Amendment - 1

NIT No: SECI/C&P/NIT/2020/VOCPT5					
Tender for Design, Engineering, Supply, Construction, Erection, Testing & Commissioning of cumulative 5 MW (AC) ground based Solar PV Power Plant along with 10 years Plant O&M at different sites at VOCPT, Tuticorin, Tamilnadu, India					
Sl. No.	**Section**	**Page No.**	**Clause**	**Original Version**	**Amendment**
1	VII-A(Scope of Works)	203 of 432	4.1.5	Containerized Sub – Station (CSS) comprising of LT switchgear unit (s), protection and metering units/ compartments, unit batteries and battery chargers, auxiliaries such as HVAC and fire suppression systems, as applicable, step-up transformers to match utility grid, HT switchgear unit, Control Systems etc. with Power and Energy ratings, details of which are as specified in Part – II of Technical specifications.	Compact Sub-Station (CSS) comprising of LT switchgear unit (s), protection and metering units/ compartments, unit batteries and battery chargers, auxiliaries such as HVAC and fire suppression systems, as applicable, step-up transformers to match utility grid, HT switchgear unit, Control Systems etc. with Power and Energy ratings, details of which are as specified in Part – II of Technical specifications.
2	VII-B (Technical Specifications)	259 of 432	9.5.2	Auxiliary voltage of the relays shall be 110 VDC and the relays shall be capable of operating continuously between 80 – 120% of auxiliary voltage.	All the relays shall be capable of operating continuously between 80 – 120% of auxiliary voltage.
3	VII-B (Technical Specifications)	265 of 432	10.5(ii)	Maximum voltage drop in LT cable (from inverter to inverter transformer) shall be limited to 0.5% of the rated voltage. For HT cables (from inverter transformer to interconnection point), maximum voltage drop shall be limited to 0.5 % of the rated voltage. Successful Bidder shall provide voltage drop calculations in excel sheet.	Maximum voltage drop in LT cable (from inverter to inverter transformer) shall be limited to 0.5% of the rated voltage. For HT cables (from inverter transformer to plant end), maximum voltage drop shall be limited to 0.5 % of the rated voltage. Successful Bidder shall provide voltage drop calculations in excel sheet.
4	VII-B (Technical Specifications)	266 of 432	12.2	Voltage Ratio - 22 kV/0.415 kV	Voltage Ratio - As per system design
5	VII-B (Technical Specifications)	279 of 432	17.4(v)	Galvanized Iron mast with base plate and guy wire kit	Galvanized Iron mast with base plate and anchor bolt assembly
6	VII-B (Technical Specifications)	289 of 432	21.1.1	The Contractor shall provide minimum 4 (four) number of secondary standard pyranometers (ISO 9060 classification) along with necessary accessories for measuring the incidental solar radiation at horizontal and inclined plane of array.	The Contractor shall provide minimum 2 (two) number of secondary standard pyranometers (ISO 9060 classification) along with necessary accessories for measuring the incidental solar radiation at horizontal and inclined plane of array.
7	VII-B (Technical Specifications)	319 of 432	13.10	For fundamental time period T0 >1.0 Sec, the design of the MMS structure shall be checked against dynamic effects of wind as per provisions of IS – 875 (Part-3) using gust factor method.	In case of natural frequency in first mode less than 5 Hz, the design of the MMS structure shall also be checked against dynamic effects of wind as per provisions of IS – 875 (Part-3) using gust factor method.
8	VII-B (Technical Specifications)	319 of 432	13.10.1	The purlins shall be provided with min. following tie/sag rods or angles or channels: 1 no., in the mid of each span and shall connect all the purlin members 1 no., diagonal, at each corner in end spans	To be provided as New clause 13.40.
9	VII-B (Technical Specifications)	321 of 432	13.40	New Clause	The purlins shall be provided with min. following tie/sag rods or angles or channels: 1 no., in the mid of each span and shall connect all the purlin members 1 no., diagonal, at each corner in end spans
10	VII-B (Technical Specifications)	323 of 432	16.2.2	LCR/ ICR (Inverter Control Room)	Kindly refer Annexure-1 to Amendment-1.
11	VII-B (Technical Specifications)	331 of 432	18.1	Doors, windows and ventilators shall be made of AL sections (minimum average thickness 2.5mm), industrial grade, anodized (grade AC25, min. thickness 25 micron conforming to IS: 1868) or with polyester powder coating (Total DFT 50 microns conforming to IS: 13871) and shall be approved make & color shade. All sections, fittings and fixtures shall be anodized (min. thickness of coating 20 micron). The window and door shutters shall be of clear float/ wired glass as per design/ functional requirements. However, the doors in toile area shall be of steel frame with solid core (MDF) flush shutter, 35mm thick, with laminated finish conforming to IS: 2202.	Doors, windows, partitions and ventilators shall be made of AL sections (minimum average thickness for windows and ventilators- 2.0mm, for partitions and doors- 2.5 mm), industrial grade, anodized (grade AC25, min. thickness 25 micron conforming to IS: 1868) or with polyester powder coating (Total DFT 50 microns conforming to IS: 13871) and shall be approved make & color shade. All sections, fittings and fixtures shall be anodized (min. thickness of coating 20 micron). The window and door shutters shall be of clear float/ wired glass as per design/ functional requirements. However, the doors in toilet area shall be of steel frame with solid core (MDF) flush shutter, 35mm thick, with laminated finish conforming to IS: 2202.

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Tender for Design, Engineering, Supply, Construction, Erection, Testing & Commissioning of cumulative 5 MW (AC) ground based Solar PV Power Plant along with 10 years Plant O&M at different sites at VOCPT, Tuticorin, Tamilnadu, India					
Sl. No.	**Section**	**Page No.**	**Clause**	**Original Version**	**Amendment**
12	VII-B (Technical Specifications)	338 of 432	34.1	Module cleaning procedure and pressure requirement at discharge point shall be as per the recommendation of PV module manufacturer. However, discharge pressure at outlet shall not be less than 50kg/cm2 (5 MPa).	Module cleaning procedure and pressure requirement at discharge point shall be as per the recommendation of PV module manufacturer. However, discharge pressure at outlet shall not be less than 5 kg/cm2 (0.5 MPa).
13	VII-B (Technical Specifications)	344 of 432	6.3	An Indicative Field & Manufacturing Quality Plan for civil, structural and MMS works is enclosed with this specification for reference as Annexure-.	An Indicative Field & Manufacturing Quality Plan for civil, structural and MMS works is enclosed with this specification for reference as Annexure-E.
14	VII-C (Special Technical Specifications)	347 of 432	5	The bore log data and lab test results on DS samples are attached with this Annexure only for reference and general information of the Bidder. No warranty is expressed or implied that such information, given in good faith, will present a complete or accurate picture of the whole of the Site.	The bore log data and lab test results on DS samples provided in the attached soil report are only for reference and general information of the Bidder. No warranty is expressed or implied of the information that it presents a complete or accurate picture of the whole of the Site. Further, any recommendations regarding safe bearing capacity and pile capacity mentioned in the attached soil report shall be ignored and Owner/ SECI shall not take any responsibility of the same and the detailed Geotech investigations are in the scope of the bidder as per NIT.
15	VII-C (Special Technical Specifications)	347 of 432	11	The min. details of WMB road section shall be as follows: Topping: Surface dressing, compacted 75mm thick with murrum blended with WBM Grade-III, as applicable. WBM (CBR>100%): Compacted 125mm thick, Grade III WBM (CBR>100%): Compacted 125 mm thick, Grade II Granular sub-base (CBR>15%): Compacted 350 mm thick, Compacted subgrade: 300mm thick top layer of subgrade to be compacted up to 98% of standard proctor density Shoulders: Compacted 150mm thick, murrum blended with WBM Grade-III	The min. details of all road sections shall be as follows: i. Surface Dressing: 75mm thick (1:2:4 PCC) ii. WBM (CBR>100%): Compacted 125mm thick, Grade III iii. WBM (CBR>100%): Compacted 125 mm thick, Grade II iv. Granular sub-base (CBR>15%): Compacted 350 mm thick, v. Compacted subgrade: 300mm thick top layer of subgrade to be compacted up to 98% of standard proctor density Shoulders: Compacted 150mm thick, murrum blended with WBM Grade-III
16	VII-C (Special Technical Specifications)	348 of 432	16	All exposed steel surfaces (expected galvanized) shall be painted with min. 2 coats of PVF2 paint over two coats of suitable primer. Total DFT of painting system shall not be less than 150 microns.	Corrosion protection treatment for all equipment document and all structural members including claddings sheets of MCR shall be provided as per IS 800 considering environmental classification as “polluted coastal (as polluted inland plus high airborne salt levels), very severe or extreme” and for the design life of 25 years.
17	VII-C (Special Technical Specifications)	348 of 432	21	Building: a. Compact sub – station, as per specification is proposed, in this case, the building shall comprise of following: i. SCADA cum Supervisor cabin and office area (approx. carpet area 20 m2) ii. Pantry - with service platform and utensil washing facilities (approx. carpet area 5 m2) iii. Toilet block with separate gents and ladies wash room facilities (approx. total carpet area 12 m2) b. Other specifications shall be with respect to the technical specifications. c. Building for housing any/all electrical equipment, wherever proposed by the Bidder, shall be as per the CRZ regulations.	Kindly refer Annexure-2 to Amendment-1.
18	VII-C (Special Technical Specifications)	349 of 432	23	Water storage tank shall be of Overhead water type.	Water storage tank of required/specified capacity shall be over ground PVC tank.
19	VII-C (Special Technical Specifications)	349 of 432	26 (a)	Overhead Line shall have 33KV Silicone Polymeric Composite insulators suitable for operation in the Site conditions and shall be designed to meet the high quality, safety and reliability capable of withstanding a wide range of environmental conditions.	Overhead Line shall have 22 kV Silicone Polymeric Composite insulators suitable for operation in the Site conditions and shall be designed to meet the high quality, safety and reliability capable of withstanding a wide range of environmental conditions.
20	VII-C (Special Technical Specifications)	350 of 432	29 to 31	New Clauses	Kindly refer Annexure-3 to Amendment-1.

Amendment - 1

NIT No: SECI/C&P/NIT/2020/VOCPT5					
Tender for Design, Engineering, Supply, Construction, Erection, Testing & Commissioning of cumulative 5 MW (AC) ground based Solar PV Power Plant along with 10 years Plant O&M at different sites at VOCPT, Tuticorin, Tamilnadu, India					
Sl. No.	**Section**	**Page No.**	**Clause**	**Original Version**	**Amendment**
21	VII-C (Special Technical Specifications)	350 of 432	32	New Clause	Warranty Commencement Date for all the equipment shall be the date of supply.
22	Annexure-C (PG Test Procedure)	354 of 432	2.1.3	Pre-PR Test	Kindly refer Annexure-4 to Amendment-1.
23	Annexure-C (PG Test Procedure)	357 of 432	2.1.4.3(1)	Data Collection: PV Power Plant test related parameters are collected in one-minute and 15 intervals for the 30 (Thirty) days (consecutive) reference period. The data shall consist of the following at a minimum: Irradiance at Collector's (i.e. PV Module) POA; (Source: SCADA, Temporal Resolution: 1 minute) Other Met Data received from installed WMS; (Source: SCADA, Temporal Resolution: 1 minute) Energy generated at Plant (kWh) (Source: Plant MFM Meter from SCADA, Temporal Resolution: 1 minute) Energy injected into grid (kWh) (Source: ABT Meter at GSS/injection point, Temporal Resolution: 15 minute) PV Module Temperature recorded from the temperature Sensors (oC) (Source: SCADA, Temporal Resolution: 1 minute)	Data Collection: PV Power Plant test related parameters are collected in one-minute and 15 intervals for the 30 (Thirty) days (consecutive) reference period. The data shall consist of the following at a minimum: Irradiance at Collector's (i.e. PV Module) POA; (Source: SCADA, Temporal Resolution: 1 minute) Other Met Data received from installed WMS; (Source: SCADA, Temporal Resolution: 1 minute) Energy generated at Plant (kWh) (Source: Plant End TVM from SCADA, Temporal Resolution: 1 minute) Energy injected into grid (kWh) (Source: Plant End ABT Meter, Temporal Resolution: 15 minute) PV Module Temperature recorded from the temperature Sensors (oC) (Source: SCADA, Temporal Resolution: 1 minute)
24	Annexure-E (Indicative Field & Manufacturing Quality Plan for Civil & MMS Works)	-	-	Addendum	Kindly refer the attachment.
25	Annexure-F (Plant Documentation, Commissioning and Test Procedure)	-	-	Addendum	Kindly refer the attachment.

Clarifications to Queries raised during Pre-Bid Meeting

Tender for Design, Engineering, Supply, Construction, Erection, Testing & Commissioning of cumulative 5 MW (AC) ground based Solar PV Power Plant along with 10 years Plant O&M at different sites at VOCPT, Tuticorin, Tamilnadu, India

NIT No: SECI/C&P/NIT/2020/VOCPT5

S No.	Tender Section	Page No.	Clause No	Description as per Tender Document	Queries	Category (Finance/Technical/Contractual)	Clarifications
1	VII (B)	10 of 124	1.3.2	The Employer reserves the right to conduct Pressure Cooker (PC) test/ Highly Accelerated Stress Test (HAST) to confirm the durability of the back sheet in accelerated conditions.	Kindly exclude this specification as there is no national or international standard for the specified test. It is also in our knowledge that the top testing agencies in the world like TUV and UL are not agreeing to conduct such tests as they do not have facilities either in India and abroad. Hence, this clause may be deleted, please.	Technical	Pressure Cooker Test shall be carried out under following conditions: 121 °C /100 %RH and 2 atm pressure for 48 hours. The apparatus shall be such that specimen is not dipped in water but exposed to vapor (steam) while maintaining aforementioned conditions. Necessary sensors for measurement of Temperature, Pressure and RH shall be installed for verification. For acceptance: 1. There shall be no delamination or microcracks observed in the back sheet. 2. The back sheet shall retain 30% of the initial value (as per approved GTP) of the Elongation at Break.
2		90 of 432	19.1	A 'Force Majeure' means any event or circumstance or combination of events those stated below that wholly or partly prevents or unavoidably delays an Affected Party in the performance of its obligations under this Agreement, but only if and to the extent that such events or circumstances are not within the reasonable control, directly or indirectly, of the Affected Party and could not have been avoided if the Affected Party had taken reasonable care or complied with Prudent Utility Practices: • Act of God, including, but not limited to lightning, fire not caused by Contractors' negligence and explosion (to the extent originating from a source external to the site), earthquake (above 7.0 magnitude on Richter Scale), volcanic eruption, landslide, unprecedented flood, cyclone, typhoon or tornado; • Any act of war (whether declared or undeclared), invasion, armed conflict or act of foreign enemy, blockade, embargo, revolution, riot, insurrection, terrorist or military action, quarantine; • Radioactive contamination or ionizing radiation originating from a source in India or resulting from another Force Majeure Event mentioned above.	As a result of the ongoing pandemic, if the state of Tamilnadu undergoes lockdown or any other such event occurs as a side effect of the pandemic which directly/indirectly affects the completion period of the project, SECI/VOCPT may please allow an extension by equivalent period, of course through a course of mutual discussion & agreement	Contractual	All such situations are dealt on case to case basis under Force Majeure, if applicable
3		91 of 432	20	Subject to Force Majeure Clause, if the Contractor fails to comply with the Time for Completion /successful commissioning of Plant facilities in accordance with SCC Clause then the Contractor shall pay to the Owner a sum equivalent to half percent (0.5%) per week of the Contract Price for the whole of the facilities as liquidated damages for such default and not as a penalty, without prejudice to the Owner's other remedies under the Contract subject to the maximum limit of five percent (05%) of Contract Price for the whole of the facilities	We understand that this LD amount shall be deductible from first contract's value and shall exclude O&M contract	Contractual	LD is applicable on the contract value. Kindly refer definitions under GCC Section IV for "Contract Value"
4		98 of 432	32.1.2	The Contractor shall acquire, on behalf of Owner, in the Owner's name, all permits, approvals and/or licenses from all local, state or national government authorities or public service undertakings in the Country/State where the Site is located that are necessary for the setting up of the Plant & operation of Plant till its desired life as mentioned under the Contract, including, but not limited to, entry permits for all imported Owner's/Employer's Equipment (if any).	Please confirm whether tree cutting or replantation is in bidder scope as it shall require permissions from local horticulture dep't. It is requested to VOCPT to please obtain the permissions with local authorities wherein bidder can support them with necessary inputs required	Technical	Terms & conditions of the tender document shall prevail.
5		99 of 432	33.1	The Contractor shall have to execute the Work in such place and conditions where other agencies may also be engaged for other works such as site grading, filling, and levelling, electrical and mechanical engineering works, etc.	We understand that site grading, levelling, filling etc. are not a part of our scope and we shall be handed over with a levelled site ready for installation. Please confirm	Technical	Kindly refer Clause No. 5.1.3 of Section-VII(A) - Scope of Works. Earthwork for site levelling & grading are in the scope of the Contractor. Terms and conditions of the tender document will prevail.
6		149 of 432	16	Schedule of Rates & Payments (GCC clause 80.1)	Customer is requested to please govern the contract with the following terms of payment: 10% interest free advance along with a clear purchase order through LC against submission of PO acknowledgement 70% against proof of dispatch through LC on pro rata basis 10% against erection through LC on pro rata basis. Erection of structures, mounting of panels, inverter/ACDB/DCDB installation and cabling may be considered as Erection 5% against commissioning through LC on pro rata basis. Charging of local LT panel may please be considered as commissioning 5% on proving out	Contractual	Terms & conditions of the tender document shall prevail.
7		200 of 432	1.1	CUF : 20%	It was pointed out during the Prebid meeting that CUF shall be measured at the substation end. It is worthwhile to mention here that a promise of CUF @20% may well be derived from simulations but in practice with our past experience we have seen that such high CUF ratings are extremely challenging and nearly hypothetical to maintain, esp when evacuation is 4.4 kms away. It is requested to please reframe the CUF @17%	Technical	Kindly refer Clause 2.2 of Annexure-C (PG Test Procedure). CUF will be calculated based on plant end ABT meter excluding auxiliary consumption. Terms & conditions of the tender document shall prevail

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Clarifications to Queries raised during Pre-Bid Meeting

8				General Query	Any delay in payments due from the scheduled milestone as per the contractual document performed in accordance with the contract, unless delayed due to unavoidable reasons, shall be compensated by the customer with interest for the period of delay on the payment liable for release. Interest rates to be governed by MCLR	Contractual	Terms & conditions of the tender document shall prevail.
9		204 of 432	4.1.24	Design & construction of Transmission line/ cable from plant take off point to the designated substation including right of way (ROW). Estimated length for the overhead transmission line is 3.2km and 22kV grade UG cable is 0.8km. The UG cable shall also pass under an existing railway siding of SPIC Chemical factory	We request customer to please secure ROW prior to handing over of works to bidder.	Technical	Terms & conditions of the tender document shall prevail.
10		205 of 432	5.1.4	Slope protection works for existing drain along the side of Gulf of Mannar and drain at bus station end	Please elaborate as in present circumstances it is very tough to travel interstate to assess the site	Technical	Few photographs of the site showing status of drains attached for general reference of the bidder. However, it is requested that the bidder shall visit the site to assess the extent of work before bidding as defined in NIT. As the photographs don't give full picture of the site, SECI/Owner shall not be responsible for any variations in actual site conditions and those assessed through attached photographs.
11		229 of 432	1.1	IEC 61215-1:2016 Ed.1 IEC 61215-1-1:2016 Ed.1 IEC 61730-1:2016 Ed.2 IEC 61730-2:2016 Ed.2	It is requested to please accept IS 14286:2010 in place of IEC 61215:2016 and IS/IEC 61730:2004in place of IEC 61730:2016	Technical	Terms & conditions of the tender document shall prevail
12		277 of 432	16.3.2	Each PV Module frame shall be earthed using copper wire of sufficient cross section	It is requested to please accept conventional MS earthing conductor wire.	Technical	Terms & conditions of the tender document shall prevail
13		281 of 432	19.1.3.VIII	Telecom Lease line connection, if required for transferring data from Plant over internet shall be taken by Contractor in the name of Employer for O&M period	It is requested to please confirm the requirement at this stage itself.	VOCPT	The bidder shall provide wireless connectivity to VOCPT admin Office,. Further Telecom, if required - may be taken in the name of Port
14	II	24	12.6	However, Change in Law shall not include (iii) any change on account of regulatory measures by the Appropriate Commission.	EPC contractor cannot be made liable for any change in the regulatory laws which can affect his costing post bid submission. EPC contractor bids on the basis of current laws enforce and as such takes into account all charges with it. If charges change after bid submission, it should be paid by the Owner and covered in this clause.	Technical	connectivity to VOCPT admin. Office
16	IV	127	81.1.4	Employer/ Owner shall make all endeavor to make payments of undisputed amount of the bills submitted based on the joint measurements within 30 (Thirty) days from the date of certification by the Engineer-in-Charge/Project Manager.	Suggest amend the payment to be made within 15 (fifteen) days from the date of certification.	Contractual	Terms & conditions of the tender document shall prevail.
17	IV	131	94.5	The Contractor should arrange for providing insurance coverage to its workmen under Workmen's Compensation Act or similar Rules and Acts as applicable during execution of work for covering risk against any mishap to its workmen.	As per clause 94.10, the contractor is to provide ESIC for all workers which covers all risks/accidents in case of any mishap at site. Insurance coverage as per clause 94.5 shall be provided for Contractor's personnel working on site who are not covered under ESIC. Please confirm.	Contractual	Yes
18	IV	151	SCC Page 8 of 12 Part-C	Final Ten (10%) of the total price of Civil Works shall be paid after CUF demonstration after first year of O&M of the complete Facility pursuant to completion of all the civil works including finishing and debris removal. However, this Payment may also be released after completion of all the civil works including finishing and debris removal on submission of Bank Guarantee of equivalent amount. The BG shall be valid up to demonstration of CUF for the successful first year of Operation. However, in case of delay, the BG shall be extended suitably.	Request include a separate chapter/section on the documentation required for clearing the contractors bills. It has been our experience that new requirements are projected as there is no clarity on the exact documents required to be submitted along with the bills. This delays contractors bill payments leading to financial crunch and Please clarify specifically what are the "requisite documentation" as mentioned in the clause.	Contractual	Clause No 16 of SCC "Schedule of Rates & Payments " clearly mentions the documentation requirement during billing.
19	VII	235	3.3	DC cables (SMU to Inverter) shall be single core, armored, Flame Retardant Low smoke (FRLS), PVC outer sheath conforming to IS 7098-I.	Generally, Solar DC Cable have flame retardant properties but for XLPE Armored Cables from SMU to Inverter. Request to remove FRLS requirement for this cable.	Technical	Terms & conditions of the tender document shall prevail
20	VII	235	3.5	The average voltage drop in the cables (Modules to Inverter) shall be limited to 1.5 % of the rated voltage.	We understood that the voltage drop will be limited to 1.5% of the rated voltage at nominal condition. Request Confirm.	Technical	Yes. The average voltage drop in the cables (Modules to Inverter) shall be limited to 1.5 % of the rated voltage at Standard Test Conditions. Terms & conditions of the tender document shall prevail
21	VII	238	4.2.1	The rated/ name plate AC capacity of the PCU shall be AC power output of the PCU at 50°C.	Inverter supplier gives the rating on its number plate at 25^{o} /40^{o} C which is a standard practice. Request accept rating at 40^{o} C.	Technical	Terms & conditions of the tender document shall prevail

