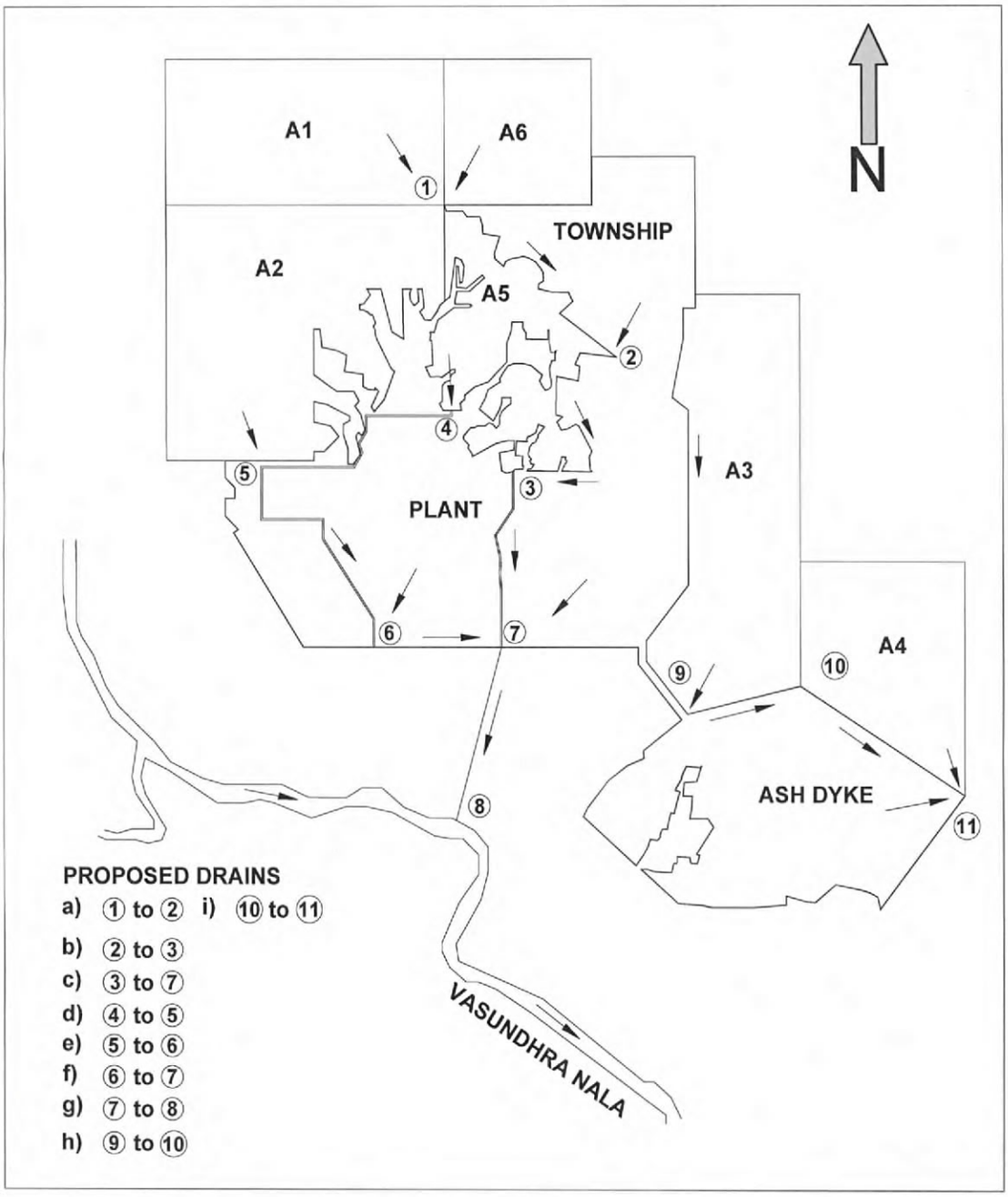

FIGURE 5: LOCATION OF NODES FOR STORM WATER DRAINS (Alternative II)

The design discharge for each of channel segment has been estimated duly considering the discharge from component of plant/township/ash dyke /adjoining area as applicable.

The storm water drainage channels would be provided with smooth lining for sides and bed similar to the surface of smooth finished concrete. Accordingly, the cross section of the outfall channel has been derived using Manning's n value of 0.02 and the bed slope of 1:2500. The design details of drainage channel segment are given in Table 10. It is necessary to provide 1 m free board to all segments to arrive at the top of bank..

TABLE 10: DETAILS OF OUTFALL CHANNEL SEGMENT (Alternative II)

Segment	Design Discharge (m^3/s)	Width (m)	Depth (m)	Remark
1-2	87	13	4	
2-3	131	17	4	
3-7	169	21	4	
4-5	39	7	4	
5-6	122	16	4	
6-7	199	24	4	
7-8	406	45	4	Proposed outfall 1
9-10	41	8	3.5	
10-11	89	15	3.5	
@11	141	22	3.5	Proposed outfall 2

High water level in Vasundhara nala at the proposed outfall locations at node points 8 was estimated at RL, 212.37 m using the resulting water profile for post project scenario (Figure 6). These have been used to work out bed level of the proposed drainage channels after adding 1m height to ensure free flow conditions. The safe grade elevation for plant, township and ash dyke area was proposed as RL 221m / RL 225 m, RL 227m and RL 220 m respectively, considering; the topography of the area and the high water levels in Vasundhara nala estimated using 1-D mathematical model runs.

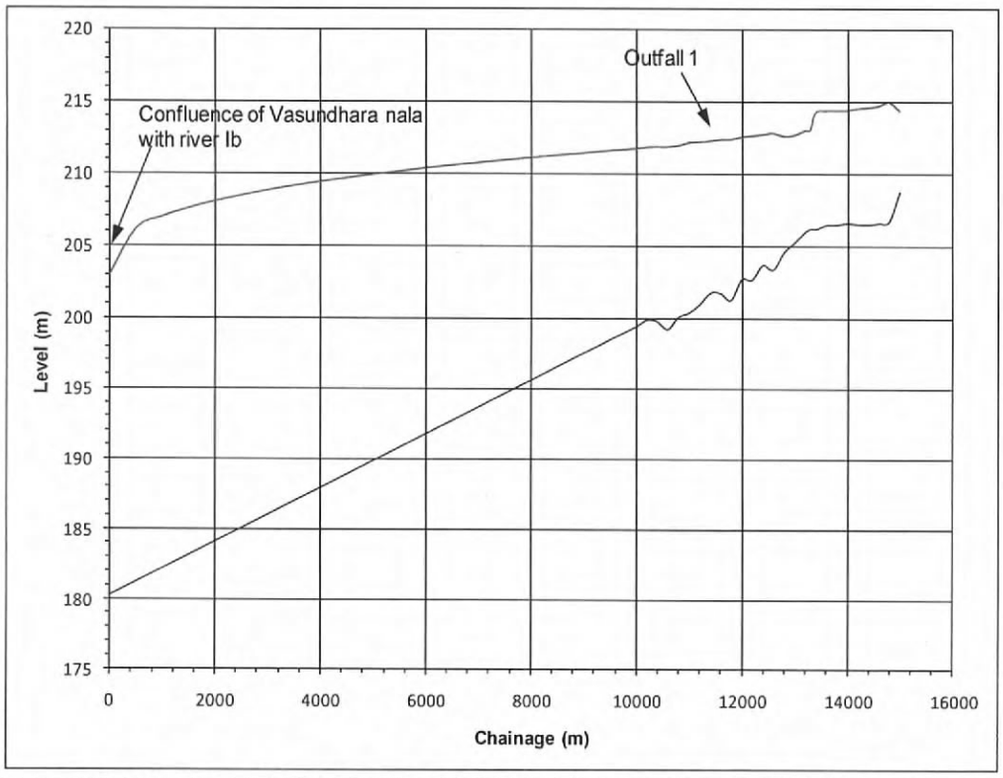

FIGURE 6: WATER SURFACE PROFILE OUTFALL LOCATION IN VASUNDHARA NALA (Alternative II)

In addition to this, bed and bank levels of the proposed storm water drainage channels have been derived from estimated HFL at outfall locations in view of bed slope of 1:2500, depth of water and 1 m height to ensure free flow conditions. The details are given in Table 11.

TABLE 11: BED AND BANK LEVELS OF SWD CHANNELS (Alternative II)

Node No	Bed Level (m)	Bank Level (m)	Remark
1	215.40	220.40	Formation level of Plant - RL 221 m /RL 225 m Township - RL 227 m Ash dyke - RL 220 m
2	214.84	219.84	
3	214.23	219.23	
4	216.32	221.32	
5	215.73	220.73	
6	215.11	220.11	
7	213.79	218.79	
8	213.37	218.37	
9	215.50	220.00	
10	215.20	219.70	
11	214.72	219.22	

Note: It can be noticed that bed level of connecting branch segments 6-7 at node point 7 has been arrived by adding 1m to bed level of channel segment 3-7 at node point 7. e.g. bed level of connecting branch segment 6-7 at node 7 is 214.79 m which is 1m above 213.79 m bed level at 7 of segment 3-7.

Reviewing, bed and bank levels of SWD channels, it is noticed that bed levels at node points 6 and 7 are at RL 215.11 m and RL 213.79 m respectively. Proposed grade level at this area is at RL 221 m, which is higher by 5.89 m and 7.21 m respectively. Bed levels at node points 3, 4 and 5 are at RL 214.23 m, RL 216.32 m and 215.73 m respectively. Proposed grade level at these node points is 225 m. it is higher by 10.77m, 8.68 m and 9.27 m respectively. The bed levels at node point 1 and 2 are at RL 215.40 m and RL 214.84 m respectively. The grade level at these node points is at RL 227 m. It is higher by 11.60 m and 12.16 m respectively.

The storm water from ash dyke is discharged to tributary of Vasundhara nala flowing along the eastern side of ash dyke through outfall at node 11. On review of toposheet it has been found that the bed level of tributary as approximately at RL 213.72 m at outfall (node 11).The bed level of outfall channel at node 11 was derived by adding 1m to the estimated bed level of tributary at outfall. It is clarified that the estimated bed level of tributary at outfall (node 11) is to be verified with the prevailing ground conditions before laying the storm water drainage network for ash dyke area. The remodeling of tributary up to its confluence with Vasundhara nala to be carried out to ensure the cross section of tributary is adequate to carry storm water from ash dyke and adjoining area.

The drainage network is to be laid with bed levels derived from high water level in Vasundhara nala, it results huge difference in bed levels and safe grade level of plant and township. In this situation, negotiating this difference, the fall structures with energy dissipation system are to be provided. The details like location and height of fall can be

worked out by NTPC duly considering prevailing topography at outfall location. The design details of storm water drainage channels for Alternative II are given in Table 12.

TABLE 12: DESIGN DETAILS OF SWD CHANNEL (Alternative II)

Segment	Design Discharge (m^3/s)	Dimensions of Cross Section (m)		Bed Level (m)	Bank Level (m)	Remark
		Width	Depth			
1-2	87	13	4	215.40	220.40	
2-3	131	17	4	214.84	219.84	
3-7	169	21	4	214.23	219.23	
4-5	39	7	4	216.32	221.32	
5-6	122	16	4	215.73	220.73	
6-7	199	24	4	215.11	220.11	
7-8	406	45	4	213.79	218.79	Proposed outfall 1
9-10	41	8	3.5	215.50	220.00	
10-11	89	15	3.5	215.20	219.70	
@11	141	22	3.5	214.72	219.22	Proposed outfall 2

10. DISCUSSIONS

Two alternatives have been considered for storm water drainage scheme of Darlipali STPP. Based on the HFL derived using 1-D mathematical modelling, three outfalls are proposed at node points 11, 12 and 13 on the reach of Vasundhara nala in Alternative I for discharge of storm water from plant, township, ash dyke and adjoining area. Alternative II has been proposed on the basis of the comments received from M/s NTPC vide their e-mail dated 14th October, 2014. The storm water from plant, township and part adjoining area is to be drained to Vasundhara nala through a single outfall at node and storm water from ash dyke and part adjoining area is to be drained to nala on the eastern side of ash dyke through another outfall are proposed in Alternative II.

11. RECOMMENDATION

Based on studies, following recommendations are given:

1) It is recommended to adopt Alternative I and the storm water drainage system involving nodes and segments as suggested in Figure 3 with reference to the design discharges estimated and tabulated in Table 8. In case of any practical difficulty in implementation of Alternative I due to acquisition of land as indicated by NTPC, Alternative II suggested in Table 10 can also be adopted.

2) The storm water drainage channel dimensions have been derived for a bed slope of 1:2500, smooth lining for sides and bed, similar to the surface of smooth finished concrete lining resulting in a flow of Manning's n of 0.020. The dimensions of various segments and bed levels at the end of segments are derived and are given in Table 8.

3) Separate structures in the form of falls are to be provided at practically appropriate locations. The details like location and height of fall can be worked out by Site engineers duly considering prevailing topography at outfall location and estimated discharge. In addition, the energy dissipation arrangements are to be made at the downstream of each fall to prevent erosion.

