

Item No	Description	Specification / Additional Information	Unit	Qty	Brand	Model	Unit Price (Excl)	Total Price
1	ACSA Permits	Provisional Sum of R50k. Bidder to complete all required training and police clearances. Pay for the issuing of the permits and claim against this line item for proven cost.	Each	1			R 50 000	R50 000,00
2	Site Establishment & Safety Compliance		Each	1				
3	Storage	Procure good quality 2nd-hand 12m shipping container for storage of equipment and spares. The containers must remain at the airport after the project is concluded. Include a relocation from the contractor's site camp to a defined airport location within 500m from the site camp.	Each	1				
4	P&G	per lot	Each	1				
5	Decommission, Dismantle, crange, rig-out, remove of the existing infrastructure to be replaced or upgraded.	Decommissioning must be planned with minimum operational impact. Removal and store in safe loaction as defined by the Employer.	Each	1				
6	Disposal of existing chiller.	Either by selling the unit or scrapping. Revenue income from the process to offset bidder's account.	Each	1				
7	Offer to buy exisiting Chiller	Alternatively - Bidder can make an offer to buy the existing Chiller. This option will include Decommissioning, dismantling, crange, rig-out, removal, disposal - all for the bidders account. Offer value will off-set the bidder's account payable.	Each	1				
8	New Chiller	Supply, delivery and installation of a new complete chiller (523 kW) Scroll chiller to replace the old Air Cooled Screw Liquid Chiller (Model = YCAS0503SC50), in its current location. Including all sensors + Chiller plant management system + Commissioning + Sea and road freight 1 x 40ft HC Container - DDP George. OEM / Agent factory standard specifications, quality and documentation will apply. Container to remain property of the airport.	Each	1				
9	Destuffing & offloading	Destuffing & offloading from the container on a truck at the customer's site. Installation and rigging of the units.	Each	1				
10	BMS	Install a Building Management System (BMS) connected to the controls of the entire HVAC system. BMS must be available via Web application and cellphone app. Operational screens (with dashboard) to be installed at the Airport's Information desk. Operational + Maintenance (Administration) functionality to the ME department via Web & cellphone applications. Review and install additional digital sensors (pressure x5; temperature x5; outside ambient temperature, etc.) to provide early triggers for reactive maintenance and effective reporting of system parameters. BMS to provide system status reporting. Test and commission controller & BMS effectivity for optimum interface with key role players (end-user; maintenance team) and other systems (Fire detection; OPS information desk; etc.). Install a HVAC-BMS system (Scada) covering all HVAC equipment, including the Fire Detection interface, AHU-VSD's, smart meters, Back-up inverter, redundant air conditioning units in departures + check-in + IT Core room + Terminal substation, etcetera – with feedback and control functionality – including a database storing historical events for up to 3 months (minimum). BMS must be connected to the new HVAC system controller to display all equipment status and fault conditions. Provide control measures like setpoints and schedules (daily + seasonal). Make provision for both local and web-based interfacing. This system must be able to interface (or expand) with a future bigger building management system (BMS) to cover other ACSA sytems and equipment. Also a report with detail BOQ must be submitted on how to include all HVAC equipment in all ACSA buildings onto the BMS. Initial licencing cost with no yearly fees. Bidder to provide a detailed BOQ with rates which informs the total value in this line item.	Each	1				
11	Electrical, piping and civil work required to install the new equipment.	Provisional sum of R250k. Bidder to provide a list of line items required with rates, qty = 1. Claim against provisional sum for all Electrical, piping and civil work required to install the new equipment. Items to include on the BOQ: replacement of supply circuitbreakers to the new chiller if required (current size = 3ph 250A). Ensure that each air conditioning unit is electrically installed directly from the closest distribution board (DB) and not plugged into the closest wall socket. Any additional (over and above the standard lenghts that comes with a unit installation), i.e. piping, etc., where outside units (currently located high against building) are installed (relocated) on ground floor to enable easy maintenance.	Each	1			R 250 000	R250 000,00