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22	VII	243	5.5.1	The CSS shall be of type tested design. Type test reports as per IEC 62271-202 shall be submitted during detailed engineering. The tests should have been conducted on the similar equipment by NABL accredited laboratory. In case the contractor is not able to submit the test reports during detailed engineering, the contractor shall submit the reports of type/special tests either conducted by NABL accredited laboratory or witnessed by Employer.	We understood that SECI will witness the tests if the test reports conducted by NABL is not available for particular items during detailed engineering. Kindly confirm.	Technical	If type/special test reports are not available, the Contractor shall get the tests conducted the tests at NABL accredited laboratory or witnessed by Employer. Terms & conditions of the tender document shall prevail
23	VII	264	10.2	All AC cables shall be flame retardant, low smoke (FRLS) type designed to withstand all mechanical, electrical and thermal stresses develop under steady state and transient operating conditions.	Generally, for all AC Cables, there is no requirement of FRLS properties. Request to remove FRLS requirement for XLPE armored cables.	Technical	Terms & conditions of the tender document shall prevail
24	VII	278	16.3.3	Continuous copper Earthing wire shall be run to connect a group of modules and both ends of the loop shall be bolted to the DC earth grid using bimetallic lugs and stainless-steel fasteners. The copper Earthing wire shall be routed in such a way to avoid physical contact with the module aluminum frame.	If module manufacturer approves that Earthing is achieved by continuous MMS, then request to remove separate module to module Earthing requirement using Cu wire.	Technical	Terms & conditions of the tender document shall prevail
25	VII	279	17.2	Protection Level for the entire plant shall be level – I.	Generally, protection level is selected based on lighting protection risk analysis & for this site location Level-IV is also sufficient. Request client to confirm that the protection level shall be decided during the detailed Engineering.	Technical	Terms & conditions of the tender document shall prevail
26	VII	279	17.4	Each ESE air terminal shall be provided with following accessories. (iv) Galvanized Iron mast with base plate and guy wire kit	Guy wires unnecessarily occupies a lot of space. Request consider the standalone GI mast to install ESE air terminal.	Technical	Kindly refer S.No. 5 of Amendment-1.
27	VII	280	18.1.5	All testing of the optic fiber cable being supplied shall be as per the relevant IEC, EIA and other international standards.	Request waive off requirement of Test certificates for OFC and RS 485 cables as suppliers/dealers are unable to provide type test certificates for small quantities of cables. Also kindly provide specific vendor list for OFC and RS485 cables .	Technical	Terms & conditions of the tender document shall prevail
28	VII	289	20.4.8	Lighting panels shall be earthed by two separate and distinct connections with Earthing system. Switch boxes, junction boxes, lighting fixtures, fans, single phase receptacles etc. shall be earthed by means of separate earth continuity conductor. Cable armour shall be connected to Earthing system at both the ends. Proper Earthing of street light poles shall be ensured.	Street light pole, junction box and lighting fixtures are metallically connected. Therefore separate Earthing is not required for each component of the pole. The junction box will be earthed by using PEN method at lighting panel. Request client to clarify and confirm.	Technical	Terms & conditions of the tender document shall prevail
29	VII	288	20.3.2	The lighting system for outdoor and indoor areas of solar power plant shall be designed in such a way that uniform illumination is achieved. Average LUX level to be maintained in different areas shall be as under: Control Room and equipment rooms- 300 LUX Office- 300 LUX Battery & other rooms - 150 LUX	Request propose amendment to LUX level requirements in following rooms as follows based on practical experience : Office- 200 LUX	Technical	Terms & conditions of the tender document shall prevail
30	VII	288	20.3.3	The lighting level shall take into account appropriate light output ratio of luminaires, coefficient of utilization maintenance factor (of 0.7 or less) to take into account deterioration with time and dust deposition.	The mentioned coefficient of utilization maintenance factor (of 0.7 or less) for conventional lights like Halogen, CFL, etc. Generally for LED lights it shall be 0.9 or less. Request Client to change this coefficient of utilization maintenance factor as 0.9 or less by considering above.	Technical	Terms & conditions of the tender document shall prevail
31	VII	288	20.4.1	LED luminaires shall meet the following parameters: Luminaire efficacy >90 lumens per watt Color Temperature 5700o K (cool day light)	Request client to change this parameters as follow. Luminaire efficacy > = 90 lumens per watt Color Temperature 4000o K (cool day light) Cool day light temperature of LED is around 4000 o K to 4500 o K. For your information, at 5700 o K, it will be bluish light instead of cool day light.	Technical	Terms & conditions of the tender document shall prevail
32	VII	308	8	Peripheral boundary Wall/Fence	Request clarify if there is a requirement of a either boundary wall or Fencing as the cost for building both of them is very different. If possible provide a reference design for whatever is required/specified.	Technical	Section-VII(B) - Technical Specifications - are generic. Section-VII(C) lays down Special Technical Specifications with reference to site specific design requirements. In case of any conflict in requirements between Section VII(B) and Section VII(C), Section-VII(C) shall have the precedence. Kindly refer Clause No.18 of Special Technical Specifications.
33	VII	322	16.1.2	Unless otherwise specified elsewhere, all buildings and plinth for open installations except Security room/ cabin shall have RCC framed structure. Masonry partition walls shall be provided for Kitchen, Pantry, Battery room and Toilet units. For other rooms AL Glass partitions shall be provided. The plinth for open installations and equipment area shall be designed with OEM requirements. The security room/ cabin(s) shall be of prefabricated structure.	In case of outdoor inverter & Switchgear, request client to confirm if use of pre Engineering building/shed for data logger, UPS, battery or other indoor components is allowed.	Technical	Kindly refer S.No. 10 of Amendment-1.

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Clarifications to Queries raised during Pre-Bid Meeting

34	VII	322	16.2.1	For O&M of SPV Plant MCR building shall provide following facilities; (I) Inverter/ Switchgear, equipment room(s) as per requirement (ii) Air conditioned area (with provision of split A/C unit of adequate capacity) for SCADA room (min. 12m^2) & Conference room (min. area 20m^2) (iii) Supervisor cabin and office area (min. area 25m^2) (iv) Store cum record room (min. area 20m^2) (v) Battery room as per requirement & (vi) One toilet block with gents and ladies wash room facilities (min. area 12m^2) (vii) There shall be suitable provision for easy/ smooth passage for O&M personnel, cable trenches etc.	We understood that the minimum area given at this clause is tentative & can be reduced based on practical requirement during detailed engineering. Request client to confirm for the same.	Technical	Kindly refer S.No.17 of Amendment-1.
35	VII	308	7.7	The storm water drainage system shall be a network of open surface drains (with rectangular or trapezoidal cross section) and shall generally be designed to follow the natural flow of water and ground contours.	Request Client to confirm to use FRP underground water tank/ Free fabricated RCC tank to reduce the execution time and project cost.	Technical	Query not clear. Inconsistent with respect to referred spec. clause.
36	VII	314	11.1.3	Min. depth of foundation for all buildings and plinth for open installations shall be 1.5 m below NGL. For all other structures, min. depth of foundation shall be 1.0 m unless specified otherwise.	Request client to confirm the depth of the SMB/SJB foundation depth in case hard rock area is encountered.	Technical	Terms & conditions of the tender document shall prevail
37	VII	314	11.1.5	All design & drawings shall be submitted to the Engineer for approval before execution.	Request client to confirm the maximum time period of 10 (Ten) days for GFC drawing/document approvals.	Technical	Kindly refer Clause 55 of GCC (Page No. 111 of 432). Terms & conditions of the tender document shall prevail
38	IV	106	45.3	Breakdown / Corrective maintenance: Whenever a fault occurs, the Contractor has to attend to rectify the fault & the fault must be rectified within the 72 hours from the time of occurrence of fault. The Contractor must maintain all the records pertaining to all such faults and necessary measures taken. The date of Comprehensive Operation & Maintenance Contract period shall begin from the date of Operational acceptance. However, operation of the Power Plant means operation of system as per TS and workmanship in order to keep the project trouble free covering the O&M period. The Contractor must demonstrate the committed CUF at the end of every year in accordance with commitment made in line with the Performance guarantees.	Irradiance & temperature variation are a major factors to estimate CUF. So, request client to consider the 72 Hrs. downtime as included in CUF calculation as deemed generation.	Technical	Terms & conditions of the tender document shall prevail
39	VII	228	2.7	The designed array capacity at STC shall be suitably determined to meet the proposed guaranteed generation output at the point of interconnection by the contractor in his bid. The contractor shall take care of first year degradation also by installing additional DC capacity as the CUF calculations will not factor the first-year degradation of the modules.	We understand that first-year degradation of modules modules will be start from date of plant commissioning, kindly confirm.	Technical	Kindly refer Clause 2.2 of Annexure-C (PG Test Procedure). CUF shall be calculated on annual basis from the date of operational acceptance of the plant till the end of O&M period. Terms & conditions of the tender document shall prevail
40	VII	228	2.8	Each component offered by the bidder shall be of established reliability. The minimum target reliability of each equipment shall be established by the bidder considering its mean time between failures and mean time to restore, such that the availability of complete system is assured. Bidder's recommendation of the spares shall be on the basis of established reliability.	Request client to give the required spares list for each site location as the perception of both the parties can be vastly different and this part has a financial effect on the Contractor.	Technical	Kindly refer Annexure-D (Mandatory Spares).
41	VII	234	2.3	Warranty The SMU unit shall be warranted for minimum of 5 (five) years against all material/ manufacturing defects and workmanship.	We understood that, Warranty of the material will start from date of COD. Kindly confirm.	Technical	Kindly refer S.No. 21 of Amendment-1.
42	VII	236	3.9.8	The horizontal and vertical clearances between power and communication cable shall not be less than 300mm.	Rocky surfaces are highlighted in the tender at site and therefore request to allow the min. separation distance between cables as 100 mm.	Technical	Terms & conditions of the tender document shall prevail
43	VII	239	4.3.8	Dedicated communication interface shall be provided to monitor the PCU from SCADA.	We understood that, PCU unit input will be maximum 16 -Tag (Inputs) per inverter will be considered and without ON/OFF command	Technical	Query is not relevant to the referred clause.
44	VII	240	4.7	Warranty The complete Power Conditioning Unit shall be warranted for minimum of 5 (five) years against all material/ manufacturing defects and workmanship.	We understood that, warranty of the material start from date of COD. Kindly confirm	Technical	Kindly refer S.No. 21 of Amendment-1.
45	VII	243	6.2	Technical Requirements- Tap Changer OCTC, No. of steps shall be as per system requirement	We understood "OFF LOAD TAP CHANGER" (in lieu of OCTC). Kindly confirm.	Technical	Yes. OCTC is the short-term of Off-Load Tap Changer. Terms & conditions of the tender document shall prevail

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46	VII	246	6.4	Warranty The transformer shall be warranted for minimum of 5 (five) years against all material/ manufacturing defects and workmanship.	We understood that, warranty of the material start from date of COD. Kindly confirm	Technical	Kindly refer S.No. 21 of Amendment-1.
47	VII	246	6.5.1	Type Tests (I) Lightning impulse (Full & Chopped Wave) test on windings as per IEC 60076-3 (ii) Temperature Rise test at a tap corresponding to maximum losses as per IEC 60076-2	In case Transformer supplier has conducted type test(s) within last ten years, he may submit the type test reports to the owner for waiver of conductance of such type test(s) again. These reports should be for the tests conducted on the equipment similar to those proposed to be supplied under this contract and test(s) should have been either conducted at an independent laboratory or should have been witnessed by a client. Kindly confirm.	Technical	Type test reports of similar transformer provided by NABL accredited laboratory is acceptable. In case such reports are not available, the Contractor shall get the tests conducted by NABL accredited laboratory or witnessed by the Employer. Terms & conditions of the tender document shall prevail
48	VII	259	9.5.2	Auxiliary voltage of the relays shall be 110 VDC and the relays shall be capable of operating continuously between 80 – 120% of auxiliary voltage.	Kindly reconsider the really operating voltage limit from 24V-110V DC	Technical	Kindly refer S.No. 2 of Amendment-1.
49	VII	262	9.11	The HT panel unit shall be warranted for minimum of 5 (five) years against all material/ manufacturing defects and workmanship.	We understood that Warranty of the material will start from date of COD. Kindly confirm	Technical	Kindly refer S.No. 21 of Amendment-1.
50	VII	254	8.1.16	Earth leakage relay with Core balance CTs (CBCT) shall be provided on main incoming feeders having phase CT ratio more than 50/1A. CBCT's shall be circular window type with window size based on the overall diameter of the cables, to be finalized during detailed engineering.	Instead of providing CBCT, we can use overcurrent relay in LT panel. Kindly confirm	Technical	Terms & conditions of the tender document shall prevail
51	VII	277	16.3.2	Each PV Module frame shall be earthed using copper wire of sufficient cross section. The copper wire shall be connected to the earth hole provided in the module frame using suitable arrangement in line with the manufacturer recommendation. The Earthing arrangement shall use stainless washers to prevent galvanic corrosion between aluminum frame and copper wire. In order to achieve effective Earthing, serrated washers shall be employed to penetrate the anodization layer of the module frame.	The PV module is connected with galvanized MMS structure and same table is connected with grid Earthing .We understood that separate Earthing is not required for PV modules. Kindly confirm.	Technical	Terms & conditions of the tender document shall prevail
52	VII	292	22.1	CCTV Cameras along with monitoring stations (sufficient numbers) and all other accessories required for its proper operation must be installed to have complete coverage of following areas for 24 hours. (I) Main entry: Covering all the entry/exit (ii) Along the Plant Perimeter: Covering complete perimeter of Plant Area to capture all possible intrusion (iii) Control Rooms: Covering Entry/Exit and Equipment Rooms (iv) Switchyard	We understood that one CCTV camera for each mentioned location except in Perimeter. Kindly confirm	Technical	The number of cameras shall functionally meet the requirements mentioned in the referred clause. The exact number of cameras shall be decided based on plant layout during detailed engineering. Terms & conditions of the tender document shall prevail
53	VII	336	31.5.1	The Contractor shall design & provide soak pit and RCC Septic tank for treatment of sewage and waste water from MCR building and Security room. The septic shall be designed as liquid retaining structure conforming to IS:3370 for design loads as specified under Cl. No. 35. However, in case of ground water within 1.5m of finished grade level or the soil strata being of low permeability (permeability ≤ 10-6 m/s) where septic tank and soak pit arrangement is not effective, suitable packaged sewage treatment plant of reputed make/manufacture shall be provided. The sewage treatment facility shall be of required capacity and of proven design suitable for total of 15 people.	Request consider pre-fabricated RCC septic tank to reduce execution time and ease of installation with long life.	Technical	Pre- fabricated RCC sceptic tank of required capacity as per spec. from reputed manufacturer satisfying all design requirements shall also be acceptable.
54	VII	336	32.2	Internal trenches (inside buildings) shall be provided with chelurid plate (min. 8mm thick with stiffening angle ISA 50x50x6 @ 750 mm c/c for trench width greater than 800 mm) covers while external trench shall have precast concrete covers.	Kindly change the chequer plate thickness from 8mm into 6mm for safe manual access by O&M individuals.	Technical	Terms & conditions of the tender document shall prevail
55	VII	337	33.3	In case of transformer oil tank capacity more ≥ 20000 liters, the soak pit shall be connected to a separate burnt oil pit through discharge pipe (300 mm dia) and shall be suitably sized to accommodate full oil volume (excluding free board above inlet pipe) of the transformer connected to it, without backflow. In this case the capacity of the soak pit may be reduced to min. 1/3rd of the total transformer oil volume. The burnt oil pit shall be further connected to oily water drainage system. The water shall be discharged into the nearest drain by gravity	We understood that transformer oil soak pit will be precast RCC tank. Kindly confirm	Technical	Precast RCC tank conforming to all technical specifications including design considerations as per tender document shall also be acceptable.
56	VII	338	34.6	The module cleaning system shall include construction of RCC tank or supply and installation of Ground mounted PVC tank (s) of required storage capacity, pumps (including 1 No. standby pump), water supply mains and flexible hose pipes, taps, valves (NRV, Butterfly valve, Ball valve, Gate valve, PRV, scour valve etc.), Water hammer arrester(s), pressure gauge, flow meter etc. as per the planning & design.	We understood that PVC tank can be used to store water for module cleaning system. Kindly confirm.	Technical	Terms & conditions of the tender document shall prevail

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Clarifications to Queries raised during Pre-Bid Meeting