ACKNOWLEDGEMENT

We wish to express our deep sense of gratitude to Shri S.Govindan, Director, CWPRS for constant encouragement and valuable suggestions during the course of studies. We extend our gratitude to Shri V.G.Bhave, Joint Director (Rtd.) and Shri U.C. Roman, Chief Research Officer (Rtd.) who were involved in this studies in the initial stages. Discussions and interactions held with Shri. S.M.Khare, General Manager (PE-Civil) (Rtd.) and Shri Rajiv Baijal, Additional General Manager (PE-Civil), NTPC,EOC, Noida were very useful for these studies. The services extended in data scrutiny and preparation of report by CWPRS staff members Shri K.S.Kulkarni, Head Draftsman, and Smt. M. A. Nisal, Laboratory Assistant II are also acknowledged.

REFERENCES

1) CWPRS Technical Report No. 5130 "Mathematical Model Studies for Determination of Safe Grade Elevation for Proposed Integrated Power Plant near Darlipali, Dist. Sundargarh, Odisha".
2) CWPRS Interim Reprt vide No. SWH/10(76)-AND/2012/141/2340 dated 31st May, 2012.
3) Central Water Commission (1997), "Flood Estimation Report for Mahanadi sub zone- 3-(d).
4) Indian Road Congress(1990), Publication No 13, " Guidelines for the design of small bridges and culverts"
5) Mutreja, K.N. (1986), 'Applied Hydrology', Tata McGraw-Hill, Inc. New Delhi.
6) Chow, V.T. (1959); 'Open Channel Hydraulics' , McGraw-Hill, Inc. New York.

SL. NO.

ANNEXURE – M

SPECIFICATIONS FOR 100% SOLIDS , HIGH BUILD, ELASTOMERIC POLYURETHANE COATING FOR CONCRETE

1.00.00 The coating shall meet minimum requirements for materials, equipment, application, inspection, repair and handling aspects associated with the coating of Concrete applications using 100% Solids (Solventless) Two Component, Fast Curing Elastomeric Polyurethane Coating classified under ASTM D -16, Type V.

1.01.00 The polyurethane on the external / internal surface of the Concrete shall provide a hard yet flexible, impermeable barrier with outstanding adhesion impact and abrasion resistance as well as crack spanning capability to protect the Concrete from corrosion and abrasion. It shall cover all variations associated with operating conditions of NDCT.

1.02.00 Supplier or his licensed applicator shall obtain prior written approval from the Owner for any deviations from the requirements of this specification and / or the standard referred herein.

1.03.00 The work shall conform to following documents (latest revision or as specified) and as referred in this specification.

a) SSPC-PS Guide 17.00, 1 Aug, 1991	Guide for Selecting Urethane Painting System
b) RP 0892-92	NACE International Linings Over Concrete For Immersion Service
c) RP 0187-96	NACE International Design Considerations For Corrosion Control of Reinforcing Steel In Concrete.
	Adhesion Testers

2.00.00 **GENERAL REQUIREMENT**

2.01.00 The bidder shall perform all work in accordance with this specification and other requirements noted herein.

Bidder shall submit a detailed written description in the form of a manual covering coating equipment, procedure, materials, inspection, tests and repair etc, for Owner's approval.

2.02.00 The bidder shall also supply copies of test reports conducted by in internationally reputed test agencies evidencing that materials conform to minimum performance requirements. The bidder shall also supply certificates from coating manufacturer as under.

- That the materials (with batch numbers, dates of manufacture and shelf life) are free from all manufacturing defects.

- That the materials will meet performance criteria as given below when applied.
- That the bidder or his applicator possesses the necessary technical skills and equipment to apply these materials and is authorized by the manufacturer for this purpose.

100% Solids, Two Component Polyurethane are specialized coatings characterized by very short pot lives. The coating shall be applied either by the coating material manufacturer himself or by his authorized applicator. The authorized applicator should have been trained and certified by the coating manufacturer and shall possess the necessary specialized equipment, trained crew and experience in spraying fast setting plural component polyurethane coatings. Contractor shall provide, for the owner's approval, details of coating manufacturer's authorized applicator including details of equipment, experience in spraying fast setting 100% Solids Polyurethane Coatings and client references for verification. In no case shall coating application be undertaken by coating contractors without prior track record of applying these materials. In addition, contractor shall provide certificate from coating materials manufacturers that the applicator possesses the necessary technical skills and equipment to apply these materials and is authorized by the manufacturer for this purpose.

2.03.00 Applied coating will be tested for dry film thickness and adhesion and hardness.

All coating operations shall be performed under the supervision of, and performed by, personnel skilled in the application of the coating system.

2.04.00 The bidder shall provide access, during all phases of work, to the Owner and their representatives.

2.05.00 All cleaning, priming and coating machines shall be equipped with rubber or wheels overlaid with hard fiber to prevent damaging the concrete surface.

2.06.00 The materials shall be applied by Airless Spray System, as per the standards specified by the material manufacturer.

2.07.00 100% Solids Polyurethane systems are solvent free eliminating solvent health hazards and flammability concerns All safety precautions warranted by good industrial hygiene practices and regulated by local, state or central laws must be taken into consideration while applying these coatings.

3.00.00 MATERIAL SPECIFICATIONS

3.01.00 ELASTOMERIC POLYURETHANE COATING :

Spray applied, Impermeable, 100% Solids, Elastomeric Aromatic Polyurethane Coating (Non Tar Extended), as per ASTM D-16, Type V (Two Component, Chemical Cure). Shall meet following criteria. All tests at ambient (25 C) unless otherwise specified.

- NOMINAL THICKNESS 2,000 Microns
- TENSILE STRENGTH ASTM D-638 17 N / mm^2

• ADHESION ASTM D-4541 (Elcometer Pull Off)	2 N / mm^2
• RECOVERABLE ELONGATION ASTM D-638	50% Min.
• SURFACE HARDNESS ASTM D 2240 (Cured Film - Shore D)	50 Min.
• WATER VAPOUR PERMEABILITY ASTM E - 96 / F-1249-90	0.3 gms. / 24 Hour / M2 Max.
• RESISTANCE TEMPERATURES	0° C to 60^oC
• FLEXIBILITY 180° Bend -1.0 mm thick ASTM D 1737	Pass over 12 mm Mandrel
• ACCELERATED WEATHERING ASTM G – 154 53 / BS 3800 2,000 Hours	Excellent. Some Discoloration.
• ABRASION RESISTANCE ASTM D 4060 /FTMS 141 Taber Abraser H - 10 Wheel 1,000 gms., 1,000 cycles	Weight Loss 0.05 gms. Max
• CHEMICAL RESISTANCE Immersion of 30 days in sea water followed by	
(%) Weight Change	< 1.0 %
(%) Hardness (Shore D) Change	< 5.0 %
(%) Tensile Strength Change	< 5.0 %

3.02.00 **PRIMER**

Primer shall be used on new concrete surfaces before application of PU coating.

Damp tolerant, penetrating, sealing primer shall be applied at 100-125 Microns Wet Film Thickness in accordance with the recommendation of the Polyurethane Coating manufacturer.

4.00.00 **SURFACE PREPARATION**

4.01.00 The bidder shall be responsible for the structural integrity of the concrete.

The use of form release agents shall be compatible to the coating. Contractor shall take measures in concrete casting to provide a suitable surface finish that shall be compatible with subsequent application of coating. The measures shall include providing well compacted, dense concrete with minimal air entrainment and a relatively smooth surface finish. Pond floor shall be vacuum dewatered.
Remove any fins or protrusions using power grinding. These may also be required to be removed for applications requiring an even finish.

Residual bug – holes beneath the surface of the coating shall be opened by sweep blasting and flooded with Polyurethane coating during spray application. Any larger voids shall be filled with Elastomeric Polyurethane hand mix material or compatible grout. Active cracks shall be bridged by using Elastomeric Polyurethane over Industrial Nylon / Polyester Fabric. Any exposed steel surfaces shall be wire brush cleaned and primed before coating application.

4.02.00 Exterior waterproofing shall be applied to the structure below the finished ground level and upto atleast 300 mm above it. The structure shall be sealed from the exterior (soil side) to block capillary action of moisture through the concrete. Leaks from groundwater can permeate the entire concrete thickness. The exterior waterproofing system must be suitable for the expected exposure condition.

4.03.00 Before general surface preparation, surface contaminants (if any) shall be removed. Oil and Grease shall be removed by multiple detergent wash, preferably using steam. (Solvents shall not be used as they will cause the petroleum products to penetrate the concrete surface). Chemically contaminated concrete shall be neutralized prior to complete surface preparation. Acidic surfaces shall be neutralized using an alkaline cleaner and rinsed with fresh water and then cleaned with steam and detergent. After chemical cleaning, surface will be tested for residual chemicals. pH shall be tested using ASTM D - 4262 using pH test paper on rinse water . Concrete shall be dried thoroughly thereafter.

4.04.00 Sweep blast the concrete surface using expendable abrasive. The blast nozzle should be kept at sufficient distance to avoid over blast and exposing of aggregate. Following blasting remove dust using air jet (with the abrasive turned off) .

4.05.00 Any of the following methods of surface preparation may be used to achieve a near white blast cleaned surface :

a) Dry abrasive blasting using compressed air, blast nozzles and abrasive.
b) Dry abrasive blasting using a dosed cycle, re-circulating abrasive system, with compressed air, blast nozzle, and abrasive, with or without vacuum for dust and abrasive recovery.
c) Dry abrasive blasting using a dosed cycle, re-circulating abrasive system with centrifugal, wheels and abrasive (such as Wheelabrator).

4.06.00 Compressed air used for blast cleaning shall be dean, dry and free of moisture and oil. Moisture separators, oil separators, traps or other equipment may be necessary to achieve dean, dry air.

4.07.00 Blast cleaning operations shall be done in such a manner that no damage is done to partially or entirely completed portions of the work.

4.08.00 Dry blast cleaning shall not be concluded during times when the surface will become wet after blast cleaning.

4.09.00 Non-metallic disposable mineral abrasive such as silica sand shall be the chosen abrasive for open blasting operations Steel grit and shot are approved abrasive media for blast cleaning in closed cycle, recirculating abrasive systems (compressed air, vacuum and centrifugal wheel) . No other abrasive media shall be used without prior approval.

4.10.00 The cleanliness and size of recycled abrasive shall be maintained to ensure compliance with this standard.

4.11.00 The blast cleaning abrasive shall be dry and free of oil, grease and other contaminants. Applicator shall use abrasive media of size that will ensure the necessary roughness desired.

4.12.00 Dust and residues shall be removed from prepared surface by brushing, blowing off with dean , dry air or vacuum cleaning. Moisture separators, oil separators, traps or other equipment may be necessary to achieve clean, dry air.

4.13.00 Prior to the application of Elastomeric Urethane on new concrete surface, sufficient time must pass to allow the excess moisture to evaporate. This time will vary on conditions and is normally 14-28 days. After the curing period has elapsed, concrete must be checked for the presence of excess moisture on and beneath the surface using a Delmhorst BD-8 Moisture Detector. A reading of 2% and under indicates that the concrete is ready to be coated. The moisture content must not only be checked on the surface but beneath it by driving nails 6-12 mm into the concrete and placing the probes on the nail - heads. Alternatively the moisture may be tested by the Plastic Sheet Test ASTM D-4263 . The test involves taping a 450 mm X 450 mm , 0.1 mm thick dear plastic sheet to the surface of the concrete for a duration of 16 hours. Absence of any droplets of moisture underneath the plastic sheet indicates that the concrete is ready for coating.
In cases of continued ingress of moisture from localised areas of concrete, apply propane blow torch to ensure that the moisture content as specified above is achieved.

5.00.00 **PRIMING**

5.01.00 Before beginning priming and coating, measure the humidity using a sling psychrometer and calculate the dew point. The relative humidity must be lower than 85%. Temperature of concrete surface must be at least 3°C higher than the dew point. Under controlled conditions, it is possible to heat the concrete surface to eliminate condensation problems.

5.02.00 The type of primer used shall be as described in the coating specification 3.02.00.

5.03.00 Primer shall be sprayed onto the cleaned surface with a wet film thickness of 75-125 Microns. Since the primer penetrates into the concrete surface, no DFT measurements will be taken and estimation shall be on volumetric basis. The primer on application shall be free from runs or drips or areas of excessive thickness.

5.04.00 The primed surface shall be protected so that it will not come into contact with rain, dust or other substances until completely hardened and coated with the Elastomeric Polyurethane Top Coat.

5.05.00 Primed surface should be over coated within the time recommended for the approved type of primer. In the event that the re-coat interval of primed surface is exceeded without top-coating with the Elastomeric Polyurethane, the surface must be re-primed.

6.00.00 **COATING**

6.01.00 be 2,000 Microns, measured in accordance with 7.02.02. Being a thixotropic, high build, non-levelling coating, the Elastomeric Polyurethane coating shall take the contour / profile of the substrate.

