NA

From: NA
Sent: Friday, June 06, 2008 4:37 PM
To: members_of_the_staff
Subject: REVISED MASTER SPECIFICATIONS

Attachments: E-S4 shd of rates.pdf; E-S7 shd of technical particulars.pdf

Our Ref: OM-SC/020

The Electrical Installation (NSC & DSC) master specifications have been updated as highlighted in red.

Schedule 4 – Schedule of Rates

E-S4 shd of ·ates.pdf (178 KB)..

Schedule 7 – Schedule of Technical Particulars

E-S7 shd of technical particul...

Regards,
NA

Alpha
Consulting Engineers Pte Ltd

FEEDBACK REPORT FORM

Ref No: 109 - 020608

To: RT From: LFY

Job No./Project: Master Specs - EI - Schedule of Technical Particulars *(where applicable)*

Source of feedback:

Scope of Feedback: *Quality System/Administrative/Contractual/Technical/Specification/Others

Section A : Problem & Cause

Mistakes & outdated items found in the schedule and omit requirement to fill in the "local agent" column.

Section B : Suggested Corrective Action

Corrections and updating

Section C: Approved Corrective Action

Approved By : Date: 11/6/08

Section D : Action

Action By: NA

Targeted Completion: June 2008

Actual Completion: 5 June 2008 Verified By:

* *Delete as appropriate*

Distribution:

ELECTRICAL INSTALLATION

SCHEDULE 7 - SCHEDULE OF TECHNICAL PARTICULARS

Preamble

Particulars given in this Schedule will be binding upon the Sub-Contractor, and may not be varied except on the written instruction of the Architect. The approval or otherwise of these particulars given shall in no way be deemed to relieve the Sub-Contractor of any of his obligations under the Sub-Contract.

Tenderers are requested not to repeat the details called for in any separate Specification of their own. The words 'As Specified' or 'To Suit' of 'Equal and Approved' will not be accepted as a sufficient description of any item.

Tenderers wishing to offer alternative equipment shall submit full technical details as indicated hereafter on separate sheets and **not in this document**. Alternative offers shall also be accompanied by summarised cost adjustments relating to the price entered in the Form of Tender. **Failure to comply with this requirement may lead to the alternative offer not being considered**.

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S7.1 HV Switchgear

S7.1.1 General Information

Description	Particulars
Manufacturer/Country of Origin	
Model/Type No.	
Overall Dimension (L x W x H) mm	

S7.1.2 Circuit Breakers

Description		Particulars
Normal Current Rating (Amp)	Incoming Feeders	
	Bus Coupler	
	Outgoing Feeders	
Rated Breaking Capacity (kA)	Symmetrical	
	Asymmetrical	
Rated Short Time Current (kA)	1 Sec	
	3 Sec	
Impulse Withstand Voltage kV (Rms)		
Rated Voltage kV (Rms)		
Type of Insulating Medium		

S7.1.3 Protection Relays

Description	Particulars	
	Pilot Wire Relay	IDMTL Relay
Manufacturer/Country of Origin		
Model/Type No.		

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S7.1.4 DC Power Supply

Description		Particulars
Charger	Manufacturer/Country of Origin	
	Model/Type No.	
Battery Units	Manufacturer/Country of Origin	
	Model/Type No.	
	Rated Voltage of battery (per cell)	
	Rated amp-hour of battery units for all tripping, indications, controls etc. based on total discharge current for 10 hours (AH)	

S7.1.5 Control Panel

Description	Particulars
Manufacturer/Country of Origin	

S7.1.6 Anciliary Equipment

Description	Manufacturer/ Country of Origin	Model/Type No.
Ammeters		
Voltmeters		
Anti-condensation heater		
Dehumidifier		
kilowatt hour meter		
kW maximum demand meter with alarm unit		
MCB		
Padlock		
Remote Terminal Box		
Remote Control Box		
Key/Tool Box		

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S7.2 Cast Resin Power Transformer

