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NATO Communications and Information Agency  
Agence OTAN d'information et de communication

**BOOK II**

**PART IV – STATEMENT OF WORK**

**SOW - ANNEX H**

**SITE INFORMATION DATA  
PACKAGE  
(GREECE)**

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**THE CONTENTS OF BOOK II, PART IV – STATEMENT OF WORK, SOW -  
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NATO Communications and Information Agency  
Agence OTAN d'information et de communication

## BOOK II

### SECTION IV – STATEMENT OF WORK

#### SOW – ANNEX I

# SYSTEM REQUIREMENTS SPECIFICATIONS (CIVIL WORKS) (GREECE)

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## **PART A – SUMMARY AND GENERAL REQUIREMENTS**

### **SECTION 1 OVERVIEW**

#### **1.1 General**

1.1.1. The purpose of this section is to outline the civil works-related requirements that shall be met for the preparation and construction of the building, utilities and other facilities required to accommodate the SSSB system with its supporting infrastructure (such as SSSB electrical installation, HVAC, UPS etc.). It is the Contractor's responsibility to provide the Purchaser with complete and finished civil works as specified in this Annex and site specific Appendixes

#### **1.2 General Responsibilities of the Contractor**

1.2.1. Site specific Appendixes provide information on the civil works scope relevant for each respective site.

1.2.2. The Contractor shall be responsible for meeting all requirements specified in those Appendixes.

1.2.3. The Contractor shall cross reference the requirements stipulated in site specific Appendixes with respective requirements described in this Annex and the SOW Main Body, and shall meet all of them.

1.2.4. In relation to all deliverables (for example pieces of equipment, material, structural works, systems, subsystems, components, line-replaceable units etc.) that are part of any installation and/or construction works, as specified in the core SOW, this Annex and site specific Appendixes, the Contractor shall be responsible for the following:

- a. Design
- b. Delivery to the site
- c. Installation and construction (as required) including any supporting structures, systems, installation and auxiliary material and equipment.
- d. Provision of access to all premises (including building/ arranging temporary access for the duration of installation/ construction works to all premises (e.g. preparation of temporary roads, temporary parking and operation areas for machinery such as cranes, concrete mixers, etc.) including ramps to introduce equipment to buildings and rooms etc., removal of fence sections if required, then temporary closer of the fence gap according to respective THN security driven requirements and finally, reinstallation of the removed sections to their original conditions before the removal)
- e. Temporary storage including protection/ guarding of stored items (unless THN GRC agrees to provide this at any of the sites which shall be specifically agreed with THN GRC in relation to individual sites)

- f. Removal of all of the temporary structures the Contractor may have erected.
- g. Provision of all required utilities the Contractor needs for the execution of the project (power, water, internet connection etc.). This may require provision of power generators with construction site power distribution system, fuel tanks, water tanks etc. (unless THN GRC agrees to provide those at the sites in which case it shall be specifically agreed with THN GRC in relation to individual sites).
- h. Removal and disposal of any waste being the result of the Contractor's work.
- i. Certification as required in accordance with respective THN Law, regulations and standards.
- j. Testing and commissioning.
- k. Integration with existing systems as required.
- l. Modification of existing facilities, infrastructure and installations as required.

### **1.3 Operational Requirements**

- 1.3.1. This shall include:
  - a. Site demolition and preparation works
  - b. Usage of external public access road
  - c. Site works:
    - i. Paved areas
    - ii. Landscaping
    - iii. Antenna foundations and masts
  - d. Functional Areas:
    - i. Operations
    - ii. Administration
  - e. Utilities:
    - i. Environment control system (HVAC)
    - ii. Electrical distribution system
    - iii. Drainage system
    - iv. Lightning protection and grounding system
  - f. Protective works
    - i. Fences and gates
    - ii. Fire protection systems

## **1.4 Current Situation**

1.4.1. The existing situation at the Greek (GRC) radio sites is described further within the GRC Site Information Data Package (SIDP) Annex of this SOW (IFB-CO-15577-SSSB SOW Annex H (NATO R\*\*\*\*\*D)).

1.4.2. The Site Information Data Package (IFB-CO-15577-SSSB SOW Annex H (NATO R\*\*\*\*\*D)) shows the boundaries of the existing installations as well as the currently available military domain.

1.4.3. The Contractor shall use the available land at the six GRC radio sites at Kartsinoudi, Limnonari and 7th AD Radar site on Skyros as well as sites at Sideros and Mavros on Crete and Naval Entity 47 (NE47) on Kythira efficiently. The Contractor shall design and construct facilities that make future expansion and enhancements possible, whilst maintaining minimum 'buffer' zones for security according to THN GRC instructions that will be provided during the Contractor's site survey. In this context, any requirement for land expropriation shall be limited to the bare minimum and shall not exceed the proposed expropriation (if any) detailed in Section 12 of the SOW (IFB-CO-15577-SSSB -Book 2-Part 4-SOW).

1.4.4. The existing power plant details are provided in SOW (IFB-CO-15577-SSSB SOW Annex H (NATO R\*\*\*\*\*D)) and in supporting Purchaser-provided information. It includes: Diesel Generators, Power Switch Gear, UPS and batteries.



## **SECTION 2 DESCRIPTION OF THE CIVIL WORKS (CW)**

- 2.1** This Statement of Requirements (SOW) represents to the extent possible the definition by the Purchaser of the needs expressed by the operational users.
- 2.2** This definition has been done from a global perspective but does not represent a finalized nor complete product. In this particular context the term TBD means to be determined by the Contractor, during the bidding phase, and the Contractor during the execution phase. A similar principle shall apply to other requirements stated throughout this SOW Annex where, for the avoidance of doubt, such obligations shall transfer to the Contractor during the execution phase.
- 2.3** The site installations and the building shall be designed to meet the operational requirements and to incorporate environmentally friendly measures to reduce life-cycle costs.
- 2.4** The design of these facilities shall be such as to enable the personnel to perform the required maintenance and control functions in the best possible economical way.
- 2.5** The structure of these civil works requirements as defined herein in this Annex and in site specific Appendixes is still generic and not definitive. It is the Contractor's responsibility to complete and expand it as required for the design and the execution of the works under this contract in line with good engineering practices and when justified and required applying state of the art technical solutions. In the same context the use of Building Life-Cycle Cost (BLCC) Programs is recommended.
- 2.6** The broad requirements and the summary technical description are included below:
- 2.6.1. The Contractor's approach and choices shall be fully justified and documented through its studies, legal and technical references and documentation, etc.
- 2.6.2. The Contractor should be aware that there will be no need to prepare any Environmental study/analysis for areas dedicated to Greek national defence in line with Greek legislation (Greek Government Gazette FEK 209-A'-21.9.2011 – Environmental Licensing of Projects and Activities, Setting in Function with the creation of an Environmental Balance and Other Provisions of the Ministry of Environment, Article 1, Paragraph 2).
- 2.6.3. The Contractor shall prepare a Radio Hazard Study for the personnel in TX sites, especially for the Radio Site at Mavros on the island of Crete.
- 2.6.4. Testing and Acceptance shall comply with the provisions in Section 12 and 13 of the core SOW. Successful completion of Construction/Factory Acceptance Tests of the Civil Works elements shall be achieved prior to the installation of the transmitting and receiving COMMS equipment (including integrated PFE equipment).

## **SECTION 3 SURVEYS**

### **3.1 Existing situation.**

3.1.1. The existing situation at is described in SOW Annex B (IFB-CO-15577-SSSB SOW Annex B (NATO R\*\*\*\*\*D).and includes:

3.1.2. The existing site lay-out, showing existing limits, fences, access and internal roads, parking, etc., is represented in the drawings provided within the SOW SIDP Annex (IFB-CO-15777 SOW Annex H) and includes where available:

- a. The plans of the existing utilities: water, electricity, sewage, etc.
- b. As Built Drawings for existing facilities
- c. Initial Land survey
- d. Initial Topographic survey report including existing limits.

3.1.3. The Contractor is reminded that the SIDP annex is provided purely as background info for the Contractor's benefit. It has no particular contractual status and it is the Contractor's responsibility to check and validate those data for design and realization of the site civil works.

### **3.2 Preliminary Site survey**

3.2.1. A preliminary Site survey shall be executed by the Contractor at the first stage of the execution phase and as the minimum shall address following:

- a. Construction site office
- b. Access road to the site
- c. Situation of cables, ducts, other buried infrastructure etc.
- d. Structures, Buildings and infrastructure to be demolished/ dismantled
- e. Health and Safety as dictated by the H&S THN laws and regulations

### **3.3 Commercial Electrical Power station**

3.3.1. In remote locations, commercial distribution ring implementations are uncommon.

3.3.2. Further details on existing main distribution networks are provided herein in this Annex below and can be requested from THN GRC at the Contractor's site surveys or in preparation phase for such surveys.

### **3.4 ISLAND OF CRETE**

3.4.1. Sideros HF TX Site (AKRA SIDERO) shall be converted to a HF RX site.

- a. There is a Medium Voltage Line connection to the site with no ring implementation.
- b. Within the facility, THN GRC has dual MV Transformers for redundancy.