Coating shall be done only at times when the substrates temperature is at least 3ºC over the dew point. Hourly measurements of dew point and surface temperatures shall be made prior to and when coating is under progress. Surface temperature should be minimum 5ºC and should not exceed 70ºC.

6.02.00 Equipment for the spray application shall be in conformity with system specification, meeting minimum specified by the coating manufacturer. Equipment shall consist of Material Feed Pumps, Purge Pump, Proportioning Pump, Mix Manifold, Static Mixer, Interconnecting Hoses etc.

6.03.00 Partially used and unused material drums must be tightly sealed and contain a blanket of nitrogen to prevent moisture contamination when not in use.

6.04.00 Before application on the substrate apply a test patch for runs or drips and gel time as well as tack free time.

6.05.00 The proportioning pump shall be fitted with a numeric counter to keep track of the volume while spraying.

6.06.00 Entire thickness shall be built up in a single application (with a number of passes) . If the surface is large enough to require more than one day for the coating, the edges of the coated areas shall be feathered and roughened with a grinding too) prior to beginning priming and coating.

6.07.00 Areas not to be coated shall be masked with disposable plastic sheets, cardboard etc.

6.08.00 Visual inspection shall be made for film discontinuities such as air bubbles, blowholes, skips, shadows. Such defects will be marked and repaired with Elastomeric Polyurethane hand mix kit with slower pot life after roughening the edges.

7.00.00 **INSPECTION**

7.01.00 All work under this specification shall be subject to inspection by the owner or his representative. All parts of work shall be accessible. The applicator shall correct such work as is found defective and not as per the specifications.

7.02.00 The following tests shall be made :

During coating application the wet film thickness will be measured using Nordson wet Film Gauge as per ASTM D 4414.

7.02.01 Adhesion

Pull Off adhesion to Concrete measured using an portable adhesion tester such as Positest AT-CM Elcometer or equivalent as per ASTM D4541 on fully cured (7 days) concrete. Frequency shall be 3 readings per 1,000 Sq.M of coated area. The average of readings from three ~~five~~ randomly selected areas shall constitute the adhesion and shall be minimum 2 N/mm2 (see below). Test area to be flat (without curvature). The following method will be used to determine whether coating meets adhesion requirements.

Elcometer Reading	Type of Failure		Result / Conclusion
> 2 N / mm^2	T1	90% or more of break at coating - concrete interface	Coating meets adhesion criteria. Take actual reading of bond strength.
	T2	90% of more of break within the concrete	Concrete Failure. Coating adhesion exceeds 2N/mm^2
< 2 N / mm ^{2}	T1	90% or more of break at coating - concrete interface	Coating does not meet adhesion criteria. Take actual reading of bond strength achieved.
	T2	90% of more of break within the concrete	Concrete lacks sufficient strength to provide necessary adhesion figure. Coating adhesion accepted.

7.02.02 Film Thickness (DFT)

The film thickness shall be determined from the thickness of the coating detached along with the Elcometer dollies of the adhesion test and the readings shall be recorded. Frequency shall be identical to adhesion test. Average of 3 reading shall constitute the film thickness and shall be al least 2,000 Microns. Minimum spot reading shall be 1,800 Microns. Recommended spread rate by the manufacturer for the specified thickness of the PU coating shall be ascertained and adhered to during the coating process.

7.02.03 Hardness (Durometer)

Cured films (7 days) shall be tested for hardness using Durometer (Shore D) as per ASTM D 2240.

Details of facilities to be dismantled - Annexure-P(R0)

Sl. No.	Name of facility	Total No. of Units	Plinth Area per Unit {Sq.m.}	Total Plinth Area {Sq.m.}	Type of Super-structure	Type of Sub-structure	Storey Configuration	Scope of Dismantling	Facilities envisaged under Darlipali Stage-II	Type & Present Location of facility
1	Boundary wall				Brick Masonsry Work	RCC & PCC	3 m height	EPC Vendor	BTG package	Facilities in Plant area
2	Watch tower	2	60	120	Brick Masonsry Work with shed	RCC & PCC	Single Storey	EPC Vendor	BTG package	
3										
4										
5										
6										
7										
8										
9										
10										
11										

SUB-SECTION–IID

CIVIL WORKS

1.00.00 SCOPE OF CIVIL, STRUCTURAL & ARCHITECTURAL WORKS OF EPC PACKAGE

The scope of civil, structural and architectural works shall include topographical survey, geotechnical investigation, site clearance, dismantling of existing structures/substructures/facilities, site levelling, preparation of design documents and drawings and getting approval of the same from the Employer and construction of all civil, structural and architectural works including supply of all construction materials for all buildings, equipment and facilities for the project. The nature of work generally involves geotechnical investigation, piling, earthwork in excavation in all types of soil and rock including controlled blasting/ mechanical means, de-watering, backfilling around completed structures, plinth filling, disposal of surplus earth/rock/excavated material/dismantled material, concreting including reinforcement and form work, chimney construction using slip form, masonry work, plastering, corrosion protection measures including painting, un-insulated / sandwiched insulated metal wall cladding, roofing and flooring including permanent steel decking, false ceiling, under deck and over deck insulation, acid and alkali resistant lining, fabrication of all structures at factory, pre assembly of fabricated structures at factory, transportation of pre-fabricated structures and erection of steel structures (with bolted field connections) and miscellaneous steel works (i.e., steel staircase, cable supports, pipe supports, ladders, walkways, railing, chequered plate/grating floors, inserts etc.), painting of structures, paving, gravel filling, providing pre-cast covers, damp proofing, roof water proofing, anti-weed treatment, roads, drainage, sewerage, rain water harvesting, final grading and site clearance before handing over and any other item of work required for completion of all systems under the scope of work complete.

The works covered under the scope of the bidder have to be executed in an existing power station. The bidder shall take all necessary precautions to protect the existing equipment, structures, facilities and buildings etc. from damage. In case any damage occurs due to activities of the bidder on account of negligence, ignorance, accidental or any other reason whatsoever, the damage shall be made - good by the bidder at his own cost to the satisfaction of the Owner. The bidder shall take all necessary safety measures to avoid any harm, injury to his workers/staff from the equipment / facilities of the power station.

The scope of Bidder for civil, structural and architectural works as defined above shall include but not be limited to the following buildings/ areas/ systems along with their foundations, super structures and finishes complete:

1. Topographical Survey.
2. Geo-technical Investigation (additional data wherever required beyond details as provided).

3. Site clearance including cutting of trees of girth less than 30 centimeters. Cutting of trees of girth more than 30cm shall be done by the Owner after finalization of GLP. However, removal and disposal of roots of trees of all girths (including trees of girth less than 30cm or more) and other vegetation is in Bidder's scope.

4. Dismantling, removal, and disposal of identified facilities/ structures/ substructures/ foundations of dismantled quarters/buildings/structures, reinforcement, pavement/paving, pipes and any underground structure/materials, debris etc. all complete.

   Refer Annexure-P in PART-B along with Tender Drawing titled 'General Layout Plan' EXISTING FACILITIES / BUILDINGS WITHIN STAGE-II PLANT AREA, for tentative list of existing facilities. The list is only indicative and may not be exhaustive/complete. The list contains structures

   a) where super structure is to be dismantled by owner and structures below ground level including foundations is in bidder's scope and

   b) dismantling of whole structures including above ground level and below ground level is in bidder's scope.

   In case where superstructure dismantling is in Owner's scope, dismantling of all underground facilities including paving /flooring and projection of structures above ground level etc., if any, is in the scope of bidder. Existing foundation/underground structures interfering with new foundations/structures are to be removed by the bidder. All existing foundations/below ground facilities interfering with new facilities are to be dismantled upto minimum 10m or technical/system requirement, whichever is greater, from the extreme outline of the new underground foundation/ structure. No drawing for substructure are available. Bidder may assess the same as per actual site conditions without any additional time and cost implication to owner.

   Dismantling of all existing facilities and disposal of dismantled material is in the scope of the bidder. The bidder has to take care this aspect while bidding. Dismantled material such as reinforcement, structural steel, concrete, masonry waste, other demolition waste, etc., arising from civil structures shall be the property of the bidder. Bidder shall be responsible for safe disposal of all such materials outside the plant boundary in environmentally friendly manner meeting all statutory requirements. The liability for any payment w.r.t. removal /disposal of dismantled material including the applicable taxes/duties shall be that of the Bidder.

   The area will be handed over in as is and where is basis.

5. Infrastructure Works

   a. Rigid pavements Roads in Plant area and all other roads as shown in General Layout plan (GLP)/ Road layout tender drawing including approach road /heavy duty paving/heavy duty passage to buildings/ facilities in the package, including construction of priority roads at onset of project works and maintenance of the roads during the entire construction period. Laying of 40mm bitumen mastic wearing course over roads after completion of construction activities i.e at the time of handover as specified in Cl 5.10.00 of part-B sub-section D-1-5.

   b. RCC Storm water drainage in Plant area (including facilities/structures) and RCC drains along roads in Bidder's Scope including connection upto disposal point as shown in GLP/Layout of drain. Drains to be constructed simultaneously with roads.

   c. Packaged type Sewerage treatment plant (3 nos. as indicated in tender drawing General Layout Plan) and sewage pumping station including sewage pump, sump & house and connection up to sewage treatment plants; connection of sewage lines of all buildings under Bidder's scope to the nearest sewerage system. Storage or handling of effluent after tertiary treatment is excluded from bidder's scope of work.

   d. Complete site levelling of entire plant area as shown in drawing Titled 'Site Levelling Plan'.

   e. Retaining walls/slope protection work under site levelling work.

   f. Rerouting of Diversion Nalah

   g. Plant boundary wall as shown in tender drawing.

   h. Water supply system for Plant area.

   i. Permanent Safety Control Room at onset of project works.

   j. Separate RCC drainage network with GI grating cover and sump pit for plant effluents for all buildings and facilities in Bidder's scope including floor wash water from all the facilities in Plant Area upto Effluent Treatment plant including connection of effluent line from structures under the scope of package.

   k. Hard crusting in plant area and preassembly area to facilitate movement of vehicles and erection of equipment.

6. Foundations for all buildings/ area/ systems including machine foundations.

7. All Civil, Structural, Architectural works including underground facilities like drainage, sewerage, trenches, earthing mat/ grounding for entire Plant area covering the following:

   a. Boiler and ESP supporting structures and foundations.

   b. Elevator pit & Civil Works for Machine Room for Boiler Elevator.

   c. Mill Bunker building supporting structures and foundations, floors, roof & side cladding.

   d. ESP control room building.

   e. Mill reject silo and associated trenches.

   f. Compressor house.

   g. Coal mill foundations & PA/FD/ID Fan foundations.

   h. Seal air fan foundation and all other equipment foundations.

   i. Coarse ash hopper tower foundations & FEA tower foundations.

   j. Coal transfer points, coal conveyor galleries and supporting trestles in the boiler area – foundations, floors, roof & side cladding, staircases, gravity take up structure for conveyors in the boiler area.

   k. Area Paving and miscellaneous foundations in entire area enclosed within the peripheral roads of the entire plant area from edge of drain along peripheral road beyond AIR COOLED CONDENSER(ACC) upto road beyond Chimney, bound by peripheral roads in orthogonal directions, including heavy duty passages, sump pits, drains, culverts, cable slits, fire water trench, including, rail/ road/ drain crossing of fire water trench & pipes etc. (as shown in tender drawing).

   l. Bunker MCC including RIO room.

   m. Main Power House (MPH) building. Air Conditioned Office of 250 sqm shall be provided in MPH building above CR in addition to other facilities specified

   n. Foundations for turbine generator, turbine driven boiler feed pumps and motor driven boiler feed pump(s) including steel helical springs and viscous dampers below RCC top deck (The foundation type can be with/without steel helical springs/ dampers as per option provided in specification)

   o. CW Pit, CEP Pit, and all other equipment foundations in Turbine-Generator (TG) area.

p. Transformer yard area foundations including rail track cum road along the entire A-Row extending up to peripheral roads on either side and transformer yard, condensate storage tank foundation, condensate transfer pump foundation, fire barrier wall, pit, sump, pipe and manhole, common oil retention pit/oil-water separation pit, gate and fencing etc.

q. Diesel generator set foundations & stack foundations along with steel support structure and foundations for stack support.

r. Civil, structural, architectural works for CPU system in Main Power house & regeneration area including Switchgear/MCC and control room building and Transformer foundations.

s. Civil, Structural & Architectural works for rooms for Owner's Electrical equipment like HT/LT switchgear, cable vault, batteries/battery chargers, foundation of service transformers, space for bus ducts and cable trays etc. as listed in Clause 1.19.00 of Sub Section-IIB, Part-A, Section VI Electrical Chapter of technical specifications.

t. VFD Room in transformer Yard area, for CEP.

8. Chimney including elevator, electrical works, aviation obstruction lighting.

9. Civil, structural, architectural works of all facilities associated with complete Flue gas desulfurization (FGD) including Gypsum handling system .

