



**DEPARTMENT OF NATIONAL DEFENCE  
REAL PROPERTY OPERATIONS  
DETACHMENT (GAGETOWN)  
5 CDSB GAGETOWN**

**SPECIFICATION**

**SERVICE CONTRACT  
INSPECTION AND MAINTENANCE OF THE DELTA DIRECT  
DIGITAL CONTROL SYSTEM  
BARRACK (GREEN ARMOURY, NEW  
BRUNSWICK) 01 APRIL 2018 TO 31 MARCH 2019  
WITH AN OPTION TO RENEW FOR TWO, ONE-YEAR PERIOD**

**McClary**

**Fire Inspector**

**Project**

**Alison McCoy  
Engineering**

**PF No:**

**Job No: L-S255/1-0301/223**

**Date: 2017-06-26**

<b>NATIONAL DEFENCE</b>	<b>INDEX</b>	<b>SECTION 00000</b>
<b>JOB NO.L-S255/1-0301/223</b>		<b>PAGE 1</b>
<b>5 CDSB GAGETOWN</b>		<b>2017-06-26</b>

<u>Section</u>	<u>Title</u>	<u>Pages</u>
<u>Division 00 - Procurement and Contracting Requirements</u>		
0 21 13	Instructions to Bidders	5
<u>Division 01 - General Requirements</u>		
1 35 30	Health and Safety Requirements	2
01 35 35	DND Fire Safety Requirements	3
01 35 43	Environmental Procedures	1
<u>Annexes</u>		
Annex A	Minor Remote Inspections	2
Annex B	Major On-Site Inspections	3
Annex C	Points List	2

**END OF SECTION**

## **1 GENERAL**

### **1.1 DESCRIPTION OF WORK**

- .1 The Work under this Service Contract comprises the furnishing of all labour, materials, tools, equipment, software and firmware updates required to complete repairs, remote phone line inspections and annual on-site inspection of the Delta Version 3 Orcaview building automation systems at the Barrack Green Armoury as specified herein.
- .2 Barrack Green Armoury is located at 60 Broadview Avenue Saint John, New Brunswick.

### **1.2 DURATION OF CONTRACT**

- .1 This Service Contract will extend from 01 April 2018 to 31 March 2019, with two one-year option to renew.

### **1.3 REFERENCES**

- .1 Canada Labour Code, Part II - Occupational Health and Safety.
- .2 Canadian Electrical Code, CSA C22.1-12.
- .3 American Society of Heating, Refrigeration and Air-Conditioning Engineers (ASHRAE)
  - .1 Standard 62.1 - Ventilation for Acceptable Indoor Air Quality.
  - .2 Standard 135 - BACnet Data Communication Protocol for Building Automation and Control Networks.

### **1.4 BUILDING SYSTEMS**

- .1 Building Automation Systems included are:
  - .1 Delta Controls Orcaview Version 3 Energy Management System panels, firmware and software.
  - .2 All associated control devices, sensors and network wiring.
  - .3 On-site user-interface workstation.

### **1.5 QUALIFICATIONS**

- .1 The Contractor must be qualified and knowledgeable in the inspection and repair of Delta Orcaview V3 Energy Management Systems and all equipment listed in 1.4.1.
- .2 The Contractor must provide a copy of an agreement with Delta Controls, the Orcaview V3 supplier, to the Engineer before the award of this Service Contract. This must show that the Contractor and Technicians are qualified to perform the work on this system and that the Contractor can provide the system software, firmware as well as all updates as required.
- .3 The work shall be performed by qualified controls technicians directly employed by the Contractor and trained by the system's manufacturer. The Contractor must provide copies of certificates as proof of training in Delta's Orcaview Version 3 for all technicians assigned to work on these

systems. Copies of certificates are to be provided to the Engineer prior to the award of this Service Contract.

#### **1.6 ENGINEER**

- .1 The Engineer as defined and stated in this specification will be the Commanding Officer Real Property Operations Detachment (Gagetown) or a designated representative. The address of the Engineer is:

Contracts Office  
Real Property Operations  
Detachment (Gagetown)  
PO Box 17000 Station Forces  
Oromocto, N.B. E2V 4J5  
Tel 506 422-2677  
Fax 506 422-1248

#### **1.7 DOCUMENTS REQUIRED**

- .1 Maintain at the job site, one copy each of the following:
- .1 Specification,
  - .2 All Addenda
  - .3 Electronic copies of all panel databases, current sequence of operations, floor plan showing all device locations and up-to-date points lists.