- c. As the site shall be converted to RX only, current power capacity in Watts (possibly as high as 1000kW) is no longer needed / required.
  - d. THN GRC will install a Transformer and will deliver Low Voltage (LV) to the existing at the site Main Power Distribution Board (MPDB).
  - e. THN GRC will also install a power meter for LV once the required capacity has been confirmed by the Contractor
  - f. Indicative low voltage ratings available are 78kVA, 135VA and 250kVA.
- 3.4.2. Mavros HF RX Site (AKRA MAVRO) shall be converted to a HF TX site.
- a. Radio Site Mavros being an Rx Site has power delivered in Low Voltage.
  - b. There is a transformer installed at the site entrance gate.
  - c. The Contractor shall analyse whether this transformer shall be upgraded, along with the cabling and the LV MPDB at the facility.
  - d. Currently installed capacity equals the rating of the Generators at 100kVA.
  - e. The Contractor shall define the Total Power Requirement for the new TXs and all other equipment provided by the Contractor under this contract.
  - f. The Contractor shall note that 250kVA is the maximum LV power available at the site.
  - g. Retrofitting of the LW installation for the power lines feeding the new TXs and all other equipment provided by the Contractor under this contract shall be executed by the Contractor.
  - h. A maximum of 250kVA will be requested / programmed by THN GRC based on power consumption figures provided by the Contractor.
- 3.4.3. Kartsinoudi HF TX Site shall have the same configuration as in the old Akra Sidero that is present in Kartsinoudi, with dual / redundant Medium Voltage Transformers.
- a. Existing MV line is installed as aerial line until reaching the site gate.
  - b. From the site gate onwards the MV line is installed underground.
  - c. The number of HF transmitters, under this contract, shall be reduced to three units.
  - d. Therefore, the Contractor shall execute one of the two options:
    - i. Dismantle existing MV transformers and relevant MV Switches and convert the entire installation from MV to LV
    - ii. Refurbishment of the existing installation.
  - e. The Contractor shall propose and implement the most suitable of the above stipulated options.

- f. Indicative low voltage ratings available are 78kVA, 135VA and 250kVA.
- g. Summary for Kartsinoudi TX Site:
  - i. KARTSINOUDI is not part of the local commercial LV, MV distribution ring.
  - ii. The Contractor shall either convert existing MV installation to LV or refurbish where needed keeping the existing layout.
  - iii. If it is converted to LV, a maximum of 250kVA will be requested / programmed by THN GRC based on power consumption figures provided by the Contractor.

3.4.4. Limnonari HF RX Site has no connection to the commercial main power distribution network.

- a. Existing design relies on 24h per day continuous operation of power generators (PGS).
- b. The Contractor shall dismantle and dispose of existing PGS and provide and installed new ones as per requirements stipulated thereafter in this Annex and in the site specific Appendix.

### **3.5 KYTHIRA ISLAND**

3.5.1. NE 47 HF Radio Site is connected to the LV commercial main power distribution network.

- a. The Contractor shall upgrade the existing power connection
- b. Existing connection is at 78kVA.
- c. Indicative low voltage ratings available are 78kVA, 135VA and 250kVA.
- d. Summary for NE 47 HF Radio Site
  - i. The NE 47 Radio Site on Kythira is not part of the local commercial LV, MV distribution ring.
  - ii. The Contractor shall upgrade the existing LV installation assuring that the new transformer (to be provided by the Contractor) has sufficient capacity to support existing loads and the new SSSB system with its supporting equipment
  - iii. Further requirements are stipulated hereafter in this Annex and in the site specific Appendix
  - iv. A maximum of 250kVA will be requested / programmed by THN GRC based on power consumption figures provided by the Contractor.

3.5.2. As the LV power provision to the NE 47 HF Radio Site shall not be interrupted, any station shall not be dismantled before, either a temporary connection has been provided, or the new station is built and connected to the commercial electrical distribution network and fully operational.

3.5.3. All interim and long-term power planning shall be coordinated with the electrical power supplier, the local power distributor and the Purchaser.

3.5.4. It is the Contractor's sole responsibility to ensure that all electrical power supply required for the neighborhood is delivered at all time without significant interruption in accordance with the electrical power supplier obligations and practice.

3.5.5. Details of the Point of Contact (POC) for the Electrical Power distributor will be confirmed prior to/or during the Contractors Site Surveys

### **3.6 Surveys and soil tests**

3.6.1. Prior to any studies and start of the works the Contractor shall execute a detailed topographic survey, as well as the necessary soil investigations, in order to complete and verify the information provided by NCI Agency and/or the Territorial Host Nation (THN).

3.6.2. Any topographic survey and soil tests shall be executed under the sole responsibility of the Contractor and the survey and soil test reports shall be presented to the Purchaser. The reports shall be the references for the subsequent studies and designs that the Contractor shall execute in accordance with requirements stipulated herein in this Annex and in site specific Appendixes.

### **3.7 External public access road**

3.7.1. Although the road to access the site is outside of the military area, the Contractor shall be responsible for maintaining this road in a state equivalent to what it was at the beginning of the works.

3.7.2. To that purpose the Contractor shall:

- a. Submit request for an authorisation to the local authorities in case of works required on public roads (i.e. excavations, dismantling of signs and traffic lights).
- b. Agree with the local authorities on the conditions to be met during the execution of the works regarding traffic, protection measures in case of heavy vehicles traffic, reparation works after the execution, etc.
- c. Record the findings and decisions in a report to be signed for acceptance / approval by both parties. One copy of this report, duly signed by all parties involved, shall be provided to the Purchaser

### **3.8 Commercial and Host Nation Telecommunication Service Providers**

3.8.1. The SIDP Annex Appendices (IFB-CO-15577-SOW Annex H) contains some THN provided drawing describing the fiber optic and cable entry points.

3.8.2. All relevant actions regarding telecommunication providers will be handled by the THN and not the Contractor.

3.8.3. The THN will be responsible for any termination of services which will impact the execution of works by the Contractor.

3.8.4. In case it is required the Contractor shall provide an appropriate route from the fiber optic and cable entry points, to a location conveniently close to the area identified to accommodate the termination equipment, power and space for any termination equipment. The THN shall provide the National Defence Network (NDN) connection to each SSSB COMMS site. At the SSSB COMMS sites, the Contractor shall integrate the router and all local network related lines and equipment, needed for the SSSB system functionality, including inter-site connections

## **SECTION 4 ARCHITECTURE AND ENGINEERING (A/E) DESIGN**

**4.1** The Civil Works scope of the contract shall include the studies, documents and drawings necessary for execution of the works.

**4.2** Those studies and works shall meet various criteria such as but not limited to:

- 4.2.1. Building regulations;
- 4.2.2. Stability;
- 4.2.3. Functionality;
- 4.2.4. Technical specifications;
- 4.2.5. Fire protection;
- 4.2.6. Physical security;

**4.3** In this framework and unless they possess the required capacity, accreditations and authorisations, the Contractor shall sub-contract the studies, the design and the control of the works to an A/E company (A/E) accredited and maintaining a permanent office in Greece. This shall comply with the criteria defined herein in this Annex.

**4.4** Consequently, the term “A/E firm” or “A/E” shall be understood as “the sub-Contractor in charge of and responsible for the studies, designs and the control of the civil works”.

**4.5** The overall mission of the A/E firm includes:

- 4.5.1. The pre-design studies and schematic design.
- 4.5.2. The schematic design, as the minimum, shall include:
  - a. Floor plans
  - b. Site plans
  - c. Building elevations (all four sides - the east, west, north and south)
  - d. Description of building systems (structural, mechanical, HVAC, electrical, fuel distribution, fire protection, data cabling etc.), interior and exterior finishes, and the building site with supporting schematic and conceptual drawings
- 4.5.3. The application/file for the Request of the Construction Permit shall be submitted during the execution phase as specified herein in this Annex.
- 4.5.4. The planning, preparation, execution, follow-up of the design studies (30% and 100%) and construction documents (drawings and specifications establishing the requirements for the civil works scope of the project).
- 4.5.5. The participation in the supervision, the control and the acceptance (including but not limited to provisional and final acceptance) of the execution of the civil works part of the contract.
- 4.5.6. The participation in any follow-up tasks during the warranty phase.

4.5.7. The fulfilment of their responsibility as the architect and the author of the project in accordance with all applicable national laws and specific regulations such as or equivalent to the deontology, laws, directives, recommendations, etc. applicable in Greece.



## **SECTION 5 CONSTRUCTION PERMIT**

- 5.1** The Contractor shall prepare and submit construction permits to the THN authorities for THN approval.
- 5.2** The Contractor shall provide the construction permit, supplemented by any other permits that are required in given locations as one of the first deliverables.
- 5.3** The Contractor shall prepare the design and all studies (including the Radio Hazard Studies), which shall be submitted to the appropriate department of the Hellenic Navy General Staff (HNGS/C4) for approval.
- 5.4** According to the MINISTERIAL DECISION 26229/1123/1987 (Government Gazette 749/D' 10.8.1987) "Terms and procedures for issuing construction permits for the execution of military projects" NATIONAL DEFENSE AND ENVIRONMENT, SPATIAL PLANNING & PUBLIC WORKS, an approval from an independent control office or by the locally responsible urban planning services is not required.
- 5.5** More requirements concerning the construction permit procedures are provided thereafter in this Annex.