12	Pumps for the evaporator Chilled water	Assess and refurbish exisiting pumps to deliver commissioning specs. Include one spare pump of similar size. Current Pump spec: size=65-200, Impeller size=186mm, Motor size=15kw, Elec supply=3ph 400Vac 50hz, Running current=20.8A, Pressure before pump=1.5bar, Pressure after pump=3.5bar, Flow rate= 23.2 l/s.	Each	1				
13	Factory Acceptance Tests - new Chiller	Factory Acceptance Tests (FAT). Employer to have this option for Factory visits and/or performance testing.	Each	1				
14	Structure to elivate the new Chiller.	Steel structure with applicable rust and paint coatings. Elevation by approximately 2m (Contractor to confirm) for condenser coils to protrude above the roof clearance. Refer to drawings for current location of the Chiller. Allowing for improved cooling of the condenser coils. Structure to be designed and approved by a structural Eng. Drawings to be approved at Municipal Planning office. This is an option to be verified for practicality and safety prior to installation.	Each	1				
15	HVAC System Sensors - Temperature	Current specs = WIKA, Machine Glass Thermometer Model 32, V - Form. Replace with same + additional functionality to communicate with BMS. If a different brand and type is recommended then the quality and performance specs must be approved by ACSA prior to procurement and installation.	Each	10	WIKA	Machine Glass Thermometer Model 32, V - Form		
16	HVAC System Sensors - Pressure	Current = WIKA, Bourdon Tube Pressure Gauge Model 213.53 with liquid filling & stainless steel case. Replace with same + additional functionality to communicate with BMS. If a different brand and type is recommended then the quality and performance specs must be approved by ACSA prior to procurement and installation.	Each	10	WIKA	Bourdon Tube Pressure Gauge Model 213.53 with liquid filling & stainless steel case		

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17	HVAC Control System	The current Carel controllers is out of date and the hardware is no longer available, including the software. Assess and install most applicable (new) updated programmable controller (or PLC) to improve on maintenance and efficiencies. Replace existing Carel pCO2 Large in DB1 + Carel pCO2 Medium in DB2. Reconfigure controls to include new equipment: i.e. chiller, VSD's, Power Inverter, BMS, etc. The redundant/backup air conditioning units in Departures; Check-in; IT store room & Terminal Substation must also be connected to the main controller or have localised remote controllers that connects to the BMS. Controller must interface with all the new equipment installed by way of a communication protocol, i.e TCP/IP, etc.	Each	1				
18	Air conditioning Unit - Under Ceiling	Air conditioning Unit - Under Ceiling (Complete installation. Commercial application. Energy Efficiency. Drive/Inverter Technology. Capable of communicating to BMS and control via occupancy sensor). 60000BTU / closest standard size	Each	10		same as the other units being supplied		
19	Air conditioning Unit - Cassette	Air conditioning Unit - Cassette (Complete installation. Commercial application. Energy Efficiency. Drive/Inverter Technology. Capable of communicating to BMS and control via occupancy sensor). 45000BTU / closest standard size	Each	15		same as the other units being supplied		
20	Air conditioning Unit - Midwall / Split	Air conditioning Unit - Midwall / Split (Complete installation. Commercial application. Energy Efficiency. Drive/Inverter Technology. Capable of communicating to BMS and control via occupancy sensor). 25000BTU / closest standard size	Each	10		same as the other units being supplied		
21	Air conditioning Unit - Midwall / Split	Air conditioning Unit - Midwall / Split (Complete installation. Commercial application. Energy Efficiency. Drive/Inverter Technology. Capable of communicating to BMS and control via occupancy sensor). 18000BTU / closest standard size	Each	18		same as the other units being supplied		