#### **1.8 CONTRACTOR'S USE OF SITE**

- .1 Access to the work site is to be as directed by the Engineer.
- .2 Movement around the site is subject to restrictions laid down by the Engineer.
- .3 Do not unreasonably encumber site with materials or equipment.

#### **1.9 ACCEPTABILITY OF MATERIAL**

- .1 Material and parts used will be those specified by the manufacturer of the equipment and any other material will require the approval of the Engineer.
- .2 Provide material and equipment of specified design and quality, performing to published ratings and for which replacement parts are readily available.
- .3 The Contractor will not make any change in the design and installation of equipment and materials without the prior written approval of the Engineer.
- .4 If, in an emergency, the Contractor installs parts other than those specified, they will be replaced with specified parts before claiming payment, but no claim for other than specified parts will be made.
- .5 All replaced parts and materials not under warranty, whether serviceable or unserviceable will be left on site for inspection on completion of the work.
- .6 All manufactured articles, materials and equipment will be applied, installed, connected and used as specified by the manufacturer.

- .7 Requests for acceptance of material other than those specified will be submitted in writing to the Engineer. The request must be supported with sufficient product information to enable the Engineer to make an assessment.

#### **1.10 GUARANTEE**

- .1 The Contractor will guarantee all materials and workmanship for a period of one year or the manufacturer's guarantee, whichever is longer, after acceptance by the Engineer. Any defects which may develop during this period will be rectified and made good to the satisfaction of the Engineer, by the Contractor at their own expense.

#### **1.11 CODES AND STANDARDS**

- .1 Observe and enforce construction safety measures required by Canada Labour Code Part II and the WorkSafeNB. Contractor must be registered and in good standing with the WorkSafeNB and provide proof of such to PWGSC prior to the award of this Service Contract.
- .2 All line-voltage electrical work is to conform to the Canadian Electrical Code. Line voltage work is to be performed by a journeyman electrician certified by the New Brunswick Department of Post-Secondary Education, Training and Labour or appropriate governmental department of the Contractor's province.
- .3 All low-voltage control wiring and control device installations are to conform to the highest quality industry standards and as directed by the Engineer.
- .4 All programming and sequences are to be such that they provide indoor air quality as per the recommendations detailed in the ASHRAE Standard 62.1.
- .5 All network communication protocol will conform to ASHRAE Standard 135.
- .6 Direct Digital Controls installation technicians will use wiring installation standards to ensure all wire used meets appropriate codes. In mechanical rooms all wire will be in raceways or conduit. Above ceiling plenum installations will use plenum rated wire and tie wraps to secure the wire in a high location. Additionally, above ceiling plenum wiring will never be tied off to other trades' piping or hangers.

#### **1.12 OVERLOADING**

- .1 Contractor is responsible to ensure that no part of the work performed or equipment installed subjects adjacent structures to unsafe loads or permanent deformation.

#### **1.13 TEMPORARY STRUCTURES**

- .1 The Contractor will furnish and maintain all equipment such as temporary stairs, ramps, ladders, scaffolds, hoists, chutes, etc, as may be required for the proper execution of the work.
- .2 Temporary structures erected by the Contractor will remain their property and will be removed by them from the site on completion of the work.

#### 1.14 SITE CLEAN UP

- .1 On completion of all work, the Contractor will remove all surplus materials, tools, equipment, and debris. The building and site must be left in a clean and tidy condition to the satisfaction of the Engineer. The Contractor will not remove any salvageable material or equipment from the job site without permission from the Engineer.