## **SECTION 6 CIVIL WORKS INFRASTRUCTURE**

### **6.1 General**

6.1.1. This part includes all works, which shall be executed in a coordinated manner for the realization of the site general infrastructure as defined herein in this Annex and in site specific Appendixes.

6.1.2. Site preparation and demolition works shall include:

- a. Construction of the site offices for the Administration, the Contractor and his sub-contractors
- b. Demolition works that are necessary prior to the construction of the new facilities, including disposal of all materials in accordance with the applicable local/THN legislation.
- c. Stockpiling of the top soil for re-spread after completion of construction works so that final landscaping can be established in the shortest possible time.
- d. Where required the removal and disposal of existing fuel tanks.

Note: Precautions and required measures shall be taken by the Contractor to prevent soil pollution and/or remove possible existing contaminated soil during these activities.

### **6.2 Dismantling and recovery of equipment**

6.2.1. The Contractor shall be responsible for dismantling, removal and disposal of various structures, installations and equipment. Further requirements are stipulated hereafter in this Annex and in site specific Appendixes.

### **6.3 Asbestos**

6.3.1. The attention of the Contractor is drawn to the fact that Asbestos may be present on the site under various forms like, among others, cable ducts, wall covers and various pipes and ducts.

6.3.2. The Contractor shall address this aspect where necessary in construction permit application, in the design and the execution phase.

6.3.3. It is the Contractor's responsibility to take appropriate measures for the containment, removal and disposal of asbestos in accordance with applicable THN legislation:

- a. Such measures shall be applied in relations to the Contractor's scope, in areas affected by the Contractor's works
- b. The Contractor shall confirm in writing that asbestos was contained and removed from the areas affected by the Contractor's works
- c. The Contractor shall immediately notify respective THN authorities in case any asbestos is identified at the sites

6.3.4. Further requirements are described in Section SECTION 18 para 18.3

#### **6.4 Earthworks**

6.4.1. Earthworks works shall be executed, in accordance with requirements stipulated herein in this Annex and in site specific Appendixes, taking into account all coordination measures related to:

- a. The demolition works and preparation of the site
- b. Road, antenna and building foundations
- c. Trenches, buried cables and ducts
- d. Roads, parking, walk pads
- e. Fences and outdoor signage
- f. Fuel tanks and piping
- g. Etc.

#### **6.5 Foundations for roads, antennas, paved areas and various building structures**

6.5.1. Those works shall be executed, in accordance with requirements stipulated herein in this Annex and in site specific Appendixes, for the following:

- a. The paved areas: roads, walk pads, parking, etc.
- b. The antenna masts
- c. Fences and outdoor signs
- d. Power generators
- e. Fuel tanks
- f. Other building structures and areas as necessary.

#### **6.6 Rain water drainage**

6.6.1. A storm sewer system shall be provided where necessary and shall be as a minimum at 1.5 m away from the building grade beams.

6.6.2. The storm sewer system and drainage system, when required for stability of the buildings, antenna masts, towers and supporting infrastructure, shall meet following requirements:

- a. Collection and evacuation of rain water discharged from each building drainage system, antenna fields, roads, pathways etc.
- b. Drainage of surface and sub-surface water
- c. Control of ground water level
- d. Protection against flooding.

6.6.3. The storm sewer system and drainage shall be kept separated from any existing sewage disposal system.

6.6.4. The connection to the existing drainage system of the local community at the radio sites shall be coordinated by the Contractor with the local authority. Further requirements are stipulated herein in this Annex and in site specific Appendixes.

6.6.5. A study prepared by the Contractor and approved by this local authority shall be included in the 30% design.

**6.7 Buried cables, cable ducts and trenches**

6.7.1. Those works shall be executed, in accordance with the requirements stipulated herein in this Annex and in site specific Appendixes, for the following:

- a. As a general principle all required cables (electricity, data, etc.) shall be laid in the ground in protective pipes and conduits in accordance with applicable THN technical and legal regulations.
- b. When for any reason this is not possible (for example due to conflict with existing utilities and/or other infrastructure, different protection measures required, etc.) the cables shall be installed in on the ground ducts and trays and/or overhead support structures in accordance with applicable THN technical and legal regulations.

6.7.2. Trenches for cables and ducts:

- a. Those works shall be executed for all the cables and ducts to be installed on the site, including cables and ducts from and to the buildings and antenna locations.
- b. Special attention shall be paid to coordination of all earthworks to be executed on the site in order to avoid damages to existing / already executed installations (roads, foundations, water drainage, etc.).

## **SECTION 7 BUILDINGS AND MISCELLANEOUS CONSTRUCTIONS**

### **7.1 Building general**

7.1.1. The building shall be designed:

- a. To fulfil the requirements defined hereafter in this Annex and in site specific Appendixes
- b. To meet the principles of "the Greek Ministry of Defence (GRC MOD) national/military constructions standards and/or as specified herein in this Annex and in site specific Appendixes.

7.1.2. The building shall be designed and line with the following THN legislation and regulations:

- a. Presidential Decree 244/1980:"Cement Regulation for Concrete Works (Pre-stressed, Reinforced and Unarmed) (Government Gazette 69/A/1989).
- b. ELOT EN 10080, ELOT 1421-1, ELOT 1421-3 "Standards for concrete reinforcement steels".
- c. Ministerial Decision D11E/0/30123/1991 (Government Gazette 1068/B/31-12-1991 "Amendment of the New Concrete Regulation for the Design and Construction of Concrete Works".
- d. Ministerial Decision D17a/116/4/FN429/18-10-2000 (Reinforced Concrete Regulation) EKOS 2000.
- e. Ministerial Decision D14/50504/2002 (Government Gazette 537/B; /1-5-2002) "Adaptation of the Concrete Technology Regulation to the Requirements of the Harmonized Standard" ELOT EN 197-1.
- f. Ministerial Decision D17a/141/3/FN 275/1999 (Government Gazette 2184/B/20-12-1999) "Hellenic Earthquake Regulation 2000" (Approval of the Greek Earthquake Regulation)
- g. Ministerial Decision 16462/29/2001 (Government Gazette 917/B/17.7.2001) "Cement for the Construction of Concrete Works".
- h. Ministerial Decision D14/92330/08 (1416/B/17.7.08) (Government Gazette 381/B/24.3.2000) "Approval of the New Regulation of Concrete Reinforcement Steel Technology".
- i. Ministerial Decision DIPAD/OIK. 372/2014 (Government Gazette 1457/B/5.6.2014) "Approval of the application and use of the Euro codes in combination with the respective National Appendices)
- j. Government Gazette 59/D/3-2-1989 "Building Regulations".
- k. Joint Ministerial Decision D6/B/OIK 5825 (Government Gazette 407/B/2010) "Approval of the Energy Efficiency Regulation of Buildings (KENAK)".

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- l. Ministerial Decision F.7.5/1816/88/2004 (Government Gazette 470/B/5-3-2004) "Replacement of the current Regulation of Internal Electrical Installations with the ELOT Standards and other relevant provisions".
- m. Manual of Standard Distribution Structures of Public Power Corporation (PPC), the Instructions Distribution of PPC SA.
- n. Greek Technical Specifications-Government Gazette 2221/30-07-12 with mandatory application in all public works.
- o. Sewerage Regulation
- p. Amendment and Supplementation of Presidential Decree 71/88 "Building Fire Protection Regulation" (Government Gazette 1316/B/31-12-1998)
- q. Presidential Decree 41/2018 "Building Fire Protection Regulation" (Government Gazette 80/A/7-5-2018)

7.1.3. Furthermore the site installations and the building shall be designed in a "smart way" in order to not only meet the operational requirements, but also taking into account state of the art technical solutions resulting in environment friendly facilities with a reduced life-cycle cost.

7.1.4. A general SSSB site layout showing the building requirements is provided at figures 1 to 3. Any layout may be adapted to suit local conditions and to provide better accommodation for the SSSB function.

7.1.5. As a general rule the rooms in the new building shall be column free.

7.1.6. All works shall be executed in accordance with the technical specifications stipulated herein in this Annex and in site specific Appendixes.