22	Air conditioning Unit - Midwall / Split	Air conditioning Unit - Midwall / Split (Complete installation. Commercial application. Energy Efficiency. Drive/Inverter Technology. Capable of communicating to BMS and control via occupancy sensor). 12000BTU / closest standard size	Each	15		same as the other units being supplied		
23	Air conditioning Unit - Midwall / Split	Air conditioning Unit - Midwall / Split (Complete installation. Commercial application. Energy Efficiency. Drive/Inverter Technology. Capable of communicating to BMS and control via occupancy sensor). 9000BTU / closest standard size	Each	15		same as the other units being supplied		
24	Ducting to remove dirty air from air conditioning units where required	Ducting to remove dirty air from cassette air conditioning units where required.	m	500				
25	Electrical cable 2.5mm <sup>2</sup> round suffix 2core + earth	Electrical cable 2.5mm <sup>2</sup> round suffix 2core + earth	m	500				
26	Electrical cable 4mm <sup>2</sup> round suffix 4core + earth	Electrical cable 4mm <sup>2</sup> round suffix 4core + earth	m	200				
27	Electrical locakable Isolator (next to the inside unit) 30A Single Phase	Electrical locakable Isolator (installed next to the inside unit) 30A Single Phase	each	20				
28	Electrical locakable Isolator (next to the inside unit) 30A Three Phase	Electrical locakable Isolator (installed next to the inside unit) 30A Three Phase	each	15				
29	Electrical locakable Field Isolator (next to the outside unit) 30A Single Phase	Electrical locakable Field Isolator (installed next to the outside unit) 30A Single Phase	each	20				
30	Electrical locakable Field Isolator (next to the outside unit) 30A Three Phase	Electrical locakable Field Isolator (installed next to the outside unit) 30A Three Phase	each	15				
31	Occupancy Sensor (installed at each unit for energy efficiency) Able to be connected to BMS	Occupancy Sensor (installed at each unit for energy efficiency) Able to be connected to BMS.	each	50				
32	Essential Supply to HVAC System for Air handling units.	Install new essential power cable from the Terminal electrical substation to the main HVAC DB in plant room 1. Include supply circuit breaker + Coc. Distance is approximately 200m. Cable size 70mm <sup>2</sup> SWA 4-core + earth. Essential DB with circuitry to enable essential power to the 4 air handling units, excluding the chiller. Including a Change-over and re-wiring of existing circuitry to enable essential operations. Update drawings. Size of the motors to be verified in the drawings.	Each	1				
33	Swirl Diffuser	Type VDZ, Adjustable for mounting heights ≥ 3.80m. Current = Trox Technik. Provide same or similar in quality & operations. Provision of diffusers if required to replace or upgrade. Refer to the drawings for further technical details.	Each	15				
34	Aludec	Flexible Ducting. Provision of ducting (over and above) what is requested/covered as part of the other BOQ line items, if required to replace or upgrade. Refer to the drawings for further technical details.	m	100				
35	Refurbish AHU's	Assess the effectivity of the AHU's (1-4) against initial installation commissioning values, including at the specific diffusers in the terminal building. Reconfigure and refurbish where required for effective operation against applicable compliances for the fresh-air control of a public building. Provide a detailed technical report (with response times + pictures + recommendations) on the existing system before the project + after the project. Any repairs / upgrades required will be claimed for against the provisional sums in the BOQ.	Each	1				
36	Modify HVAC infrastructure AHU 03 + AHU 04	The Departure lounge HVAC coverage currently excludes the old Fancourt Lounge footprint. This area was opened up to form part of the departure lounge. Hence the HVAC infrastructure to be modified to include this area. Install fresh-air diffusers (x4, 300 CCD 320l/s each). Tie-in fresh air supply from the existing HVAC system in the adjacent departure lounge. Install extraction system in the ablutions. Tie-in to the existing extraction infrastructure that runs past this facility. Replace existing cartridge units with new - to be used as back-up units. Extend the existing supply air duct (300x450mm, 10m). Adjust the Air Handling duty points: AHU 03 – Departure Lounge to be set to 5229 L/s. + AHU 04 – Arrivals to be set to 6600 L/s.	Each	1				