#### 1.15 INSPECTIONS

- .1 Provide operational inspections as follows:
  - .1 Provide two (2) Minor Remote Inspections, one during the month of January and one during the month of May as per Annex A at Barrack Green Armoury.
  - .2 Provide one (1) Major On-Site Inspection during the month of September as per Annex B at Barrack Green Armoury.
  - .3 All inspections to include a complete point verification checklist and all contractor's recommendations for repairs on the Delta Orcaview Building Automation System. Major inspections include all upgrades as recommended by the manufacturer, Delta Controls. Major inspections to include all mechanical adjustments to control devices, calibrations, cleaning and a review of the sequence and programming of all control panels.
  - .4 The Contractor will provide their own computer, necessary software and equipment for all inspections.
  - .5 All telephone charges required to do Minor Remote Inspections will be included in the Contractor's submitted bid price. No additional charges for remote connection to the system will be accepted.
- .2 Up-to-date points lists will be generated by the contractor at the time of each inspection. For bidding purposes, bidders will use the points list in Annexes C to submit prices. Changes to points lists, either adjustments or additions will not constitute changes to inspection prices unless deemed significant and approved by the Engineer.

#### 1.16 QUANTITIES BASIS FOR PAYMENT

- .1 The Contractor will submit costs per inspection, hourly rates and a material mark-up for following in accordance with the specification. Such prices will include labour, supervision, expenses, tools, equipment, transportation (travel time to and from the Contractors base of operations will included in the rates provided) and profit:
  - .1 Rate per Minor Maintenance Inspection as per Annex A at Barrack Green Armoury: **Quantity Two (2).**
  - .2 Rate per Major Maintenance Inspection as per Annex B at Barrack Green Armoury: **Quantity One (1).**
  - .3 Rate per hour for a service technician, at Barrack Green Armoury: **Estimated Quantity 100 hours.**
- .2 All products and materials will be invoiced at the Contractor's wholesale cost plus a percentage for mark-up. Contractor shall submit all invoices for material as supporting documentation when submitting invoices for payment. For tendering purposes, The Contractor will submit their percent of mark-up on products and material. **Estimated Quantity: Ten Thousand Dollars (\$10,000.00).**

- .3 The above estimated quantities may increase or decrease and are to be used for tendering purposes only. The quantities are not guaranteed and the Contractor will have no claim for loss of anticipated profits as a result of these estimated quantities.
- .4 Time charged and the contract price of materials (if any) used may be verified by Government Audit before or after payment.
- .5 The Contractor will provide service daily during normal working hours, Monday to Friday 0730 to 1600 hrs as well as in the evenings and during Saturdays, Sundays and holidays.
- .6 Upon receipt of an Acceptance of Tender, the Contractor will advise the Engineer in writing of the telephone and location at which they or their personnel may be contacted at any time. Also at this time, the Engineer will inform the Contractor of the Engineer's Representatives authorized to request service. When repairs are required, over and above the regularly scheduled inspections, the Engineer's Representative will notify the Contractor and detail the work to be completed in writing. Work undertaken at the request of others will be entirely at the Contractors risk with regard to payment and will not be authorized by the Engineer after completion.
- .7 The Contractor will not refuse any call for service requested by the Engineer and must respond within 24 hours on normal service calls and 4 hours on emergency service calls.
- .8 The Contractor will submit his invoice for payment to the Engineer within 15 days of completion of the work.

#### **1.17 SECURITY CLEARANCES**

- .1 The Contractor shall maintain an up-to-date roster of all employees involved in this contract including managers, supervisors, tradespersons, drivers and labourers. This roster must be made available to the Engineer upon request.
- .2 The Contractor shall provide proof of the information contained within the roster to the Engineer upon request. The Engineer reserves the right to have removed from the site those personnel who do not meet security requirements as laid down by the Military Police Section.
- .3 Security procedures require, that when requested by the Engineer, the Contractor will provide to the Engineer at no cost to DND, a copy of a Canadian Police Certificate for Employment for each employee who will work on this Service Contract.

**END OF SECTION**

## 1 GENERAL

### 1.1 REFERENCES

- .1 Canada Labour Code, Part II.
- .2 Canada Occupational Safety and Health Regulations.
- .3 The National Fire Code of Canada (2010 Edition)
- .4 The Workplace Hazardous Materials Information System, WHMIS.
- .5 Province of New Brunswick, Occupational Health and Safety Act, 1991.

### 1.2 REGULATORY REQUIREMENTS

- .1 Do work in accordance with the safety measures of the 2010 National Fire Code Of Canada, Provincial Government, WorkSafeNB and municipal authority, provided that in any case of conflict or discrepancy the more stringent requirements shall apply.
- .2 Comply with regulations contained in the Workplace Hazardous Materials Information System (WHMIS) regarding use, handling, storage and disposal of hazardous materials; and regarding labelling and provision of Material Safety Data Sheets (MSDS) acceptable to Human Resources and Skills Development Canada and Health Canada.