57	VII	298	1.2	This excludes design, supply and installation of Galvanized 220 kV and 132 kV Transmission Line towers, Tower extensions & accessories and 11 kV, 22 kV, 22kV & 33 kV transmission poles & accessories which shall be designed following latest guidelines of respective SEB (State electricity board) and got approved before execution. In absence of SEB/ STU guidelines REC (Rural electrification corporation) standards may be followed. Poles at corner with angle > 100 shall be provided with 4-pole structure or lattice tower. Use of PCC spun poles is not acceptable. Approved copies of these designs & drawings shall be submitted to the employer for reference and record.	As per clause 6.1.1 page no. 206, All statutory approvals/permissions and/or No Objection Certificates (NoC) etc. from the DISCOM for obtaining connectivity at the substation as per Project Particulars provided above. The type of Transmission line pole will be provided as per DISCOM approved drg./specifications. Contractor shall be allowed to use RCC pole if DISCOM approves RCC pole for power evacuation. Kindly confirm.	Technical	Terms & conditions of the tender document shall prevail
58	VII	204	4.1.20	CCTV cameras for plant surveillance. The CCTV connectivity is to be linked with surveillance monitoring system of VOCPT Admin Building.	1.Requesting client to give the distance between solar plant to admin 2.We understand that ,there is no addition requirement of display (LCD/LED TV) in admin building .	VOCPT	The CCTV surveillance facility shall be provided at Port administrative building with suitable client setup including suitable display. Distance will be 1Km approx
59	VII	319	13.10.1	The purlins shall be provided with min. following tie/sag rods or angles or channels	Our understanding is that Sag rods are not required for the purlins considering the lateral restrained provided by the solar panels to the purlins. Request client to confirm that our understanding is correct and sag rods are not required for the purlin	Technical	Terms & conditions of the tender document shall prevail
60	VII	318	13	Module Mounting Structure (MMS)	(a) Request client to confirm that during design stage of MMS structure we can utilize IS875 Part III 2015 - latest edition standard including the reduction factor specified within code for calculating the wind loads considering the height and other parameters for MMS structure. (b) Request allow use of Posmac and Galvalume sections in the MMS with minimum thickness of 1 mm. (c) Request allow use of SS304 (or equivalent) fasteners for module mounting and GI fasteners for rest.	Technical	(a) As defended in IS:875 (part-3) -2015, The wind pressure for building or structure less than 10m Hight may be reduced by 20% for evaluating stability and design of framing. Purlin members which are directly supporting modules shall be designed for full wind pressure. (b) Terms & conditions of the tender document shall prevail (c) Terms & conditions of the tender document shall prevail
61	VII	98	32.1.3	Contractors responsibility :In the matter of connectivity of Plant to DISCOM's substation, the Owner will take the necessary connectivity permission, however, all the other permissions and clearances as deemed required by the State Agency/DISCOM for Bay allocation, technical/regulatory compliance for interconnection, ROW etc are to be taken by the Contractor. Statutory fees pertaining to such shall be reimbursed by the Owner on production of the documentary evidence/Demand note over and above the contract value. Further, Contractor shall also facilitate Owner in getting the required permissions/agreements as required for the energy accounting by State agencies/DISCOM.	The grid connectivity permission is one of most important document having bearing on cost and timeline of the project. We request to provide the same well before Bidding date .	Technical	Terms & conditions of the tender document shall prevail.
62	VII	229	1	Photovoltaic Modules	DCR (Domestic Content Requirement) is not mentioned in PV module clues ,Our understanding is that the solar panel and the components used in the manufacture of the panel should not necessarily be made in India. Request client to confirm the same.	Technical	There is no DCR for PV Module procurement.
63	V	143	3.1	Issue of NOA/ LOA/ LOI (as applicable) = Zero Date (D)	We request to kindly consider the zero Date as the date of handover of site to successful Bidder.	Contractual	Terms & conditions of the tender document shall prevail.
64	II	35	32.3.6	Net Present Value (NPV) of O&M Contract Price including GST for the entire period in years to be calculated at a discounting rate as mentioned in the Tender documents..	As per tender, NPV Value of O&M Cost will be used for Evaluation Purpose. Please confirm that the Original O&M Cost including GST will be considered for Billing and payment.	Contractual	Yes
65	II			Approvals of Project	Please confirm: 1) Who is approving authority for tender after award of tender. SECI will deal with the successful bidder or Owner will takeover from SECI after Successful L1 Bidder and all approvals etc will be done by Owner. 2) Also, Please confirm that all the approvals associated for tenders will be in scope of Bidder as per Tender documents only and if any additional approvals required, the expense and support will be given by Owner of project.	Contractual	The Contract Agreement will ne placed by the Owner, VOCPT & all payment related approvals/Discretion lies with the owner.
66	II			Additional Cost if any	We understands that if Any additional requirement of the SECI/Owner during the post award stage will have commercial implications and the Employer / owner will reimburse for the same.	Contractual	It's a lump sum Turnkey, all inclusive contract considering possible contingencies also.
67	VII C	349	1 (25)	The crossing of railway line shall be through horizontal drilling method and cable should be laid strictly as per the approving authority. The work should not disturb the operations of the railway line.	We understands that the Evacuation line will cross the Railway Line. We request tendering authorities to kindly consider the scope related to approvals from railway in there scope for crossing the transmission line.	Technical	Terms & conditions of the tender document shall prevail.

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Clarifications to Queries raised during Pre-Bid Meeting

68	VII	229	1	PV Modules wattage	Is there any Minimum watt peak of Module required or Bidder need to decide as per there own design?	Technical	There is no requirement on minimum module power rating. However, module efficiency as mentioned in Clause 1.2 of Technical Specifications shall be met.
69	VII	230	1	PV Modules: As per the Solar Photovoltaics, Systems, Devices and Components Goods (Requirements for Compulsory Registration) Order, 2017, PV Modules used in the grid connected solar power projects shall be registered with BIS and bear the Standard Mark as notified by the Bureau of Indian Standards. Further, PV Modules should have been included in the ALMM list as per MNRE Approved Models and Manufacturers of Solar Photovoltaic Modules (Requirements for Compulsory Registration) Order, 2019.	As per Bidder understanding, there is no restriction on make of module and cell the modules and open category modules are acceptable. Only Criteria Offered Module should fulfil is that - Module should be BIS registered and ALMM List approved. Also, as the ALMM list has not been released by MNRE Yet, please confirm what's the criteria bidder need to consider. Kindly confirm.	Technical	The extant orders of MNRE regarding ALMM shall be followed time to time. Terms & conditions of the tender document shall prevail
70	VII	234	3.5.(ii)	The average voltage drop in the cables (Modules to Inverter) shall be limited to 1.5 % of the rated voltage. Contractor shall provide voltage drop calculations in excel sheet.	We request to kindly consider voltage drop limit be extended to 2% as it may depend upon the land of the plant as well which will be finalized during detailed engineering stage.	Technical	Terms & conditions of the tender document shall prevail
71	VII	241	5.2.1	Compact Sub-Station shall consist of 2.5 MVA	As per bidder understanding, the 5MW plant be divided into 2 blocks - 2.5MW each. Please confirm.	Technical	There shall be two nos. of 2.5 MVA inverter duty transformers. However, there is no restriction on PCU rating provided all the tender conditions are met. DC capacity of a block shall be decided taking into the account the overloading.
72	VII	265	10.5.(ii)	Maximum voltage drop in LT cable (from inverter to inverter transformer) shall be limited to 0.5% of the rated voltage. For HT cables (from inverter transformer to interconnection point), maximum voltage drop shall be limited to 0.5 % of the rated voltage.	Is total AC Cable voltage drop be 1.5% allowed?	Technical	Kindly refer S.No.3 of Amendment-1.
73	VII	279	17.2	Protection level for the entire plant shall be Level-I.	We request to kindly consider the level - 3 Or Level -4 of Protection, as Level 1will lead to more number of ESE-LA that will occupy more space and increase the cost. Kindly confirm.	Technical	Terms & conditions of the tender document shall prevail
74	VII C	353	2.1, 2.2	Performance Ratio and CUF	We have done the calculation for PR and CUF as per given formula and we are facing issue in the calculation that if we try to increase the PR of plant by increasing the DC capacity, then CUF decreases and if we try to increase CUF, PR decreases. You may please review the issue and provide solution for same.	Technical	Kindly refer the CUF formula given in Clause 2.2 of Annexure-C to Section-VII(C). CUF shall be calculated based on the plant AC capacity, i.e. 5 MW. The guaranteed PR and CUF values have been decided after careful due-diligence. Terms & conditions of the tender document shall prevail
75	VII	243	6.2	Voltage Ratio 22 kV/ Inverter output voltage	As per Bidder understanding, Bidder need to Step up the Inverter output to 22 KV and evacuate the Power from Plant to grid substation @22 KV level using Overhead / Under ground transmission line. Please confirm.	Technical	Evacuation voltage is 22 kV. Terms & conditions of the tender document shall prevail
76	VII			Bidder scope	Please clarify regarding the Bidder scope for evacuation of power. Is it till interconnection of 22 KV Supply interconnection @Grid Substation or Bidder also need to step up the power at GSS to 110 KV level. Please clarify the exact scope.	Technical	The interconnection voltage level is 22 kV.
77	VII			Metering Point	As per Bidder understanding and Tender Technical Part, bidder need to demonstrate the CUF and PR at Plant Boundary. Please confirm.	Technical	Both CUF and PR will be measured at plant boundary. Kindly refer Annexure-C (PG Test Procedure).
78	VII			Vendor List	We understand that there is no vendor list in tender and there are no Provision to submit tentative vendor list in tender. We request to please confirm that material manufacturers meeting the Technical specification will be accepted without any issue at detailed engineering stage.	Technical	it confirm that material manufacturer meeting the yeshiva speci as per the nit submitted during detailed engineering shall be acceptable
79	VII			Bay extension	Is Bay extension required for connecting the Supply at GSS and if Yes, then work and cost related to it and approval is it in scope of Bidder or not.	VOCPT	The salutatory charges payable to TANGEDCO will be reimbursed and all other facilities required for establishing the structure for interconnection as per site requirement will be under bidders scope.

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80	Technical Specs	2	1.1	CUF 20%	Please confirm if the calculation of CUF is based on 5MW(AC) or 5.5MW(DC) capacity	Technical	CUF will be calculated based on plant AC capacity, 5 MW. Kindly refer Clause 2.2 of Annexure-C (PG Test Procedure).
81	Technical Specs	2	1.1	Electrical Interconnection Details	Please confirm the interconnection point, Plant end or Discom substation	Technical	The interconnecting substation is 230/110/22 kV Auto Substation, Muthaiapuram which is 4 km from the plant. Terms & conditions of the tender document shall prevail
82	Technical Specs	43	10.1	AC Cables	Please confirm if Aluminium conductor AC cables can be used	Technical	There is no restriction on AC cable conductor material provided all the tender conditions are met.
83	IFB	5 of 9		NAME OF WORK/ BRIEF SCOPE OF WORK/ JOB: Design & engineering, procurement & supply of equipment and materials, testing at manufacturers works, multi – level inspections, packing and forwarding, supply, receipt, unloading and storage at site, associated civil works, services, permits, licenses, installation and incidentals, insurance at all stages, erection, testing and commissioning of 5 MW (AC) Grid Interactive ground based Solar PV Power Plant and performance demonstration with associated equipment and materials on turnkey basis at VOCPT in Tamilnadu State along with 10 (Ten) years comprehensive operation and maintenance from the date of commissioning or Operational Acceptance, whichever is later.	We understand that VOCPT is the owner of the project. Kindly clarify who will consume this Solar generated electricity?	Technical	VOCPT will consume the generated power
84	ITB	11 of 47		12.6 In case of any variation (positive/ negative) in existing rates of taxes/ duties/ levies or a new tax/ duty/ levy is introduced or any existing tax/ duty/ levy is abolished or application of any Tax in the course of the performance of this Contract, which will/ may impact the overall pricing in connection with performance of the Contract, an equitable adjustment of the Contract Price shall be made to factor any such change by addition to the Contract Price or deduction therefrom, as the case may be. All these adjustments would be carried out by considering the base price of taxes equivalent to the amount mentioned under taxes and duties column of the SOR/ PS. The term Change in Law shall refer to the occurrence of any of the following events pertaining to this project only after the last date of the bid submission. However, Change in Law shall not include (i) any change in taxes on corporate income or (ii) any change in any withholding tax on income or dividends distributed to the shareholders of the Contractor, or (iii) any change on account of regulatory measures by the Appropriate Commission.	We understand that any change in Custom duty/ Safeguard Duty/ Other Duty/ GST/Tax shall be passed on to Owner i.e VOCPT. Kindly confirm	Contractual	All such changes will be suitably dealt with "Change in Law" clause of the GCC section IV
85	Tech. Specs	8 of 124		Solar PV Module Type - Domestic or Imported	Kindly clarify, What is the type of Solar PV module - Domestic or Imported? If Solar PV modules required is to be made in India, then please clarify it will be with imported or indigenous Solar cell. Please confirm.	Technical	There is no DCR for PV Module/Cell procurement.
86	SCC	2 of 11		The Time for Commissioning for 5 MW grid connected ground based Solar PV Power Plant with other associated equipment as per this tender document in total shall be 9 (Nine) Months from the Date of the Notification of Award NOA/LOA/LOI	We request you to accept that this execution timeline of 9 months from NOA/LOA/LOI is subject to submission of all engineering drawings & documents by EPC Contractor within 6 weeks from NOA/LOA/LOI whichever is later, then in response SECI will provide approval on all documents within 4 weeks of submission by EPC contractor. Any delay in approval process shall increase execution timeline.	Contractual	Terms & conditions of the tender document shall prevail.
87	SCC	4 of 11		The bidder shall make own arrangements from the nearest supply source as per Owner terms and conditions, If Owner providing the water supply for construction & O&M activity.	Please confirm, water for O&M activity shall be provided by VOCPT, Tuticorin without any charge/cost.	Technical	Terms & conditions of the tender document shall prevail.
88	SCC	4 of 11		The bidder shall make own arrangements from the nearest supply source as per Owner terms and conditions, If Owner providing the Power supply for construction activity	Please confirm, Construction Power shall be provided by VOCPT, Tuticorin without any charge/cost.	Technical	Terms & conditions of the tender document shall prevail.
89	SCC	5 of 11		1. The value of the Contract Performance Security shall be 5% (Five percent) of the Contract Value (i.e., total sum of the Supply & Service Contract). This Performance security will be valid for a total period of 132 Months (09 Months Project commissioning period) + 120 Months O & M Period + 03 Months additional) from the date of its issuance. The successful bidder can submit Contract Performance Security with initial validity of one year and the same may be extended every year till completion of the total 132 months period. 2. Further, 5% (Five percent) of contract value as security deposit will be deducted from the each running bill, subject to maximum of 10% of the running bill.	We suggest - 1. Contract Performance Security of 5% of the Contract Value (i.e., total sum of the Supply & Service Contract). This Performance security should be valid for a (total period of 9 Months Project commissioning period + 03 Months claim period) from the date of its issuance. 2. Performance Security during O&M period should be 5% of O&M Contract Value. This O&M security BG amount should be reduced by 10% every year.	Contractual	Terms & conditions of the tender document shall prevail.

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90	SCC	6 of 11		SCC Point 10 - LD SCC point 13 Functional Guarantees - 1,2,3,4,5	The Liquidated Damages as specified on account of execution delay and Functional Guarantees as mentioned in point 10 & 13 of SCC : All mentioned LD are getting imposed for same performance guarantee & are not capped. Hence we request you to impose 5% of Contract Value capped LD only due to delay in Commissioning & due to shortfall in generation. All other LDs mentioned in tender will account for additional LD liability to the bidder. Kindly consider our request.	Contractual	Terms & conditions of the tender document shall prevail.
91	SCC	8 of 11		Schedule of Rates & Payments	As per the provided payment terms in tender. Part A. The payment for the Supply Portion of the First Contract (Supply & Services Contract): 30% of supply amount is getting stuck due to Installation & commissioning and 10% of supply amount is getting stuck due to CUF Demonstration. Supply value should not getting hold due to I&C and CUF achievement part. Part B. Service Portion is already considering Freight & Insurance portion, Erection, Testing and Commissioning Portion and Civil & Allied works portion which is getting paid after Installation & Commissioning part. Hence, we request you to modify payment term of Supply portion - 100% of supply portion should be	Contractual	Terms & conditions of the tender document shall prevail.
92	SOR-1	427 of pdf		SCHEDULE OF RATES [SOR-2] [OPERATION AND MAINTENANCE]	As per payment terms, O&M Payment shall be as per Yearly O&M Price. Therefore, NPV of O&M Price is not required in Price Bid Format. Kindly revise O&M Price without NPV value .	Contractual	Terms & conditions of the tender document shall prevail.
93	Sample Forms	45 of 46		F-24 Power of Attorney	We understand that Standard Company Power of Attorney Copy on the name of Authorized Signatory for participation in tender can be submitted in this tender. Kindly confirm.	Contractual	Same may be seen on case to case basis.
94	Tech. Specs	10 of 12		The period of Operation and Maintenance will be deemed to commence from the date of completion of performance demonstration/Operational acceptance and successively the complete Plant and Equipment to be handed over to the O&M contractor for operation and maintenance of the same. O&M contract shall further be extended on the mutually agreed terms and conditions for the period of minimum 10 (ten) years.	We understand that entire scope of work of this tender includes EPC work with 10 years Operation & Maintenance. Further O&M contract will get extended for 10 years on mutually agreed Price, terms & conditions between the EPC Contractor & VOCPT. Kindly confirm.	Contractual	Same can not be confirmed at this stage.
95	Tech. Specs	11 of 12		The contractor has to arrange proper security system including deputation of security personnel at his own cost for the check vigil for the Solar Power Plant for the complete scope of works including comprehensive O&M period.	VOCPT is the owner of the solar power plant and the installation is in their premises, then security of the solar power plant should be considered by VOCPT. Please confirm.	Technical	Terms & conditions of the tender document shall prevail.
96	Tech. Specs	84 of 124		The contractor is responsible for making the site ready and easily approachable by clearing bushes, felling of trees (mandatory permissions/ licenses/ statutory clearances from competent authorities if required for cutting of trees, blasting or mining operations, disposal of waste material etc. shall be obtained by the contractor), cutting, filling with selected excavated earth or borrowed earth including identifying borrow areas.	1. We request SECI/VOCPT to provide Railway approval, Right of Way (ROW) approval, Forest Department/ Environmental Department approval/ statutory approval if required and any other approval from SPIC Chemical Factory. 2. We request SECI/VOCPT to provide space for disposal of waste material. Please confirm.	Technical	Terms & conditions of the tender document shall prevail.
97	Tech. Specs	6 of 12		Design & construction of Transmission line/ cable from plant take off point to the designated substation including right of way (ROW). Estimated length for the overhead transmission line is 3.2km and 22kV grade UG cable is 0.8km. The UG cable shall also pass under an existing railway siding of SPIC Chemical factory (Refer Section VII C: Special Technical Specifications)	We understand that Solar Power Plant location is under VOCPT premises. We understand that area from Solar Power Plant location to substation are under ownership of VOCPT. Please confirm. SECI/VOCPT to provide Railway approval, Right of Way (ROW) approval, Forest Department/ Environmental Department approval/ Statutory approval if required and any other approval from SPIC Chemical Factory.	Technical	Solar Plant location is with in VOCPT premises. The area from proposed Solar Power plant location up to the boundary of VOCPT is belongs to VOCPT. The area beyond VOCPT boundary and up to substation is under public/Private domain.
98	GCC	29 of 72		The Contractor shall grade/level the land identified for development of the mentioned Solar power Plant along with the design, procure, manufacture (including associated purchases and/or subcontracting), install, commission and complete the Facilities, carry out the Guarantee tests with due care and diligence in accordance with the Contract along with interconnecting transmission system including Right of Way for Transmission Line and the comprehensive O&M of the complete facilities for the period as defined under the tender document .	We understand that Solar Power Plant installation Land is owned by VOCPT. Kindly confirm. Kindly clarify that O&M of 10 years include operation & maintenance of Solar Power plant and it does not include operation and maintenance of transmission line & its facilities. Any Statutory approval required for Land development, shall be provided by SECI/ VOCPT. Please confirm.	Technical	VOCPT is the owner of land 10 year O&M period includes O&M of Solar Power plant & Transmission line the contractor shall acquire all necessary statutory approvals/permissions on behalf of owner. VOCPT will facilitate.
99	Tech. Specs	2 of 12		Minimum values of PR and CUF of the plant after netting off the auxiliary consumption: PR : 0.78 CUF : 20%	This guarantee is required for how many years. What is the year to year degradation factor needs to be considered. Kindly confirm.	Technical	Kindly refer Annexure-C (PG Test Procedure) to Section-VII(B). PR shall be demonstrated for Operational Acceptance. CUF shall be measured annually from the date of Operational Acceptance till the end of O&M period. For annual degradation, kindly refer Clause 2.2 of Annexure-C to Section-CII(B). Terms & conditions of the tender document shall prevail
100	Tech. Specs	2 of 12		Minimum DC Capacity (MWp): 5.5 MWp	To achieve 20% CUF, minimum DC capacity should be 5.7 MWp. Hence we request you to revise minimum DC capacity from 5.5 MWp to 5.7 MWp. Please confirm	Technical	The Contractor is free to install DC capacity more than 5.5 MWp in the given land if required to meet the required CUF. Terms & conditions of the tender document shall prevail

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Clarifications to Queries raised during Pre-Bid Meeting