**7.2 New SSSB building**

7.2.1. The building shall be windowless and shall include as a minimum the following:

Description	Minimum usable dimensions (m <sup>2</sup> )	Remarks	Security Class
Supply Storage Room/ Workshop and Test facilities for electronic equipment	12 m <sup>2</sup>	Miscellaneous storage area for technical administrative materials and supplies Average occasional occupancy 2 persons	N/A
SSSB Equipment room	50 m <sup>2</sup>	As defined in IFB Book 2 Part 4 SoW and its supporting appendices. If the building design provides for a separate Environment Control room (HVAC) the size of SSSB Equipment room can be proportionally decreased	Class I
Power Generator room	50 m <sup>2</sup>	2 generators; exterior access is required in addition to direct access from inside of the building areas	

Main Power switchgear room	TBD		
UPS/Battery room	TBD		
Environment Control room (HVAC)	TBD	If not housed in SSSB Equipment Room. Including fresh air input. Exterior access is required in addition to direct access from inside of the building areas.	
Vestibule	4m <sup>2</sup>	At the main entry to the SSSB building, equipped with double door that assures protection against outdoor conditions when opening the double door of the SSSB Equipment Room	

Table 7-1 – Room Requirements

7.2.2. A site block diagram block diagram representing all functional areas of the new site is shown in **Error! Reference source not found..**

### **7.3 Antenna foundations**

7.3.1. This item is to be designed by the Contractor taking into account:

- a. The antennas and any associated equipment as specified in the SRS Tech Annex (Annex A Section 4 Technical Requirements: Systems and Infrastructure).
- b. Minimum technical requirements defined herein in this Annex and in site specific Appendixes.

## **SECTION 8 HEATING VENTILATION AND AIR CONDITIONING (HVAC)**

### **8.1 An Environmental Control System (ECS)**

8.1.1. An ECS shall be provided for the following areas:

- a. The new SSSB building
- b. In other premises at various sites, as HVAC system dedicated for SSSB system and its supporting installations provided by the Contractor.

8.1.2. To the extent possible and practical the HVAC for all premises and installations shall be combined.

8.1.3. The detailed requirements are stipulated hereafter in this Annex and in site specific Appendixes.



## **SECTION 9 FIRE FIGHTING AND FIRE PROTECTION**

### **9.1 Fire Systems Overview**

9.1.1. The fire protection system shall be provided in the new SSSB building and in other premises at various sites, where SSSB system and its supporting installations are provided by the Contractor.

9.1.2. The fire protection system shall consist of:

- a. Fire prevention measures
- b. A fire detection system
- c. A fire alarm system
- d. A firefighting system

9.1.3. The Contractor shall comply with the national and regional legislations as well as with guidelines from the local authority.

9.1.4. A detail description of the minimum requirement, stipulated hereafter in this Annex and in site specific Appendixes, addresses the following:

- a. General fire prevention measures
- b. Fire detection
- c. Fire alarm
- d. Fire fighting

### **9.2 Fire Prevention**

9.2.1. Materials and technique used in buildings and utilities shall be chosen taking due regard of their flammability.

9.2.2. Fire prevention measures shall be coordinated with a recognized competent authority (for example local fire brigade).

### **9.3 Fire Detection**

- a. A Fire detection system shall be in accordance with applicable national standards and regulations, and shall be provided in every single room of the new SSSB building and in other premises at various sites, where SSSB system and its supporting installations are provided by the Contractor.

### **9.4 Fire Alarm**

9.4.1. A Central fire alarm (audible and visual) shall include as a minimum:

- a. Fire detectors
- b. Fire alarm buttons throughout the new SSSB building and in other premises at various sites, where SSSB system and its supporting installations are provided by the Contractor

- c. A synoptic panel that shall be located in permanently manned functional areas as defined by the THN.

### **9.5 Firefighting system**

9.5.1. Throughout the site, the fire extinguishing equipment shall be provided appropriately to the usage of the rooms and installed equipment.

9.5.2. Notices, marking, signs shall be displayed giving full instructions on procedure to be followed and action to be taken in case of fire.

9.5.3. This shall include, as appropriate, automatic fire extinguishing system at the Site Kythira, Naval Entity 47 South (TX-RX), fire extinguishers fire blankets, fire protection tools (for example axes, shovels etc.) as stipulated in respective THN rules and regulations.

## **SECTION 10 ELECTRICAL WORKS**

### **10.1 Electrical Systems Overview**

10.1.1. The electrical distribution system serving the SSSB shall include:

- a. Mains Supply System and/or integration with existing Main Supply System (details on existing systems can be found in the SIDP Annex)
- b. Electrical Distribution System (switchgears)
- c. Power Back-up (Diesel Generators)
- d. No-break power supply (UPS)
- e. Building standard electrical equipment
- f. External building lighting
- g. Lightning protection and Grounding system

10.1.2. A detailed description of the required electrical distribution system and equipment is provided hereafter in this Annex and in site specific Appendixes, and addresses the following:

- a. General
- b. HV/MV/LV (as required) electrical power station
- c. Mains power distribution board (MPDB) and/or integration with existing MPDB
- d. Electrical distribution panels
- e. Cables and wiring
- f. Electrical equipment
- g. Emergency lights
- h. Electrical power back-up
- i. UPS
- j. Lightning protection and grounding connection
- k. External lighting
- l. Legal inspections for electrical works

## **SECTION 11 ROADS, PAVED AREAS AND LANDSCAPING**

### **11.1 Roads, Paved Area and Landscaping Overview**

11.1.1. The following facilities and features shall be provided by the Contractor:

- a. Antenna access roads
- b. Parking areas and paved connections to existing site roads and existing parking
- c. Walk pads and Walkways
- d. Landscaping, planting and gardening

### **11.2 Antenna Access Roads**

11.2.1. These roads shall be connected to the existing site roads and/or existing roads that provide access to given sites, and shall provide connections to all antenna locations.

### **11.3 Parking Areas**

11.3.1. Inside of the fence a parking area for minimum three (3) vans (maximum 3.5T each) shall be provided. It shall be conveniently located not to interfere with the functions of the internal road system.

### **11.4 Paths and Walkways**

11.4.1. Those works shall be executed in accordance with requirements stipulated hereafter in this Annex and in site specific Appendixes.

### **11.5 Landscaping, Planting and Gardening**

11.5.1. Those works shall be executed in accordance with requirements stipulated hereafter in this Annex.

11.5.2. The Contractor shall include all phases of erosion, sedimentation and dust control as an integral part of the design and construction of the site.

11.5.3. This shall include both temporary erosion and sedimentation control measures applied during the construction and permanent stabilization remaining in effect after construction is completed.

11.5.4. At the end of construction works vegetative cover shall be used to provide dust and erosion control.

11.5.5. The Contractor as an integral part of the construction project shall provide planting of trees, shrubs and ground cover for aesthetic purposes but only where they were present beforehand.

## **SECTION 12 TELEPHONY AND DATA**

### **12.1 Telephony Requirements**

12.1.1. Telephony requirements will remain a THN responsibility.

12.1.2. Where not in existence, the Contractor shall coordinate with the THN but it would be expected that the Telephone and Data system would include details on:

- a. PABX
- b. Terminal equipment
- c. Maintenance position
- d. Cabling
- e. Connection to the outside networks

12.1.3. Further requirements can be found in Section 2 of Annex A to the core SOW (GRC SRS (Tech)) as well as the core SOW itself.

## **SECTION 13 HEALTH AND SAFETY (H&S)**

**13.1** Without prejudice to their overall legal obligations regarding health and safety of their personnel during the execution of the works, the Contractor and his sub-contractors shall apply the principles of the preventative measures defined in Greek H&S legislation regarding the welfare of workers.

**13.2** The Contractor shall ensure that during H&S Planning following THN legislation and regulations are taken into account and complied with:

13.2.1. Presidential Decree 305/1996 (Government Gazette 212/A/29-8-1996) "Minimum safety and health requirements to be applied to temporary or mobile construction sites in compliance with Directive EEC 57/1992".

13.2.2. Law 4412/2016 "Public Procurement of Works, Supplies and Services" (adjustment to Directives 2014/24/EU and 2014/25/EU), Article 138 "General Obligations of the Contractor", Paragraph 7 (Government Gazette 147/A/8-8-2016).

13.2.3. Law 3850/2010 "Ratification of the Code of Laws for Health and Employee Safety" ( Government Gazette 84/A/2-6-2010)

**13.3** The Contractor shall include in in the design and execution phase all required information regarding health and safety taking into account that:

13.3.1. The Contractor shall propose at least one individual who possesses all legally required accreditations within THN GRC to fulfil the role of "H&S coordinator".

13.3.2. The H&S coordinator shall be responsible for safety coordination in the design and execution phase.

13.3.3. Based on Law 3850/2010 "Ratification of the Code of Laws for Health and Employee Safety" (Government Gazette 84/A/2-6-2010), Article 8 "Obligation to employ a safety technician and occupational physician":

- a. The Contractor has the obligation to use the services of a "security technician" (TEXNIKOS ASFALIAS) if the employees for the execution of the project will be less than fifty (50).
- b. The Contractor has the obligation to use the services of a "security technician" (TEXNIKOS ASFALIAS) and an "occupational physician" (IATROS ERGASIAS) if the employees for the execution of the project will be fifty (50) or more.

**13.4** In this context the execution of the H&S coordination for this project shall be assigned only to individuals who fulfil the legal conditions and are authorized to execute the missions of the H&S design coordinator and the H&S execution coordinator.