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37	Technical Drawings + SOP's	Provide detailed technical drawings (Single line; Power circuit; Process and logic flow diagrams - in pdf, CAD & Shape file formats - printed in manuals + 10x big A0 laminated drawings installed [Alluminium frame] in 5 different locations), inclusive of applicable Certifications. Develop standards (SOP's) - for the procurement; installation and maintenance of equipment, i.e., split unit air conditioning units, specific to the conditions at George airport - to deliver high levels of efficiency (procurement, OEM support, equipment operation, electricity usage, maintenance, disposal & spares). These standards must be presented and approved at the ACSA OM MANCO.	Each	1				
38	Refurbish air ducting	Provisional sum of R150k. Refer to the HVAC drawings for ducting specifications. Bidder to provide a list of line items required with rates, qty = 1. Claim against provisional sum for all ducting refurbishment. Investigate and refurbish all air ducting (supply air + return air) as part of the initial system refurbishment. Also improve the location of air-registers for balanced distribution of controlled air.	Each	1			R 150 000	R150 000,00
39	Variable speed Drive - AHU 01	Install variable speed drive on AHU 1 to accommodate efficiencies. Provide installed redundancies which will cater for unit failures. Leave the existing contactor control as redundancy. AHU 01: THLZ630R, kW max=12.5kW, nMax=1,550 1/min. Provide Status & Control to SCADA / BMS	Each	1				
40	Variable speed Drive - AHU 02	Install variable speed drive on AHU 2 to accommodate efficiencies. Provide installed redundancies which will cater for unit failures. Leave the existing contactor control as redundancy. AHU 02: THLZ450R, kW max=8.00kW, nMax=2,500 1/min. Provide Status & Control to SCADA / BMS	Each	1				
41	Variable speed Drive - AHU 03	Install variable speed drive on AHU 3 to accommodate efficiencies. Provide installed redundancies which will cater for unit failures. Leave the existing contactor control as redundancy. AHU 03: THLZ500R, kW max=10.0kW, nMax=2,100 1/min. Provide Status & Control to SCADA / BMS	Each	1				
42	Variable speed Drive - AHU 04	Install variable speed drive on AHU 4 to accommodate efficiencies. Provide installed redundancies which will cater for unit failures. Leave the existing contactor control as redundancy. AHU 04: THLZ630R, kW max=12.5kW, nMax=1,550 1/min. Provide Status & Control to SCADA / BMS	Each	1				
43	VRV / VRF unit - Check-in area	Install redundant VRV/VRF unit (multi-split) with various cartridge & under ceiling units in the Check-in area. Footprint of the area: L=32m,W=28m. with suspended ceiling height of 2.76m. Connected to essential electrical power. The condenser must be located on Airside. The condenser unit must be installed in a manner that is acceptable to the ambience and look of the airport - to passengers boarding onto the aircraft. Install a barrier (hiding the unit) around the condenser unit, constructed with steel and sheeting, painted the same color as the terminal building walls. With local controls (wall mounted) + BMS controls. Including actual temperature readings inside the area.	Each	1				
44	VRV / VRF unit - Departures area	Install redundant VRV/VRF unit (multisplit) with various cartridge & underceiling units in the Departures area. Footprint of the area: L=43m,W=28m. With suspended ceiling height of 2.76m. Connected to essential electrical power. The condensor must be located on Airside. The condensor unit must be installed in a manner that is acceptable to the ambience and look of the airport - to passengers boarding onto the aircraft. Install a barrier (hiding the unit) around the condenser unit, constructed with steel and sheeting, painted the same colour as the terminal building walls. With local controlls (wall mounted) + BMS controls. Including actual temperature readings inside the area.	Each	1				
45	VRV / VRF unit - Arrivals area	Install redundant VRV/VRF unit (multisplit) with various cartridge & underceiling units in the Arrivals area. Footprint of the area: L=27m,W=23.8m. With suspended ceiling height of 6.5m. Connected to essential electrical power. The condensor must be located on Airside. The condensor unit must be installed in a manner that is acceptable to the ambience and look of the airport - to passengers boarding onto the aircraft. Install a barrier (hiding the unit) around the condenser unit, constructed with steel and sheeting, painted the same colour as the terminal building walls. With local controlls (wall mounted) + BMS controls. Including actual temperature readings inside the area.	Each	1				