101	IFB	6 of 9		All associated civil works, including design and Engineering, for: Earthwork for Site grading, cutting, filling, levelling & compacting, internal Roads, Storm water drainage in the requisite project land as required for development of this Solar PV Power Plant	SECI/VOCPT to provide Railway approval, Right of Way (ROW) approval, Forest Department/ Environmental Department approval/ Statutory approval if required and any other approval from SPIC Chemical Factory.	Technical	the contractor shall acquire all necessary statutory approvals/permissions on behalf of owner. VOCPT will facilitate.
102	Tech. Specs	9 of 12		The Contractor shall establish forecasting tools for submitting schedule and comply with TNERC Regulation for Forecasting, Scheduling and Deviation settlement of solar and wind generation. The scope under this Clause shall also include establishing and maintaining forecasting tools and appointment of QCA/Aggregator, if required. % Error (Deviation) shall be calculated as per the said regulations and DSM Charges in case of deviation beyond the permissible limits shall be borne by the Contractor.	We recommend to include Penalty due to deviation in forecasting if occurs, then this should get equally divided (50:50) between EPC Contractor & VOCPT.	VOCPT	Terms & Conditions of tender document shall prevail
103	GCC	26 of 72		Contractor's office at Site	Kindly confirm number of staff requirement during Construction and 10 years O&M period Solar PV Power Plant Project respectively.	Contractual	Contractor has deploy the required contractual manpower in line with good industry practices.
104	Tender	365 of pdf		Soil Testing Report	Any deviation in the actual soil condition/ soil strata not matching with soil test report provided in tender. Any additional civil work due to increase in pile length or soil preparation will be in the account of VOCPT/ SECI.	Technical	The attached soil report is only for reference and general information of the Bidder. No warranty is expressed or implied of the information that it presents a complete or accurate picture of the whole of the site. VOCPT/ SECI shall not take any responsibility for the same.
105	GCC	40 of 72	51.1	However, these adjustments would be restricted to direct transactions between the Owner and the Contractor. This adjustment shall not be applicable on procurement of raw materials, intermediary components etc. by the Contractor and shall also not be applicable on bought out items dispatched directly from sub- vendor works to site.	In case of imposition of any new laws on the custom duty or any change in the rates of custom duty should be treated under as 'Change in Tax ' or 'Imposition of new laws' and and necessary adjustments should be given as these variations have direct impact on the Project Cost .Also any supply transaction , direct and indirect , should come under the 'change in taxation' clause	Contractual	All such changes will be suitably dealt with "Change in Law" clause of the GCC section IV
106	GCC	50 of 72	73.15	Notwithstanding anything contrary contained herein, the aggregate total liability of Contractor under the Agreement or otherwise shall be limited to 100% of Agreement/ Contract Value except in case of Patent Infringement liability. However, neither party shall be liable to the other party for any indirect and consequential damages, loss of profits or loss of production	Kindly consider the total Liability of the Contract upto 10% of the Contract Value	Contractual	Terms & conditions of the tender document shall prevail.
107	SCC	6 of 11	11	Further, 5% (Five percent) of contract value as security deposit will be deducted from the each running bill, subject to maximum of 10% of the running bill.	Kindly confirm when is 5% will be released	VOCPT	The performance security and security deposit will be refunded after 72 months (9 Months + 60 months O & M + 3 Months) after submission of performance security for 5 years O & M period. At the end of 5th year O & M, the contractor shall submit 10% of 10 Years O & M cost as performance security in the form of bank guarantee and the same will be refunded after 3 months from the date of successful completion of 10 years O &M period
108	SCC	6 of 11	11	Contract Performance Security submitted shall be released to the Contractor without any interest not later than 75 (Seventy-Five) days after the successful completion of the complete O&M period (10 Years) subject to the approval and acceptance of the O&M period deliverables.	We understand that the PBG needs to have validity of 132 months but can be released after 75 days from 129 months on completion of 10 years of O&M period	Contractual	Kindly refer clause No 11 of SCC Section V for further understanding regarding this point.
109	SCC	7 of 11	13	Liquidated damages during O&M period against breakdown of other Infrastructure of Plant which doesn't affect the generation of power, directly such as but not limited to civil infrastructure, water supply system/network, other Infrastructure developed by the Contractor as a Scope of Work for the Project (Section-VII: Scope of Works & Technical Specifications) shall be penalized @ Rs.1000/day, per incident of breakdown reported beyond 07 Days of such reporting. Cumulative value of such penalty shall be limited to 50% of yearly O&M cost.	Completion time of rectification entirely depend on the quantum and the nature of the fault . Hence we request to impose penalty if the rectification work has not started within 7 days of reporting of any fault . Also as there will be penalty due to shortfall in achieving CUF , this is a duplication of penalty and hence this clause should be deleted	Contractual	Contract Performance Security
110	SCC	8 of 11	16	Interest bearing adjustable initial advance (OPTIONAL) of 10% of the Contract Value (i.e., total sum of all the Supply Contract) shall be released to successful bidder upon receipt of unconditional acceptance of NOA, detailed Performa invoice of contractor and against submission of unconditional & irrevocable Advance Bank Guarantee (ABG) with a validity period up to date of final commissioning total amounting to 110% of total advance amount. The ABG needs to be submitted in addition to the Contract Performance Security. The annual interest rate shall be calculated based on SBI one-year MCLR + 3.5% as applicable. Successful bidder will be required to submit the individual ABGs on individual site basis for claiming the advance amount.	Request to allow interest free mobilization advance against submission of equivalent amount of Advance Bank Guarantee	Contractual	Contract Performance Security
111	Technical Spec	5 of 12	4.1.1	Adequate capacity of Solar PV modules of suitable rating including module mounting structures (fixed), fasteners, MMS foundation and module interconnection.	Please confirm if only fixed type MMS to be used	Technical	Yes. Only fixed tilt is allowed. Terms & conditions of the tender document shall prevail
112	Technical Spec	6 of 12	4.1.24	Design & construction of Transmission line/ cable from plant take off point to the designated substation including right of way (ROW)	ROW should be under Client's scope .Please accept	Technical	Terms & conditions of the tender document shall prevail.

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Clarifications to Queries raised during Pre-Bid Meeting

113					Please confirm if only Indian Modules with Indian Cells are to be used	Technical	There is no DCR for module/cell procurement.
114	Technical Spec	4 of 5	26.a	Overhead Line shall have 33KV Silicone Polymeric Composite insulators suitable for operation in the Site conditions and shall be designed to meet the high quality, safety and reliability capable of withstanding a wide range of environmental conditions	Should be 22 KV . Please clarify	Technical	Kindly refer S.No. 19 of Amendment-1.
115	Annexure-C	3 of 10	2.1	A Performance Ratio Guarantee test shall be commenced within 60 days of the commissioning of Plant Facilities to demonstrate that the plant has achieved the Guaranteed Performance Ratio in line with requirements under section VII of the bidding document	By commissioning we mean synchronization of the entire system to the 22 KV substation .Please confirm	Technical	Kindly refer Clause 1.1.22 of Section-IV (GCC) for definition of commissioning.
116	Technical Spec	8 of 12	5.1.1	Construction of transmission line and laying of cable as per the evacuation route plan, from take-off point at plant to the delivery point at STU/DISCOM substation including laying of UG cable at railway siding of SPIC chemical factory through 250 mm dia. GI pipe to be laid (top of pipe at min. 1.0m below the rail sleeper) through horizontal directional drilling technology.	Please confirm for Railway crossing permission need to be taken from whom - Factory owner or Railway Department. Also please share working in the Coastal Area is any special type of permission is required	Technical	Permission need to be taken from Railway Department
117	Technical Spec	8 of 12	6.1	Obtaining statutory approvals /clearances on behalf of the Employer from various Government Departments, not limited to, the following:	As the land is inside the premises of the Port Area hence all the statutory approvals except CEIG/CEA . DISCOM should be under VOCPT'S scope	Technical	the contractor shall acquire all necessary approvals/permissions on behalf of owner. VOCPT will facilitate.
118	VII.A	204	4.1.24	Design & construction of Transmission line/ cable from plant take off point to the designated substation including right of way (ROW).	Please mention the type(Private/ Govt) of land falling under the transmission line and please provide the rout.	Technical	Solar Plant location is with in VOCPT premises. The area from proposed Solar Power plant location up to the boundary of VOCPT is belongs to VOCPT. The area beyond VOCPT boundary and up to substation is under public/Private domain. Route map of transmission line is attached for reference
119	VII.B	241	5.2.1	Compact Sub-Station shall consist of 2.5 MVA, PCU output voltage/22 kV, dry type inverter duty transformer, 22kV SF6 insulated Ring Main Unit (RMU), 415V LT switchgear with all accessories, interconnections, fittings and auxiliary equipment.	Please allow us to install outdoor transformers, SF6 insulated RMU/ VCB panel LT switchgears inside control room instead of CCS.	Technical	Terms & conditions of the tender document shall prevail
120	VII.B	243	6.2	Inverter Duty Transformer : VA Rating= 2.5 MVA	Please allow us to install Inverter duty transformer of 5 MVA capacity.	Technical	Terms & conditions of the tender document shall prevail
121	VII.B	279	17.2	Protection level for the entire plant shall be Level-I.	For the Solar power plant design, protection level shall be level-IV. Please accept.	Technical	Terms & conditions of the tender document shall prevail
122	VII.B	289	21.1.1	The Contractor shall provide minimum 4 (four) number of secondary standard pyranometers (ISO 9060 classification)	Here, we could not understand the requirement of 4 nos of Pyranometers. Please clarify. However, 2 nos are sufficient	Technical	Kindly refer S.No. 6 of Amendment-1.
123	VII.C	359	2.2	Reference Irradiation = 1997 kWh/m2	Request you to please provide reference monthly irradiation values.	Technical	CUF is calculated annually. Hence, there is no need for monthly irradiation values. Terms & conditions of the tender document shall prevail
124	VII.C	349	26.a	Overhead Line shall have 33KV Silicone Polymeric Composite insulators suitable	It looks there is a typo error, voltage level shall be 22 KV instead of 33.	Technical	Kindly refer S.No. 19 of Amendment-1.
125		363	C	Proposed Solar Power Area	Layout shown in tender is not clear. Request you to provide contour map of the land in Cad format with land boundary	Technical	Contour maps are not available. The contractor has to do their own assessment.

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Clarifications to Queries raised during Pre-Bid Meeting

126		297	25.4.1	In case the power evacuation is planned with overhead transmission line for plant internal and external evacuation, the design of tower and its accessories shall be as per theDISCOM's requirement and the design shall be submitted to Employer for approval/	As we have to evacuate 5MW power in 22kV line, hence we mayn't require any tower for transmission. Transmission line using pole is enough. Kindly clarify.	Technical	Transmission poles are acceptable provided they are approved by concerned DISCOM. Terms & conditions of the tender document shall prevail
127		203 & 241	4.1.5	Containerized Sub – Station (CSS) & Compact substation	Please clarify what to consider Containerized Sub – Station or compact S/S.	Technical	Kindly refer S.No. 1 of Amendment-1.
128					Can we go with conventional system instead of CSS.	Technical	Only Compact Sub-Station is allowed.
129		350	d.	The evacuated power has to be connected through 22KV out door VCB at Auto Sub-station., Muthiahpuram.	Do we have to consider only one O/D type VCB or the entire Bay with protection. Please provide the details at evacuation end.	VOCPT	The bidder shall supply & install the required Equipments for new bay development including breaker, protection and metering units/ compartments, remote operating units, cable arrangements for remote operation, unit batteries and battery chargers, auxiliaries as per TANGEDCO requirement.
130					Which system to be considered? Earthed or Un earthed system?	VOCPT	3 wire system. Cable shall be of armored.
131	VII.C	265	10.5	For HT cables (from inverter transformer to interconnection point), maximum voltage drop shall be limited to 0.5 % of the rated voltage.	Here we understood that the maximum voltage drop shall be limited to 0.5 % of the rated voltage from inverter transformer to plant end ABT metering point.	Technical	Kindly refer S.No. 3 of Amendment-1.
132				MCR	In tender different types of specifications are given in the the the tender. Request you to confirm the same	Technical	Kindly refer S.No. 21 of Amendment-1.
133	VII - B	99	13.31	The length of single table shall not be more than 20m.	Kindly suggest table size for 1500 volt system (30 module in series)	Technical	In case the Contractor proposes 30 modules in series, they may consider portrait configuration with 2 rows. Number of modules in series depends on module voltage ratings and site specific temperature conditions. Actual configuration and number of modules in series will be decided during detailed engineering. Terms & conditions of the tender document shall prevail
134	VII - B	84	5.4	Mandatory permissions/ licenses/ statutory clearances from competent authorities if required for cutting of trees, blasting or mining operations, disposal of waste material etc. shall be obtained by the contractor.	Cutting of big trees & removal & uprooting shall be in client scope. Removal of shrubs, bushes, vegetation, small plants shall be in bidder scope.	Technical	Terms & conditions of the tender document shall prevail.
135	VII - C	3	1.2	As the ground water contains high concentration of chlorides, it is not suitable for construction and module cleaning purposes. Suitable water for construction and module cleaning purposes (during plant operation) including its storage shall be arranged by the bidder.	Source of water for construction & module cleaning shall be identified by client. Supply & other facilities shall be in bidder scope.	Technical	Refer SCC clause no. 05
136	VII - C	3	1.23	Water storage tank shall be of Overhead water type.	Instead of overhead RCC water tank, on ground PVC / Syntex / similar arrangements will be provided.	Technical	Water storage tank of required/specified capacity shall be over ground PVC tank.
137		350	d.	The evacuated power has to be connected through 22KV out door VCB at Auto Sub-station., Muthiahpuram.	Do we have to consider only one O/D type VCB or the entire Bay with protection. Please provide the details at evacuation end.	VOCPT	This point is already addressed. Kindly refer the clarifications.
138					Which system to be considered? Earthed or Un earthed system?	VOCPT	3 wire system. Cable shall be of armored.

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139		15	1.1	IEC 61215-1-1: 2016 Ed.1 _Special requirements for testing of crystalline silicon PV modules with backsheet-400 cycles for TC and 2000 cycles DHT	VSL modules are tested as per standard IEC 61215 test procedure for TC200 and DH1000	Technical	Terms & conditions of the tender document shall prevail
140		15		IEC 62804-1:2015 Ed.1 : Test methods for the detection of PID-Part 1: Crystalline silicon (under conditions of 85°C/85% RH for minimum 192 hours)	VSL modules are tested as per standard IEC 62804 test procedure for 96hrs	Technical	Terms & conditions of the tender document shall prevail
141		19	1.6.6	Maximum three numbers of bins will be allowed for each module rating	VSL to provide 2 current bins in a given module power bin.	Technical	Terms & conditions of the tender document shall prevail
142		Page 9 of 10	2.2	Eac is the number of units recorded in the plant end ABT meter excluding auxiliary consumption, kWh	There are contradictory requirement in tender. Please confirm the ABT meter position (plant end or S/S end) for CUF and PR calculation.	Technical	Kindly refer the formula provided in Clause 2.1.1 of Annexure-C for PR and Clause 2.2 of Annexure-C for CUF. Both PR and CUF will be calculated based on ABT meter readings at plant end. Kindly also refer S.No. 23 of Amendment-1.
143		Page 7 of 10	2.1.4.3	Energy injected into grid (kWh) (Source: ABT Meter at GSS/injection point		Technical	
144		ANNEXURE-C Page 5 of 10	2.1.3.5	Open circuit voltage (VOC) test. This test verifies that strings are properly connected (module and string polarity) and that strings are producing the expected voltage according to the module data sheet, as observed in the SCADA.	Module voltage at Voc is measured at STC condition which is mention in data sheet. How it will verifies same voltage as per data sheet in site condition?	Technical	Kindly refer S.No. 22 of Amendment-1.
145		Page 118 of 124	34.1	Module cleaning procedure and pressure requirement at discharge point shall be as per the recommendation of PV module manufacturer. However, discharge pressure at outlet shall not be less than 50kg/cm2 (5 MPa)	As per stand ard practice 4 to 6 Kg/cm2 (4-6 bar) pressure considered at outlet. Please confirm the pressure at cleaning point.	Technical	Please read 5 kgf/cm2 (0.5 Mpa) in place of 50 kg/m2 (5 Mpa).
146		Page 98 of 124	13.21	Two numbers of anti-theft fasteners of stainless steel on two diagonally opposite corners for each module shall be provided.	Anti theft fasteners will obstruct the easy replacement of defected modules with new one. Please confirm.	Technical	Terms & conditions of the tender document shall prevail
147					Please confirm if there is any restriction in using Modules - Indian module with imported cell , Indian Module with Indian cell , Imported Modules	Technical	There is no DCR on module/cell procurement.
148	Sub Station	241	5	NA	Request to share GA and section drawings of Switchyard interconnection point	VOCPT	New bay requirement. Hence not applicable
149	Sub Station	241	5	NA	Please confirm availability of ACBD, Auxiliary supply, 110V DC supply at existing substation.	VOCPT	This point is already addressed. Kindly refer the clarifications.
150	Sub Station	241	5	NA	What is the length of cable trench from proposed bay extension termination point to existing cable trench.	VOCPT	Cable shall be terminated at the new bay
151	Sub Station	241	5	NA	In pooling substation, Please provide section and GA details indicating proposed bay location and control room to calculate required control cables, etc	VOCPT	The design and implementation is under bidders scope as per norms

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152	Equipment	NA	NA	NA	Request to share the List of approved makes / Vendor list for equipment	Technical	There are no approved makes/vendor list. Makes that satisfy all the tender requirements are eligible for supply.
153	SCADA	281	19	NA	Please confirm the requirement of Power plant controller as per revised IEC guidelines	Technical	Power plant controller is not envisaged.
154	Testing and Inspection	246	6.5	Short-circuit withstand test as per IEC 60076-5	Short circuit test required to be done again for transformer? Can we provide approved short circuit test already done?	Technical	Test report of similar transformer provided by NABL accredited laboratory is acceptable. In case such reports are not available, the Contractor shall get the tests conducted by NABL accredited laboratory or witnessed by the Employer. Terms & conditions of the tender document shall prevail
155	PG Test Procedure	353	2	Annual Generation Guarantee up to a period of 10 years (O&M Period), starting from the date of Operational Acceptance.	What is the generation guarantee to be provided by the contractor?	Technical	Kindly refer Clause 1.1 of Section-VII(A) and Clause 2.2 of Annexure-C to Section-VII(C). Terms & conditions of the tender document shall prevail
156	Buildings and Plinth for Open Installations	322	16	Unless otherwise specified elsewhere, all buildings and plinth for open installations except Security room/ cabin shall have RCC framed structure. Masonry partition walls shall be provided for Kitchen, Pantry, Battery room and Toilet units. For other rooms AL Glass partitions shall be provided. The plinth for open installations and equipment area shall be designed with OEM requirements to ensure all satisfactory operations. The security room/ cabin(s) shall be of prefabricated structure.	Can we use Pre Engineered buildings for control rooms? What is the specific size/area of the ICR and MCR?	Technical	Please refer S.No. 16 & 17 of Amendment-1.
157	Site Details and Works:	347	1	NA	Please share AutoCAd drawings with the levels of adjacent structures in order to give a valid commitment of energy generation with respect to area.	VOCPT	The design and implementation is under bidders scope as per norms
158	Peripheral boundary Wall/Fence	310	8	NA	What is the tentative length of boundary wall to be considered? Or else please share autocad drawing or GPS coordinates of the boundary. Also, which type of fencing out of the three must be considered. Because, there is considerable price difference between chain link, narbed wire and masonry boundary walls. Specific one is required to become L1 bidder.	VOCPT	As per tender conditions, the fencing shall be provided at site
159	Power evacuation system	297	25.3	The ROW for the TL/UG cable shall be obtained prior to the construction of the line from the concerned authorities. Total length for the power evacuation system is 4km (approx.) wherein it includes 3.2km (approx.) overhead line and 0.8km (approx.) of UG cable. UG cable shall also cross an existing railway siding of SPIC Chemical factory through GI pipe conduit(s) with due approvals from concerned authorities	TL/UG cable Railway crossing to be done? If yes, approval for railway crossing to be taken by contractor or client?	Technical	the contractor shall acquire all necessary approvals/permissions on behalf of owner. VOCPT will facilitate.
160	Site Details and Works:	347	1	NA	Please confirm if the area marked is shadow free and completely available for PV plant installation?	VOCPT	the area is Shadow free and completely available for Solar PV plant
161	Sub Station	241	5	NA	Any specific fencing is required at bay extension or already available?	VOCPT	Not required.
162	Area Grading and Land Development	304	5	NA	Necessary clearance for vegetation i.e., bushes, tree cutting, shall be arranged by owner.	Technical	the contractor shall acquire all necessary approvals/permissions on behalf of owner. VOCPT will facilitate.
163	Construction Water Supply	81	2.3	Contractor will have to make his own arrangements for supply of water to his labor camps and for works. The water quality should be suitable for use in civil construction work. All pumping installations, pipe network and distribution system will have to be carried out by the Contractor at his own risk and cost.	Any existing bore well available or can contractor bore a new well for water supply for O&M module cleaning?	Technical	Refer SCC clause no. 05
164	Procurement & Supply	204	1/4/2024	Design & construction of Transmission line/ cable from plant take off point to the designated substation including right of way (ROW).	Request for approach road and Transmission line ROW to be considered under client scope or to be reimbursed by you	Technical	Approach road to plant and Transmission Line/Cable ROW are in Contractor's scope. Terms & conditions of document will prevail.