**13.5** Further detailed instructions are included hereafter in this Annex and in respective sections of the core SOW.

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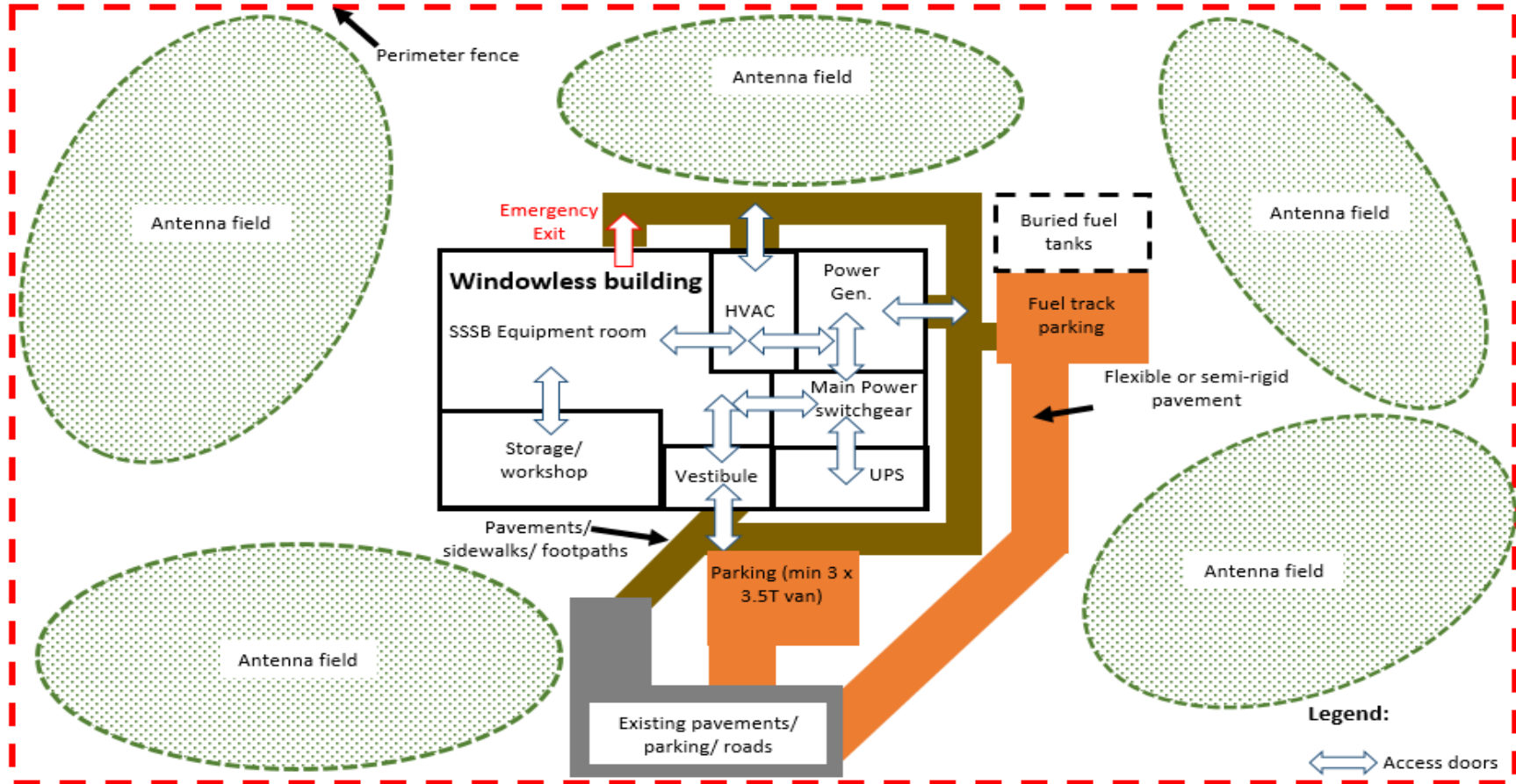


Figure 1 – Functional Site Block Diagram

## **Part B – DETAILED DESCRIPTION AND TECHNICAL SPECIFICATIONS**

### **SECTION 14 INTRODUCTION**

**14.1** The goal of this project is that after completion of the civil works NCI Agency with support from THN GRC, will be in position to allow the installation and operation of the SSSB Comms System as described in the SOW and Annexes G to I.

**14.2** Infrastructure and buildings shall be built to meet the operational and technical criteria laid down by NATO MMR (Minimum Military Requirements) and the standards and legal documents of the THN GRC.

**14.3** In this context it is important to note that:

14.3.1. These installations shall as much as possible integrate harmoniously into the rural but relatively inhabited landscape of the local areas.

14.3.2. Local Authority details for the six GRC radio sites are as follows:

- a. Site Kartsinoudi, Skyros Island (HF TX): Skyros Municipality.
- b. Site Limnonari, Skyros Island (HF RX): Skyros Municipality.
- c. 7<sup>th</sup> Radar, Skyros Island (UHF TRX): Skyros Municipality.
- d. Co-located HF TX/HF RX COMMS Site, Kythira Island: Kythira Municipality
- e. Site Sideros, Crete Island (HF TX) - This Site shall be converted to HF RX): Sitia Municipality.
- f. Site Mavros, Crete Island (HF RX) - This Site shall be converted to HF TX): Sitia Municipality.

14.3.3. The Contractor can request THN GRC to provide Local Authority details for the following DLOS stations:

- a. Skopelos DLOS radio-relays station
- b. Agios Efstratios DLOS radio-relays station
- c. Pelion DLOS radio-relays station
- d. ARS Larissa DLOS radio-relays station
- e. Pagia DLOS radio-relays station

14.3.4. These installations will on occasion be occupied and operated by military and civilian, female and male personnel as part of routine O&M of the various sites.

**14.4** Below and in the following sections, some general considerations and design principles are presented which shall guide the Contractor during the design development and execution.



14.4.1. Knowledge and skills from outside of the Purchaser community are therefore called upon so that, the most relevant solutions are integrated into the offer, without losing sight of operational, economic or other criteria.

14.4.2. Without prejudice to the responsibilities of the Architect and Engineer Company (A/E) (for reference see respective sections herein in this Annex) the attention of the Contractor is drawn to the fact that any material, equipment and installation, regardless of what it might be, shall be submitted for the approval of the A/E and then presented to the Purchaser, before implementation.

14.4.3. The opinions and proposals of the A/E architect and author of the design shall be formulated explicitly in the relevant technical descriptions.

14.4.4. Any material, equipment, structure and installation used, installed, built, modified, and connected without having been presented to the Purchaser, with or without the agreement of the A/E, risks having to be immediately dismantled and removed from the site, by and at the expense of the Contractor, without the latter being able to claim any compensation.

14.4.5. In addition, copies of the delivery and shipping manifests of materials and equipment sent to the radio site shall be delivered both to the Purchaser and THN PM/Site Coordinator.

## **SECTION 15 TECHNICAL SPECIFICATIONS**

### **15.1 Aims.**

15.1.1. The study, designs and work execution shall comply with the requirements stipulated herein in this Annex. The requirements are linked to the Civil Works requirements also formulated herein in this Annex and in site specific Appendixes.

15.1.2. Where applicable, a specific level of performance, a specific technical description or a specific reference to an existing product, Purchaser Furnished Equipment (PFE), may be included in the SOW. In this case the Contractor shall comply with it as necessary.

15.1.3. Where appropriate, materials and technical solutions are prescribed by the Purchaser in general terms. However, the technical solutions offered by the Contractor must be validated and justified (calculation notes, technical sheets, etc.) by the Contractor's design office (A/E), which takes full responsibility for it.

15.1.4. The Contractor shall develop their design and present their descriptions in the form of relevant graphics, drawings, layouts, calculation, and narrative including the following as a minimum:

- a. Nature of construction, demolishing, dismantling, refurbishment or new build works as well as installation works
- b. Application – where and why given material and equipment are used / proposed for installation, construction, demolishing and dismantling works
- c. Equipment, installations and material performance parameters
- d. Bill of quantities in accordance with THN standards or standards in force in the THN (for example Civil Engineering Standard Method of Measurement (CESMM))
- e. Unit of measurements for offered material, equipment, installations, demolishing and dismantling works as well as structures
- f. Identification and description of method of implementation (including earth works, construction, installation, demolishing and dismantling works)
- g. Work schedule
- h. Health and Safety coordination documents

15.1.5. Without prejudice to the requirements laid out in the core SOW document, the Contractor shall respect the requirements and composition of the undermentioned civil works.

### **15.2 Technical documents.**

15.2.1. The Contractor shall provide within the Technical Documents the following:

- a. Plans/ drawings
- b. Explanatory texts and calculation notes
- c. Detailed descriptions of works and equipment
- d. The quantity (bill of quantities)

**15.3 The work schedule.**

15.3.1. The Contractor shall propose a succinct Gantt-type schedule, presenting the main stages of the work to be carried out and in line with the Schedule of Supply and Services (SSS).

15.3.2. This schedule shall present the "civil works sub-project" integrated into the core of this SSSB project and shall be established taking into account all the requirements mentioned in this Contractor document, including the main milestone delivery dates (civil works and installation of SSSB transmission equipment, external services, etc.) and the necessary links between the specific civil works tasks and the other tasks of the core project.