10. Civil, Structural, Architectural works for all buildings/ structures/ facilities for ash handling along with switchgear building & control room including the following:

a. Ash Water Pump House open type

b. Foundation for Dry Bottom Ash, conveyor including Transfer points for dry bottom ash as per system requirements

c. Foundation for Dewatering/Hydro bins system in case of wet bottom ash system only.

d. HCSD Pump shed

e. Switch gear/MCC and Control Room for all buildings.

f. Silo area utility building, ash classifier system and bagging plant complex (as per system requirement)

g. Fly Ash Silo including HCSD silo, Bottom Ash silo, Silo area utility building, ash classifier system and bagging plant complex including Ash bag storage shed (as per system requirement)

h. Transport air compressor Shed with side sheeting

i. Conveying air Compressor Shed with side sheeting (if required as per system)

j. Steel Trestles including foundation for supporting fly ash Piping within plant area and up to silos.

k. RCC pedestals for ash slurry disposal pipes and ash water recirculation pipe inside plant boundary. Slurry pipes mentioned in the specification includes HCSD pipe also.

l. Miscellaneous works like Transformer Foundation, Fencing, Paving etc.

m. Culverts/local humps or bridges as per site conditions, for routing of the ash pipes at crossing for nallah /water body crossing /roads/rail lines etc.

n. Weigh Bridge.

o. Any other buildings/structures if required as per system.

12. Civil, structural, architectural works for fuel oil pressurizing pump house with switchgear room, MCC cum control room and its associated works.

13. DELETED

14. Raw Water system civil Works

All Civil work associated with the Raw water pump House (RWPH) including forebay/ common sump, inlet pipes from raw water reservoir including isolation arrangement, Switchgear and C/R building, laying of Raw water pipes from Raw water pump house to PT Plant and AHP Plant including all other associated facilities.

15. Civil, Structural, Architectural works for the following buildings/ structures/ facilities of **Water & Effluent treatment plant**:

a) Pre-treatment plant and associated structure and facilities
b) DM plant and associated structure and facilities
c) CW Chemical Treatment Plant and associated facilities
d) Coal slurry settling pond and associated facilities
e) Chlorination (ClO_2) plant and associated facilities
f) Water System Control Room Building and remote I/O room associated with PT plant, DM & CW chemical plant.
g) DM Plant laboratory
h) Zero liquid discharge and associated facilities

i) Liquid effluent Treatment Plant & associated facilities required for disposal of liquid effluent. Effluent quality monitoring system (EQMS)

j) DM, PT & Service Water Switch Gear & Control/Remote I/O Room Buildings, transformer foundation etc

k) DM & CW Chemical plant

l) Station Piping Civil works

16. Civil, Structural works for pipe /cable /duct supporting structures, trestles and foundations, Condensate Storage Tank and CST pump house, trenches, duct banks, pedestals, thrust blocks, trenches, Hume pipes & culverts, duct banks etc at crossing in offsite area for pipes and cables, buried pipes and crossing, racks, culverts across rail tracks for pipes/ drains/ sewers and any other facility and thrust blocks etc. associated with all systems covered under the scope.

17. DELETED

18. All civil, structural & architectural works associated with Auxiliary Cooling tower and auxiliary Water pump house including associated Switchgear and CR/Remote IO Building, transformer foundation, pipes and ducts including concrete encasement etc.

19. Civil Works for 765kV and 132 kV AIS Switchyard and associated civil work as per system requirement.
All civil, structural & architectural works associated with Switchyard i.e. Towers, Girders, Equipment Supporting structures, Lighting Masts, Transformer /Reactor foundations. Addition/alternation/modification as required in existing Stage-I Switchyard Control room building to accommodate Stage-II Panels. AC Kiosk, roads, drains, fencing with gate, anti-weed treatment, gravel filling, inter-connection of new Switchyard with existing switchyard and all other related works complete as per system requirement.

20. Coal, Biomass and Gypsum Handling Plant
All civil, structural & architectural works associated with coal, Gypsum handling plant, i.e. track hopper, transfer points, crusher houses, overhead/ground conveyor galleries, tunnels for conveyor galleries, Bio mass silos , pump houses, MCC/Control Buildings, penthouse, Truck tipplers, Gypsum storage shed,

drainage, inter-connections with existing transfer points and all other related works complete as per system requirement.

21. Pipe /Cable / duct supporting structures, trenches, culverts, duct banks, pedestals, hume pipe culverts and thrust blocks etc. associated with all systems covered under the scope of EPC package.

22. Civil works for Outdoor transformer foundations.

23. Civil, Structural, Architectural, Electrification, air-conditioning and ventilation works, for the following Miscellaneous Buildings/ structures/ facilities:
    a. Safety Park Building
    b. Watch Towers

24. Earthing mats & risers for all buildings.

25. Sheds for Construction workers and O&M Workers, including food serving kiosk and bio Toilet Blocks for ladies and gents to cater to the workers working in each work area. The sheds should be easily accessible to workers by foot. Minimum 06 numbers of shed in different areas shall be provided. Drinking water facility and maintenance of toilet and shed shall be the responsibility of the bidder till COD of all the units. The sheds shall be constructed at start of the project construction and are permanent in nature.

26. Facilities for rainwater harvesting in Plant area and other buildings in Bidder's scope.

27. Civil Works associated with fire detection and fire protection system

    Civil, structural, architectural works for fire water tank foundation, fire water pump house including Switchgear/MCC & Control room, fire water booster pump house & control room, foam system including foam system shed & control room, deluge valve housing, pedestals for pipes, concrete encasement of pylon pipes (within filled up gravel portion) used for HVW spray system for protection of transformers, rail/road crossing of fire water trench etc, civil works associated with buried pipes & crossing etc.

28. Civil works associated with air conditioning & ventilation system.

29. Civil, Structural works for pipe /cable /duct supporting structures, trestles and foundations, trenches, culverts, duct banks, pedestals, hume pipe & culverts,

buried pipes, racks, culverts across rail/road tracks for pipes/ drains/ cables and any other facility and thrust blocks etc. associated with all systems covered under the scope.

30. Miscellaneous Switchgear building.
31. Civil, structural, architectural works for SOLAR PV plant on roof top of building/facilities in the bidder's scope. For Indicative Capacity of roof top solar refer Sub- Section – IIA-21 Section-VI, Part-A (Solar P.V.). List of building would be finalised during detailed engineering.
32. Civil works associated with Raw Water Reservoir as per tender drawing including inlet pipes upto terminal point, outlet pipes for raw water pump house, etc and all other associated works
33. All Civil Works associated with Air Cooled Condenser including pylon supports etc. as per system requirement
34. Any other miscellaneous building or facility.
35. Providing foundations and support structures for elevators mentioned elsewhere in the specifications.

1.00.01 Steel structures for following facilities as mentioned below shall be fabricated in factory, transported, and erected at site.

1. Technological Structures such as Boiler, ESP including Hopper and Bunker support Structure. Any structure whose design and fabrication drawings are not provided to Owner shall also be considered as technological structure.
2. Main Power House Building including Control Tower.

All factory-fabricated structures shall have bolted field connections.

For balance structures bidder has the option to fabricate at factory or at site meeting all the quality and inspection requirements as defined elsewhere in the technical specifications.

For coal/Lime/Biomass bunkers, hoppers and chimney flue liners, to prevent coal dust/flue gas leakages, the applicable field joints shall necessarily be welded.

No additional land than what is mentioned in technical specifications, shall be provided by Owner for site fabrication. Bidder has to make all necessary arrangements of land, electricity, water, security, etc. on its own. No claim, whatsoever, regarding time extension and financial implication for site fabrication shall be entertained at any point of time.

Note : Steel structures shall mean plant and non-plant building structures, boiler & ESP support structures, Coal, limestone and Gypsum handling structures, AHP structures, chimney flue liners support platforms & stairs, pipe and cable support structures.

Civil, structural and architectural works though not explicitly mentioned in the above list but required for the completion of the various systems of the package shall also be in the scope of the bidder.

1.00.02 **CORROSION PROTECTION**

The plant lies in the corrosive category C3 as per ISO 12944-2. Protection measures shall be provided as specified in Part-B of Technical Specifications.

1.00.03 Supply of earth for filling in site levelling, Railway siding embankment (within plant boundary) & disposal of surplus earth/ debris including arranging the borrow pit/disposal site and making payment of royalty, levies, taxes and any other applicable charges etc. shall be in bidder's scope.

1.00.04 **THE SCOPE OF WORK OF THE SUCCESSFUL BIDDER INCLUDES: -**

(a) To interact, discuss with Owner / Proof Checking (PC) agency for the modalities, schedule, and design parameters, loading to be considered in line with the Owner's specifications.

(b) To submit the drawings and design calculations as per the project schedule sequentially as per the sequence below.

(c) Incorporate all the comments/observations/suggestions furnished by the PC on the drawings and design documents.

(d) After review of the drawings and design documents by PC the same shall be submitted to the Owner for consent. In case of further observation by Owner the same is also to be incorporated.

Sequence of submission of documents: -

1) Design basis which will include all design philosophy, seismic and wind criteria as per specification, foundation type along with bearing capacity as per Geotechnical Report, materials of construction, loading details, finishing schedule etc.

2) Architectural details/General Arrangement drawings for buildings, facilities, equipment including the elevations and cross sections.

3) Design calculation along with the STAAD/ANSYS/SAP 2000 models and/or computer work sheets or any other software model as mutually agreed with Owner.

4) Foundation drawings.

5) Superstructure drawings sequentially as per construction sequence or material projection, as applicable.

2.00.00 WORKER & STAFF COLONY AND CONSTRUCTION FACILITIES

2.01.00 WORKER & STAFF COLONY

The following are in the Bidder's scope of work for Worker & staff colony: -

a) Development of Bidders temporary staff colony and worker colony along with toilets & fencing etc. For safety of Worker, bidder to provide separate approach road for their movement, as per site conditions, which shall be completely isolated from material movement road/path. No material movement shall be allowed on approach road meant for worker colony.

b) Adequate no. of Rest rooms with toilet for bidder's worker & staff.

c) All Civil and Structural work associated with drinking and service water for Bidder's worker and other personnel at the work site/colony/offices including pump houses, pipes, overhead tank, tube wells etc.

d) The EPC Contractor shall have total responsibility for providing and maintaining facilities for safety, welfare, drinking water and sanitation, hygiene, biennial health checkup etc. for construction workers at their workplaces as well as at worker & staff colonies. The facilities for occupational safety, healthy environment, first aid, drinking water, resting place & toilets, canteen, crèche, etc. shall be provided at the workplace for construction workers by the contractor.

e) Accommodation for Workers & staff colony in adequate numbers as required for the project peak demand shall be made in the form of temporary structures which shall be removed after completion of the project. It shall have facilities for drinking water & sanitation, approach road, dust suppression, drainage, sewage treatment plant, solid waste collection & disposal, fuel for cooking, medical healthcare, creches, etc.

f) Sole responsibility of development and maintenance of above facilities for construction workers hired by the Contractor or his sub-contractors shall rest with the Contractor. Land, water, electricity for the worker & staff colony shall be arranged by the Contractor as stipulated elsewhere in Technical Specification.

2.02.00 CONSTRUCTION FACILITIES

The following are in the Bidder's scope of work pertaining to construction facilities in this package.

1. Construction Water

Construction water shall be the responsibility of Bidder during all stages of construction.

However, construction water may be provided by Owner at one point on chargeable basis. Bidder shall arrange for further distribution/transportation to required location by their own.

Charges for construction water shall be decided by NTPC based on the cost to NTPC, which shall be intimated during the execution stage.

2. Construction Power

Scope of supply of construction power is specified in SECTION – VI, PART-B, SUB SECTION B-18 of Technical specification.

3. Construction of following temporary facilities of bidder

a) Construction office,

b) Construction stores (covered) & open stores as per his requirement.

c) Workshops for maintenance of construction plant and equipment.

d) Material/field testing laboratory facilities and any other temporary building.

4. Providing all necessary fire-fighting devices/equipment/fire tender etc. required during the project execution stage in project areas including laydown/pre-assembly yard area.

5. Providing all tools and tackles required for the work.

6. The Bidder shall arrange skilled/semiskilled/unskilled labour (from local source(s) as far as available) and supervisory staff for quality execution of all civil, structural and architectural works.

7. Development of hard crusted / paved fabrication yard for onsite structural steel fabrication work where permitted.

8. Area lighting at the construction / erection site, fabrication, pre-assembly and storage yard, office areas, labour and staff colony etc.

9. Providing first aid facilities at the construction / erection sites, workshops, laboratories, fabrication, pre-assembly &storage yard, Offices and other places of work as per the requirement.

10. Use of ash and ash based products.

In line with Gazette Notification on Ash Utilization issued by Ministry of Environment & Forest and its amendments, Bidder shall use ash and ash based products in all construction. He shall furnish a compliance report along with all details of use of ash and ash based products along with each bill. The above requirements shall be

applicable to his sub-vendors also and Contractor shall be responsible for enforcing the same on his sub-vendors.

Fly ash is available within plant boundary. Bidder to collect and transport the same meeting environmental norms/ local regulations at his own cost as per operation schedule for fly ash collection.

A token amount of Re 1 per Metric Tonne shall be charged.