Queries Related to Site Survey

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Clarifications to Queries raised during Pre-Bid Meeting

1				Transmission line rout	Please provide the transmission line rout survey including underground cable rout. Please also show the rout on Google earth.	Technical	
2					Total Area available	Technical	
3					Situation of the Land (Plain / Hilly / Un Even)	Technical	
4					Ground Water depth	Technical	
5					Any River/Pond/Natural drain running through the land	Technical	
6					If any River/Pond/Natural drain is running then possibility of diverting is there.	Technical	
7					Type of soil (Sandy / Rocky / Black Cotton / Laterite)	Technical	
8					Nature of soil (Cohesive / Non Cohesive)	Technical	
9					Type of Approach road and approx. length (Bitumen / WBM / Murrum / PCC)	Technical	
10					Width of approach road.	Technical	
11					Tentative undulation	Technical	
12					Water logging occurs after rain or not?	Technical	
13					Type of land (Residential / Industrial / Agricultural)	Technical	
14					Surrounding boundary of the site	Technical	
15					HFL (High flood level) of Land	Technical	
16					Any obstacles (Tree, any constructed building etc…) on installation location, if yes then details. Scope of removals	Technical	
17					Plant access.	Technical	
18					Presences of natural water body in installation location, if yes then details.	Technical	
19					Natural drain discharge point, if yes then details.	Technical	
20					Any transmission line in installation location, if yes then details.	Technical	
21					Any pipeline (Gas/Water/other) running in install location, if yes then details.	Technical	
22					Please mark in proposed land with length and photograph of existing lines / cables which may damage while working at site	Technical	
23					Please confirm the length of horizontal drilling required for railway line crossing. Also mark in proposed land layout.	Technical	
24					Please confirm the length of the existing drains (on side of Gulf of Mannar and near the Bus stop end of the project) where existing slope is 20 degree.	Technical	
25					Any Big Tree/high voltage grid line going through the site? (Describe location, height of obstruction etc.)	Technical	
26					Any hill is there inside the land area? If yes then give description like approx. height and location i.e. in North/South/East/West	Technical	
27					Any hill/other-obstruction is there outside the plant boundary situated other than North side & capable of posing shadow in the land under discussion. Please give the approx. height and distance of such obstructions (hill/tower/tree etc.) from the plant boundary	Technical	
28					Sanctioned Load	Technical	Please refer the tender document, clarifications and amendment-1. the transmission line rout map, site photos are attached for reference.
29					Voltage Level	Technical	
30					Installed Capacity of DG sets (if available)	Technical	
31					Installed Capacity & Voltage of Transformer	Technical	
32					Inverter Location from module	Technical	
33					HT / LT panel Location	Technical	
34					HT / LT panel rating	Technical	
35					Grid Level Voltage	Technical	
36					Load operating voltage	Technical	
37					Name and address of the Utility Company? Who is the contact person of the concerned Utility Company regarding inter-connectivity?	Technical	
38					How far the utility grid line from the site and what is the kV rating of that line? Is it possible to inject power in this line?	Technical	
39					How many Grid substations are there with in a dia of 15-20 km? (Both existing and proposed) Give details of each substation as per the attached separate format.	Technical	
40					Whether the nearby substation has the excess capacity to take the power. If yes, how much in MW	Technical	
41					Any other solar plant is there nearby the proposed site? If yes give Company name, plant size.	Technical	
42					Local / legal issue at site	Technical	
43					Nearest City	Technical	
44					Local Transport available	Technical	
45					Transporter details	Technical	
46					Local warehouse availability	Technical	
47					Nearest bus stop	Technical	
48					Nearest Rail station	Technical	
49						Technical	
50					Please provide the dimension of land as the dimension shown on layout are not readable. Also please provide the Topography survey in Auto Cad format with marking of land boundaries, trees, any transmission line or any other objects if available at site.	Technical	
51					Images of site and images of existing railway siding of SPIC Chemical factory from where 22 kV cable will pass.	Technical	
52					Details and images of rout of underground cable and transmission line.	Technical	
53						Technical	
54					Details of Substation, Bay availability, images of spare bay or space for Bay for Solar Plant connection at substation	Technical	
55						Technical	
56					Coordinate of the Substation	Technical	
57					Please also mention the type of land (Govt / Private) in transmission area.	Technical	

Declaration : The compiled Pre Bid Queries have been reproduced on as it is basis, without any modifications.

ANNEXURES TO AMENDMENT-1

ANNEXURE-1

16.2.2 LCR/ ICR (Inverter Control Room)

- Inverter and associated equipment shall be installed on plinth as open installations.
- There shall be suitable provision for easy/smooth passage of O&M personnel, cable trench, operating area, etc.
- The plinth supporting the ICR/LCR equipment shall have RCC framed structure with foundations, columns and beams up to plinth level (FFL).
- Plinth filling and flooring shall be provided as per the technical specifications (Section VII – B of Tender).

ANNEXURE-2

21.1 **Compact Sub-station (CSS)**, as per Cl. 5 of Section VII – B of Tender, shall be provided for housing transformer, RMU, LT switchgear etc.

i. CSS shall be placed on plinth having RCC framed structure with foundations, columns and beams up to plinth level (FFL) as specified for LCR/ICR.
ii. The size and clear head room of CSS shall be as per system requirements.
iii. Plinth filling and flooring shall be provided as per the technical specifications (Section VII – B of Tender).

21.2 **MCR** shall be PEB structure with following requirements:

i. SCADA cum Supervisor cabin and office area (approx. carpet area 20 m^2)
ii. Pantry - with service platform and utensil washing facilities (approx. carpet area 5 m^2)
iii. Toilet block with separate gents and ladies wash room facilities (approx. total carpet area 12 m^2)
iv. Min. thickness for primary structural members and secondary structural members of PEB shall be 5 mm (BMT) and 4 mm (BMT) respectively.
v. PEB structure for MCR shall be placed on plinth having RCC framed structure with foundations, columns and beams up to plinth level (FFL) similar to specified for LCR/ICR
vi. Plinth filling and flooring shall be provided as per the technical specifications (Section VII – B of Tender).
vii. Foundation anchor bolts for PEB shall be heavy duty and provided with corrosion protection treatment. Min. diameter for the foundation bolts shall be 20 mm.

ANNEXURE-3

29. Min. grade of concrete shall be M30 for all RCC works except Liquid retaining structures where the min. grade of concrete shall be M35.
30. All reinforcements shall be applied with corrosion resistant paint as per manufacturer's catalogue. The proposed treatment shall be subject to approval of the owner/ SECI. Contractor may also use readily available reinforcement steel, corrosion resistant (CRS) grade, or with factory applied corrosion resistant paint subject to approval of the owner.
31. Weather Canopy in the form of open shade shall be provided for all the open installations. Canopy columns shall be supported on the pedestals at plinth level.

ANNEXURE-4

2.1.3 Pre-PR Test

2.1.3.5 Open circuit voltage (V_{OC}) test.

This test verifies that strings are properly connected (module and string polarity) and that strings are producing the expected voltage according to the module data sheet, as observed in the SCADA. String open circuit voltage test shall be conducted under stable weather conditions wherein the requirements of IEC 62446:2016 – 6.4 shall apply.

If any abnormality is observed in the DC bus Voltage of SMU in SCADA, the following procedure shall be used:(a)DC string combiner box is opened; fuses leading to the sub main junction box are removed.(b)The voltage is measured with a calibrated, industry accepted instrument from the negative bus bar to the string positive lead.

	A	B	C	D	E	F	G	H	I	J	K	L	M
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2								SR - Site Register SECI-SPV-QA-F-XXX SECI-SPV-QA-T-XXX (XXX - Inspection record form No. or Test report format no.)		**M'fr/ Supplier or Sub-Contractor**	**EPC Contractor**	**SECI or Owner**	
3	**1**	**General Requirements**											
4	a	Availability of requisite test set-up and equipment in good working condition with valid calibration at site well before commencement of concerned activity	As required/ agreed	Critical	Physical	Once prior to start of work & Monthly there after	Tech. Specs, Construction Drawings	SR	√		**x**	**x**	**Min. list of equipment** - CTM, Set of Seives for CA & FA, Elcometer (digital), Micrometer, Multimeter, Meggar, Torque Wrench, Moulds for casting of concrete/ mortar test samples, Curing tank of adequate size, SS measuring tape - 50m, Theodolite, leveling staff and associated equipment etc. for day to day work with proper storrage racks. The equipment shall be in adequate no. matching the site progress requirements. Functioning of laboratory equipment in proper working condition to be verified on monthly basis
5	b	Submission of QA & QC manpower deployment schedule based on agreed L-2 network	As required/ agreed	Critical	Verification	Before start of work	Tech. Specs, Construction Drawings	SR	√		**x**	**x**	
6	c	Availability of QA & QC manpower deployment based on agreed deployment schedule, Periodic review for augmentation as per actual progress	As required/ agreed	Critical	Physical	Once prior to start of work & Monthly there after	Tech. Specs, Construction Drawings	SR	√		**x**	**x**	
7	d	Submission of schedule/ programme of tests and inspection of civil works (survey, excavation, concreting, backfilling, brickwork, finishing works, roads, drains etc.) to be done monthly and quarterly based on agreed schedule	As required/ agreed	Critical	Physical	Once prior to start of work & Monthly/ Quarterly there after	Tech. Specs, Construction Drawings	SR	√	**x**	**x**	**x**	
8	e	Submission of actual work programme min. 3 days (72 hours) in advance to facilitate planning for quality checks as per approved QP	As required/ agreed	Critical	Physical	48 hours before start of actual work	Master programme/ schedule	SR	√	**x**	**x**	**x**	
9	f	Stacking and storage of construction materials and components at site	IS: 4062	Critical	Physical	Random	Tech. Specs, Construction Drawings & IS: 4062	SR	√	**x**	**x**	**x**	
11	**2**	**Surveying (Execution phase)**											
12	a	Availability of Calibrated Instruments, qualified & experieced staff at site	As required/ agreed	Critical	Physical	100%	Tech. Specs, Construction Drawings, Agreed deployment schedule	Calibration Report	√	x	x	x	
13	b	Ensure correct Boundary Layout and Latitude-Longitude Coordinates,True North	construction Drawings	Critical	Measurement	100%	Tech. Specs, Construction Drawings	SR	√	x	x	x	
14	c	GL (ground level), FGL (finished ground level) and Plinth Level, Check PBM(permanent bench mark) with Total Station/ Theodolite and after conformation carryout Peg marking	As required/ agreed	Critical	Measurement	100%	Construction Drawings	SR	√	x	x	x	
16	**3**	**Materials**											
17	A	*Cement*											
18	i	Fineness	As per IS: 4031	Critical	Review of MTC/ Physical	One test at Lab to corelate with MTC	IS:456,IS:269,IS:8112, IS:12269,IS:1489, Tech. Specs	Manufacturers Test Certificate (MTC's) and Laboratory Test results	√	**x**	**x**	**x**	Each consignment/ lot of cement shall be duly correlated with MTC If cement stored is more than 60 days in godown the same shall be re-tested for conformation with MTC
19	ii	Compressive Strength											
20	iii	Initial & final setting time											
21	iv	Chemical composition of Cement											
22	B	*Coarse Aggregates (CA)*											

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23	i	Determination of Particle size (Sieve Analysis), Flakiness index, Elongation index	As per IS: 2386	Major	Visual	Once per 100 cum or part thereof (During monsoon moisture content to be checked every day)	IS:383,IS:2386, Tech. Specs	Lab Test results	√	**x**	**x**	**x**	Water content of concrete to be corrected as per results of moisture content
24	ii	Moisture content											
25	iii	Crushing Value, Impact value, Abrasion value		Critical		One test at Lab for each source/ on every change of source			√	**x**	**x**	**x**	These tests shall be carried out while establishing design mix. In case of change of source the design mix shall be re-validated for new source
26	iv	Specific Gravity, water absorption											
27	v	Bulk Density											
28	vi	Soundness											
29	vii	Presence of deleterious materials											
30	C	*Fine Aggregate (FA)*											
31	i	Gradation/Determination of Particle size (Sieve Analysis)	Balance, Oven etc. As per IS: 2386, 383	Major	Visual	Gradation - Once per 1000 cum or part there of Mosture content - Every day	IS:383,IS:2386,IS:456 , Tech. Specs	Lab Test results	√	**x**	**x**	**x**	Water content of concrete to be corrected as per results of moisture content
32		Moisture Content											
33	ii	Specific Gravity and density (for design mix concretes only)	As per IS: 2386, 383	Major	Visual	One test at Lab for each source/ on every change of source							
34	iii	Water absorption (for design mix concretes only)											
35	iv	Presence of deleterious materials											
36	D	*Concrete Admixture*											
37	i	Type of admixture			Review of MTC		IS: 9103, Approved design mix		√	**x**	**x**	**x**	Admixture shall be of brand and type as per approved design mix.
38	ii	Physical & Chemical properties			Review of MTC		IS: 9103, Manufacturer's Brochure						Each lot/ batch of admixurture shall acompany the Manufacturer's Brochure and shall be correlated with MTC
39	iii	Suitability											
40	E	*Bricks*											
41	i	Dimensional Tolerance, shape			Measurement/ Physical	As per relevant IS code/ one sample for 30,000 nos. or part there of	IS: 1077, IS: 13757, IS: 12894, Tech. Specs, Construction Drawings	Lab Test results	√	**x**	**x**	**x**	Efflorescence shall be checked at each source
42	ii	Compressive Strength											
43	iii	Water Absorption											
44	iv	Efflorescence			Visual								
45	E	*Water*											
46	i	Cleanliness - Test for ascertaining limit of solids		Major		One per 3 months for each source	IS:456,IS:3025 (part 18), Tech. Specs, Construction Drawings specification	Lab Test reports	√	**x**	**x**	**x**	Water to be used for concrete shall be of potable quality and shall meet requirements specifed in IS: 456
47	ii	Chemical Tests to ascertain the suitability for construction purposes - pH Value, Sulphate & Chloride content					IS:456,IS:3025 (part 22, 23), Tech. Specs, Construction Drawings	Lab Test reports	√	**x**	**x**	**x**	
48	F	*Reinforcement Steel*											
49	i	Identification & Size		Major	Visual	Each batch of delivery	IS:432,IS:1786,IS:1852, Tech Specs	SR	√	**x**	**x**	**x**	Reinforcement steel shall be stored properly at site to avoid rusting
50	ii	Freedom from cracks, surface flaws, lamination				Random in each shift			√	**x**	**x**	**x**	
51	iii	Tensile Test		Critical	Review of MTC	Each batch of delivery	IS:432,IS:1566,IS:1786, Tech Specs	Manufacturers Test Certificate (MTC's)	√	**x**	**x**	**x**	
52	iv	Yield stress/proof stress											
53	v	Percentage Elongation							√	**x**	**x**	**x**	
54	vi	Bend/Rebend Test											
55	vii	Reverse Bend Test for HDS wire					IS:432, Tec. Specs		√	**x**	**x**	**x**	
57	**3**	**Structural Steel Work {Example: Chequered plate cover, Panel supports, Rungs, Cat lader, Inserts, Fencing gate (MS) etc.}**											
58	i	Strutural Steel (Raw material)-Chemical Properties, Ultimate Tensile Strength(UTS), Yield Strength (YS), Percentage Elongation, Bend test		Critical	Review of MTC	For each batch of each section	IS: 2062, IS: 8500, Tech. Specs, Construction Drawings	Manufacturers Test Certificate (MTC's)	√	**x**	**x**	**x**	MTC to be correlated
59	ii	Dimensional Check - Secition dimensions, thickness		Critical	Measurement	10% of total quanity at Random			√	**x**	**x**	**x**	For Fencing gate - dimensional check 100%

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60	iii	Visual checks for damages, rusting, pitting, scaling etc.		Major	Visual	100%	IS: 822, Tech. Specs, Construction Drawings, MTC, relevant BIS standards for painting	Manufacturers Test Certificate (MTC's)/ SR	√	**x**	**x**	**x**	
61	iv	Visual checks for welding defects, painting (surface preparation, primer coat, and Finishing coat - make and shade of paint, DFT) as applicable.		Major	Visual/ Measurement/ Review of MTC	10% of total quanity at Random			√	**x**	**x**	**x**	MTC to be correlated
62	v	Acceptance ofStructural steel works		Major	Physical/ Acceptance	Random	Tech. Specs, Construction Drawings	SR	√	**x**	**x**	**x**	
64	**4**	**Foundation System**											
65	**A**	**Bored Cast in-situ Concrete Piling (for MMS support)**											
66	**a**	**Execution**											
67	i	Ensuring correctness of layout		Critical	Physical	100%	Tech. Specs, Construction Drawings	SR	√	**x**	**x**	**x**	
68	ii	Checking of pile making as per drawing	Total Station	Major	Vsual								
69	iii	Checking of Centre line of Pile Group	Total Station	Critical	Physical								
70	iv	Check Pile Location	Total Station										
71	v	GL, Pile depth, diameter and alignment	As required		Measurement								1. During boring of pile, record SPT/ core recovery to ensure socketing length in the hard strata equivalent in terms of pile diameter in hard rock zone as per tech Specs and approved construction drawings. 2. In case of collapse of pile bore during drilling temporary MS lining shall be used. 3. Lines and levels to be checked 4. Each bore shall be cleaned of any loose materail by pressure jet washing/ cleaning by air jet 5.The column section shall pe placed and held in position in true vertical alignment using template/ tripod till initial setting of concrete 6. Concrete garde - as per Construction Drawing
72	vi	Cleaning/ flushing of pile bore	As required	Major	Visual		IS 2911, Tech Specs, Construction Drawings	SR	√	**x**	**x**	**x**	
73	vii	Insertion & positioning of Column post in the bore hole (in case of embeded col. Leg) Placement of reinforcement and foundation bolts with template (inacse of fixing of col. with base plate & foundation bolt assembly)	As required	Critical	Visual/ Measurement								
74	viii	Acceptance of Pile casting - Shape, reinforcement or col. leg embedment (as aplicable), concreting, compacting with use of needle vibrator etc.	As required/ Agreed	Major	Visual								
75	ix	Grouting u/s of base plate	As required/ Agreed	Critical	Visual	100%	Tech. Specs & Construction drawings	SR	√	**x**	**x**	**x**	The type, grade and thickness of grout shall be as per approved drawing
76	**b**	**Testing**											
77	i	Initial pile load test - Compression (Vertical), Lateral (Horizontal), & Pull out (Tension)	Calibrated dial gauges, jack of required capacity, datum bars etc.	Critical	Physical	100% for 3 no. for each type of test or as specified in Tech Specs, Approved test pile layout	IS 2911, Tech Specs, Construction Drawings	Test Report	√	**x**	**x**	**x**	1. The R/F details shall be as per approved drawing for test plie (if applicable), 2. The test load shall be up to 2.5 times of required pile capacity in case of Compression and Lateral load and 2 times in case of Pull out test as per IS: 2911 (Pt. 4), 3. The location shall be as per approved pile test programme/ layout drawing 4. The test shall be carried out as per approved methodology 5. Test report along with test records shall be submitted in standard format as per IS:2911
78	ii	Routine pile tests - Pull out and Lateral		Critical	Physical	100% for 0.5% of total no. of working piles for each type of test	IS 2911, Tech Specs, Construction Drawings	Test Report					1. The piles for routine tests shall be selected at Random to represent total no. of job piles insalled 2. The test load for vertical and pull out shall be 1.5 times the required pile capacity 3. The test shall be carried out as per approved methodology. 4. The Test report along with test records shall be submitted in standard format as per IS:2971 (Pt. 4)

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80	**B**	**Cable Trench/ Building & Equipment Foundations**											
81	**a**	Before Excavation											
82	i	Ensuring correctness of layout		Critical	Physical	100%	Tech. Specs, Construction Drawings	SR	√	**x**	**x**	**x**	
83	ii	Checking of trench marking & alignment		Major	Visual		Tech Specs, Construction Drawings						
84	**b**	Excavation											
85	i	Dimensional conformity including diagonal check		Ctitical	Visual / Measurement	100%	IS:3764, Tech Specs, Construction Drawings	SR	√	**x**	**x**	**x**	
86	ii	Excavated earth kept away from edges		Minor	Visual	Random		SR	√	**x**	**x**	**x**	
87	**c**	Acceptance of Trench/ Foundation casting - Shape, reinforcement, shuttering, concreting, etc.		Minor	Physical	100%	Tech. Specs, Construction Drawings	SR	√	**x**	**x**	**x**	
89	**5**	**Foundation Bolts / Inserts/ Concrete embedments**											
90	i	Visual check of mechanical damage and galvanising painting if applicable on inserts			Visual / Measurement	100%	As per Tech Specs, Construction Drawings	SR	√	**x**	**x**	**x**	
91	ii	Bolt and assecories, inserts - Dimensions (total & threaded length & dia of bolt, size & thk of embedment and lugs etc.), Nos											
92	iii	Verticality, alignment, levels, pitch distance, embeded and projected length of bolt											
93	iii	Use of template for Alignment and Level checking											
94	iv	Acceptance of foundation bolt assembly / inserts in postion											
96	**6**	**Formwork**											
97	i	Materials & Accessories	As agreed/ required	Major	Visual	Once before start of work	IS :456 , Other relevant BIS Standard, Tech. Specs, Construction Drawings	SR	√	**x**	**x**	**x**	
98	ii	Soundness of staging, shuttering and scaffolding including application of mould oil/ release agent	As agreed/ required	Major	Visual	Once before start of work	Manufacturer's specs, IS :3096, IS:4014, IS: 4990, Tech. Specs, Construction Drawings	SR	√	**x**	**x**	**x**	
99	iii	Dimensional Check, alignment & levels as per drawing and tolerences		Major	Visual/ Measurement	100%	Tech. Specs, Construction Drawings	SR	√	**x**	**x**	**x**	
100	iv	Proper sealing of joints, Acceptance of formwork before concreting		Major	Physical/ Visual	Before start of concreting	As per provisions, tolerences, Tech. Specs, Construction drawings		√	**x**	**x**	**x**	
102	**7**	**Placement of Reienforcement Steel**											
103	i	Check whether Bar bending schedule (BBS) with necessary lap, spacers & chairs is available before start of cutting & bending of bars	As agreed/ required	Major	Visual/ physical	Random in each shift at each work site	Tech. Specs, Construction Drawings, IS: 2502	SR	√	**x**	**x**	**x**	
104	ii	Check whether cutting and bending of bars is as per BBS and placement conforms construction drawings			Visual/ measurement								
105	iii	Check whether all joints and crossing of bars are tied properly with right gauge and annealed wire			Visual								