15.3.3. This schedule shall also include all the tests and trials planned for prior the technical acceptance of major equipment, site tests, provisional acceptance, etc.

**15.4 Documents relating to and explaining the choice of Architect and Engineer Company (A / E).**

15.4.1. The Contractor shall demonstrate that their choice of A/E satisfies the qualitative selection rules as well as its composition as described in the core SOW, Section 6 (Quality Assurance).

**15.5 Health and Safety Coordination Documents**

15.5.1. The Contractor shall provide the name, contact details and list of Suitably Qualified and Experienced Person (SQEP) of the person(s) appointed as Health and Safety Coordinator(s).

15.5.2. The Contractor shall provide formal documents (such as certified copies of relevant diplomas, professional certificates, certificates of successfully exams or exams organized specifically for the H&S on construction sites, civil works and related designs) demonstrating that the Health and Safety Coordinator(s) are:

- a. Qualified and capable of being responsible for H&S of the study phase, design and, if the bid is selected, for the safety coordination in execution phase
- b. Possesses all legally required accreditations in the THN to fulfil the role of "health and safety coordinator".
- c. Has professional experience and proof of professional experience shall be provided in the form of a declaration of honor signed by the candidate for the "health and safety coordinator"

- d. The Purchaser reserves the right to check all the information requested; in the event of inaccuracies, the Contractor runs the risk of seeing his offer as not meeting requirements.

### **15.6 Other documents**

15.6.1. Technical documents (the pre-design and schematic design shall include (non-exhaustive list):

- a. Plans/ drawings:
- b. All plans/ drawings shall be produced in English.
- c. For formats, numbering, legends, representations, symbols and other indications the Contractor shall adhere to respective standards and best engineering / design practices.

15.6.2. Civil Works Infrastructure shall include as a minimum:

- a. The general situational layout showing the construction site, the site installations, buildings, access to the site, cables, pipes etc. (scale 1/500)
- b. The general site plan (1/500) including the demolition phases, accesses, roads and parking lots, buildings, foundations for antennas and other installations, fences, safety zones, etc.
- c. Drainage installations (1/100 and / or 1/200 scale)
- d. Cables, pipes, ducts and trenches (1/100 and / or 1/200 scale)

15.6.3. Buildings and miscellaneous constructions shall include as a minimum:

- a. General plans/ layouts per building and level (1/100 scale) with equipment layout
- b. The cross sections drawings necessary in order to be able to obtain a complete concept of the design (scale 1/50)
- c. The schematic plans and drawings necessary to obtain a complete idea of the construction systems and materials to be used (scale 1/50, 1/20 or 1/10)
- d. Roof plans with outlets (1/100 scale)

Note: without prejudice to the responsibilities of the A/E, all architectural plans shall be produced and signed by a chartered architect who is accredited in THN

15.6.4. HVAC shall include as a minimum (scale 1/50 or 1/100):

- a. HVAC installation plans and drawings (with location of main equipment such is indoor and outdoor units, ventilation groups etc.)
- b. Ventilation ducts
- c. In summary, all the drawings and cross sections necessary to make the Contractors proposal understandable.

- 15.6.5. Fire protection and fighting shall include as a minimum (scale 1/50 or 1/100):
- a. Fire detection and fire alarm plans (with locations of the main components such as the automatic fire extinguishing system, control panel, fire detection sensors, fire alarm buttons, fire extinguishers, etc.)
  - b. Fire compartmentalization plan per building / zone
- 15.6.6. Electrical works shall include as minimum (scale 1/50 or 1/100):
- a. Electrical installation plans and drawings (with the location of the main components – main power distribution board, electrical distribution boards, power generators, UPS, battery rack, high-voltage cabin, etc.)
  - b. Plans with indication of lighting points and sockets
  - c. Schematic diagram of the energy distributions including the distributions from the main power distribution board to the electrical distribution boards
- 15.6.7. Fuel supply system shall include as a minimum (scale 1/50 or 1/100):
- a. Fuel supply system installation plans and drawings (with location of main equipment such is daily and buried fuel tanks, pump stations, pipes, cathodic protection etc.)
  - b. In summary, all the drawings and cross sections necessary to make the Contractors proposal understandable
- 15.6.8. Roads, paved areas and landscaping shall include as minimum:
- a. General plans and drawings (scale 1/100 and / or 1/200)
  - b. Details of the structure of roads, parking lots, paths, sidewalks, and other relevant structures, etc. (scale 1/100 and / or 1/50)
  - c. Landscaping, planting and gardening areas with significant details
  - d. The establishment of geodetic landmarks
  - e. The waste collection and storage area before disposal
- 15.6.9. Physical Security shall include as minimum (scale 1/50 or 1/100):
- a. Security zone plans including the location of fences, gates, security doors and locks for the new SSSB building and the refurbishment at 7th Air Force Radar Station (Skyros Island), including any details necessary for proper understanding of the solution
- 15.6.10. Telephony and Data Network shall include as minimum (scale 1/50 or 1/100):
- a. Data and Telephony installation plans (with installation of main components, main telephone distributor, data cabinets, etc.)
  - b. Plans with data sockets

- c. The plans of the buried outdoor cables

Note: Provision of Telephony and Data Network infrastructure and services is normally the responsibility of the THN and would normally be in situ.

**15.7 Explanatory texts and calculation notes.**

15.7.1. All stability studies shall be carried out in accordance with the requirements set out herein in this Annex and the principles of relevant national standards and best practices applicable in the THN.

15.7.2. They shall also include a description of the construction systems proposed with major constraints and major details in order to be able to assess the constructions as well as the technical characteristics.

15.7.3. They shall include a summary of the main construction elements:

- a. Composition of interior walls (materials, thicknesses, types, etc.)
- b. Composition of exterior walls (materials, thicknesses, types, etc.)
- c. Interior and exterior joinery
- d. Coverings (floors, ceilings, walls, etc.) by room or space
- e. Drainage
- f. Antenna and mast foundations
- g. Antenna and mast structures
- h. Retaining wall structure should that be required for antenna and mast erection

15.7.4. Structural calculations, stability studies, electrical calculations, HVAC parameters calculations, fuel supply system calculations, equipment studies and documents shall:

- a. Relate to construction works requiring a stability study or civil engineering equipment requiring a study
- b. Take into account at least the requirements provided in this Annex and in site specific Appendixes the nature of the soil and local weather and climatic conditions
- c. Relate to HVAC, electricity, data and telephony, fire protection system, fuel installations and all other equipment provided by the Contractor
- d. Base heat loss and heat load calculations on the principles of relevant standards and best practices applicable in THN and local climatic conditions.

15.7.5. They shall include description of the works and supplies necessary for the realization of the infrastructure and equipment installation in accordance with the standards and legislation in force in the THN.

15.7.6. They shall include quantity (bill of quantities).

## **SECTION 16 APPLICABLE DOCUMENTS AND STANDARDS**

**16.1** The documents and standards mentioned in this section are applicable to other parts of this Annex and site specific Appendixes. The other parts of this Annex and site specific Appendixes may supplement and/or amend the mentioned documents and standards when necessary.

**16.2** In case of inconsistencies and/or contradictions it is the Contractor's responsibility to sort and / or prioritize the documents cited, including the standards and directives, which they consider to be applicable and taking precedence over other documents. This process shall be in accordance with respective THN laws and regulations.

**16.3** This Annex and site specific Appendixes refer to numerous directives and standards the Contractor shall comply with for:

- 16.3.1. Designs
- 16.3.2. Equipment and material specifications and performance parameters
- 16.3.3. Provision of equipment and material
- 16.3.4. Execution of civil works
- 16.3.5. Installation of equipment and utilities
- 16.3.6. Testing and commissioning

**16.4** The Contractor is allowed to comply with equivalents of the directives and standards, referred to in this Annex and in site specific Appendixes, when all of the following conditions are met:

- 16.4.1. The equivalent standards introduce equal or more stringent requirements
- 16.4.2. The equivalent standards are recognized, applicable and in force in the THN including their MOD
- 16.4.3. The Contractor shall be able to proof (as applicable) by design, analysis, CoC, DoC, demonstration and testing that by meeting requirements to equivalent standards the Contractor meets or exceeds requirements stipulated in directives and standards referred to in this Annex and site specific Appendixes

**16.5** A list of THN GRC applicable documents and standards is as follows:

- 16.5.1. Presidential Decree 244/1980:"Cement Regulation for Concrete Works (Pre-stressed, Reinforced and Unarmed) (Government Gazette 69/A/1989).
- 16.5.2. ELOT EN 10080, ELOT 1421-1, ELOT 1421-3 "Standards for concrete reinforcement steels".
- 16.5.3. Ministerial Decision D11E/0/30123/1991 (Government Gazette 1068/B/31-12-1991 "Amendment of the New Concrete Regulation for the Design and Construction of Concrete Works".
- 16.5.4. Ministerial Decision D17a/116/4/FN429/18-10-2000 (Reinforced Concrete Regulation) EKOS 2000.