11. Repair & Maintenance Facilities by the Bidder:

Bidder shall establish/set up at site suitable repair facilities for construction equipment and machinery (like cranes, hydra, forklifts, welding equipment, dumpers, rollers, etc.) Bidder shall also make arrangements /tie-up with manufacturers / suppliers of such construction plant, equipment & machinery, for periodic overhaul/ maintenance and for repair of major breakdown, if any. Bidder shall also keep adequate stock of spares at site for various construction plant, equipment and machinery to meet day to day requirements as recommended by the manufacturer / suppliers or as instructed by the Engineer. Bidder shall deploy dedicated qualified, full time mechanical / electrical foreman & supervisors for manning the repair facilities as specified above.

12. Water sprinkling in construction area and roads, as per requirement/directions of Engineer-in-Charge, to arrest fugitive construction dust.

13. Dewatering in construction area during construction period for any seepage water as well as accumulated rainwater.

14. Housekeeping of all construction area and disposal of construction/demolition waste. This also includes cutting and removal of vegetation including dry vegetation to avoid fire hazard in the entire project construction area.

2.03.00 **DEVELOPMENT OF LAYDOWN AREA**

Bidder shall use a lay down area as shown in tender GLP Drawing. One area marked in GLP totalling 65 acres (approx.) are identified as laydown/preassembly area. Fencing of the laydown area in the area marked for laydown is in bidder's scope.

2.03.01 The contractor shall develop the following facilities before using the allocated laydown area.

a. Site clearance including cutting of trees as specified elsewhere in the specifications.

b. Bidder shall construct and maintain approach road from plant area to laydown area as shown in Tender General layout Plan and road network in the interior of laydown area. Further bidder to ensure measures to avoid noise and dust pollution to habitants during the contract period.

c. Security of material shall be responsibility of the EPC Contractor, including gate control.

d. RCC/Brick drains in the entire laydown area and along roads shall be planned so as to ensure proper disposal of rainwater. RCC drain with culvert to be mandatorily provided at crossings wherever vehicular /material movement is envisaged.

e. Levelling, compaction backfilling, for purpose of laydown area surface preparation

f. Hard crusting of Laydown area, fabrication, and pre-assembly yard area has to be carried out as per specifications mentioned elsewhere. The extent of hard crusting shall be decided by the contractor based on their requirement. Material and equipment storage shall be as per guidelines covered elsewhere.

SUB-SECTION–III

TERMINAL POINTS & EXCLUSIONS

1.00.00 **TERMINAL POINTS**

The following terminal points are to be read in conjunction with the tender drawings, scope of supply and technical specifications of various systems.

1.01.00 **MECHANICAL**

1.01.01 **Auxiliary Steam System**

a) TP Location for Auxiliary Steam interconnection for Auxiliary Steam Station Header with existing HT Auxiliary Steam Header of Stage I with motorized isolation valve as indicated in the tender drg. Shall be Dummy Connection with Valve given near Axis No.26 and in BC Bay at 25.0 M elevation floor of Unit # 2 TG Bay in HT Header.

b) The stub/Tee-off connections with Isolating valve and blank flange required on the auxiliary steam Unit/Station header for future connections as indicated in the tender drg.

All the interconnection with existing piping system to be done by the bidder. All the valves and fittings, Anchors / Additional Supports required for interconnection shall be provided by bidder.

1.01.02 **Others**

Outlets of mill reject storage bunkers.

1.02.00 **NOT USED**

1.03.00 **Ash handling system & AWRS**

Terminal Point for Ash slurry disposal piping (BA slurry, HCSD) and AWRS piping shall be 5 m inside plant boundary.

1.04.00 **Coal Conveying Plant**

Upto discharge chute of conveyor-8A/8B in TP-11 of stage-I.

1.05.00 **Biomass handling Plant**
a) Upto conveyor-12A/12B feeding point of stage-I

1.06.00 **WATER SYSTEM**
a. Interconnection of Raw water common header with existing stage(I).
b. Existing CSSP of Stage-I to be used for coal laden water treatment, and as required, pumping system in bidder's scope for pumping the decanted water to clarifier as per technical specifications.

1.07.00 Terminal point for LDO supply and return

- Supply line (400 NB) from existing Stage-II FO storage tanks (2x4000 KL)

- 200 NB return line header to the existing Stage-II FO storage tanks (2x4000 KL) for LDO return line from the boiler.

1.08.00 **Fire Detection & Protection System:**

Separate hydrant and spray headers available in plant area of Stage-I for tapping required for Hydrant and Spray system of Stage-II. However, if found necessary during detailed engineering, dedicated & new fire water headers/mains (hydrant & spray) tap-off shall be taken from existing discharge headers of hydrant/spray pumps and shall be routed to Phase-II area for connection to fire water pipe network of Phase-II.

2.00.00 **ELECTRICAL**

a) Terminal point for Construction power – 2nos., of 11kV feeder terminals of employers Stage#1 MIscelleneous switchgear as indicated in electrical tender SLD.

b) Terminal points for switchyard-

765KV switchyard in existing Darlipali STPP#1 as indicated in electrical tender SLD.

132KV switchyard in existing Darlipali STPP#1 as indicated in electrical tender SLD.

2 nos 415V feeders in existing ACDB & MCC, 2 nos. 220V feeders in existing DCDB at Darlipali Stage-I switchyard.

3.00.00 **CONTROL & INSTRUMENTATION**

3.01.00 **For AWRS and Make up Water system**

3.01.01 TBs of employer's instruments and Local Junction boxes for signals which are being interfaced with the Contractor's control system. All required cables from these TBs to contractors control system shall be supplied, laid and terminated by the Contractor.

3.01.02 For Employer's Fieldbus (FF/Profibus) based Devices:--

a. TBs of Fieldbus positioners and instruments.

b. TBs of Fieldbus based non-intrusive actuators for fieldbus cable. All required cables from these TBs to contractors control system shall be supplied, laid and terminated by the Contractor.

3.01.03 Employer shall provide one (1) number, 415 V, three phase 3-wire, 50 Hz feerder for UPS each at makeup water system and AWRS system. All required Cables from this feeder to Contractor UPS panel will be in contractors scope.

3.01.04 Employer shall provide two (2) number, 415 V, three phase 3-wire, 50 Hz feerder for 24 VDC system each at makeup water system and AWRS system. All required Cables from these feeder to Contractor 24VDC panel will be in contractors scope.

4.00.00 **CIVIL**

Terminal point for Raw water reservoir pipe connecting to make up water pipes shall be as per tender drawing titled 'Reservoir Layout Plan'.

5.00.00 **EXCLUSIONS**

5.01.00 **MECHANICAL**

a) Supply of limestone and Biomass.

b) Fuel Oil unloading & storage system

c) Fugitive dust suppression system at ash pond

d) Ash slurry piping & AWRS from 5 m inside plant boundary to Ash dyke shall be excluded from the Bidders' scope.

5.02.00 **ELECTRICAL**

a) Supply erection and commissioning of PLCC, HF cable.

5.03.00 **CIVIL**

a) Green belt development and afforestation

b) Township

c) Landscaping

NTPC Limited

(A Government of India Enterprise)

DARLIPALI SUPER THERMAL POWER PROJECT STAGE-II (1 X 800 MW)

TECHNICAL SPECIFICATION

FOR

EPC PACKAGE

PART-E

SECTION - VIA

BIDDING DOCUMENT NO.: CS-9551-001-2

(This document is meant for the exclusive purpose of bidding against this Package and shall not be transferred, reproduced or otherwise used for purposes other than that for which it is specifically issued).

PART - E

APPLICABLE DRAWINGS FOR THE PACKAGE

The drawings listed below and forming part of the specification shall be supplement to the requirements specified herein. The scope and terminal points of the equipment to be furnished under this package shall be as identified in these drawings and read in conjunction with the text of the specification.

Sl. No.	Drawing Title	Drawing No.
1.	GENERAL LAYOUT PLAN	9551-999-POC-F-001
2.	TOPOGRAPHIC SURVEY	9551-999-POC-F-002
3.	SAFETY PARK - ARCHITECTURAL DETAILS & SPECIFICATIONS	9551-001-POC-A-002
4.	SITE LEVELING PLAN	9551-001-POC-A-003
5.	LAYOUT PLAN OF ROADS	9551-001-POC-A-004
6.	LAYOUT PLAN OF DRAINS	9551-001-POC-A-006
7.	DETAIL'S OF ROADS	9551-001-POC-A-005
8.	RESERVOIR LAYOUT PLAN	9551-001-POC-A-008
9.	WORKER'S ACCOMODATION FLOOR PLAN & ELEVATION	9551-XXX-POC-A-019
10.	SHED FOR CONSTRUCTION WORKERS AND O&M WORKERS - TYPICAL ARCHITECTURAL DETAILS	9551-XXX-POC-A-011
11.	Main Steam, Hot Reheat & Cold Reheat P&ID	XXXX-999-POM-A-004
12.	HP & LP Bypass System P&ID	XXXX -999-POM-A-005
13.	Auxiliary Steam System P&ID	XXXX -999-POM-A-006
14.	Extraction Steam P&ID for Heaters	XXXX -999-POM-A-007
15.	Extraction Steam P&ID for BFP Turbine	XXXX -999-POM-A-008
16.	Condensate System P&ID	XXXX-999-POM-A-009
17.	Feed Water P&ID	XXXX -999-POM-A-010
18.	Heater Vent and Drains P&ID	XXXX -999-POM-A-011
19.	Steam Drain System P&ID	XXXX -999-POM-A-012
20.	Symbol / Legends	XXXX -999-POM-A-013
21.	Central Turbine lube oil storage and purification system	XXXX-001-POM-A-015
22.	Proposed Scheme for Plant Effluent Separation TG Area	XXXX-001-POM-A-015A
23.	Centralised Nitrogen filling System	XXXX-001-POM-A-015B

Sl. No.	Drawing Title	Drawing No.
24.	Air extraction system	XXXX-001-POM-A-016
25.	Fuel Oil Scheme	9551-001-POM-A-017
26.	Scheme of Air & Flue Gas Path with Instrumentation (With BISECTOR AH)	9551-001-POM-A-018a, Sh. 1 of 2
27.	Scheme of Air & Flue Gas Path with Instrumentation (With BISECTOR AH)	9551-001-POM-A-018a, Sh. 2 of 2
28.	Scheme of Air & Flue Gas Path with Instrumentation (With TRISECTOR AH)	9551-001-POM-A-018b, Sh.1 of 2
29.	Scheme of Air & Flue Gas Path with Instrumentation (With TRISECTOR AH)	9551-001-POM-A-018b, Sh. 2 of 2
30.	Start-up Drain System	9551-001-POM-A-019
31.	Scheme for Pulveriser (Vertical Mill)	9551-001-POM-A-020
32.	Section of ESP Hopper	0000-104-POM-A-003
33.	Scheme of FGD- Absorber System	9551-101-POM-A-022
34.	Scheme of FGD Milling System	9551-001-POM-A-023
35.	Scheme of Gypsum Dewatering System	9551-001-POM-A-024
36.	Single Line Flow Diagram of Wet Bottom Ash Handling System (Jet Pump)	XXXX-001-POM-A-025(2 Sheets)
37.	Single Line Flow Diagram of Dry Bottom Ash Handling System Ash Disposal & Ash Water System	XXXX-001-POM-A-026
38.	Single Line Flow Diagram For Fly Ash Handling System (Vacuum System) (Applicable For ESP Hoppers)	XXXX-001-POM-A-027
39.	Single Line Flow Diagram for Fly Ash Handling System (Pressure System)	XXXX-001-POM-A-028
40.	Single Line Flow Diagram for Ash Classifier System (for Vacuum system)	XXXX-001-POM-A-029
41.	Single Line Flow Diagram for Ash Classifier System (for pressure system)	XXXX-001-POM-A-029
42.	Gypsum Flow diagram	XXXX-001-POM-A-031
43.	Coal & Biomass Flow Diagram	XXXX-001-POM-A-032
44.	General Arrangement of existing Transfer point(TP)-11	
45.	General Arrangement of existing conveyor-12A/12B	
46.	Schematic diagram of Compressed Air System	XXXX-001-POM-A-047
47.	P&I Diagram of HVW/MVW Spray System	XXXX-001-POM-A-048
48.	P&I Diagram of Fire Water Booster Pump House	XXXX-001-POM-A-050
49.	Miscellaneous Details of Fire Detection System	XXXX-001-POM-A-051