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106	iv	Check for proper cover,spacing of bars, spacers & chairs after the reinforcement cage has been put inside the foundation			Visual								
107	v	Check whether lapping of bars are tied properly with right gauge and annealed wire			Visual								
109	**8**	**Concrete**											
110	i	Availability of approved Design Mix (for all specified grades)		Critical	Physical	For each specified grade of concrete	IS :456, Tech Specs, Construction Drawings	Approved mix design	√		**x**	**x**	The concrete shall be as per approved design mix and the materials (cement, coarse and fine aggregate shall be from the same source considered during mix trials. The mix design shall be verified and approved in case of change of source of any of the matearials
111	ii	Minimum cement content (as applicable in MMS piling and foundation/ below ground works)		Critical	Physical	For piling and foundation works	IS: 456, Tech. specs, Construction drawings	SR	√		**x**	**x**	The minimum cement content shall correspond to exposure conditions and/ or, suplphate contents in ground water/ soil
112	iii	Trial mixes to ascertain the workability and cube strength	As per recommended mix design from specialist agency	Critical	Physical/ Testing	One for each mix proportion	Tech. Specs, IS: 456	Lab Test Reports	√	**x**	**x**	**x**	Necessary correction for moisture content and water absoption according to mix design recommendations may be carried out during trial mix
113	iv	Mixing of concrete- check for quanities of cement, CA, FA and water used, Concrete shall be homogenous	Mixing shall be done in a approved mixer/ batching plant (conforming to IS: 4926/ 4925)	Major	Physical	Mixer/ Batcher to be calibrated at the time of starting and subsequently once in tree months	IS: 4925, IS: 4926	Calibration Report/ Certificate	√	**x**	**x**	**x**	Review of calibration chart/ Certificate as per IS: 4926 Qty. of materials including cement consumptionshall be available through on line printer
114	v	Handling & trasportation	As required	Major	Physical	100%	As per approved/ agreed construction methodology	SR		**x**	**x**	**x**	Concrete shall be placed within 30 minutes of its removal from mixer
115	vi	Placement of concrete	As required	Major	Visual/ Physical	100%			√	**x**	**x**	**x**	
116	vii	Compacting	As required	Major	Physical	At Random			√	**x**	**x**	**x**	
117	viii	Curing	As required	major	Physical	At Random	IS: 456	SR		**x**	**x**	**x**	
119	**9**	**Concrete Testing & Acceptance**											
120	i	Workability - Slump Test		Critical	Physical	At the time of concrete pouring at site every 2 hrs	IS:456, IS:516,IS:1199, Tech Specs, Construction Drawings	Test Results / SR	√	**x**	**x**	**x**	
121	ii	Crushing strength - (Works test cubes)		Critical	Physical	Testing	IS:456, IS:516,IS:1199, Tech Specs, Construction Drawings	Test Results/ SR	√	**x**	**x**	**x**	**MMS Pile** - 6 cubes (3 for 7 day test & 3 for 28 day strength) per sample for each 5 cum or part there off **Building work and Equipment/ Misc foundations etc.** - 6 cubes (3 for 7 day test & 3 for 28 day strength) per sample for each 25 cum or part there off
122	iii	Acceptance of concrete work - Dimensional check (dimensions, levels etc), placement of bolts, inserts, pockets, pitch distance for bolts etc.	As required & dimensional tolerences	Major	Visual/ Measurement	100%		Joint Protocol between Civil Conractor, EPC Vendor and SECI/ Owner where applicable/ SR	√	**x**	**x**	**x**	
124	**10**	**Acceptance of Hardened Concrete**											
125	i	Dimensional check (dimensions, levels etc), workmanship, finsishing after removal of shuttering	As required & dimensional tolerences	Major	Visual/ Measurement	At Random			√	**x**	**x**	**x**	

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126	ii	Water tightness test for liquid retaining structures/ tanks	As required	Critical	Physical/ Testing	100%	IS: 3370 (Pt.4), Tech Specs, Construction Drawings	SR/ Test Records	√	**x**	**x**	**x**	Water tightness test shall be performed for Under ground (UG) water tank, Septic tank
128	**11**	**Excavation & filling in foundations, trenches, plinth & grading works**											
129		**Excavation**											
130		Nature, Type of soil/ rock before and during excavation		Major	Visual	Random in each shift	Tech. Specs., Construction Drawings	SR		**x**	**x**	**x**	
131		Initial GL before start of excavation		Major	Measurement	100%		SR	√	**x**	**x**	**x**	
132		Final shape/ size & dimensions of excavation		Major	Measurement	100%		SR	√	**x**	**x**	**x**	
133		Final excavation levels		Major	Measurement	100%		SR	√	**x**	**x**	**x**	
134		Side slope of final excavation		Major	Measurement	Random in each shift		SR		**x**	**x**	**x**	
135	**12**	**Fill / Backfill**											
136	i	Suitability of borrowed earth for filling (if applicable) - Grain size analysis, Atterberg limits, Free swell index, Organic matter		Major	Physical	One in every 2000 cum or part there of for each type and source of fill material subject to min. 2 samples	IS: 2720 (Pt. IV), IS: 2720 (Pt. XI), Tech Specs, Construction Drawings	Lab Test Results/ SR	√	**x**	**x**	**x**	The parameter should not be worse than the parameter of the existing soil in plant area
137	ii	Optimum moisture content (OMC), Max. dry density (MDD) before fill		Critical	Visual	At Random	IS: 2720 (Pt. I), IS: 2720 (Pt.VII), Tech Specs, Construction Drawings	Lab Test Results/ SR	√	**x**	**x**	**x**	
138	iii	Layer thickness, Compaction procedure		Major	Visual	At Random	Approved Methodology, Tech. Specs, Construction Drawings	SR	√	**x**	**x**	**x**	The layer thickness, Type & Capacity of roller, No. of passes shall be as per approved methodology, Construction Drawing, Tech. Specs
139	iv	Degree of compaction - 1. Dry density by proctor needle penetration 2. Earth filling - In-situ Dry density (core cutter or sand replacement method) or Sand Filling - In-situ Relative density (Density Index)		Critical	Physical	(i) For foundation fill/ backfill - One for every 10 foundations at Random for each compacted layer (ii) For area grading/ filling - one every 1000 sqm area for each compacted layer	IS: 2720 (Pt. XXIX), IS: 2720 (Pt. XXVIII), IS: 2720 (Pt. XIV), Tech Specs, Construction Drawings	Test Results/ SR	√	**x**	**x**	**x**	
141	**13**	**Brick masonry work**											
142	i	Soaking of Bricks before use		Major	Physical	100%	IS: 2250	SR		**x**	**x**	**x**	
143	ii	Grading of sand, Mortar mix / proportion, Compressive strength, Consistency		Major	Physical/ Test	At Random	IS: 2250, IS: 2116, Tech Specs, Construction Drawings / As per Design Specification	Lab Test Results/ SR		**x**	**x**	**x**	The sand grading shall conform to IS: 2116
144	iii	Workmanship, Verticality (Plumb) / Alignment		Major	Physical/ Measurement	100%	IS: 2212, IS: 1905, Tech Specs, Construction Drawings	SR	√	**x**	**x**	**x**	
145	iv	Check for Bond/closers, joints		Major	Visual	At Random	IS: 2250	SR		**x**	**x**	**x**	
146	v	Curing		Major	Visual	100%	IS: 2250 / As perTech. Specification	SR		**x**	**x**	**x**	
148	**12**	**Cement Plaster**											

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149	i	Quality & Grading of sand, Check for mix proportion, wetting the surface etc		Major	Physical	At Random	IS: 2116, IS: 2386 (Pt. I & II), IS: 1542, Tech Specs	Lab Test Results/ SR		x	x	x	Sand to be used shall be free from deleteriousmaterials, Grading shall conform to Table-I of IS: 2116
150	ii	Plaster & grooves - Thickness, Evenness & Finishing, Trueness os palstering system		Major	Visual/ Measurement	At Random in each shift	Tech Specifications, Construction Drawings	SR	√	x	x	x	Trueness - Deviation not more than 4mm when checked with straight edge of 2m length
151	iii	Hacking, Raking of joints, Cleaning the surface, Removing all loose particles, Wetting the surface etc		Major	Visual	At Random in each shift	IS 1661, Tech Specs	SR		x	x	x	
152	iv	Curing		Minor	Physical	100%	IS 1661, Tech Specs	SR		x	x	x	
154	**14**	**Painting System - Plastered Masonry & Concrete surface**											
155	i	Materials & accessories - Approval for Paint, Color shade and Brand- Dry distemper, Oil Bound Distemeper, Acrylic Emulsion, Chemical resistant, Oil resistant Paint, Weather proof acrylic exterior paint, water proof cement paint etc.	As approved by SECI/ Owner	Critical	Review of MTC	Each batch of delivery	Tech Specs, Construction Drawings	MTC/ SR	√	x	x	x	MTC shall be correlated with the material received
156	ii	Surface preparation	As required	Minor	Physical	Random in each shift	IS: 2935 (Pt.1), Tech Specs, Construction Drawings	SR	x	x	x	x	
157	iii	Number of coats	As required	Major	Physical	Random in each shift	Tech Specs, Construction Drawings	SR	x	x	x	x	
158	iv	Application and Acceptance of painted surface	As required	Major	Physical	Each surface at Random							
160	**15**	**Floor finishes & Alied works**											
161	i	Preperation of Sub-grade			Physical	At Random for each building	Tech. Specs, Construction Drawings	SR	√	x	x	x	
162	ii	Plinth filling in layers (stone agrregates/ rubble with interstices filled with sand), ramming & compaction			Physical	At Random for each building	IS: 2720, Tech. Specs, Construction Drawings		√	x	x	x	Quality Checks as aplicable to Fill/ Back fill
163	iii	Check providing shuttering, reinforcement (if applicable)			Physical	At Random for each building	Tech. Specs, Construcion Drawings			x	x	x	Quality Checks as aplicable to Shuttering/ Reinforcement placement
164	iv	Checking the Panel size (as applicable)			Physical	At Random for each building	IS: 5491, Tech. Specs, Construcion Drawings			x	x	x	The concrete shall be cast in alternate panels in chess board fashion, panel size as specified in Construction Drawing or 25 sqm
165	v	Availability of Design mix (if applicable)			Visual	At Random for each building	Tech. Specs, Construcion Drawings	Mix Design Report/ SR		x	x	x	
166	vi	Clearance for concreting (as applicable)			Physical	100%	Tech. Specs, Construction Drawings	Joint Protocol between Civil Contractor, Eqpt. Supplier/ EPC Vendor & SECI/ Owner SR		x	x	x	
167	viii	Performing concreting ensuring Grade/Mix Proportions, Compaction, Thickness and Finish			Physical	At Random per shift	IS; 456, Tech. Specs, Construction Drawings	SR	√	x	x	x	Quality Checks as aplicabel to Concrete Work
168	viii	Curing			Visual	100%	IS: 456, Tech. Specs	SR		x	x	x	Minimum up to 10 days from date of casting
169	ix	Testing of Concrete Cubes for Flooring			Physical	One sample for every 20 Cum of concreting or part thereof for each days concreting (one sample consists of min 3 test cubes for 28 days strength)	IS:456, IS:516,IS:1199 and Design specification	Lab Test Reports					
170	x	Tiled flooring/ dado											

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171	a	Material - Glazed ceramic Tiles, Vitrified Ceramic Tiles, Mosaic Tailes, Acid alkali Tiles, Heavy duty cement concrete tiles	As agreed/ required	Critical	Review of MTC & Test Reports	Each lot of material received	IS:13755, IS:1237, IS:8042, Tech Specs, Construction Drawings	MTC/ SR	√	x	x	x	MTC shall be correlated for all the parameters specified in Tech. Specs, BIS Standard
172	b	Finishing & Acceptance		Major	Physical	100%	IS: 1443, Tech Specs, Construction Drawings						
173	xi	IPS with or without IRONITE (as aplicable)		Major	Physical	At Random per shift	IS: 5491, Tech. Specs, Construction Drawings	SR	√	x	x	x	
174	xi	Fixing of Panel Dividers for finishing course (3 mm Thk Glass/ 2mm Thk Aluminium strip) (if applicable)		Major	Physical	At Random per shift	Tech Specs, Construction Drawings	SR	√	x	x	x	
175	xii	Anti abrasion/ anti wearing epoxy coating (if aplicable)											
176	a	Material	As agreed/ required	Critical	Approved Make and Type	Each lot of material received	Tech Specs, Construction Drawings, Manufacturer's Brochure/ Recommendations	manufacturer's Brochure/ SR	√	x	x	x	Material specifications to be correlated with Manufacturer's Brochure
177	b	Finishing & Acceptance		Major	Physical	100%	Tech Specs, Construction Drawings	SR	√	x	x	x	
178	xiv	Kota stone flooring and skirting (as aplicable)											
179	a	Material	Quality, Texture, Thickness, Colour fro approved source	Major	Physical	Each batch of delivery	Tech Specs, Construction Drawings	SR	√	x	x	x	
180	b	Finishing & Acceptance		Major	Physical	100%	Tech Specs, Cosntruction Drawings	SR	√	x	x	x	
181	xv	Acid/ Alkali resistant tile flooring/ dado											
182	a	Material -Tiles, Mortar, Sealing, Fillers etc.	Thickness, Quality,	Critical	Approved source, Review of MTC/ Test Report	Each batch of delivery	Tech Specs, Construction Drawings	SR	√	x	x	x	The acid alkali resistant tile flooring nd dado shall be provided in battery room as per approved Arch finishing details
183	b	Finishing & Acceptance	Workmanship	Major	Physical	100%	Tech Specs, Construction Drawings	SR	√	x	x	x	
184	xvi	Interlocking Blocks											
185	a	Materials	Size/ Shape, colour shade, Grade of Concrete	Critical	Approved source, Review of MTC/ Test Report	Each batch of delivery	BS: 6717, Tech Specs, Construction Drawings	SR	√	x	x	x	
186	b	Final finishing & Acceptance	As agreed/ required	Major	Physical	100%	BS: 7533 (Pt.3), Tech Specs, Construction Drawings	SR	√	x	x	x	
188	**16**	**Damp Proof Course**											
189	i	Material - Hot bitumen & water proofing materials etc.	As agreed/ required	Critical	Review of MTC	Each batch of delivery	IS: 702, Tech. Specs, Cosntruction Drawings	SR	√	x	x	x	
190	ii	Acceptance of Damp Proof Course - Thickness, Grade of PCC, Application of Bitumen layer etc.	As agreed/ required	Major		100%	Tech Specs, Construction Drawings	SR	√	x	x	x	
192	**17**	**Grouting of pockets/ underside of base plate**											
193	i	Material	As required/ Agreed	Critical	Review of MTC/ Physical	Each batch of delivery	Tech. specs, Construction Drawings, Manufacturerr's catelogue	SR	√	x	x	x	In case of ready mixed grout MTC to be correlated with Manufacturerr's catelogue
194	ii	Type of Mix	Anti shrink cement grout/ Ready mixed - Fluid mix, stiff mix as required	Major	Physical	At Random prr shift of grout application	Tech. specs, Construction Drawings	SR	√	x	x	x	In case of cement grout anti shrink compound shall be added as per provisions of relevant IS/ Cosntruction Drawing
195	iii	Mixing, placement, application	As required	Major	Visual	At Random prr shift of grout application	Tech. Specs, Construction Drawings	SR	√	x	x	x	
196	iv	Crushing Strength - Test cubes	As required	Major	Physical/ Testing	3 cubes for entire grouting work	IS: 4031 (Pt.6), Tech Specs, Construction Drawings	SR/ Lab Test Report	√	x	x	x	

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197	v	Acceptance of Grouting	Thickness, Finished level etc.	Major	Physical	!00% of 20 % of grout work at Random	Tech. Specs, Construction Drawings	SR	√	x	x	x	
199	**18**	**Precast Concrete**											
200	**a**	**Bought Out Units (Precast boundary wall units - Slab Panels, Column etc., Trench Covers , Manhole Covers, Paver Blocks etc.)**											
201	i	Crushing strength	As required	Critical	Review of MTC/ Test Reports	100% for Each batch of delivery	IS: 456, IS:516, IS: 1199, Tech Specs, Construction Drawings	MTC	√	x	x	x	Sampling as per IS: 456, Vendor record review
202	ii	Workmanship, dimentions, R/F	As require/ agreed	Major	Review of MTC/ Physical	Each batch of delivery at Random	Tech Specs, Construction Drawings	MTC/ SR	√	x	x	x	Vendor record review, Physical check at Random
203	**b**	**Cast at site (if applicable)**											
204	i	Crushing strength - Test Cubes	As required	Critical	Testing		IS: 456, IS:516, IS: 1199, Tech Specs, Construction Drawings	SR	√	x	x	x	1 sample of 6 cubes (3 for 7 days strength, 3 for 28 days strength) for each 5 cum of concrete with minimum 1 sample per shift of concrete work
205	ii	Workmanship, dimentions, R/F	As required/ agreed	Major	Physical	At Random	Tech Specs, Construction Drawings	SR		x	x	x	
206	**c**	**Acceptance of pre-cast concrete units**											
207	i	Bought Out Units - Check for any breakage, damage during handing & trasport, erection at site (levels) etc.	As required/ Agreed	Major	Visual	At Random	Tech Specs, Construction Drawings	SR	√	x	x	x	
208	ii	Cast at site (if applicable) - Check for curing, damage during handling, erection at site (level) etc.	As required/ Agreed	Major	Visual	100% of 10% at Random	Tech Specs, Construction Drawings	SR	√	x	x	x	
210	**19**	**Joints In concrete**											
211	i	Joint Material - Bitumen inpregnataed fiber board, PVC water stop, Sealing compound - Bitumastic/ polysulphide, Hydrophilic strip, Expanded polysterene (thermocol) board etc.	As per manufacturer's standards	Critical	Review of MTC	Each batch of delivery	Tech. Specs, Construction Drawings, IS: 1838, IS:1834, IS:2200	MTC	√	x	x	x	
212	ii	Acceptance of installation	As agreed/ required	Major	Physical	Each installation at Random	Tech. Specs and Construction Drawings	SR	√	x	x	x	
214	**20**	**Underdeck Insulation Works**											
215	i	Insulation material - Mineral/ Glass wool, galvanized wire neting, Aluminium foil, fasteners etc.	As agreed/ required	Critical	Review of MTC/ Test Reports	Each lot received at site	Tech. Specs and Construction Drawings	MTC/ Test Reports/ SR	√	x	x	x	All tests as per Tech. Specifications
216	ii	Acceptance of installation	As agreed/ required	Major	Physical	Each installation	Tech. Specs and Construction Drawings	SR	√	x	x	x	
218	**21**	**False Ceiling**											
219	i	Materials - Gypsum board/ Tiles, Particle board tiles, Al tiles/ Strips, GI hangers, AL/ GI Tee support, AL/ GI Edge angle, Fasteners etc.	As agreed/ required	Critical	Visual/ Physical, Review of MTC	Each lot received at site	IS:2095, IS:8183, Tech. Specs and Construction Drawings	MTC/ SR	√	x	x	x	Compare MTC with Tech. Specifications and requirements
220	ii	Acceptance of Installation	As agreed/ required	Major	Visual/ Physical	Random	Tech. Specs and Construction Drawings	SR		x	x	x	
222	**22**	**Doors, Windows, Ventilators, Glass/ Glazing and Grill**											