- 16.5.5. Ministerial Decision D14/50504/2002 (Government Gazette 537/B; /1-5-2002) "Adaptation of the Concrete Technology Regulation to the Requirements of the Harmonized Standard" ELOT EN 197-1.
- 16.5.6. Ministerial Decision D17a/141/3/FN 275/1999 (Government Gazette 2184/B; /20-12-1999) Hellenic Earthquake Regulation 2000 (Approval of the Greek Earthquake Regulation).
- 16.5.7. Ministerial Decision 16462/29/2001 (Government Gazette 917/B'/17.7.2001) "Cement for the Construction of Concrete Works".
- 16.5.8. Ministerial Decision D14/92330/08 (1416/B'/17.7.08) (Government Gazette 381/B'/24.3.2000) "Approval of the New Regulation of Concrete Reinforcement Steel Technology".
- 16.5.9. Ministerial Decision DIPAD/OIK. 372/2014 (Government Gazette 1457/B'/5.6.2014) "Approval of the application and use of the Euro codes in combination with the respective National Appendices)
- 16.5.10. Government Gazette 59/D/3-2-1989 "Building Regulations".
- 16.5.11. Joint Ministerial Decision D6/B'/OIK 5825 (Government Gazette 407/B/2010) "Approval of the Energy Efficiency Regulation of Buildings (KENAK)".
- 16.5.12. Ministerial Decision F.7.5/1816/88/2004 (Government Gazette 470/B/5-3-2004) "Replacement of the current Regulation of Internal Electrical Installations with the ELOT Standards and other relevant provisions".
- 16.5.13. Manual of Standard Distribution Structures of Public Power Corporation (PPC), the Instructions Distribution of PPC SA.
- 16.5.14. Greek Technical Specifications-Government Gazette 2221/30-07-12 with mandatory application in all public works.
- 16.5.15. Sewerage Regulation
- 16.5.16. Amendment and Supplementation of Presidential Decree 71/88 "Building Fire Protection Regulation" (Government Gazette 1316/B/31-12-1998)
- 16.5.17. Law 4412/2016 "Public Procurement of Works, Supplies and Services" (adjustment to Directives 2014/24/EU and 2014/25/EU) Government Gazette 147/A/08-08-2016.
- 16.5.18. Royal Degree of 13.5/1936 (Government Gazette 23-06-1936) "Regulation of Internal Hydraulic Installations" and the respective amendments
- 16.5.19. The Technical Instructions of the Technical Chamber of Greece TEE (TOTE)
- 16.5.20. Technical Instructions of the Technical Chamber of Greece No2411/86 "Facilities in Buildings and plots: Cold-Hot Water Distribution" and 2412/86 "Facilities in Buildings and plots: Sewerage Networks"
- 16.5.21. Presidential Decree 41/2018 "Building Fire Protection Regulation" (Government Gazette 80/A'/7-5-2018)



## **SECTION 17 MISCELLANEOUS**

- 17.1** The Purchaser requires the presence on site of a qualified Contractor's representative (Reference SOW Section 2 - Key Personnel), who possesses thorough knowledge of all the civil works data and requirements as stipulated in this Annex and in site specific Appendixes, qualified and capable to coordinate all of the respective works. This Contractor's representative shall be also, in a timely manner, aware of all technical aspects to ensure effective and efficient coordination with the production, delivery, construction as well as installation of equipment and material stipulated in this Annex in site specific Appendixes.
- 17.2** In case the Contractor's representative does not possess all required qualifications, experience and accreditation, the Contractor shall nominate additional individual (s) who have the required qualification and experience and to whom the execution of those concerned elements shall be entrusted.
- 17.3** The Contractor shall take into account sizing, qualities, quantities, level of efforts, tools and machinery required to meet all requirements of the SOW, this Annex and site specific Appendixes. If it appears during execution that certain works / supplies have been undersized, the relative costs (additional works / supplies) shall be entirely borne by the Contractor.
- 17.4** If not already supplied by the THN the Contractor shall supply first aid kits to THN H&S standards and regulations for the protection of own personnel during execution of the works. This shall include any necessary and associated first aid signage (i.e. Emergency contacts/locations etc.).

## **SECTION 18 SURVEYS**

### **18.1 Existing situation**

18.1.1. The existing situation is presented in the SSSB GRC - SIDP provided in Annex H to the core SOW.

18.1.2. The information in the GRC SIDP represents the boundaries of the existing military land and the planned extension that is in progress in order to determine the limits of the future site to be imperatively respected by the Contractor. If during the study of the offers by the Contractor it appeared to them that these limits must be moved and / or extended, it is up to the Contractor to justify this to the Purchaser.

### **18.2 Topographic survey and soil tests**

18.2.1. The Contractor shall be responsible for conducting the surveys necessary for the definitive, complete and correct identification of the structures and installations at the site.

18.2.2. In the execution phase, the Contractor shall not exceed the limits of the existing site as defined in the contractual documents included in the SOW.

18.2.3. Results of any previous soil tests carried out on the initiative of the GRC MOD that were made available as part of the Bidder's Information Package are only indicative. The Contractor shall still be required to conduct soil tests.

18.2.4. The soil tests for the final design shall be conducted by a specialized firm, recognized and accredited by THN.

18.2.5. The soil tests shall be completed before any works execution at the site.

18.2.6. Before start of any works at the site the Contractor shall perform a detailed topographic survey. The survey shall be executed by certified and accredited by a THN GRC real estate surveyor. The survey shall identify and document results in accordance with respective THN standards and legislation.

18.2.7. The survey shall also identify all cables and pipelines present in the work area as well as the connections to the public domain.

### **18.3 Asbestos inventory on the site**

18.3.1. In addition to the information available within the SSSB GRC - SIDP (Annex H) it is the Contractor's responsibility to conduct the necessary asbestos surveys and readings ahead of any site works.

18.3.2. The Contractor is reminded that any Asbestos inventory report provided by the THN during the bidding phase is provided purely as background info for the Contractors benefit. They have no particular contractual status and it is the Contractor's responsibility to check and validate those data for design and realization of the site civil works.

### **18.4 Other inventories**

18.4.1. It is the Contractor's responsibility to conduct an inventory prior to any intervention on the construction site.

18.4.2. This inventory shall cover all of the installations and infrastructure (including buried, concealed, on the ground and over the ground) that will remain and will not remain in place after the works in the scope of this contract are finished.

18.4.3. The purpose of this inventory is to define without possible dispute the current state and functionality of all the installations and infrastructure (including buried, concealed, on the ground and over the ground) including the ones to be demolished.

18.4.4. The inventory of the installations and infrastructure that may need to be demolished shall also define conditions under which this demolition works shall be conducted, specifically in case of asbestos presence.

18.4.5. The inventory file shall be supplied to the Purchaser in triplicate at least 10 working days before the start date of the work.

**18.5 Precautions to be taken throughout the duration of the work**

18.5.1. The Contractor shall ensure to take all necessary measures to avoid nuisance on the site and in the vicinity thereof. This includes but is not limited to:

- a. Rational planning
- b. Noise reduction measures
- c. Measures to reduce dust/mud

## **SECTION 19 ARCHITECTURE AND ENGINEERING (A/E) DESIGN**

### **19.1 General**

19.1.1. In its design and when making any choice of materials to be used, build in and installed during civil works the Contractor shall assure compliance with the THN A/E regulations on construction products as well as (EU) no 305/2011 of the European Parliament and of the Council of 9 March 2011 concerning construction products.

19.1.2. Construction works as a whole and in their separate parts must be fit for their intended use taking into account the health and safety of persons involved throughout the life cycle of the works.

### **19.2 Mechanical resistance and stability**

19.2.1. The construction works shall be designed and built in such a way that the loadings and use that are liable to act on them during their construction in progress and service life shall not lead to any of the following:

- a. Collapse of the whole or part of the work
- b. Major deformations to an inadmissible degree
- c. Damage to other parts of the construction works or to fittings or installed equipment as a result of major deformation of the load-bearing construction
- d. Damage by an event to an extent disproportionate to the original cause.