Description		Particulars		
Rated capacity as specified		*	*	*
Manufacturer/Country of Origin				
Conductor Material				
Type of Cooling				
Impedance at rated voltage, frequency, power and on principal tap at 75°C				
Temperature rise at rated power and measured in accordance with BS 171	Winding °C			
	Cores and other parts °C			
Current at rated power:	HV Winding Amp			
	LV Winding Amp			
No-load loss at rated frequency & voltage kW				
Load loss at rated frequency & power kW				
Total losses at rated voltage, frequency and power kW				
Efficiency at rated power and	1.0pf %			
	0.85pf %			
Noise level at 1m dBA				
Transformer mounting	Manufacturer			
	Model/Type No.			
Total weight of transformer kg				
Overall dimensions of transformer housing (L x W x H) mm				

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S7.3 Oil Immersed Power Transformer

Description		Particulars		
Rated capacity as specified		*	*	*
Manufacturer/Country of Origin				
Conductor Material				
Type of Cooling				
Impedance at rated voltage, frequency, power and on principal tap at 75°C				
Temperature rise at rated power and measured in accordance with BS 171	Winding °C			
	Cores and other parts °C			
Current at rated power:	HV Winding Amp			
	LV Winding Amp			
No-load loss at rated frequency & voltage kW				
Load loss at rated frequency & power kW				
Total losses at rated voltage, frequency and power kW				
Efficiency at rated power and	1.0pf %			
	0.85pf %			
Noise level at 1m dBA				
Transformer mounting	Manufacturer			
	Model/Type No.			
Total weight of transformer kg				
Overall dimensions of transformer housing (L x W x H) mm				

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S7.4 22kV Cable

Description			Particulars
Manufacturer/Country of Origin			
Local Agent			
Overall diameter	Single wire armoured	mm	
	Double wire armoured	mm	
Core screen material			
Maximum current carrying capacity per conductor - laid in air, ambient temperature 30°C		Amp	
Maximum conductor temperature - laid in air, ambient temperature 30°C		°C	
Minimum radius of bend	Single wire armoured	mm	
	Double wire armoured	mm	
Weight per metre of cable		kg	
Method of cable termination			
Manufacturer of termination accessories			

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S7.5 LV Main Switchboards & Sub-Switchboards

S7.5.1 LV Main Switchboards

Description	Particulars
Manufacturer/Country of Origin	
Form of Construction	
Type Testing Authority/Certificate	
Index of Protection (IP No.)	

S7.5.2 Sub-Switchboards

Description	Particulars
Manufacturer/Country of Origin	
Form of Construction	
Index of Protection (IP No.)	

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S7.5.3 Air Circuit Breakers

Description		Particulars
Manufacturer/Country of Origin		
Model/Type No.		
Short Time Current Rating	1 sec kA	
	3 sec kA	
Physical Dimensions L x W x H (mm)	Feeder Breaker	
	Bus Coupler	

S7.5.4 Ancilliary Equipment

Description		Manufacturer/ Country of Origin	Model/Type No.
Moulded Case Circuit Breakers			
Current Transformers for	Metering		
	Protection		
Power Factor Meters			
Overcurrent Relays			
Earth Fault Relays			
Zone Selective Ground Fault Relays			
kW Meters			
kWh Meters			
Voltmeters			
Ammeters			
Hour-run meters			
Automatic Changeover Contactors			
Service Contactors			
Control Switches & Push Buttons			
Auxiliary Switches			
Anti-Condensation Heaters			
HRC Fuses			
Indicating Lamp			
Terminal Blocks			
Circuit Breaker Mechanical Interlocks			

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S7.6 Busbar Trunkings & Accessories

Description	Particulars
Manufacturer/Country of Origin	
Model/Type No.	
Conductor Materials	
Maximum current rating of tap-off units (Amp)	
Manufacturer of HRC fuses	
Manufacturer of busbar trunking support system	

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S7.7 Cables & Jointing Accessories

Description	Manufacturer/ Country of Origin	Type/ Model No.	Manufacturer of Jointing accessories
FR Cables			
PVC/SWA/PVC Cables			
XLPE/PVC Cables			
PVC/PVC & PVC Cables			

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S7.8 Distribution Boards & Metering Panels

S7.8.1 General Information

Description	Distribution Boards	Metering Panels
Manufacturer/Country of Origin		
Form of Construction		

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S7.8.2 Components & Accessories

Description	Manufacturer/ Country of Origin	Model/Type No.
Contactor		
Connector		
Residual current device (RCD)		
Label		
Metering current transformer		
Panel switch		
Time switch		
MCB and MCCB		

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S7.9 Cable Trays, Cable Ladders, Cable Trunkings, Conduits, etc.