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223	i	Door Frame (Hollow steel metal, Aluminium, Wooden etc. including fittings such as hold fasts etc.)	As agreed/ required	Critical	Visual, Physical, Reviewof MTC/ Test Reports	Each lot received at site	Tech. Specs and Construction Drawings	MTC/ Lab Test Reports/ SR	√	**x**	**x**	**x**	
224	**a**	**Steel Doors**											
225	i	Materials (MS sheet & Stiffeners, fasteners,hinges, jambs, lock strike plate, hydraulic door closer, fittings and fixtures etc)	As agreed/ required	Critical	Visual/ Physical/ Review of MTC, Test Report	Each lot received at site	IS:2062, Tech. Specs and Construction Drawings	MTC/ Lab Test Report/ SR	√	**x**	**x**	**x**	Review of MTC/ Test Report
226	ii	Finishing & Acceptance - Surface preperation for painting, primer & finishing coat, DFT	As agreed/ required	Major	Visual/ Physical	Random	Tech. Specs and Construction Drawings	SR	√	**x**	**x**	**x**	
227	**b**	**Flush Doors**											
228	i	Shutters, Teak beading	As agreed/ required	Critical	Review of MTC/ Test Report	Each lot received at site	IS:2202, Tech. Specs and Cosnstruction Drawings	MTC/ Lab Test Report/ SR	√	**x**	**x**	**x**	
229	ii	Acceptance	As agreed/ required	Major	Visual/ Physical	Random	Tech. Specs and Construction Drawings	SR		**x**	**x**	**x**	
230	**c**	**Aluminium doors and Partition works**											
231	i	Materials- Aluminium sections (average thickness, alkali resistant, anodisation, power coating and colour shade etc.), fittings and fixtures. floor spring, hydraulic door closer, hinges, etc.	As agreed/ required	Critical	Visual/ Physical/ Review of Test Report	Each lot received at site	IS:1948, IS;1949, IS:733, IS:1285, IS:1868, IS:11857, Tech. Specs and Construction Drawings	SR/ Lab Test Reports	√	**x**	**x**	**x**	Review of Test Report For anodization check as per Tech. Specs and Construction Drawings Power coating, colour shade as applicable as per Tech. Specs and Construction Drawings
232	ii	Finishing & Acceptance - fabrication & erection, fitting etc..	As agreed/ required	Major	Visual/ Physical	Random	Tech. Specs and Construction Drawings	SR		**x**	**x**	**x**	
233	**d**	**Grill**											
234	i	Materials - Aluminium, MS, Anodization in case of aluminium	As agreed/ required	Critical	Visual/Physical/ Review of Test Report	Each lot received at site	Tech. Specs and Construction Drawings	SR/ Lab Test Reports	√	**x**	**x**	**x**	Review of Test Reports
235	ii	Finishing & Acceptance - erection, fitting, painting in case of MS grill etc.	As agreed/ required	Major	Visual/ Physical	Random	Tech. Specs and Construction Drawings	SR		**x**	**x**	**x**	
236	**e**	**Rolling Shutters**											
237	i	Surface finish, Thickness of plate, mechanically operated	As agreed/ required	Critical	Visual/ Physical/ review of MTC	Random for each lot of delivery	IS:8248, Tech. Specs & Construction Drawings	SR	√	**x**	**x**	**x**	
238	ii	Finishing and Acceptance -Painting , DFT	As agreed/ required	Major	Visual/ Physical	Random	Tech. Specs and Construction Drawings	SR		**x**	**x**	**x**	
239	**f**	**Glass and Glazing**											
240	i	Material - Clear float glass, wired glass, tinted glass, ground glass, figured glass, thickness	As agreed/ required	Major	Review of MTC/ test reports	For each lot received at site	IS: 14900, IS:1081, IS: 3548, IS:5437 Tech Specs and Construction Drawings	SR	√	**x**	**x**	**x**	
241	ii	Installation, finishing and acceptance	As agreed/ required	Major	Visual/ Physical	Random	Tech Specs and Construction Drawings	SR	√	**x**	**x**	**x**	
243	**23**	**Precast Concrete Boundary Wall**											
244		Acceptance of boundary wall- Finising, Alignment Dimensions etc.	As agreed/ required	Major	Physical		Tech Specs and Construction Drawings	SR		**x**	**x**	**x**	For inspection of precast concrte units -refer S.No. 18
246	**24**	**Roof Water Proofing**											
247	i	Methodology for the application of water proofing system	As required	Critical	Review	for each type of treatment	Tech Specs and Const. Drawings						
248	**a**	Materials											

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249	i	Polyurethene based coating, polyester scrim cloth, extruded HD dimpled polyurethene	As agreed / required	Critical	Review of MTC/ test reports	For each lot received at site	ASTM C-836, ASTM C898 and Tech Specs /Const. Drawings	MTC/ SR	√				
250	**b**	Roof											
251	i	Graded under bed - Slope/ Level	As agreed / required	Major	Physical	100%	Tech Specs and Construction Drawings	SR		**x**	**x**	**x**	
252	ii	Elastomaric coatings -Primer coat, Finishing coat	As agreed / required	Major	Review of MTC/ test reports	Each lot of delivery	Tech Specs and Construction Drawings	MTC/ Test Reports/ SR	√	**x**	**x**	**x**	
253	iii	Wearing Course - PCC-Grade, chicken wire mesh, elastomeric sealant	As agreed / required	Major	Visual/ Review of MTC	Each lot of delivery of material/ Review of Test Report	Tech Specs and Construction Drawings	MTC/ Test Reports SR	√	**x**	**x**	**x**	2 samples of 3 no. of test cube each shall be taken for PPC work for testing of crushing strength of concrete mix, Review of MTC for Chicken wire mesh, waterproof sealant
254	c	Acceptance of Water proofing treatment	As agreed/ required	Major	Visual/ Physical	100%	Tech Specs and Construction Drawings	SR		**x**	**x**	**x**	
256	**25**	**Water Supply and Sanitary Installations**											
257	**a**	**Water Supply Fittings and Fixtures**											
258	i	Materials - GI/ MS/ C-PVC/ uPVC/PPR/HDPE pipes and fittings	As agreed / required	Critical	Review of MTC/ test reports	Each lot of delivery as per Specifications	IS:1239, IS:4736, IS:4985, IS:6745, IS: 4984, IS:2633, IS:2629, IS:15778, IS:15801, Tech Specs and Construction Drawings	MTC/ SR	√	**x**	**x**	**x**	
259	ii	Disinfection - Before use	As agreed / required	Major	Physical	Each installation	IS:2065, Tech specs and construction Drawings	SR		**x**	**x**	**x**	
260	iii	Hydraulic test - Before use/ Leakage	As agreed / required	Critical	Physical	Each installation	Tech Specs and Construction Drawings	SR		**x**	**x**	**x**	
261	iv	Acceptance & Working	As agreed / required	Major	Physical	Random	Tech Specs and Construction Drawings	SR		**x**	**x**	**x**	
262	**b**	**Sand Cast Iron/ Cast iron Pipes**											
263	i	Material - SCI / CI pipes and fittings / joints	As agreed / required	Critical	Review of MTC/ test reports	Each lot of delivery (as applicable)	IS: 1729, IS:1536, IS:1538, Tech Specs and Construction Drawings	MTC/ SR	√	**x**	**x**	**x**	
264	ii	Acceptance and leakage	As agreed / required	Major	Physical	Random	Tech Specs and Construction Drawings	SR		**x**	**x**	**x**	
265	**c**	**HDPE Pipes for Sewerage**											
266	i	Material- HDPE pipes and fittings/ joints	As agreed/ required	Critical	Review of MTC/ test reports	Each lot of delivery (as applicable)	IS:14333, Tech. Specs	MTC/SR	√	**x**	**x**	**x**	
267	ii	Acceptance & leakage	As agreed / required	Major	Physical	Random	Tech Specs and Const. Drawings	SR		**x**	**x**	**x**	
268	**d**	**HDPE Pipes for Rain water Downcommer**											
269	i	HDPE pipes and fittings/ joints	As agreed/ required	Critical	Review of MTC/ test reports		IS:4984, Tech. Specs	MTC/SR	√	**x**	**x**	**x**	
270	ii	Acceptance & leakage	As agreed / required	Major	Physical	Random	Tech Specs and Const. Drawings	SR		**x**	**x**	**x**	
271	**e**	**Sanitary fitting and fixtures**											
272	i	Sanitory items and fixtures i.e. water closets, urinals, wash basins, sinks, mirrors, shelves, towel rail, soap containers, geyser, water cooler, etc, water supply / sanitation pipes, manhole cover and frames etc	As agreed / required	Major	Review of MTC/ Test reports	Each lot of delivery as per Specifications	Tech Specs and Const. Drawings	MTC/Test Reports/ SR	√	**x**	**x**	**x**	

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273	ii	Acceptance of installations of all sanitory items and fixtures	As agreed / required	Major	Acceptance	100%	Tech Specs and Const. Drawings	SR		x	x	x	
274	**f**	**RCC Pipes**											
275	i	Material - RCC pipes	As agreed / required	Major	Review of MTC/ test reports	Each lot of delivery as per Specifications	IS: 458, Tech Specs and Const. Drawings	MTC/Test Reports/ SR	√	x	x	x	
276	ii	Acceptance and leakage	As agreed / required	Major	Physical	Random	Tech Specs and Const. Drawings	SR		x	x	x	
277	**g**	**Water Storage Tank**											
278	i	Over head / loft type	As agreed / required	Critical	Physical, review of MTC/ test reports	Each lot of delivery as per Specifications	IS:12701, Tech Specs and Const. Drawings	MTC/Test Reports/ SR	√	x	x	x	
279	ii	Aceptance and leakage	As agreed / required	Major	Acceptance	Random	IS:12701, Tech Specs and Const. Drawings	SR		x	x	x	
281	**26**	**Special Items (Switch Yard)**											
282	**a**	**Earthing Mat (Grounding System)**											
283	i	Earthing mat	As agreed / required	Critical	Physical, review of MTC/ test reports	Each lot of delivery as per Specifications	As per relevant IS and Tech. Specs / Manufacturer's, IS 3043	SR/MTC	√	x	x	x	
284	ii	Weld sizes & length	Visual/Tape	Major	Visual/ Measurement	100%	Tech Specs and Const. Drawings	SR		x	x	x	Low hydrogen electrode as per approval shall be used.
285	iii	D P test	DP test Kit	Critical	Physical	10% at random	Tech Specs and Const. Drawings	TR	√	x	x	x	
286	iv	Earth test	Earthing test kit	Critical	Physical	100%	IS:3043, Tech Specs and Const. Drawings, Relevant IS 3043	SR/ Test Report	√	x	x	x	
287	**b**	**Anti Weed Treatment**											
288	i	Anti-weed treatment materials	As agreed / required	Critical	Physical, review of MTC	Each batch of delivery	Tech Specs and Const. Drawings	SR/ MTC	√	x	x	x	
289	ii	Execution of treatment	As agreed / required	Major	Physical	Random check for each treatment	Tech Specs and Const. Drawings	SR		x	x	x	
291	**27**	**Road Work**											
292	**a**	**Construction of Sub-Grade and earthen/hard soulders**											
293	i	Standard proctor Test	As per IS: 2720	Critical	Physical	One in every 2000 cum for each type and source of fill materials	As per Tech Specs and Const. Drawings,Section 900 of MORTH specification, IS 2720 (Pt.VII)	SR	√	x	x	x	In cutting or existing levelled ground - quantum of check shall be one per 1000 SQM
294	ii	Moisture content of fill before compaction	As per IS: 2720	Major	Physical	One in every 2000 cum for each type and source of fill materials	As per Tech Specs and Const. Drawings, Section 900 of MORTH specification, IS 2720 (Pt.II)	SR		x	x	x	In cutting or existing levelled ground - quantum of check shall be one per 1000 SQM
295	iii	Dry density by core cutter method ---- OR---- Dry density in place by sand displacement method	As per IS: 2720	Critical	Physical	One in every 500 SQM area for each compacted layer.	As per Tech Specs and Const. Drawings, Section 900 of MORTH specification, IS 2720 (Pt. XXIX)/ IS 2720 (Pt. XXVIII)	SR	√	x	x	x	Both for embankment and cut formation quantum of check - One in every 1000 SQM area for each compacted layer.
296	iv	Lines, grade and cross section	As required / agreed	Major	Physical	One in every 500 SQM area	As per Tech Specs and Const. Drawings	SR	√	x	x	x	Template, straight edge

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297	**b**	**Water Bound Macadam (Non-Bituminous) for base course and sub-base course**											
298	i	Aggregate Impact value	Agrregate Impact value Test Apparatus	Critical	Physical	One test per 200 cum of Test aggregate	As perTech Specs and Const. Drawings, Section 900 of MORTH specification	SR	√	**x**	**x**	**x**	
299	ii	Grading	Set of IS Sieves	Major	Physical	One test per 100 cum of aggregate	As perTech Specs and Const. Drawings, Section 900 of MORTH specification	SR		**x**	**x**	**x**	
300	iii	Flakiness index and elongation index	Flakiness test gauge	Major	Physical	One test per 200cun of agregate	As perTech Specs and Const. Drawings, Section 900 of MORTH specification	SR		**x**	**x**	**x**	
301	iv	Atterberg Limits of binding material	Atterberg limits determination	Critical	Physical	One test per 25 cum of binding material	As perTech Specs and Const. Drawings, Section 900 of MORTH specification	SR	√	**x**	**x**	**x**	
302	v	Atterberg Limits of portion of agreggate passing 425 micron sieve	Atterberg limits determination	Critical	Physical	One test per 100cum of aggregate	As perTech Specs and Const. Drawings, Section 900 of MORTH specification	SR	√	**x**	**x**	**x**	
303	vi	Camber, surface, slope	As required / agreed	Major	Physical	One in every 500 SQM area	As per Tech Specs and Const. Drawings	SR	√	**x**	**x**	**x**	Template, straight edge
304	**c**	**Bituminous Macadam for base and binder course**											
305	i	Quality of binder	Penetrometre with St. needle	Critical	Physical	No. of samples per Lot & tests as per IS:73, IS:217, IS:8887 as applicable	As per Tech Specs and Const. Drawings, Section 900 of MORTH specification, IS 73	SR	√	**x**	**x**	**x**	
306	ii	Aggregate Impact Value / Los angeles abrasion value	Aggregate Impact ValueTest apparatus	Major	Physical	Once per source	As per Tech Specs and Const. Drawings, Section 900 of MORTH specification	SR	√	**x**	**x**	**x**	
307	iii	Flakiness Index and elongation index of aggregates	Flakiness test gauge	Major	Physical	One test per 50 cum of aggregate	As per Tech Specs and Const. Drawings, Section 900 of MORTH specification	SR		**x**	**x**	**x**	
308	iv	Stripping value of aggregate (Immersion tray test)	As required / agreed	Major	Physical	Initialy one set of 3 representative specimen per source, and on every change of source.	As per Tech Specs and Const. Drawings, Section 900 of MORTH specification	SR		**x**	**x**	**x**	
309	v	Water sensitivity of mix	As required / agreed	Critical	Physical	Initialy one set of 3 representative specimen per source, and on every change of source.	As per Tech Specs and Const. Drawings, Section 900 of MORTH specification	SR	√	**x**	**x**	**x**	
310	vi	Grading of aggregates	Set of Sieves	Major	Physical	Two test per day per plant both on individual constituents and mixed aggregate from dryer	As per Tech Specs and Const. Drawings, Section 900 of MOSRTH specification	SR		**x**	**x**	**x**	
311	vii	Water absorption of aggregate	As required / agreed	Major		Initially one set of 3 representative specimen per source, and on every change of source.	As per Tech Specs and Const. Drawings, Section 900 of MOSRTH specification	SR		**x**	**x**	**x**	

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312	viii	Soundness (Magnesium and Sodium Sulphate)	As required as per IS:2386	Critical	Physical	Once per source by each method and on every change of source	As per Tech Specs and Const. Drawings, Section 900 of MOSRTH specification	SR	√	x	x	x	
313	ix	Percentage of fractured faces	As required / agreed	Major	Physical	When gravel is used one test per 50cum of aggregates	As per Tech Specs and Const. Drawings, Section 900 of MOSRTH specification	SR		x	x	x	
314	x	Binder content and aggregate grading	Bitumen extractor	Critical	Physical	Periodic, subject to a min of two tests per day per plant	As per Tech Specs and Const. Drawings, Section 900 of MORTH specification	SR	√	x	x	x	
315	xi	Control of Temperature of binder and aggregate for mixing and of the mix at the time of laying and rolling	Thermometer	Major	Physical	At regular close intervals	As per Tech Specs and Const. Drawings, Section 900 of MORTH specification	SR		x	x	x	
316	xii	Rate of spread of mixed materials	As required / agreed	Major	Physical	Regular control through checks of layer thickness	As per Tech Specs and Const. Drawings, Section 900 of MORTH specification	SR		x	x	x	
317	xii	Density of compacted Layer	As required / agreed	Critical	Physical	One test per 250 sqm of area	As per Tech Specs and Const. Drawings, Section 900 of MORTH specification	SR	√	x	x	x	
318	**c**	**Bituminous Surfacing - Open graded premix carpet and Seal coat**											
319	i	Quality of binder	Penetrometre with St. needle	Critical	Physical	No. of samples per Lot & tests as per IS:73, IS:217, IS:8887 as applicable	IS 73,Tech Specs and Const. Drawings, Section 900 of MORTH specification	SR	√	x	x	x	
320	ii	Aggregate Impact Value / Los angeles abrasion value	Aggregate Impact ValueTest apparatus	Major	Physical	One test per 50 cum of aggregate	As per Tech Specs and Const. Drawings, Section 900 of MORTH specification	SR	√	x	x	x	
321	iii	Flakiness Index and elongation indexof aggregates	Flakiness test gauge	Major	Physical	One test per 50 cum of aggregate	As per Tech Specs and Const. Drawings, Section 900 of MORTH specification	SR		x	x	x	
322	iv	Stripping value of aggregate (Immersion tray test)	As required / agreed	Major	Physical	Initialy one set of 3 representative specimen per source, and on every change of source.	As per Tech Specs and Const. Drawings, Section 900 of MORTH specification	SR	√	x	x	x	
323	v	Water absorption test		Critical	Physical	Initialy one set of 3 representative specimen per source, and on every change of source.	As per Tech Specs and Const. Drawings, Section 900 of MORTH specification	SR	√	x	x	x	
324	vi	Water sensitivity of mix	As required / agreed	Critical	Physical	Initialy one set of 3 representative specimen per source, and on every change of source.	As per Tech Specs and Const. Drawings, Section 900 of MORTH specification	SR	√	x	x	x	
325	vii	Grading of aggregates	Set of Sieves	Major	Physical	One test per 25 cum of aggregates	As per Tech Specs and Const. Drawings, Section 900 of MORTH specification	SR	√	x	x	x	

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326	viii	Soundness (Magnesium and Sodium Sulphate)	As required as per IS:2386	Critical	Physical	Once per source by each method and on every change of source	As per Tech Specs and Const. Drawings, Section 900 of MORTH specification	SR	√	x	x	x	
327	ix	Polished stone value	As required as per BS:812(Part 114)	Major	Physical	As required	As per Tech Specs and Const. Drawings, Section 900 of MORTH specification	SR		x	x	x	
328	x	Temperature of binder at application	Thermometer	Major	Physical	At regular close intervals	As per Tech Specs and Const. Drawings, Section 900 of MORTH specification	SR		x	x	x	
329	xi	Binder content	Bitumen extractor	Critical	Physical	One test per 500 cum& not less than two tests per day	As per Tech Specs and Const. Drawings, Section 900 of MORTH specification	SR	√	x	x	x	
330	xii	Rate of spread of materials	As required / agreed	Major	Physical	One test per 500 cum and not less than 2 tests per day	As per Tech Specs and Const. Drawings, Section 900 of MORTH specification	SR		x	x	x	
331	xiii	Percentage of fractured faces	Bitumen extractor	Critical	Physical	When gravel is used one test per 50cum of aggregates	As per Tech Specs and Const. Drawings, Section 900 of MORTH specification	SR	√	x	x	x	
332	**d**	**Tack Coat/ Prime coat/ fog coat**											
333	i	Quality of binder	Penetrometre with Standard needle	Critical	Physical	No. of samples per Lot & tests as per IS:73, IS:217, IS:8887 as applicable	IS 73,Tech Specs and Const. Drawings, Section 900 of MORTH specification	SR	√	x	x	x	
334	ii	Temperature of binder at application	Thermometer	Major	Physical	At regular close intervals	As per Tech Specs and Const. Drawings, Section 900 of MORTH specification	SR		x	x	x	
335	iii	Rate of spread of binder	As required / agreed	Major	Physical	One test per 500 cum and not less than 2 tests per day	As per Tech Specs and Const. Drawings, Section 900 of MORTH specification	SR		x	x	x	
336	**e**	**Alignment, Level, Surface regularity and rectification**											
337	i	Horizontal alignment, Surface levels and Surface regularity	As required / agreed	Major	Physical	At Random	As per Tech Specs and Const. Drawings, Section 900 of MORTH specification	SR	√	x	x	x	
338	ii	Rectification	As required / agreed	Major	Physical	Each rectification	As per Tech Specs and Const. Drawings, Section 900 of MORTH specification	SR		x	x	x	
340	**28**	**Geotechnical Investigations**											
341	i	Deployment of approved Geotechnical Investigation Agency - Equipments, Manpower etc	As required / agreed	Critical	Physical	Once before commencement of work	As per technical specifications and relevant IS Codes	SR	√	x	x	x	
342	ii	Execution of Geotechnical Investigation - locations, type etc as per scheme	As required / agreed	Major	Physical	Each Location	As per technical specifications and relevant IS Codes	SR		x	x	x	
343	iii	Collection of disturbed and undisturbed samples , their packing and storage	As required / agreed	Major	Physical	each sampling	As per technical specifications and relevant IS Codes	SR		x	x	x	
344	iv	Conducting filed tests as per investigation scheme- such as, SPT/ERT/SCPT/PLT/PMT etc	As required / agreed	Major	Physical	each field test	As per technical specifications and relevant IS Codes	SR		x	x	x	