46	Rust prevention	Install mechanisms (application) to inhibit (delay) rust in coastal conditions on all new outside units, including the chiller condenser coils. Bidder to provide technical detail with gaurantee details as part of the submission.	Each	1				
47	Air curtains	Install air-curtains at all the terminal doors – to control the effect of the ambient temperatures on the controlled air inside the terminal building. 3x landside + 7x airside. This can iether be stand-alone units / connected to the existing AHU closest to the door. Refer to drawings	Each	10				

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48	General Refurbishment work	General Refurbishment work. Provisional sum of R300k. Bidder to provide a list of line items required with rates, qty = 1. Claim against provisional sum for all General Refurbishment work. Assess each plant room and refurbish the room with reference to the general building items (painting, doors; floors; ceiling; walls; locks; ventilation; etc.) for optimum safety and system performance. Assess the courtyard where the chiller is located and perform refurbishment activities with reference to waterproofing; bird-perching-prevention-measures (i.e. bird net over the courtyard + bird spikes); access control; etcetera. Implement mechanisms on all electrical and moving parts to ensure safety and the implementation of simple, yet effective, lockout procedures. Refurbish and provide easy access to all infrastructure that must be maintained. For example, a ceiling trap door is required to reach the 1st floor extraction fan. Replace the doors (landside + airside) at Main gate. Repair the window in ARFF tower. Close windows, where window units are removed and replaced with split units, Etcetera.	Each	1			R 300 000	R300 000,00
49	Fire System Controls	Review the Fire controls. Refurbish where required. This line item is to review and test the Fire system controls. Provide a detailed technical report (with response times + pictures + recommendations) on the existing system before the project + after the project. Any repairs / upgrades required will be claimed for against the provisional sums in the BOQ.	Each	1				
50	Backup Power Supply	Provide an inverter with lithium technology batteries that will provide back-up (during power failures / load shedding) to the main control devices and software. Rated size = 7.5kw (capable of carrying actual load for a minimum duration of 8hrs). Panel + Switchgear circuitry + wiring + Smart usage meter + commissioning + Drawings	Each	1				
51	Smart Water meters	Supply and install a smart water meter. Monitor the Water usage of the HVAC system, Capable of also connecting to a future Automatic Meter Reading (AMR) system.	Unit	2				
52	Smart Electricity Usage Meters	Supply and install a smart electricity meter (3phase smart Power meter). Monitor the Electricity usage and quality of the HVAC system. Capable of also connecting to a future Automatic Meter Reading (AMR) system.	Unit	2				
53	Air Conditioning - Main Gate	Install a small centralize system (Fresh air supply + Cooling + Ventilation + Extraction System) at the Main Gate. Assess the existing HVAC provision in this area/facility. Provide a detailed report with recommendation on the appropriate equipment to install. Install a central unit (or separate units), that makes provision for fresh air, cooling, extraction to the entire facility. Include installation and supply, with lockable isolators. Controls and status connected to BMS. Electrical supply from the DB about 30m away, etc. This area can be reviewed during the mandatory site inspection for additional information. The main gate consist of the following internal areas: Screening area (L=4.225, W=2.928, H=2.635mm) + Ablution Set (8m²) + Kitchen (10m²) + Staff room (L=7.655, W=3.650, H=2.6005mm) + Office (10m²).	Each	1				