### 1.3 RESPONSIBILITY

- .1 Contractor is responsible for the health and safety of all persons on site. Contractor is also responsible for the protection of property, persons and the environment on or adjacent to the site in so far as the work may affect these.
- .2 Contractor and all contractor's employees are to comply with all safety requirements specified in the Contract Documents as well as all applicable federal, provincial and local statutes, regulations, ordinances and with Contractor's site-specific Health and Safety Plan.
- .3 As outlined in the Canada Labour Code Part II, the Contractor is responsible to provide a site-specific Health and Safety Plan that includes a Confined Space Entry Procedure in the event that work is deemed by the Engineer to be in a confined space. Work is not to begin until this Health and Safety Plan is submitted and approved by the Engineer.
- .4 Real Property Operations Detachment (Gagetown) employs a Lock Out/Tag Out program to prevent work related injuries due to electrical or mechanical systems being energized while personnel are working in or around these systems. The Contractor must respect these locks and tags when encountered. Do not forcibly remove these locks and/or tags at any time. If the Contractor requires that these be removed to perform work, a request is to be made to the Engineer for such removal.
- .5 As per the Canada Labour Code Part 11, it is the Contractor's responsibility



to employ their own Lock Out/Tag Out program to ensure that equipment is not energized by other personnel while they are working in or around equipment.

- .6 It is the Contractor's responsibility to ensure that all their employees are provided all Personal Protective Equipment (PPE) necessary to perform all work. Hard hats and safety glasses are to be worn at all times.

#### **1.4 UNFORESEEN HAZARDS**

- .1 Should any unforeseen or peculiar safety-related factor, hazard, or condition become evident during performance of Work, advise Engineer verbally and in writing. Follow procedures in place for Employee's Right to Refuse Work in accordance with Acts and Regulations of Province having jurisdiction.

#### **1.5 CORRECTION OF NON-COMPLIANCE**

- .1 Immediately address health and safety non-compliance issues identified by authority having jurisdiction or by Engineer.
- .2 Provide Engineer with written report of action taken to correct non-compliance of health and safety issues identified.
- .3 Engineer may stop Work if non-compliance of health and safety regulations is not corrected.

#### **1.6 WORK STOPPAGE**

- .1 Give precedence to safety and health of public and site personnel and protection of environment over cost and schedule considerations for Work.

**END OF SECTION**

## **1 GENERAL**

### **1.1 REPORTING FIRES**

- .1 Know location of nearest fire alarm box and telephone, including emergency phone number.
- .2 Report immediately all fire incidents to Fire Department as follows:
  - .1 activate nearest fire alarm box; or
  - .2 Telephone 911.
- .3 When reporting fire by telephone, give location of fire, name or number of building and be prepared to verify the location.

### **1.2 INTERIOR AND EXTERIOR FIRE PROTECTION AND ALARM SYSTEMS**

- .1 Fire protection and alarm system will not be:
  - .1 obstructed;
  - .2 shut-off; and
  - .3 left inactive at end of working day or shift without authorization from Fire Chief.
- .2 Fire hydrants, standpipes and hose systems will not be used for other than fire-fighting purposes unless authorized by Fire Chief.

### **1.3 FIRE EXTINGUISHERS**

- .1 Supply fire extinguishers, as scaled by Fire Chief, necessary to protect work in progress and contractor's physical plant on site.

### **1.4 BLOCKAGE OF ROADWAYS**

- .1 Advise Fire Chief of any work that would impede fire apparatus response. This includes violation of minimum overhead clearance, as prescribed by Fire Chief, erecting of barricades and digging of trenches.

### **1.5 SMOKING PRECAUTIONS**

- .1 Observe smoking regulations at all times.

### **1.6 RUBBISH AND WASTE MATERIALS**

- .1 Rubbish and waste materials are to be kept to a minimum.
- .2 Burning of rubbish is prohibited.
- .3 Removal:
  - .1 Remove all rubbish from work site at end of work day or shift or as directed.
- .4 Storage:
  - .1 Store oily waste in approved receptacles to ensure maximum cleanliness and safety.