Sl. No.	Drawing Title	Drawing No.
50.	Schematic Diagram for A/C System for Main Plant TG Building	XXXX-001-POM-A-054
51.	Schematic Diagram for A/C System for ESP/FGD/AHP	XXXX-001-POM-A-055
52.	Schematic Diagram for A/C System for Service Building	XXXX-001-POM-A-056
53.	Fixing Detail of Wall Mounted Axial Fan and Roof Extractor Fan	XXXX-001-POM-A-058
54.	Plant Water Scheme	XXXX-XXX-POM-A-037
55.	SCHEME OF RAW WATER SYSTEM	XXXX-XXX-POM-A-061
56.	Single Line Flow & Instrumentation Diagram of Pre-Treatment Plant	XXXX-XXX-POM-A-006
57.	P&ID & Layout of Liquid Effluent Treatment System	XXXX-XXX-POM-A-004
58.	P&ID for RO Plant	XXXX-XXX-POM-A-003 (02 Sheets)
59.	P&ID for Demeneralising Plant	XXXX-XXX-POM-A-002 (03 Sheets)
60.	P&ID and Layout of ACW Chemical Treatment System	XXXX-XXX-POM-A-043
61.	FGD Waste water Treatment Scheme	
62.	P&I Diagram of Equipment Cooling Water System	XXXX-XXX-POM-A-038
63.	Scheme Drawing of Chlorine DI-Oxide Plant for ACW System (Two Streams-Both Working)	XXXX-XXX-POM-A-004
64.	Scheme Drawing of Chlorine DI-Oxide Plant for PT System (Two Streams = 1 W + 1S)	XXXX-XXX-POM-A-005
65.	P&I Diagram for Condensate Polishing Plant	XXXX-XXX-POM-A-013 (03 Sheets)
66.	Single Line Diagram – 765/132 KV Switchyard	9551-999-POE-J-001
67.	Single Line Diagram – Main Plant	9551-999-POE-002
68.	Single Line Diagram-ACC System	9551-999-POE-J-002
69.	Single Line Diagram for Construction Power	9551-999-POE-F-002
70.	SAS	(05 Sheets)
71.	Buried Cables trench for HT & LT Cables	0000-211-POE-A-050
72.	Typical Section of Cable Tray Arrangement in Trestle	9551-999-POE—J-004
73.	Typical Rail/Road/Drain Crossing	9551-215-POE-F-EH1
74.	LV Switchgear	(16 Sheets)

Sl. No.	Drawing Title	Drawing No.
75.	MV Switchgear	(15 Sheets)
76.	Transformer	(06 Sheets)
77.	Annexure-E1	
78.	DDCMIS Configuration diagram	0000-999-POI-A-001
79.	BMS Configuration Diagram	0000-999-POI-A-002, Sh.1 of 2
80.	BMS (MFT subgroup) Configuration Diagram	0000-999-POI-A-002, Sh. 2 of 2
81.	Scheme for programmer room hardware multiplexing	0000-999-POI-A-006
82.	Standard Configuration Diagram for PLC Based Offsite Control System	0000-999-POI-A-013
83.	Instrumentation cabling diagram Grounding Scheme For Cabinets/ Panels/ Power Supply	0000-999-POI-A-019A, Sh.1 of 2
84.	Instrumentation cabling diagram Grounding Scheme For Cabinets/ Panels/ Power Supply	0000-999-POI-A-019A, Sh. 2 of 2
85.	Scheme for 24V DC Power Supply System	0000-999-POI-A-019B
86.	Scheme for Uninterrupted Power Supply System-Configuration-A	0000-999-POI-A-019C, Sh.1 of 2
87.	Scheme for Uninterrupted Power Supply System-Configuration-B	0000-999-POI-A-019C, Sh. 2 of 2
88.	Typical GA of Local Instrument Enclosure, Purging Scheme, DP Transmitter	0000-999-POI-A-036
89.	Sketch of Control Room Concept showing LVS & OWS	0000-999-POI-A-061
90.	Interfacing of Actuators	0000-999-POI-A-063
91.	TYPICAL GA of local instrument enclosure/rack Sh. 1 of 3	0000-999-POI-A-064
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94.	Interfacing of Field Instruments/ Swgr Switch (COC) Termination Details	0000-999-POI-A-065 SH 1 OF 14
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97.	Interfacing of Field Instruments 4-20mA	0000-999-POI-A-065 SH 4 OF 14
98.	Interfacing of Field Instruments Interface of DDCMIS with MCC/ SWGR/ Actuator (LT Motors)	0000-999-POI-A-065 SH 5 OF 14
99.	Interfacing of Field Instruments Typical RTD connection with Temp Transmitters in JBs	0000-999-POI-A-065 SH 6 OF 14

Sl. No.	Drawing Title	Drawing No.
100.	Interfacing of Field Instruments Interface of DDCMIS with MCC/ SWGR/ Actuator (HT Motors)	0000-999-POI-A-065 SH 7 OF 14
101.	Interfacing of Field Instruments Interface of DDCMIS with MCC/ SWGR/ Actuator (Single Coil Solenoid)	0000-999-POI-A-065 SH 8 OF 14
102.	Interfacing of Field Instruments Interface of DDCMIS with MCC/ SWGR/ Actuator (Double Coil Solenoid)	0000-999-POI-A-065 SH 9 OF 14
103.	Interfacing of Field Instruments Interface of DDCMIS with MCC/ SWGR/ Actuator (Elect. Bkr. – Sync - LT)	0000-999-POI-A-065 SH 10 OF 14
104.	Interfacing of Field Instruments Typical T/C connection with Temp TXs in JBs	0000-999-POI-A-065 SH 11 OF 14
105.	Interfacing of Field Instruments Interface of DDCMIS with MCC/ SWGR/ Actuator (Elect. Bkr. – Non Sync - LT)	0000-999-POI-A-065 SH 12 OF 14
106.	Interfacing of Field Instruments Interface of DDCMIS with MCC/ SWGR/ Actuator (Elect. Bkr. – Sync - HT)	0000-999-POI-A-065 SH 13 OF 14
107.	Interfacing of Field Instruments Interface of DDCMIS with MCC/ SWGR/ Actuator (Elect. Bkr. – Non Sync - HT)	0000-999-POI-A-065 SH 14 OF 14
108.	Acoustic Hood Out Line	0000-999-POI-A-070
109.	Block diagram of Public Address System	0000-999-POI-A-071A
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111.	Annexure-I for CHP drives	
112.	Interface of DDCMIS with MC/SWGR/LCP (BW)	0000-155-POI-A-065 SH 01
113.	Interface of DDCMIS with MC/SWGR/LCP (ELECT.BKR.-SYNC-LT)	0000-155-POI-A-065 SH 02
114.	Interface of DDCMIS with MC/SWGR/LCP (MD)	0000-155-POI-A-065 SH 03
115.	Interface of DDCMIS with MC/SWGR/LCP (SM)	0000-155-POI-A-065 SH 04
116.	Interface of DDCMIS with MC/SWGR/LCP (ILMS)	0000-155-POI-A-065 SH 05
117.	Interface of DDCMIS with MC/SWGR/LCP (LTCHP-DOL)	0000-155-POI-A-065 SH 06
118.	Interface of DDCMIS with MC/SWGR/LCP (REV-II)	0000-155-POI-A-065 SH 07
119.	Interface of DDCMIS with MC/SWGR/LCP (VWF)	0000-155-POI-A-065 SH 08
120.	Interface of DDCMIS with MC/SWGR/ ACTUATOR (HTCHP MOTORS)	0000-155-POI-A-065 SH 09
121.	Interface of DDCMIS with MC/SWGR/ ACTUATOR (Elect. Brkr.-Sync-HT)	0000-155-POI-A-065 SH 10
122.	Interface of DDCMIS with MC/SWGR/ ACTUATOR (Elect. Brkr.-Non Sync-HT)	0000-155-POI-A-065 SH 11
123.	Interface of DDCMIS with MC/SWGR/ LCP (REV-I)	0000-155-POI-A-065 SH 12
124.	INSTRUMENT INSTALLATION DIAGRAM(FOR PRESSURE GAUGE)	0000-999-POI-A-022

Sl. No.	Drawing Title	Drawing No.
125.	INSTRUMENT INSTALLATION DIAGRAM(PRESSURE MEASUREMENT USING PRESS/DP TRANSMITTERS	0000-999-POI-A-023
126.	INSTRUMENT INSTALLATION DIAGRAM(PRESSURE TRANSMITTER FUEL OIL)	0000-999-POI-A-024
127.	INSTRUMENT INSTALLATION DIAGRAM (PRESSURE MEASUREMENT USING PRESS/DP TRANSMITTERS STEAM/LIQUID VACUUM)	0000-999-POI-A-025
128.	INSTRUMENT INSTALLATION DIAGRAM FLOW MEASUREMENT (USING FLOW NOZZLES) STEAM & FEEDWATER	0000-999-POI-A-026
129.	INSTRUMENT INSTALLATION DIAGRAM FLOW MEASUREMENT (USING ORFICE PLATES) CONDENSATE & SERVICE WATER	0000-999-POI-A-027
130.	INSTRUMENT INSTALLATION DIAGRAM(FLOW MEASUREMENT AIR/GAS)	0000-999-POI-A-028
131.	INSTRUMENT INSTALLATION DIAGRAM(FLOW MEASUREMENT DIRTY AIR/FLUE GAS)	0000-999-POI-A-029
132.	INSTRUMENT INSTALLATION DIAGRAM DIFF.PRESS.MEASUREMENT (LIQUID,OIL,AIR/GAS SERVICE)	0000-999-POI-A-030
133.	INSTRUMENT INSTALLATION DIAGRAM (LEVEL GAUGE & SWITCHES)	0000-999-POI-A-031
134.	INSTRUMENT INSTALLATION DIAGRAM (LEVEL MEASUREMENT USING D/P TRANSMITTERS) DETAILS Sh. 1 of 2	0000-999-POI-A-032
135.	INSTRUMENT INSTALLATION DIAGRAM (LEVEL MEASUREMENT USING DISPLACER TYPE TRANSMITTERS) DETAILS Sh. 2 of 2	0000-999-POI-A-032
136.	INSTRUMENT INSTALLATION DIAGRAM (LEVEL MEASUREMENT-OPEN VESSEL)	0000-999-POI-A-033
137.	INSTRUMENT INSTALLATION DIAGRAM TYPICAL PURGE AIR CONNECTION & BLOWDOWN HEADER CONNECTION INSIDE INSTRUMENT RACK	0000-999-POI-A-034
138.	INSTRUMENT SOURCE CONNECTION DETAILS Sh. 1 of 14	0000-999-POI-A-035
139.	INSTRUMENT SOURCE CONNECTION DETAILS Sh. 2 of 14	0000-999-POI-A-035
140.	INSTRUMENT SOURCE CONNECTION DETAILS Sh. 3 of 14	0000-999-POI-A-035
141.	INSTRUMENT SOURCE CONNECTION DETAILS Sh. 4 of 14	0000-999-POI-A-035
142.	INSTRUMENT SOURCE CONNECTION DETAILS Sh. 5 of 14	0000-999-POI-A-035
143.	INSTRUMENT SOURCE CONNECTION DETAILS Sh. 6 of 14	0000-999-POI-A-035
144.	INSTRUMENT SOURCE CONNECTION DETAILS Sh. 7 of 14	0000-999-POI-A-035
145.	INSTRUMENT SOURCE CONNECTION DETAILS Sh. 8 of 14	0000-999-POI-A-035
146.	INSTRUMENT SOURCE CONNECTION DETAILS Sh. 9 of 14	0000-999-POI-A-035

Sl. No.	Drawing Title	Drawing No.
147.	INSTRUMENT SOURCE CONNECTION DETAILS Sh. 10 of 14	0000-999-POI-A-035
148.	INSTRUMENT SOURCE CONNECTION DETAILS Sh. 11 of 14	0000-999-POI-A-035
149.	INSTRUMENT SOURCE CONNECTION DETAILS Sh. 12 of 14	0000-999-POI-A-035
150.	INSTRUMENT SOURCE CONNECTION DETAILS Sh. 13 of 14	0000-999-POI-A-035
151.	INSTRUMENT SOURCE CONNECTION DETAILS Sh. 14 of 14	0000-999-POI-A-035

Note : All the above drawings indicates Employer's requirements to enable the bidder to make a suitable offer. All variations / alternations shall be clearly brought out in the technical deviation scheduled with implications, if any. Such variations may be acceptable, after assessment of its implication and shall be subjected to the Employer's approval.