54	Air Conditioning - IT Core room	Install an adequate air conditioning inside the main IT core room at the ACSA offices on 1st floor. Install a running and back-up unit with a configuration that it will share the duty cycle. Currently there are three individual split units installed - but it fails to cool down the room effectively without breakdowns. The IT core room (L=7m,W=2m,H=2.8m) houses all the airport's IT servers and UPS units - which generates high heat levels whilst it is enclosed (almost permanently). My recommendation is to install 2 x 52000 BTU under ceiling units with local wall mounted controls and intergrated with BMS. Remove existing units and close all holes and paint. Repair all suspended ceiling. Bidder may advise and price an alternative size and solution with clear motivation and specifications.	Each	1				
55	Air Conditioning - ARFF Changerooms	ARFF department building on airside. On the ground floor there is a opportunity to improve on the fresh air + extraction system for the changerooms – which is currently inadequate. The changerooms (male + female) consist of Ablution set + Showers + Cloak/locker-room. Assess the existing fresh air provision & the extraction of used air in these areas/facilities. Provide a detailed report with recommendation on the appropriate equipment to install. Utilize existing ducting where possible. Install a central unit (or two separate units, 1 for the Male-side & 1 for Female-side), that makes provision for fresh air, cooling, extraction to the entire Changeroom/s. Include installation and supply, with lockable isolators. Controls and status connected to BMS. Electrical supply from the DB about 30m away, etc. This area can be reviewed during the mandatory site inspection for additional information.	Each	1				
56	Air Conditioning - Terminal Substation	Install an adequate air conditioning inside the Terminal substation. The Terminal substation comprise of two individual rooms adjacent to each other (LV-side: L=6m,W=6m,H=3.6m & MV-side: L=6m,W=4m,H=3.6m). These rooms houses all the airport's electrical panels and UPS units - which generates high heat levels whilst it is enclosed (almost permanently). Currently each room have an individual split unit installed - but it fails to cool down the room effectively without breakdowns. My recommendation is to install 1 x 52000 BTU under ceiling unit (in each room) with local wall mounted controls and intergrated with BMS. Install two lovres with fire blanket in the seperating wall - to allow for redundancy if one of the units is faulty. Remove existing units and close all holes and paint. Bidder may advise and price an alternative size and solution with clear motivation and specifications.	Each	1				
57	Flammable Store + Electrical Store - Adequate Ventillation	Install an adequate ventilation setup inside the Flammable Store & Electrical Store respectively - on airside at the Electrical complex. This area can be reviewed during the mandatory site inspection for additional information. Qty 1 covers both areas. The 2nd qty is for two other areas that might be identified during the infrastructure site assessment after award.	Each	2				

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58	Waste Sortation Facility - Adequate Ventillation & extraction	Waste Sortation building on landside. There is an opportunity to improve on the fresh air + extraction system for the building – which is currently inadequate. Assess the existing fresh air provision & the extraction of used air in this area/facility. Provide a detailed report with recommendation on the appropriate equipment to install. Install a central unit (or separate units) that makes provision for fresh air and extraction. Include installation and supply, with lockable isolator. Controls and status connected to BMS. Electrical supply from the local DB, etc. This area can be reviewed during the mandatory site inspection for additional information	Each	1				
59	1 year service / maintenance	1 year service / maintenance (after defect liability period of 12 months) on all equipment touched by the project scope - Bidder to define clearly the scope and frequencies in alignment with OEM recommendations, applicable regulations + standards and ACSA policies + procedures = covering both the 12 month defect liability period and the 1 year after that.	Each	1				
60	Recommended Spares and consumables	List of minimum recommended category of spares, fuel, oil or other feed stock and consumables - as per the works information in the NEC3 ECC (4.3.4).	Each	1				
AMOUNT EXCLUDING VAT								
VAT				%	15			
Provisional Subtotal								R750 000,00
Contingency				%	10			
<b>AMOUNT INCLUDING VAT</b> Amount including VAT should be the same amount as the C1.1 Offer and Acceptance								