Description		Manufacturer/ Country of Origin	Model/Type No.
Horizontal cable support system	HV Cables		
	LV Cables		
Vertical cable support system	HV Cables		
	LV Cables		
Horizontal cable support system for cable ladders			
Vertical/horizontal cable ladders			
Support system for vertical busbar trunkings			
Support system for horizontal busbar trunking			
Cable trays & accessories			
Cable trunkings & accessories			
G.I. conduits & accessories			
PVC conduits & accessories			

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S7.10 Lighting, Power & Telephone Installation

Description	Manufacturer/ Country of Origin	Model/Type No.
Flexible conduits & accessories		
Isolating switch		
Photoelectric switch		
PVC heat resistant flexible cable		
Switch panel		
RJ11 outlet		
RJ45 outlet		
Weatherproof lighting switch		
Weatherproof 13/15/30A switch socket outlet		
13A fused connection unit		
10A switch		
20A DP switch		
13/15A switch socket outlet		
30A switch socket outlet		
Cooker control unit		
20A connection unit		
32A connection unit		
Cable termination box c/w fuses & branching units		
Door chime		
Bell Push		
Shaver outlet		
Dimmer control switch		
Underfloor ducts & accessories		
Cellular steel floor ducting & accessories		
Flushfloor trunking & accessories		

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S7.11 Luminaires & Accessories

S7.11.1 Accessories

Description	Manufacturer/ Country of Origin	Model/Type No.
Radio interference suppressor		
Glow starter		
Low loss electromagnetic Ballast		
Electronic Ballast		
Battery power pack unit		
Cable		
Fixed and adjustable suspension sets		
Fluorescent tube		
PL Lamp		
Tungsten halogen lamp		
Tungsten lamp		
High pressure sodium lamp		
Metal halide lamp		
Power factor correction capacitors & fixing clips		

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S7.11.2 Luminaires

Description	Manufacturer/ Country of Origin	Model/Type No.
Luminaires Type A		
Luminaires Type B		
Luminaires Type E1		
Luminaires Type E2		
Luminaries Type E3		
Luminaries Type E4		
Luminaires Type F1A		
Luminaires Type F1		
Luminaires Type F2A		
Luminaires Type F2		
Luminaires Type F3A		
Luminaires Type F3		
Luminaires Type F4A		
Luminaires Type F4		
Luminaires Type F5A		
Luminaires Type F5		
Luminaires Type F6A		
Luminaires Type F6		
Luminaires Type F7A		
Luminaires Type F7		
Luminaires Type F8A		
Luminaires Type F8		
Luminaires Type F9A		
Luminaires Type F9		
Luminaires Type F10A		
Luminaires Type F10		
Luminaires Type F11A		
Luminaires Type F11		
Luminaires Type F12A		
Luminaires Type F12		

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S7.11.2 Luminaires (Cont'd)

Description	Manufacturer/ Country of Origin	Model/Type No.
Luminaires Type F13A		
Luminaires Type F13		
Luminaires Type F14A		
Luminaires Type F14		
Luminaires Type F15A		
Luminaires Type F15		
Luminaires Type F16A		
Luminaires Type F16		

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S7.12 Earthing Installation

Description	Manufacturer/ Country of Origin	Model/Type No.
Copper tapes and fittings		
Electrodes & accessories		
Main earthing bars		
Main earthing bar insulators		
PVC cables (yellow/green) & accessories		
Weatherproof watertight sealing compound		

