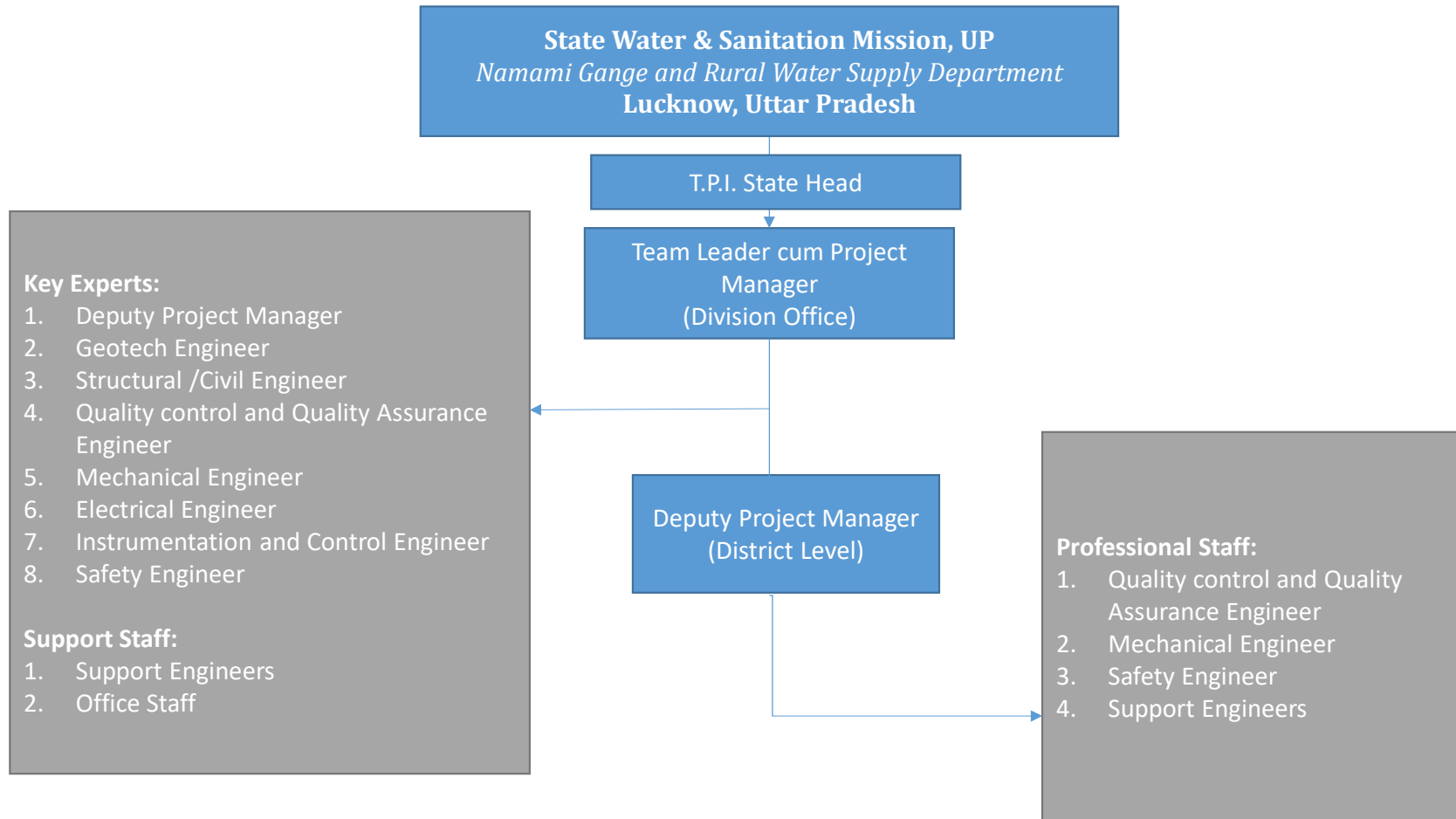
Project Monitoring

Manpower	Inspection & Design SLA	Monthly Progress Report	Documentation	Monthly Billing	Task Monitoring	Contract Monitoring
<ul style="list-style-type: none">• Attendance Monitoring at Site through manual Register with certification from TL (Manual)• Staffing monitoring (In case of additional requirement at Districts)	<ul style="list-style-type: none">• Common email ID for receiving TPI inspection request• Log to be maintained for Request received and Request attended and Report submitted	<ul style="list-style-type: none">• Monthly Report submission through this common ID and Monitoring that this report is submitted before 10th of each Month	<ul style="list-style-type: none">• All project related correspondence, Documentation, Submittals, to be kept on cloud in folder with daily back up• Current Available tool is CTL Cloud• Can use share point also	<ul style="list-style-type: none">• Every month Billing and keeping track of acknowledgment of Bills.	<ul style="list-style-type: none">• Completed task• Critical task• Over allocated Resources• Should have started Task• Task in Progress• To do list• Slipping Task• Unallocated task• Actual Work distribution• Who does what, when etc.• Communication protocol definition and use of Google form or SharePoint for real-time reporting	<ul style="list-style-type: none">• Insurance Requirement• Proper Record for meeting SLA Slippage and LD Penalty related communications• Bank Guarantee- ABG, PBG• Correspondence related to DPR cost escalation if any

- Frequent Audit of Documentation, Log and attendance
- Current available options are Survey app, Collector App, CTL Cloud
- Parallel Tool Development to start for better and effective controls.



Project Organization





Thank You