PART - E

TENDER DRAWINGS
(CIVIL)

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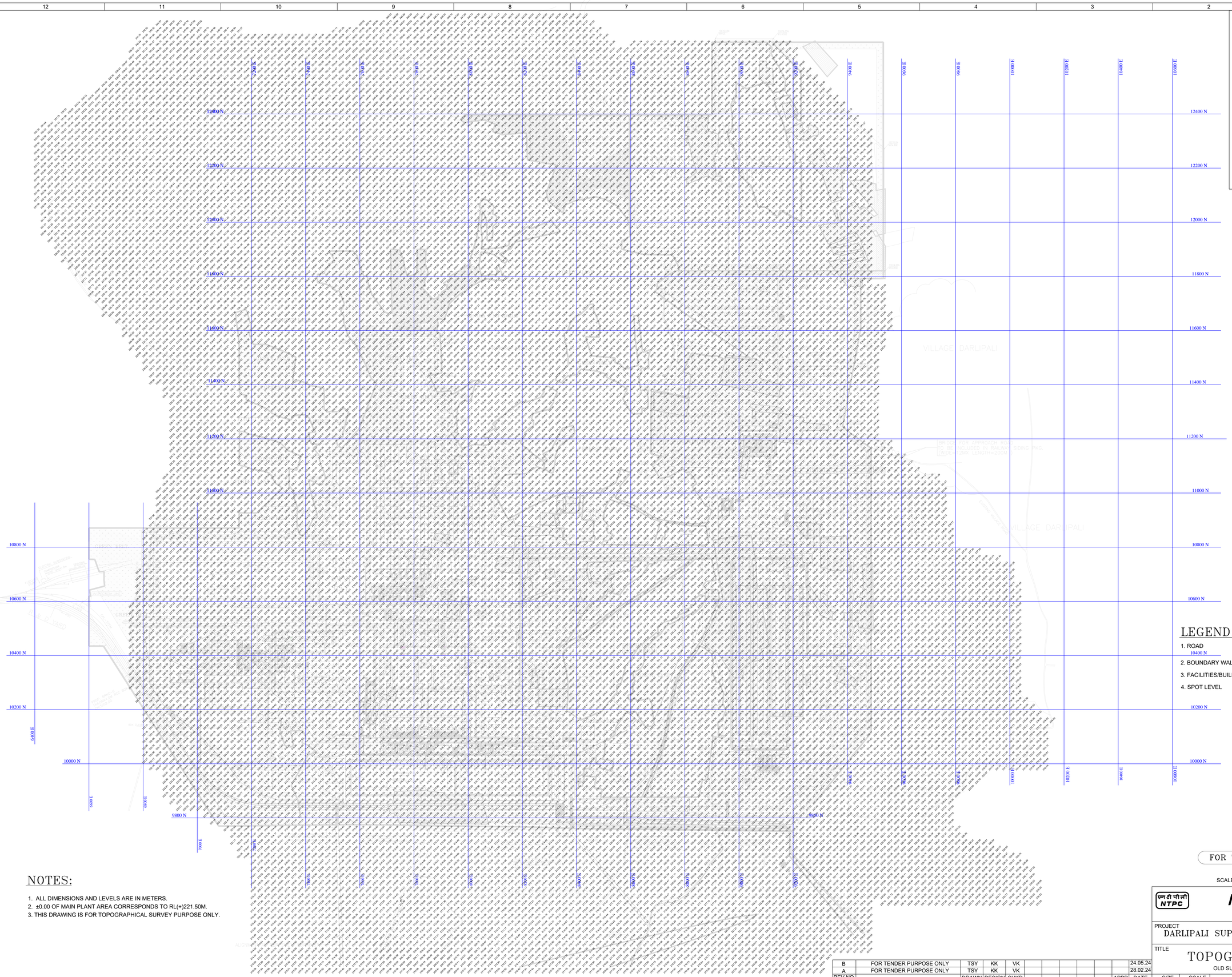

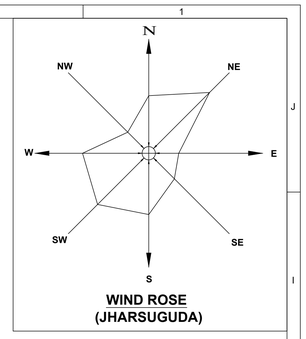

WIND ROSE (JHARSUGUDA)

LEGEND:

1. ROAD
2. BOUNDARY WALL IN VENDOR SCOPE
3. FACILITIES/BUILDINGS/STRUCTURES
4. SPOT LEVEL — RL(+)221.5/223.0/224.0/225.0/, 231.0/236.0/238.0M.

NOTES:

1. ALL DIMENSIONS AND LEVELS ARE IN METERS.
2. ±0.00 OF MAIN PLANT AREA CORRESPONDS TO RL(+)221.50M.
3. THIS DRAWING IS FOR TOPOGRAPHICAL SURVEY PURPOSE ONLY.

FOR TENDER PURPOSE ONLY

SCALE 0 40 80 120 160 200M

REV.NO.	DESCRIPTION	DRAWN	DESIGN	CHKD.	M	E	C	C&I	ES	APPD	DATE
B	FOR TENDER PURPOSE ONLY	TSY	KK	VK							24.05.24
A	FOR TENDER PURPOSE ONLY	TSY	KK	VK							28.02.24

CLEARED BY

एनटीपीसी NTPC

NTPC Limited
(A GOVERNMENT OF INDIA ENTERPRISE)
ENGINEERING DIVISION

PROJECT
DARLIPALI SUPER THERMAL POWER PROJECT
(2x800 MW+1x800 MW)

TITLE
TOPOGRAPHICAL SURVEY
OLD SURVEY DATA FOR NGL PURPOSE

SIZE	SCALE		REV. NO.
A0	1:4000	9551-999-POC-F-002	B

SHEET-01

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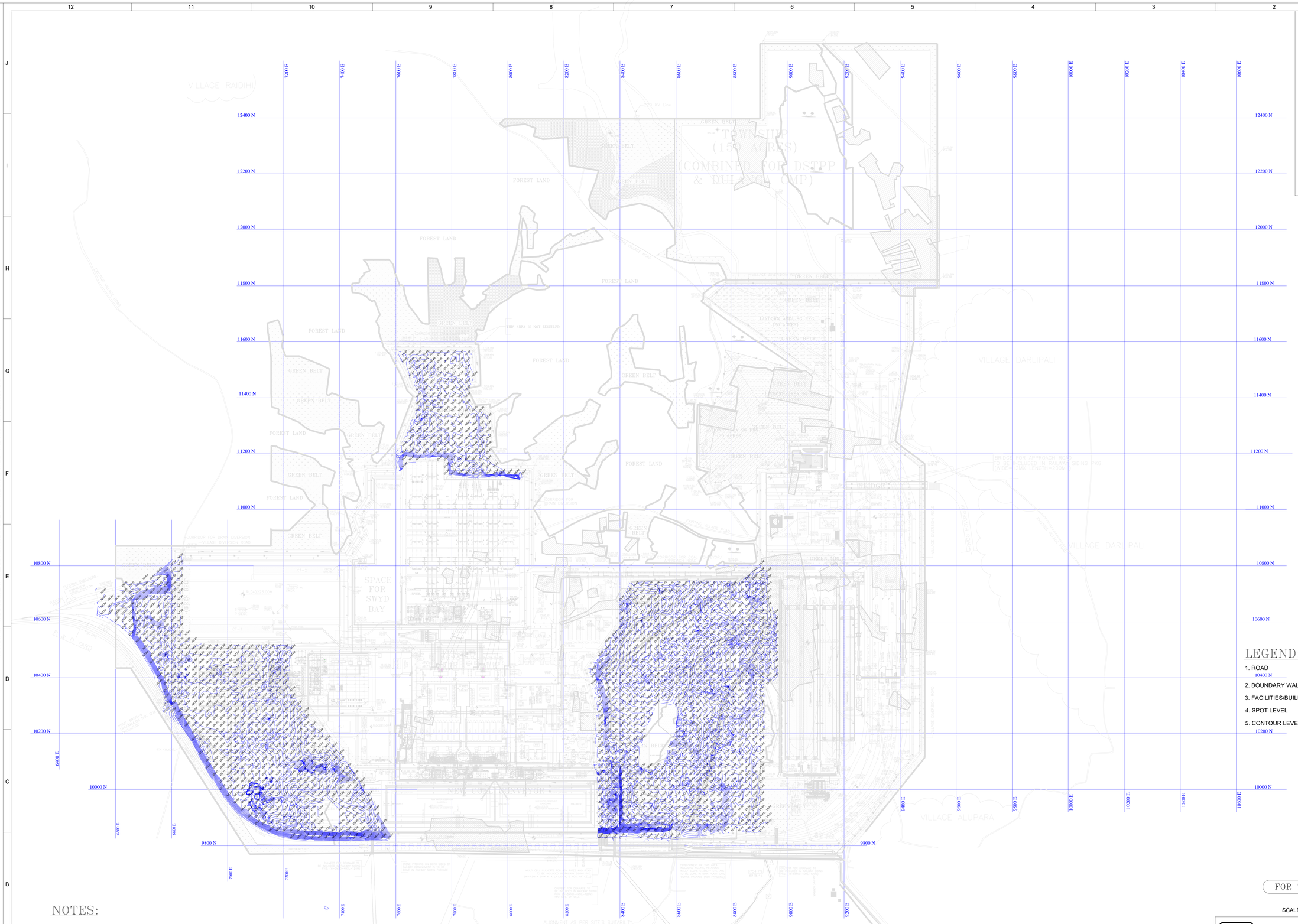

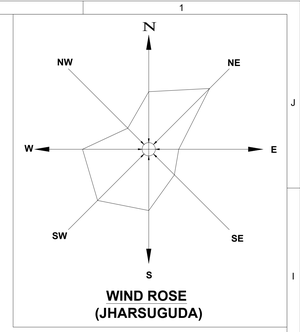

LEGEND:

1. ROAD
2. BOUNDARY WALL IN VENDOR SCOPE
3. FACILITIES/BUILDINGS/STRUCTURES
4. SPOT LEVEL — RL(+)221.5/223.0/224.0/225.0/, 231.0/236.0/238.0M.
5. CONTOUR LEVEL

NOTES:

1. ALL DIMENSIONS AND LEVELS ARE IN METERS.
2. ±0.00 OF MAIN PLANT AREA CORRESPONDS TO RL(+)221.50M.
3. THIS DRAWING IS FOR TOPOGRAPHICAL SURVEY PURPOSE ONLY.

FOR TENDER PURPOSE ONLY

SCALE 0 40 80 120 160 200M

REV.NO.	DESCRIPTION	DRAWN	DESIGN	CHKD.	M	E	C	C&I	ES	APPD	DATE
A	FOR TENDER PURPOSE ONLY	TSY	KK	VK							28.02.24

CLEARED BY

NTPC Limited
(A GOVERNMENT OF INDIA ENTERPRISE)
ENGINEERING DIVISION

PROJECT: DARLIPALI SUPER THERMAL POWER PROJECT (2x800 MW+1x800 MW)

TITLE: TOPOGRAPHICAL SURVEY (EXISTING GROUND LEVEL)

SIZE	SCALE		REV. NO.
A0	1:4000	9551-999-POC-F-002	A SHEET-02

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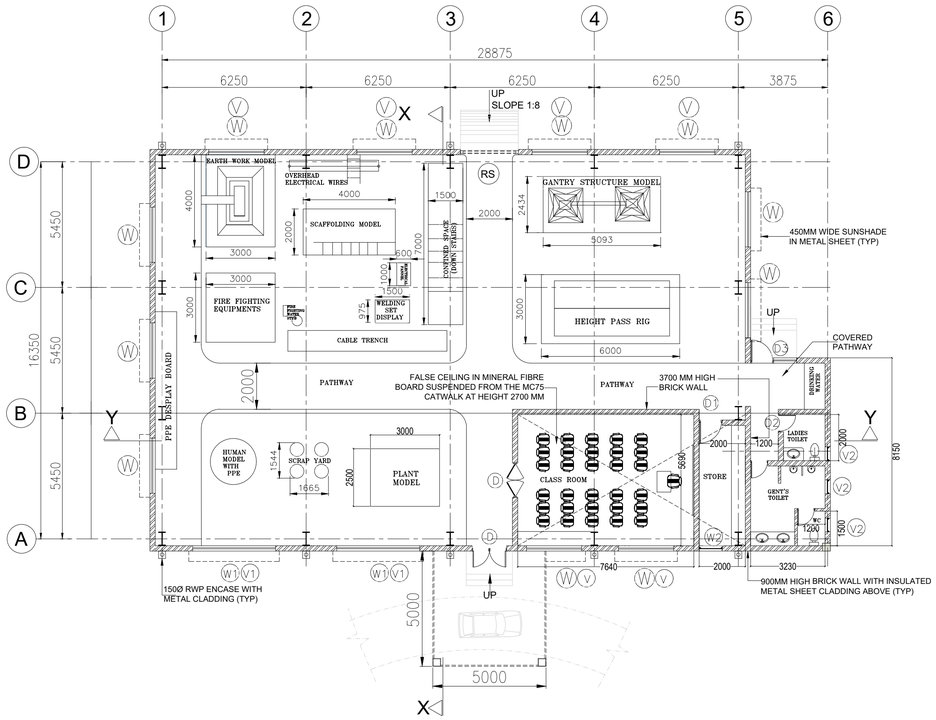
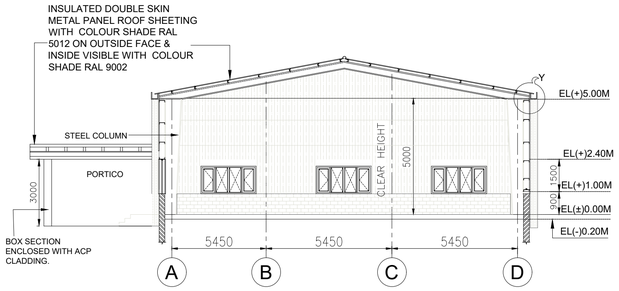
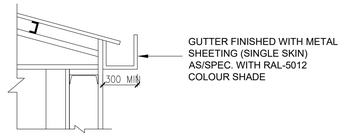