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S7.13 Lightning Protection

Description	Manufacturer/ Country of Origin	Model/Type No.
Aluminium tapes & accessories		
Copper tapes & accessories		
Electrodes & accessories		
Test clamps, connector clamps, bonding accessories etc.		
Roof conductor insulators		
Weatherproof watertight sealing compound		

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S7.14 Standby Generator Sets

S7.14.1 General

Description		Particulars	
Generator Rating as specified		*	*
Rating			
Supplier			
BS rating (before de-rating)	kW		
Site rating (after de-rating)	kW		
Overall dimension (excluding radiator duct and silencers) L x W x H (mm)			
Overall weight c/w fuel, excluding silencers	kg		
Total heat emission	Kcal/Hr		
Permissible room ambient temperature	^{o}C		

S7.14.2 Engine

Description		Particulars	
Generator rating as specified		*	*
Manufacturer/Country of Origin			
Rated engine output			
Fuel consumption, kg/kw-hr	Full load		
	3/4 load		
	1/2 load		
	1/4 load		

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S7.14.3 Alternator

Description		Particulars	
Generator rating as specified		*	*
Manufacturer/Country of Origin			
Rating	kVA		
Sub-transient reactance	X"d %		
Transient reactance	X'd %		
Total alternator loss at 75% C.M.R.	kW		
Total alternator loss at 100% C.M.R.	kW		
Voltage regulation for 100% steady load	%		
Transient voltage dip on full load	%		

S7.14.4 Silencers

Description		Particulars	
Generator rating as specified		*	*
Manufacturer/Country of Origin			
Type			
Nos. of silencers			
Dimension of each silencer (Dia x length)			
Weight of each silencer	kg		
Maximum allowable back pressure			
Total back pressure of the engine exhaust system			

S7.14.5 Battery System

Description		Particulars	
Generator rating as specified		*	*
Battery Units	Manufacturer		
	Type/Model No.		
	Ampere-hour capacity of each cell		
Charger	Manufacturer		
	Type/Model No.		

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S7.14.6 Fuel Tanks & Accessories

Description	Particulars	
Generator rating as specified	*	*
Manufacturer/ Country of Origin		
Dimensions of fuel storage tank (diameter x length) mm x mm		
Weight of fuel storage tank and fuel kg		
Dimension of fuel service tank (diameter x length) mm x mm		
Weight of fuel service tank and fuel kg		
Type of diesel fuel		
Flash point of diesel fuel ^{o}C		

S7.14.7 Fuel Transfer Pumps and Accessories

Description		Particulars	
Generator rating as specified		*	*
Manufacturer/ Country of Origin			
Type/Model No.			
Local Agent			
Manufacturer & Model/Type No. of	Motor starters		
	Pipes and fittings		
	Valves		
	Fuel level indicator (dial)		
	Content gauges		
	Pressure gauges		
	Thermometers		
	Level sensors and alarm		
	Leakage sensors		

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S7.15 Voice Communication System

S7.15.1 Sound System

Description	Manufacturer/ Country of Origin	Model/Type No.
Main Equipment Rack		
Operator Control Panel		
Pre-amplifiers		
Power amplifiers		
Electronic chime		
CD Player		
DC Power supply unit		
Battery bank		
Battery charger		
Microphones		
Horn loudspeakers		
Cone loudspeakers		
Column loudspeakers		
Power distribution panel		
Enclosure for surface mounted cone speakers		
Enclosure for recessed mounted cone speakers		
Diffusers for surface mounted cone speakers		
Diffusers for recessed mounted cone speakers		
Matching transformers		
Main distribution wires		
Final distribution wires		

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S7.15.2 Firemen Intercom System

Description	Manufacturer/ Country of Origin	Model/Type No.
Master Unit		
Slave units		
Cassette tape recorder		
Battery bank		
Battery charger		
Distribution wiring		
Console table		

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S7.16 PAX System

S7.16.1 General

Description		Particulars
Manufacturer		
Type/Model No.		
Local Agent		
Operating voltage		
Initial capacity	No. of extensions	
	No. of connecting circuits	
Ultimate Capacity	No. of extensions	
	No. of connecting circuits	