- .2 Deposit greasy or oily rags and materials subject to spontaneous combustion in approved receptacles and remove.

#### 1.7 FLAMMABLE AND COMBUSTIBLE LIQUIDS

- .1 Handling, storage and use of flammable and combustible liquids are to be governed by the current National Fire Code of Canada.
- .2 Flammable and combustible liquids such as gasoline, kerosene and naphtha will be kept for ready use in quantities not exceeding 45 litres provided they are stored in approved safety cans bearing Underwriters' Laboratory of Canada or Factory Mutual seal of approval. Storage of quantities of flammable and combustible liquids exceeding 45 litres for work purposes requires permission of Fire Chief.
- .3 Transfer of flammable and combustible liquids is prohibited within buildings or jetties.
- .4 Transfer of flammable and combustible liquids will not be carried out in vicinity of open flames or any type of heat-producing devices.
- .5 Flammable liquids having a flash point below 38° C such as naphtha or gasoline will not be used as solvents or cleaning agents.
- .6 Flammable and combustible waste liquids, for disposal, will be stored in approved containers located in a safe ventilated area. Quantities are to be kept to a minimum and Fire Department is to be notified when disposal is required.

#### 1.8 HAZARDOUS SUBSTANCES

- .1 Work entailing use of toxic or hazardous materials, chemicals and/or explosives, or otherwise creating hazard to life, safety or health, will be in accordance with National Fire Code of Canada.
- .2 Obtain from Fire Chief a "Hot Work" permit for work involving welding, burning or use of blow torches and salamanders, in buildings or facilities.
- .3 When Work is carried out in dangerous or hazardous areas involving use of heat, provide fire watchers equipped with sufficient fire extinguishers. Determination of dangerous or hazardous areas along with level of protection necessary for Fire Watch is at discretion of the Fire Chief. Contractors are responsible for providing fire watch service for work on a scale established and in conjunction with Fire Chief at pre-work conference.
- .4 Where flammable liquids, such as lacquers or urethanes are to be used, proper ventilation will be assured and all sources of ignition are to be eliminated. Fire Chief is to be informed prior to and at cessation of such work.

#### 1.9 QUESTIONS AND/OR CLARIFICATION

- .1 Direct any questions or clarification on Fire Safety in addition to above requirements to Fire Chief.

#### 1.10 FIRE INSPECTION

- .1 Site inspections by Fire Chief will be coordinated through Engineer.
- .2 Allow Fire Chief unrestricted access to work site.
- .3 Co-operate with Fire Chief during routine fire safety inspection of work site.
- .4 Immediately remedy all unsafe fire situations observed by Fire Chief.

**END OF SECTION**

**1 GENERAL**

**1.1 GENERAL**

- .1 Contractor will take all reasonable steps to ensure that they and their employees have complied with all pertinent legislation and have protected the environment.

**1.2 FIRES**

- .1 Fires and burning of rubbish on site not permitted.

**1.3 DISPOSAL OF WASTES**

- .1 Do not bury rubbish and waste materials on site unless approved by Engineer.
- .2 Do not dispose of waste or volatile materials, such as mineral spirits, oil or paint thinner into waterways, storm or sanitary sewers.

**1.4 SPILL PROTECTION**

- .1 The Contractor must have adequate clean up materials for any potential hazardous materials used in the completion of the work (ie. fuels, oils, lubricants, etc).

**END OF SECTION**

## **MINOR OPERATIONAL REMOTE INSPECTION OF BUILDING AUTOMATION SYSTEM**

### **.1 Dates:**

- .1 Minor Remote Inspections are to be completed twice a year. The first remote inspection is to be done in the month of May in conjunction with the shutdown of heating systems or change over to summer months programming. The second is to be done during the month of January.

### **.2 Network Remote Inspections:**

- .1 Connect via phone line modem to the Building Digital Controller at Barrack Green Armoury.
- .2 Check connectivity of EXP 1048 and EXP 10120 subpanels on network and confirm proper connection speed.