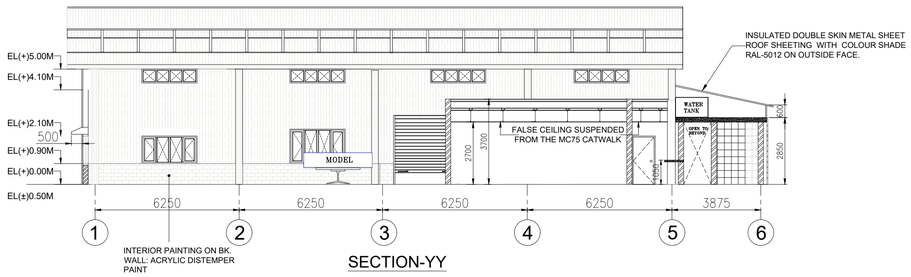
PLAN AT EL(±)0.00M



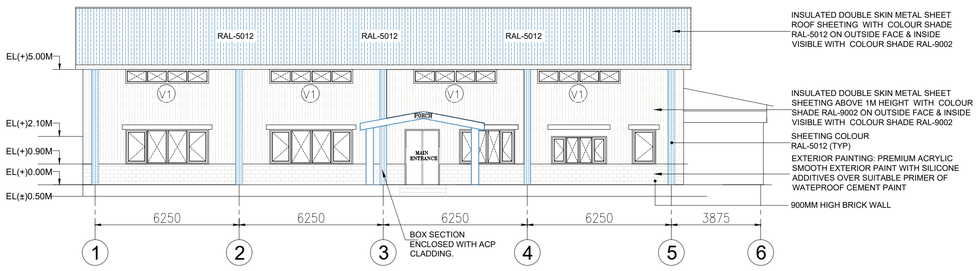
SECTION AT X-X



DETAIL AT - Y



SECTION-YY



FRONT ELEVATION

NOTES:

1. ALL DIMENSIONS ARE IN MILLIMETERS AND ELEVATIONS ARE IN METERS.
2. DRAWING SHALL NOT BE SCALED. ONLY WRITTEN DIMENSIONS SHALL BE FOLLOWED.
3. THE SIZE/LEVELS OF THE BUILDINGS SHOWN ARE TENTATIVE AND SHALL BE FINALIZED DURING DETAIL ENGINEERING.
4. WORK TO BE EXECUTED AS PER APPROVED FINAL WORKING DRAWING.

DOOR/WINDOW SCHEDULE

TYPE	SIZE	CILL LVL.	LINTEL LVL.	DESCRIPTION
D	1500X2400	0.00	2400	1500, 2400 — AL. GLAZED DOOR
D1	1000X2100	0.00	2100	1000, 2100 — STEEL DOOR
D2	750X2100	0.00	2100	750, 2100 — WOODEN FLUSH DOOR WITH STEEL FRAME
D3	2000X2400	0.00	2400	1000, 1000, 2400, 1500, 500 — AL. GLAZED DOOR
RS	2500X3000	0.00	3000	2500, 3000
W	2400X1500	900	2400	2400, 1500
W1	3600X1500	900	2400	3600, 1500
W2	1000X1500	900	2400	1000, 1500
V	3600X600	AS / ELEVATION		2400, 1500
V1	3600X600			3600, 1500
V2	600 X 600	1800	2400	3600, 1500

SAFETY PARK

THIS BUILDING SHALL BE A SINGLE STOREYED BUILDING WITH FLOOR AREA AS / DRG. THE PLAN LAYOUT/ BUILDING PROFILE SHALL BE AS SHOWN OF PRE-ENGINEERED BUILDING TYPE WITH STEEL FRAME CONSTRUCTION AND INSULATED SANDWICH CLADDING FOR WALLS AND SANDWICHED METAL SHEET ROOFING. THE DESIGN OF THE BUILDING SHALL BE SUCH SO AS TO HAVE FASTER CONSTRUCTION OF BUILDING AND SO AS TO PROVIDE A READY TO USE BUILDING, COMPLETE AND FINISHED IN ALL RESPECTS TO THE OWNER AND SO AS TO ENABLE SHIFTING AND RELOCATION OF SUPERSTRUCTURE AT LATER DATE.

SCOPE OF WORK

1. DESIGNING, MANUFACTURING, SUPPLYING, PACKING, LOADING, TRANSPORTATION, UNLOADING, INSTALLING AND COMMISSIONING OF PRE -ENGINEERED BUILDING WITH SANDWICHED METAL SHEET WALL & ROOFING,& RAIN WATER DOWN COMER AS PER LAYOUT INCLUDING R.C.C FOUNDATIONS/PEDESTALS, (INCLUDING ANY FOUNDATION REQUIRED FOR EQUIPMENTS) EMBEDMENT OF FOUNDATION BOLTS USING TEMPLATES, ENCASEMENT OF COLUMN BASES, SUPPLY & ERECTION OF DOOR/WINDOWS/VENTILATORS/ROLLING SHUTTERS, MASONRY WORK, PLASTERING, PAINTING (INTERIOR & EXTERIOR) FLOORING, FINISHING, PAVING SLAB,PLINTH PROTECTION ETC.

2. WALL CLADDING, ROOFING SHALL BE IN PRE-FABRICATED INSULATED METAL SANDWICH PANELS

3. DOOR & WINDOWS SHALL BE PROVIDED AS PER THE LAYOUT SHOWN . POWDER COATED AL. FRAMES WITH MINIMUM WALL THICKNESS OF 2 MM FOR DOORs, WINDOWS & VENTILATORS WITH 6 MM THICK TOUGHENED GLASS FOR WINDOWS AND 8 MM THICK TOUGHENED GLASS FOR GLAZED DOORS & PARTITION. MAIN ENTRANCE DOOR SHALL BE ALUMINUM GLAZED. FOR TOILET LAMINATED FLUSH DOOR SHUTTER SHALL BE PROVIDED. STEEL DOOR SHALL BE PROVIDED IN STORE ROOM . ALL THE NECESSARY ACCESSORIES AND HARDWARE SHALL BE PROVIDED. VERTICAL VENETIAN BLINDS IN PREMIUM FABRIC QUALITY SHALL BE PROVIDED FOR WINDOWS OF CLASS ROOM.

4. EXTERNAL FACE OF BRICK WALL SHALL BE FINISHED WITH 20 MM THICK PLASTER (1:5 CEMENT : SAND) AND PREMIUM ACRYLIC SMOOTH EXTERIOR PAINT WITH SILICONE ADDITIVES OVER SUITABLE PRIMER OF WATER PRROF CEMENT PAINT. INTERNAL FACE AND INTERNAL BRICK WALLS SHALL BE FINISHED WITH 12 MM THICK CEMENT SAND PLASTER (1:5) AND ACRYLIC EMULSION PAINT OVER WALL PUTTY OF MINIMUM 2 MM THICKNESS

5. FALSE CEILING IN MINERAL FIBRE BOARDS (600 X 600) SHALL BE PROVIDED IN CLASS ROOM & STORE , WHICH IS SUSPENDED FROM CATWALK CONSISTING OF MS STEEL MEMBER HAVING MAXIMUM GRID SIZE OF 1200MM X 600MM FOR SUPPORTING PANELS OF SPECIFIED SIZE. THE STEEL MEMBER SHALL BE PAINTED WITH SUITABLE PAINTING SYSTEM

6. FLOORING IN SAFETY PARK HALL SHALL BE OF MINIMUM 18 MM THICK (600MMX600MM) JHONSON ENDURA INDUSTRIAL TILES OR EQUIVALENT. FOR CLASS ROOM MATT FINISHED VITRIFIED TILE FLOORING MINIMUM 10 MM THICK(SIZE 600 MM X 600 MM) OF KAJARIA / JHONSON MAKE SHALL BE PROVIDED. TOILET SHALL BE PROVIDED WITH DUST PRESSED CERAMIC TILES FLOORING AND DESIGNER DECORATIVE CERAMIC TILE ON WALL DADO UP TO FALSE CEILING / TRUE CEILING. INTERNAL WALLS SHALL BE FINISHED WITH ACRYLIC EMULSION PAINT OVER 2MM THICK WALL PUTTY

7. ALL THE FURNITURE AS SHOWN IN LAYOUT (CHAIR & DESKS IN CLASS ROOM ETC) OF GODREJ / FEATHERLITE / JASANI OR EQUIVALENT MAKE SHALL BE PROVIDED.

8. TOILET IN WORKING CONDITION COMPLETE IN ALL RESPECTS WITH SENSOR BASED WASH BASIN SET IN GRANITE COUNTERS, DUAL FLUSH WALL HUNG W.C WITH SENSOR BASED TAPS OF JAGUAR OR EQUIVALENT. ALL THE NECESSARY ACCESSORIES OF PREMIUM QUALITY SHALL BE PROVIDED .2 NOS. PVC OVERHEAD LOFT WATER TANK CAPACITY 500 LITER SHALL BE PROVIDED. ALL THE WALLS OF TOILET SHALL BE IN BRICK MASONRY. RUST PROOF AND LEAK PROOF PLASTIC UNDERGROUND SEPTIC TANK OF ADEQUATE CAPACITY AND OF MAKE SINTEX SEPTIC TANK OR EQUIVALENT SHALL BE PROVIDED.

9. INTELLIGENT AND ENERGY EFFICIENT LED LIGHTING WITH MINIMUM LUX LEVEL AS MENTIONED BELOW WITH RECESSED OPTIC LUMINARES / LED DOWN LIGHTERS/ MEDIUM BAY/ PENDANT LIGHT/ ASCENT LIGHT OF PHILIPS/ WIPRO/ CROMPTON GREAVES/ HAVELL OR EQUIVALENT, COMPLETE IN ALL RESPECTS WITH ASSOCIATED CABLING, FIXTURES LIKE FANS , SWITCHES, MCB, ENERGY MANAGEMENT SYSTEM LIKE DIMMERS / SENSORS ETC.
   a) CLASS ROOM.-300 LUX , DECORATIVE MIRROR OPTIC TYPE LED LUMINARIES , LED DOWN LIGHTER
   b) PORTICO:-50 LUX , INDUSTRIAL TYPE LED LUMINARIES .
   c) CORRIDOR / PASSSAGE: 50 LUX , LED LUMINARIES.
   d) BUILDING PERIPHERY LIGHTING :-50 LUX , LED LUMINARIES / LED STREET LIGHT FIXTURES.
   e) OTHER AREAS NOT COVERED ABOVE :- LIGHTING PRINCIPLES SHALL BE BASED AS MENTIONED ABOVE
   f) OTHER SPACE AREA (NONA/C AREA-200 LUX-MEDIUM BAY LED LUMINARIES)
   g) STORE- 150 LUX , LED LUMINARIES.
   h) CEILING FANS & BRACKET FAN:- TENTATIVELY ONE NUMBER OF CEILING FAN SHALL BE PROVIDED FOR 10 SQ.M AREA AT SUITABLE MOUNTING HEIGHT. FAN SHALL BE 1200MM SWEEP,CLASS -E OR BETTER INSULATED COPPER WOUND SINGLE PHASE MOTOR ALONG WITH DOWN RODS ETC.& NOS OF 400MM BRACKET CEILING FANS SHALL BE PROVIDED AT STRATEGIC LOCATIONS.

10. ADEQUATE NUMBERS OF SUPPLY / EXHAUST FANS SHALL BE PROVIDED FOR VENTILATING THE BUILDING AND TOILET AREA

11. COMPLETE CONCEALED CABLING NETWORK FOR IT - INTEGRATED BUILDING WITH INTRANET CONNECTIONS AND THE ASSOCIATED COMMUNICATION NETWORKS.

12. R.O SHALL BE PROVIDED FOR DRINKING WATER, WATER COOLERS AS SHOWN IN THE LAYOUT (OF MAKE SAMSUNG / LG / KENT/ AQUAGUARD / PANASONIC / GODREJ OR EQUIVALENT)

13. AUDIO- VISUAL EQUIPMENTS LIKE OVERHEAD PROJECTORS, DISPLAY BOARDS IN THE CLASS ROOM OF SONY/ SAMSUNG MAKE SHALL BE PROVIDED IN CLASS ROOM

EXCLUSIONS

1.SAFETY EQUIPMENTS AS SHOWN IN THE DRAWING

REV.NO.	DESCRIPTION	DRAWN	DESIGN	CHKD.	M	E	C	C&I	ARCH.	APPD	DATE
A	RELEASED FOR TENDER PURPOSE	ANKITHA	DK							SK	08.12.23

CLEARED BY

एन टी पी सी NTPC
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NTPC Limited
(A GOVERNMENT OF INDIA ENTERPRISE)
(ENGINEERING DIVISION)

PROJECT: DARLIPALI SUPER THERMAL POWER PROJECT
STAGE-II (1X800 MW)

TITLE: SAFETY PARK
ARCH. DETAILS & SPECIFICATIONS

SIZE	SCALE	DRG. NO.	REV. NO.
A1	1:100	9551-001-POC-A-002	A