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345	v	Submittion of Field Borelogs in approved format	As required / agreed	Major	Review	Within 24 hours after completion of each BH	As per technical specifications and relevant IS Codes	SR		**x**	**x**	**x**	
346	vi	Submittion of laboratory test schedule and selection of samples for laboratory testing	As required / agreed	Critical	Review and acceptance	as per consultation with engineer during dispatch of samples to approved laboratory	As per technical specifications and relevant IS Codes	SR	√	**x**	**x**	**x**	
347	vii	Submission of Final Geotechnical investigation report along with recommendations	As required / agreed	Critical	Physical	After completion of investigation work and review of draft reports	As per technical specifications and relevant IS Codes	SR		**x**	**x**	**x**	
349	**29**	**Topographical Survey Works**											
350	i	Deployment of approved Topographical Surveying Agency - Equipments, Manpower etc	As required / agreed	Critical	Physical	Once before commencement of work	As per technical specifications and relevant IS Codes	SR	√	**x**	**x**	**x**	
351	ii	Transfer of Permanent Bench mark to site from known location	As required / agreed	Major	Physical	Before commencement of work	As per technical specifications and relevant IS Codes	SR		**x**	**x**	**x**	
352	iii	Establishment of boundary pillers and survey grid, Temporary bench Marks, Measurement & recording spot levels	As required / agreed	Major	Physical		As per technical specifications and relevant IS Codes	SR		**x**	**x**	**x**	
353	iv	Recording features like trees, roads, transmission lines, lake, nala, river, temple, house, culverts etc. with coordinate locations	As required / agreed	Major	Physical		As per technical specifications and relevant IS Codes	SR		**x**	**x**	**x**	
354	vi	Submission of final Counter map showing all topographical features, record of spot levels	As required / agreed	Critical	Physical	After completion of investigation work and review of draft reports	As per technical specifications and relevant IS Codes	SR	√	**x**	**x**	**x**	
356	**30**	**Internal Switchyard - Site Leveling & Grading**											
357	i	Leveling Switchyard area	As required / agreed	Major	Visual / Physical	100%	As perTech. Specification and Approved Drawing	SR		**x**	**x**	**x**	
358	ii	Grading of 20/40mm stone / Gravel Spreading in sitchyard area	As required / agreed	Major	Physical	100%	As per Tech. Specification & Approved Drawing	SR		**x**	**x**	**x**	
360	**31**	**Plant Boundary Fencing (if applicable) & Gate (Also refer S.No. 3 for Steel works as applicable)**											
361	i	Fence posts (Intermediate, Stay & Corner Posts etc.) - Section size, Length, Galvanization - Grade/ Thickness, Tensile strength etc.	As agreed/ Required	Critical	Physical/ Measurement/ Review of MTC	Each lot received at site Random	IS:226; IS:2721; IS:278; IS:480; IS:4826 , Tech. Specs & Construction Drawings	MTC/ SR	√	**x**	**x**	**x**	For Structural steel checks refer S.No. 3
362	ii	Barbed wire - Dia. of line wire and barb wire, Grade of galvanization etc, Tensile strength etc.	As agreed/ Required	Critical	Physical/ Measurement/ Review of MTC				√	**x**	**x**	**x**	
363	iii	Tie wire - Diameter, Galvanization-Grade, tensile strength etc.	As agreed/ Required	Critical	Physical/ Measurement/				√	**x**	**x**	**x**	
364	iv	Blade barbed/ Concertina Wire - Thickness/ Diameter, galvanization, Diameter of concertina coil, Tensile strength etc.	As agreed/ Required	Critical	Physical/ Measurement/ Review of MTC				√	**x**	**x**	**x**	

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365	v	Fence Fabric- Mesh size, Wire Diameter, Galvanization-Grade, Selvage, Knuckling, Tensile strength etc.	As agreed/ Required	Critical	Physical/ Measurement/ Review of MTC				√	**x**	**x**	**x**	
366	vi	MS Gate - Caster weels, ball & bearings, Fixtures & fasteners etc.	As agreed/ Required	Major	Visual	100%	Tech. Specs & Construction Drawings	SR		**x**	**x**	**x**	
367	vi	Acceptance of Boundary Fence and gate	As agreed/ Required	Major	Physical	100%	Tech. Specs & Construction Drawings	SR		**x**	**x**	**x**	
369	**32**	**Tranformer Yard Fencing & Gate (Also refer S.No. 3 for Steel Works as applicable)**											
370	i	Fence posts (Intermediate, Stay & Corner Posts), Concertina Wire Support Angles - Section size, Length, Galvanization, Tensile strength etc.	As agreed/ Required	Critical	Physical/ Measurement/ Review of MTC	Each lot received at site Random	IS-226; IS 2721; IS-4948 , IS:480; IS:4826 Tech. Specification and Approved Drawing	MTC/ SR	√	**x**	**x**	**x**	For structural steel checks refer S.No. 3
371	ii	Tie wire (as aplicable) - Diameter, Galvanization, Tensile strength etc.	As agreed/ Required	Critical	Physical/ Measurement/ Review of MTC				√	**x**	**x**	**x**	
372	iii	Fence Fabric (chain link/ welded wire as aplicable)- Mesh size, Wire Diameter, Galvanization, Selvage, Knuckling, Tensile strength etc.	As agreed/ Required	Critical	Physical/ Measurement/ Review of MTC				√	**x**	**x**	**x**	
373	iv	MS Gate - Fixtures and fasteners	As agreed/ Required	Major	Visual	100%	Tech Specs andAproved Drawings	SR		**x**	**x**	**x**	
374	v	Acceptance of Fence & Gate	As agreed/ Required	Major	Physical	100%	Tech Specs and Approved Drawings	SR		**x**	**x**	**x**	
376	**33**	**Installation of Pre Engineered Building (PEB) - Security Cabin**											
377	**a**	**Receipt**											
378	i	Receipt of materials and Checking as per packing list	As agreed/ Required	Major	Visual	100%	As per Approved Drawings & Method Statement, Relevant BIS standards	SR	√	**x**	**x**	**x**	
379	iii	Dimensional Check	As agreed/ Required	Major	Measurement	100%			√	**x**	**x**	**x**	
380	iv	Visual checks for damages, rusting, pitting etc.	As agreed/ Required	Major	Visual	100%				**x**	**x**	**x**	
381	v	Visual checks for defects, primer coating and painting/galvanising as applicable.	As agreed/ Required	Major	Visual	100%				**x**	**x**	**x**	
382	vi	Nut/Bolt/Washers Checks	As agreed/ Required	Major	Visual	100%				**x**	**x**	**x**	
383	**b**	**Pre-Installation**											
384	i	Check that the work area is ready and safe to start installation	As agreed/ Required	Major	Visual / Dimension					**x**	**x**	**x**	
385	ii	Check readiness of Foundations	As agreed/ Required	Major		100%				**x**	**x**	**x**	
386	**c**	**Installation (as aplicable)**											
387	i	Readyness of concrete platform, foundations for installation- Size, Location, Level etc.	As agreed/ Required	Major	Visual					**x**	**x**	**x**	
388	ii	Check PUF side walls/ roof are installed properly	As agreed/ Required	Major	Physical					**x**	**x**	**x**	
389	iii	Check tightening of all Nut/Washers/Bolts	As agreed/ Required	Major	Physical					**x**	**x**	**x**	
391	**34**	**Structural Work for Module Mounting Structure (MMS)**					Tech. Specification, Approved Drawing & Method Statement						
437	a	**Manufacturing**											

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438		**Strucural Steel (Raw Material)** Hot rolled & cold formed sections - Angle, Channel, Z-section, Box section, Plate, rod & bar											
439	i	Ultimate Tensile Strength (UTS), Yield Strength (YS), Percentage Elongation, Bend Test, Chemical Composition, Section dimensions	As agreed/ Required	Critical	Chemical composition, Mechanical, Measurement	1 Sample per 50 MT or part thereoff/ for every heat no.	IS 2062, IS 513, IS 811, IS 1079, IS 808, IS 1852, IS 1730 -Part I	MTC	√				Raw material to be procured from reputed manufacturers - like SAIL, RINL, JSPL, JSW, TISCO, ISSAR
440	ii	Visual Examination - Cracks, Scaling, Rust, Pitting, Lamination etc.	As agreed/ Required	Major	Visual	10% IS 2500, Level II, AQL 1.5	IS 2062, IS 513, IS 811, IS 1079, IS 808, IS 1852, IS 1730-Part I	SR	√	**x**	**x**	**x**	Material shall be free from surface defects like cracks, lamination,roughness, imperfect edges, rust, pitting & other harmful defects. Removal of minor surface defects as per IS;2062 is acceptable. Witness for 10% sample. Record review for every material
441		**Boughtout Items (Hardware - Nuts, Bolts and Washers - plain, spring)**											
442	i	Mechanical & Chemical Properties	As agreed/ Required	Critical	Chemical composition, Mechanical	1 sample per 5 MT or part thereoff	IS 1327 (Part 17) eq./ ASTM standard	MTC/ Lab test Report	√	**x**	**x**	**x**	
443	ii	Dimensional check (Dia., Thickness, Total stem length & Threaded length etc.)	As agreed/ Required	Major	Measurement	IS 1327 (part 17) eq 10 pieces per lot per member type	IS 6639, IS 2016,IS 6610 & IS 3063 / ASTM standard	Vendor Records	√	**x**	**x**	**x**	Witness for sample. Record review for every material
444	iii	Galvanizing - Mass per Sqm, Thickness (DFT)	As agreed/ Required Alcometer	Major	Visual, Measurement	IS 1327 (part 17) eq 10 pieces per lot per member type	For Hot dip galvanizing should be maintained 43 microns (min) and average 54 microns as per IS 1367 (part XIII) eq.	Vendor Records	√	**x**	**x**	**x**	Record review Random sample inspection/ measurement
445	b	**In Process Inspection**											
446		**Structural Item Fabrication**											
447	i	Straightening	As agreed/ Required	Major	Visual	100%	0.2% of total length	Vendor Records	√	**x**	**x**	**x**	Record review
448	ii	Cropping (Cutting)	As agreed/ Required	Major	Visual	100%	Approved drawing	Vendor Records	√	**x**	**x**	**x**	Record review
449	iii	Identification/ Marking	As agreed/ Required	Major	Visual	100%	Approved drawing Marking Shall be done with the help of permanent paint marker using stencil as per Drawing	Vendor Records	√	**x**	**x**	**x**	Record review Random sample inspection
450	iv	Punching/ Drilling of Holes	As agreed/ Required	Critical	Measurement	1 piece per 25 pieces	IS 802/ Approved drawing	Vendor Records	√	**x**	**x**	**x**	Record review
451		Edge Security							√	**x**	**x**	**x**	
452	v	Overall Length	As agreed/ Required	Major	Measurement	1 piece per 25 pieces	IS 802/ Approved drawing	Vendor Records	√	**x**	**x**	**x**	Record review Random sample measureemnt
453	vi	Bending	As agreed/ Required	Critical	Measurement	100%	IS 801, 811/ Approved drawing	Vendor Records	√	**x**	**x**	**x**	
454		Cross Section Dimensions							√	**x**	**x**	**x**	Record review
455	vii	Welding	As agreed/ Required	Major	Visual	100%	Approved Welding Procedure & Welder Qualification	Vendor Records	√	**x**	**x**	**x**	Record review Random sample ispection
456	viii	Visual Examination - Black spots, Porosity, Spatter, Rust bleed points, Weld dimensions	As agreed/ Required	major	Visual	100%	Tech. Specification, Approved Drawing	Vendor Records	√	**x**	**x**	**x**	Record review Raddom sample inspection (The fabricated material shall be free from
457	ix	DP Test (as necessary)	As agreed/ Required	Major	Chemical	Shift wise/ random	As and when required	Vendor Records	√	**x**	**x**	**x**	
458	x	Final Inspection of Fabricated Parts - Cross section dimensions, Thickness (before galvanization)	As agreed/ Required	Critical		10 % in lot size of 100 nos.	IS- 802, IS 807, IS 811 and relevant applicable eq. standards , approved drawings, Tech spec	Vendor Records	√	**x**	**x**	**x**	
459		**Galvanizing**											
460	i	Zinc - Ingot, Molten metal in galvanizing bath	As agreed/ Required	Critical	Chemical	1 sample from each batch of ingot supply	IS 2629	MTC Lab test report	√	**x**	**x**	**x**	Purity of Zn 98.5%, MTC to be correlated. Molten metal in the galvanizing bath ≥ 98.5 % by mass of zinc.
461		**Pre Galvanizing**											

	A	B	C	D	E	F	G	H	I	J	K	L	M
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2								SR - Site Register SECI-SPV-QA-F-XXX SECI-SPV-QA-T-XXX (XXX - Inspection record form No. or Test report format no.)		**M'fr/ Supplier or Sub-Contractor**	**EPC Contractor**	**SECI or Owner**	
462	i	Degreasing	Acid base cold degreaser	Major	Chemical	One sample daily	Sp. Gravity 1.1 to 1.2, ph Value 2 to 3	Vendor Records	√	x	x	x	Record review
463	ii	Pickling - Acid & Iron content	Lab test	Major	Chemical	One sample daily	Acid Content-Concentration 18% to 4% min, Sp. Gravity 1 to 1.3 Iron Content -120g/litre (max)	Vendor Records	√	x	x	x	Record review
464	iii	Rinsing	pH meter	Major	Chemical	One sample daily	Rinsing water ph value 5 to 7	Vendor Records	√	x	x	x	Record review
465	iv	Pre-fluxing in ZnCl solution - Specific gravity, pH	pH meter	Major	Measurement	One sample daily	Sp Gr - 1.10 to 1.26 pH - 3 to 5	Vendor Records	√	x	x	x	Record review
466	v	Pre-heating	Pyrometer	Major	Measurement	One sample daily	Above 50^0 C	Vendor Records	√	x	x	x	Record review
467	vi	Dipping - Zinc bath temperature, Imersion & withdrawl time	Continuous recording & verification by Pyrometer	Major	Measurement	Hourly check	Zn bath temp - 440^0 C to 460^0 C Article to be immersed till reaction	Vendor Records	√	x	x	x	Record review
468	vii	Quenching	Plain water	Minor			Bath in plain water for cooling & Cleaning. Temp. Below 65°	Vendor Records	√	x	x	x	Record review
469	viii	Di-chromating	Di-chromate solution	Major	Chemical	One sample daily	strength of the solution to be maintained as 0.7 to 1% of sodium dichromate, temperature of solution should be less than 65°	Vendor Records	√	x	x	x	Record review
470		**Post Galvanizing**											
471	i	Surface Defects/Finish - Dross, Pimples, Black marks, Ash deposition	As agreed/ Required	Major	Visual	100%	IS 2633	Vendor Records	√	x	x	x	Record review Random samples to be inspected during
472	ii	Thickness of Zinc Coating	Alcometer	Critical	Measurement	3 samples per dip	As Per IS 4759 , 6745 , Minimum 80micron or as per spec.	Vendor Records	√	x	x	x	Record review Random samples to be measured during factory visit by Owner/PMC
473	iii	Mass of Zinc Coating		Critical	Chemical	1 sample per shift	As Per IS 6745	Vendor Records	√	x	x	x	Record review
474	iv	Uniformity of Zinc Coating (Preece Test)		Major	Chemical	1 sample per shift	No red stains after 4 dippings	Vendor Records	√	x	x	x	Record review/ Sample test if deemed necessary
475	v	Adhesion of Zinc Coating (Pivote Hammer Test/ Knife Test)		Major	Physical	1 sample per hour	No Removal or lifting in areas between hammer impression/coating should not peel off. As per IS 2629	Vendor Records	√	x	x	x	Record review Random samples to be inspected during factory visit by Owner/PMC. Sample test if deemed necessary
476		**Proto Assembly**											
477	i	Proto Assembly check - Fitment, Dimensions, Alignment, Overall Stability	Prototype of one mounting table with	Critical	Physical/ Measureemnt	100%	Cut lengths of all members, Fitment (dia. of holes, end security, c/c distance between holes etc. shall be checked for correctness wrt permissible tolerence through in postion ispection of assembled proto), Fasteners (bolts, nuts and washers), Cleats, Gussete plates shall be as per Approved drawing/ specifications. The proto assembly shall be checked for overall stability for design verification of various conenctions and col. support system.	IR	√	x	x	x	The general quality of fabrication and galvanization of members, straightness of members, overall stability of prototype etc. shall be checked for design verification. Any suggestions for design changes etc. shall be properly recorded in the inspection report for implimentation in mass production of MMS members
478		**Marking/ Packaging**											
479	i	Marking	As agreed/ Required	Major	Visual	100%	Aprroved drawing/ marking scheme	IR	√	x	x	x	Record review Random sample shall be checked during facroty visit by Vendor and SECI/ Owner representative

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480	ii	Packaging, Storing, Bundling, Handling	As agreed/ Required	Major	Visual	100%	As per IS-802. Packing of Column. Bracing, Rafters and Purlins shall be done by strapping. Packing of smaller items by wires or in gunny bags/ or as per approved procedure	IR	√	x	x	x	Separate packaging for different type of members like Col, Purlin, Rafter, Front/ rear/ diagonal bracings, fasteners, cleats etc. Small members shall be bundled with wire. Damage to galvanization and form (shape) of the member during handling and trasporting shall be controlled
481		**Site Installation**								x	x	x	
482	i	Receipt of materials and Checking as per packing list	As agreed/ Required	Critical	Visual	Random	Tech. Specification, Approved Drawing & Method Statement.		√	x	x	x	
483	ii	Fabricated members - Dimensional Check	As agreed/ Required	Major	Visual	100%				x	x	x	
484	iii	Visual checks for defects/damages, rusting, pitting, galvanising etc.	As agreed/ Required	Major	Visual	Random				x	x	x	
485	iv	Nut/Bolt/Washers	As agreed/ Required	Major	Measurement	100%				x	x	x	
486	v	Mounting of structures & Accessories - Coordinates, Levels, Fitment, Alignment etc.	As agreed/ Required	Critical	Visual /Measurement	100%			√	x	x	x	
487	vi	Torque Checking - Daily calibration check, Bolt installation	As agreed/ Required	Major	Measurement	100%				x	x	x	
489	**35**	**Module Mouting - Pre Installation Check**			Visual	100%							
490	i	Check for site physical layout as per drawing / Design Specification		Major	Physical	100%				x	x	x	
491	ii	Check for Structure, Mounting readiness		Major	Physical					x	x	x	
493	**36**	**String Combiner Boxes (SCB) - Mouting - Pre Installation Check**											
494	i	Check for foundation readyness - location & coordinates, dimensions & levels, foundation bolts etc.		Major	Physical	100%				x	x	x	
496	**37**	**Inverter Panel**					Design Specification, Drawings, Manufacturer Manual Method Statement	SR					
497		**Pre Installation**											
498	i	Check for site physical layout as per drawing.		Major	Visual	100%			√	x	x	x	
499	ii	Ensure that no fouling with civil/structural		Major	Physical	Random				x	x	x	
500	iii	Check for Foundation readiness and level of foundation.		Major	Physical	100%				x	x	x	
502	**38**	**Burried Cables**					Design Specification, Drawings, Manufacturer Catalogue Method Statement (SW-SEPC-MS-CAB-006)						
503	i	Cable Trench - Dimensions, alignment		Critical	Physical	100%	Design Specification, Drawings, Manufacturer Catalogue Method Statement	SR		x	x	x	
504	ii	Sand filling before cable laying, sand filling after cable laying, placing of precast concrete slabs/ bricks, backfilling with soil		Major	Visual	100%				x	x	x	
586													
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592			**LEGEND**: D * Records, indentified with "Tick" (√) shall be essentially included by supplier in QA documentation.							**DOC. NO**.: SECI - XXX - XXX -XXX - FQP & MQP - 001		**REV**: 0	
593			**Legend to be used:**										
594			**Class # : A** = Critical, **B**=Major, **C**=Minor										
595			**Format of Record #** : **SR**=Site Register, **TR**=Lab Test Report, **IR**=Inspection Report, **MTC**=Manufacturer's Test Certificate										
596			All **MTC**'s shall be correlated with batch of material supply, Tech specs and drawings										
597			**Category 'A'** - Sub-contractor/ sub-vendor, EPC Vendor, SECI/ Owner										
598			**Category 'B'** - Sub-Contractor/ Sub-Vendor, EPC Vendor, SECI										
599			**Category 'C'** - Sub-Contractor/ Sub-Vendor										
600										**Reviewed By**	**Approved By**	**Approval Seal**	
601			This document shall be read in conjunction with Tech. Specifications and Drawings										