### **.3 End Devices and Sensors Remote Inspection:**

- .1 Review the system for alarms. Reset alarms and determine cause. Include recommendations in inspection report with respect to any and all alarm/event conditions.
- .2 Review the system for inputs/outputs in manual override state. Ensure inputs/outputs in manual override are included in report and Contract Manager is aware.
- .3 Save all panel databases. Provide to Contracts Manager upon request.
- .4 Toggle all outputs on/off or modulate through range and verify proper system response. Prepare a points list that includes point number, name, type and verified movement.
- .5 Verify all inputs have reasonable values and are responding to associated output modulation. Include observed values in points verification checklist.

### **.4 Upgrades:**

- .1 All software upgrades on Workstation and firmware upgrades to panels are to be completed during the major inspection. No upgrades are to be done remotely.

.5 **Schedules:**

- .1 Ensure panel time and date are accurate. Ensure all annual schedules are set for proper heating season end date. Confirm this date with Contracts Manager.

.6 **Inspection Report:**

- .1 Provide verification checklist and all recommendations regarding control system and mechanical system devices that appear faulty and include in report submitted with inspection invoice to Contracts Manager.

**MAJOR ON-SITE OPERATIONAL INSPECTION OF BUILDING AUTOMATION SYSTEM**

**.1 Date:**

- .1 Major On-Site Inspection is to be completed once per year. This inspection is to be completed in September in conjunction with the start of heating season.

**.2 Global and Programmable Controllers:**

- .1 Check all connections and secure if required.
- .2 Clean all exterior surfaces.
- .3 Save and copy all control panel databases.
- .4 Review sequence of operations and ensure maximum energy efficiency.
- .5 Install upgrades if available.
- .6 Check network speeds for optimum performance.
- .7 Check the LED indications to verify proper DC power levels, transmit and receive activity and check for possible error code indications.
- .8 Inspect wiring for signs of corrosion and fraying.
- .9 Replace Battery.
- .10 Cycle panel power to initiate self-test diagnostic and monitor lead sequencing for proper self-test displays or error code indications.
- .11 Remove dust from heat sink surfaces.
- .12 Verify the proper operation of the critical control processes and points associated with this unit and make adjustments if necessary.

**.3 Exhaust and Destratification Fan Controls:**

- .1 Review the sequence of operation.
- .2 Check the operation of all dampers.



- .3 Check all control valves.
- .4 Calibrate all controllers as required.
- .5 Check all connections and secure if required.
- .6 Calibrate sensors as required.
- .7 If problems are evident in controlled equipment make note of such in report.

**.4 Space Control Devices:**

- .1 Check all room temperature sensors and calibrate as required.
- .2 Check all control valves and report condition.
- .3 Check the operation of all dampers.
- .4 Check all thermostat operation and associated radiator valves. Report evidence of leaks and any thermostat problems in inspection report.

**.5 Boiler Controls:**

- .1 Check all valves for full range of modulation and enable for on/off operation. Check all pumps for on/off operation. Note: Control devices integral to boiler are **not** included in this Service Contract. If problems are evident, note on report.
- .2 Check remote dial-out alarm system for operation. Recommend battery replacement if necessary.

**.7 Point List Verification Report:**

- .1 Prepare a point checklist that provides verification of each point. Provide point address, name and on/off check for binary points and 0, 50 and 100% modulation for analog points. Indicate room number where point is located as well as model number of devices. All points must be modulated and visually checked for proper operation.
- .2 Verify that the panel is in control at the desired values.
- .3 Change one set point value to verify smooth transmission and stable control at

the new set point.

- .3 Return the set point to its original value.
- .4 Repeat this test for each additional control loop.
- .5 Verify that the controlled valves and the dampers will stroke fully in both directions, sealing tightly where appropriate.
- .6 Verify the proper operation of the critical control processes and points associated with this unit. Make adjustments as required.

**.8 Network Analyses:**

- .1 Ensure proper network performance.
- .2 Ensure proper addressing of panels.
- .3 Confirm proper data transfer speed.
- .4 Confirm proper modem operation. Include modem phone line number in report.

**.10 Inspection Report:**

- .1 Prepare a written inspection report that includes the points verification check list and all recommendations for repairs and additions to Direct Digital Control System. Outline all potential energy saving adjustments to system. List all model numbers and approximate cost of system components that require replacement and provide estimates of hours of labour to replace. Ensure that report is dated and signed by technician(s) performing inspection. Submit inspection report with invoice to Contracts Manager promptly after inspection.