S7.16.2 Anciliary Equipment & Wiring

Description	Manufacturer/ Country of Origin	Model/Type No.
Desk top telephone handset		
Surface mounted telephone handset		
Handset for mounting within recessed cabinet		
Battery bank		
Battery charger		
Distribution wiring		

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S7.17 Master Antenna Television System (MATV)

S7.17.1 TV System

Description	Manufacturer/ Country of Origin	Model/Type No.
Antennae for TV reception		
Pre-amplifiers		
Channel amplifiers		
Power supply unit		
Main distribution cables (co-axial)		
Final distribution cable (co-axial)		
TV/FM outlets		
Splitters		
Line equaliser units		
'T' units		
Booster Ampliers		

S7.17.2 Satellite System

Description	Manufacturer/ Country of Origin	Model/Type No.
Satellite Antennae		
Satellite Receiver		
De-multiplexer		
Frequency modulator		
NTSC/PAL converter		
Single channel per carrier audio receiver		

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S7.18 Building Security System

S7.18.1 Door Alarm Contacts

Description		Particulars
Manufacturer/Country of Origin		
Model/Type No.		
Current rating	mm	
Voltage rating	volt	

S7.18.2 Movement Detectors

Description		Particulars
Manufacturer/Country of Origin		
Model/Type No.		
Area of coverage per detector	sq m	

S7.18.3 CCTV Cameras

Description	Particulars
Manufacturer/Country of Origin	
Model/Type No.	
Size of CCD	
Sensitivity	
S/N Ratio (with AGC off)	

S7.18.4 LCD Monitors

Description	Particulars
Manufacturer/Country of Origin	
Model/Panel Size	
Maximum Resolution	

S7.18.5 Digital Control Panel

Description		Particulars
Manufacturer/Country of Origin		
Model/Type No.		
Overall dimensions (W x H x D)	mm	

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S7.18.6 Automatic Sequential Switching Unit

Description	Particulars
Manufacturer/Country of Origin	
Model/Type No.	
No. of camera inputs	
Range of viewing time of each channel sec	
Overall dimensions (W x H x D) mm	

S7.18.7 Power Supply Unit

Description	Particulars
Manufacturer/Country of Origin	
Model/Type No.	
Rated voltage of battery	
Rated AH capacity of battery based on total discharged current for 10 hours AH	
Manufacturer of battery charger	
Overall dimension of battery cabinet (L x W x H) mm	

S7.18.8 Cables between Central Controller & Interface Terminals

Description	Particulars
Manufacturer	
Type No.	
Nominal cross-section area of conductor mm^2	

S7.18.9 Cables from Interface Terminals & Interface Terminals

Description	Particulars
Manufacturer	
Type No.	
Nominal cross-section area of conductor mm^2	

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S7.18.10 Cables for CCTV

Description	Particulars
Manufacturer	
Type No.	

S7.18.11 Audio Intercom System

Description	Particulars
Audio Intercom Set	
Guard Porter Unit	
Decoder	
Power Supply Unit	
Cabling	

S7.18.12 Audio Video Intercom System

Description	Particulars
Audio Video Intercom Set	
Guard Porter Unit	
Decoder	
Power Supply Unit	
Cabling	

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S7.18.13 Card Access System

Description	Manufacturer/ Country of Origin	Type/ Model No.	Dimensions
Card Reader			
Proximity Card			
EM Lock			
Exit Pushbutton			

No. of card readers supported by a controller unit			units
Effective range of card reader		Minimum Maximum	mm mm
Proximity Card	Physical Size L x W		mm
	Memory Capacity		bit

S7.18.14 Vehicle Barrier System – Transponder Type

Description	Manufacturer/ Country of Origin	Type/ Model No.	Dimensions
Transponder			
Barrier gate			
Loop detector			

<u>Barrier Gate</u> Dimensions	mm	
Barrier Length		
Barrier Material		
Barrier Opening Time	sec.	
Barrier Closing Time	sec.	
Motor (DC)	kW	

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