**Note:**

Keep conversations to a minimum with building occupants with respect to Building Automation System. Do not take direction from occupants or caretaker in regard to sequence of operation, schedules and set points. Make note of all requests for system adjustments and include in report. Discuss any major complaints with the Engineer's representation (i.e. Contracts Manager) immediately.

**Annex C**

Page 1 of 2

**Job No. L-S255/1-0301/223****2017-06-26**

Barrack Green Armoury DDC System Points List

Panel: DSC 1212E

Address: CP1150000

Location: Rm 059

INPUTS		OUTPUTS	
PT #	DESCRIPTION	PT #	DESCRIPTION
AI1	BGA_37_RM035 SPC OVRD	BO1	BGA_KIT_UTH
AI2	BGA_37_RM139 SPC CV2	BO2	BGA_KIT_EXH
AI3	BGA_37_RM230 SPC CV2	BO3	
AI4	BGA_37_RM130A SPC CV3	BO4	
AI5	BGA_37_RM215 SPC OVRD	BO5	
AI6		BO6	
AI7		BO7	
AI8		BO8	BGA_37_R060_EXH
AI9		AO9	BGA_37_RM139_VLV CV2
AI10		AO10	BGA_37_RM230_VLV CV2
AI11		AO11	BGA_37_RM130A_VLV CV3
AI12		AO12	BGA_37_RM215_VLV CV3
BO1	BGA_37_RM035 SPC OVRD		
BO2	BGA_37_RM139 SPC CV2		
BO3	BGA_37_RM230 SPC CV2		
BO4	BGA_37_RM130A SPC CV3		
BO5	BGA_37_RM215 SPC OVRD		

Barrack Green Armoury DDC System Points List

Panel: DNT-T221

Address: CP1150001

Location: Rm 035

INPUTS		OUTPUTS	
PT #	DESCRIPTION	PT #	DESCRIPTION
AI1	KITCHEN SPC TMP	AO1	FBDP AHU4
AI2		AO2	
AI3		BO3	

**Annex C**

Page 2 of 2

**Job No. L-S255/1-0301/222****2015-08-26**

Barrack Green Armoury DDC System Points List

Panel: DSC1616

Address: CP1150002

Location: Rm 044

INPUTS			
PT #	DESCRIPTION	PT #	DESCRIPTION
AI1	OAT	BO1	SFSS
AI2	SAT	BO2	HTG VLV
AI3	MAT	BO3	OAD
BI4	BGA_STORES_OVRD	BO4	RAD
AI5	BGA_ZONE1_SPC	BO5	BGA_ZONE1_UH1
AI6	BGA_ZONE2_SPC	BO6	BGA_ZONE2_UH2
AI7	BGA_ZONE3_SPC	BO7	BGA_ZONE3_UH3
AI8	BGA_R208 SPC OVRD	BO8	BGA_R208 BB VLV
AI9	BGA_R115_SPC	AO9	BGA_R115 BB VLV
AI10	BGA_R111_SPC	BO10	BGA_R111 CEILING FANS
AI11		BO11	BGA_R049 EX FAN
AI12		BO12	BGA_R206 EX FAN
AI13		BO13	BGA_R0116 EX FAN
AI14		BO14	
AI15		BO15	
AI16		BO16	
AI101	STORES SPC		
AI201	GENERAL OFFICE SPACE		

Barrack Green Armoury DDC System Points List

Panel: DSC 1212E

Address: CP1160000

Location: Zone 3

INPUTS		OUTPUTS	
PT #	DESCRIPTION	PT #	DESCRIPTION
AI1	BGA_MAU_CST	BO1	BGA_MAU_SS
AI2	BGA_MAU_SAT	AO2	BGA_MAU_DMP
AI3	BGA_MAU_MAT	AO3	BGA_MAU_HCVLV
AI4	BGA_MAU_OVRD	BO4	
BI5	BGA_CO_ALM	BO5	BGA_ZONE1_UH1_2
AI6	BGA_ZONE1_SPC1	BO6	BGA_ZONE2_UH3_5
AI7	BGA_ZONE1_SPC2	BO7	BGA_ZONE3_UH4_6
BI8	BGA_ZONE1_OHD	BO8	
AI9	BGA_ZONE2_SPC	AO9	
AI10	BGA_ZONE3_SPC	AO10	
AI11		AO11	
AI12		AO12	