19.2.2. The Contractor shall design the civil works for service life in accordance with following standards or THN equivalents:

- a. ISO 15686-1:2011 Buildings and constructed assets - Service life planning - Part 1: General principles and framework
- b. ISO 15686-2:2012 Buildings and constructed assets - Service life planning - Part 2: Service life prediction procedures
- c. ISO 15686-4:2014 Building Construction - Service Life Planning - Part 4: Service Life Planning using Building Information Modelling
- d. ISO 15686-8:2008 Buildings and constructed assets - Service-life planning - Part 8: Reference service life and service-life estimation
- e. ISO/TS 15686-9:2008 Buildings and constructed assets - Service-life planning - Part 9: Guidance on assessment of service-life data
- f. ISO/TR 15686-11:2014 Buildings and constructed assets - Service life planning - Part 11: Terminology

19.2.3. The Contractor shall design the civil works for the following minimum service life within which no significant modernisation shall be required:

- a. The new SSSB building: 50 years
- b. Roads, parking and pavements: 30 years

- c. Electrical installations: 30 years
- d. HVAC: 20 years
- e. Fuel tanks and associated installations: 30 years
- f. Antenna masts: 30 years
- g. Any other infrastructure and installations: 20 years

### 19.3 Environmental and climatic conditions

19.3.1. The new SSSB building, installations, utilities and any other infrastructure with their foundations and ancillaries, that are the Contractor's responsibility, shall be capable of withstanding the following environmental conditions without suffering degradation of performance and without suffering permanent mechanical damages:

- a. Local climatic conditions defined according to STANAG 4370, edition 7, November 2019 – AECTP-230 Climatic Conditions (Edition 1), where following climatic categories are applicable:
  - i. A3 Intermediate and
  - ii. C0 Mild Cold
- b. Ice accumulation: glaze ice 0.9 g/cm<sup>3</sup>
- c. High Temperature: + 49° C for operation
- d. Low Temperature: - 19° C for operation

19.3.2. When designing and erecting the new SSSB building, masts with all associated ancillaries, fences etc. the Contractor shall apply Eurocode EN1991-1-4 (Eurocode 1 Part 1-4: General actions Wind actions). This publication provides guidance on the determination of natural wind actions for the structural design of buildings and civil engineering works. For the calculation procedure and especially for the determination of wind actions following shall be applied:

- a. The fundamental basic wind velocity  $v_{b,0}$  which is the 10 minute mean wind velocity with an annual risk of being exceeded of 0.02 irrespective of wind direction at a height of 10m above flat open country terrain, has a value in the National Annex  $v_{b,0}=33\text{m/s}$  for the Greek Islands in general.
- b. The basic wind velocity  $v_b$ , which is the fundamental basic wind velocity modified to account the direction of the wind and the season, shall be calculated from the equation:  $v_b = C_{dir} \times C_{season} \times v_{b,0}$ . The recommended value for  $C_{dir}$  (the directional factor) and  $C_{season}$  (the season factor) is 1.
- c. Terrain roughness: There are 5 terrain categories. For the two sites in Skyros Island (Kartsinoudi and Limnonari) as well as Site Sideros in Crete, the terrain category is No 0 (sea or coastal area exposed to the open sea). For the Site Kythira and Site Mavros in Crete the terrain category is No III (Area with regular cover of vegetation or building or

with isolated obstacles with separations of maximum 20 obstacle heights (such as villages, suburban terrain, permanent forest)).

19.3.3. Hailstones of up to 25 mm diameter, 0.9 g/cm<sup>3</sup> density and 58 m/s terminal velocity

19.3.4. Sand and dust concentrations up to 1 g/m<sup>3</sup>, with particle size down to 20 µm at an air speed up to 20 m/s

19.3.5. The design, manufacturing, installation and building process shall ensure that all infrastructure is resilient against salt corrosion as many of the radio sites are located close to the sea. Further requirements are provided in site specific Appendixes.

#### **19.4 Safety in case of fire**

19.4.1. The construction works shall be designed and built in such a way that in the event of an outbreak of fire:

- a. The load-bearing capacity of the construction can be assumed for a specific period of time
- b. The generation and spread of fire and smoke within the construction works are limited
- c. The spread of fire to neighboring construction works is limited
- d. Occupants can safely leave the construction works or be rescued by other means
- e. The safety of rescue teams is taken into consideration

#### **19.5 Hygiene, health and the environment**

19.5.1. The construction works shall be designed and built in such a way that they shall, throughout their life cycle, not be a threat to the hygiene or health and safety of workers, occupants or neighbours, nor have an exceedingly high impact, over their entire life cycle, on the environmental quality or on the climate during their construction, use and demolition, in particular as a result of any of the following:

- a. The giving-off of toxic gas
- b. The emissions of dangerous substances, volatile organic compounds (VOC), greenhouse gases or dangerous particles into indoor or outdoor air
- c. The emission of dangerous radiation
- d. The release of dangerous substances into ground water, marine waters, surface waters or soil
- e. The release of dangerous substances into drinking water or substances which have an otherwise negative impact on drinking water
- f. Emission of flue gases or faulty disposal of solid or liquid waste

- g. Dampness in parts of the construction works or on surfaces within the construction works.

### **19.6 Safety and accessibility in use.**

19.6.1. The construction works shall be designed and built in such a way that they do not present unacceptable risks of accidents or damage in service or in operation such as slipping, falling, collision, burns, electrocution and injury from explosion.

19.6.2. The new SSSB building shall be designed and built taking into consideration accessibility and use for disabled persons.

### **19.7 Protection against noise**

19.7.1. The construction works shall be designed and built in such a way that noise perceived by the occupants or people nearby is kept to a level that shall not threaten their health and shall allow them to sleep, rest and work in satisfactory conditions.

19.7.2. The Contractor shall assure that the minimum health and safety requirements regarding the exposure of workers to the risks arising from noise are met as stipulated in the Directive 2003/10/EC of the European Parliament and of the Council of 6 February 2003 or equivalent THN regulation / standard.

### **19.8 Energy economy and heat retention**

19.8.1. The construction works and their heating, cooling, lighting and ventilation installations shall be designed and built in such a way that the amount of energy they use shall be as low as practically possible, assuring their full functionality and performance according to the contractual requirements, taking into account the occupants and the climatic conditions of the location.

19.8.2. The construction works shall also be energy-efficient, using as little energy as possible during their construction and dismantling.

### **19.9 Sustainable use of natural resources**

19.9.1. The construction works shall be designed, built and/or demolished in such a way that the use of natural resources is sustainable and in particular ensure the following:

- a. Reuse or recyclability of the construction works, their materials and parts after demolition (if applicable)
- b. Durability of the construction works
- c. Use of environmentally compatible raw and secondary materials in the construction works.

### **19.10 Design rules**

19.10.1. The design, execution and control rules for the works shall be defined by THN standards and technical specifications (EUROCODES, etc.), relating to the

mechanical strength and stability of the construction works and their structural components.

**19.11 Verification of studies and designs by an approved control office**

19.11.1. The stability and equipment calculations relating to the civil works part of the project shall be conducted and signed off by an engineer or any other person with the required training and qualifications, legally recognized and accredited for the type of work or equipment relevant to his/her part of the study and design of which he/she is in charge of.

19.11.2. The studies and designs shall be checked and approved by an independent accredited control office before presentation to the Purchaser.

19.11.3. This control is required in execution and the risks relating to possible modifications and their costs resulting from this control shall be exclusively attributable to the Contractor.

19.11.4. The independent control office shall be approved by the THN Accreditation body, the EA (European Co-operation for Accreditation), the ILAC (International Laboratory Accreditation Co-operation) or the IAF (International Accreditation Forum). The regulatory body must, however, be from a NATO member country participating in the financing of the project.

**19.12 Calculation notes**

19.12.1. The calculation notes shall be dated and signed, the different versions shall be numbered.

19.12.2. The calculation notes shall clearly present as the minimum following elements:

- a. The starting hypotheses
- b. Material characteristics
- c. Modelling of the structure and the way in which general stability is considered
- d. The values of the actions and their references
- e. The calculation method used
- f. The values of the safety coefficients and the references
- g. Considered combinations and references
- h. The requirements required for the service limit state (limit deformations, etc.)
- i. The sustainability requirements (minimise material use, energy consumption, pollution emissions, waste generation, etc.)

19.12.3. The calculation notes and the complete structure design shall be based on principles presented in following publications (not exhaustive list):



- a. ISO 2394:2015 - General principles on reliability for structures
- b. EN 1990: Eurocode - Basis of structural design
- c. EN 1991: Eurocode 1 - Actions on structures
- d. EN 1992: Eurocode 2 - Design of concrete structures
- e. EN 1993: Eurocode 3 - Design of steel structures
- f. EN 1994: Eurocode 4 - Design of composite steel and concrete structures
- g. EN 1995: Eurocode 5 - Design of timber structures
- h. EN 1996: Eurocode 6 - Design of masonry structures
- i. EN 1997: Eurocode 7 - Geotechnical design
- j. EN 1999: Eurocode 9 - Design of aluminium structures

**19.13 Presentation of calculation notes**

19.13.1. The detailed calculation notes and the detailed design (including execution design) produced by A/ E shall be verified and approved by an independent control office before transmission to the Purchaser.

19.13.2. The endorsement of the independent control office does not automatically imply acceptance of these calculation notes and designs by the Purchaser. The latter reserves the right to monitor and make any comments it deems necessary.

19.13.3. The Contractor shall submit the detailed calculation notes and the detailed design (including execution design), verified and approved beforehand by the independent control office, to the Purchaser, within a period taking into account:

- a. The schedule for works execution
- b. Upstream of this work (manufacturing time, supply, etc.)
- c. The period necessary for the Purchaser to review these documents as stipulated in SSS

## **SECTION 20 CONSTRUCTION PERMIT PROCEDURE**

### **20.1 General**

20.1.1. The Contractor shall prepare the designs and all studies (e.g. the Radio Hazard Studies) and submit them to the appropriate department of the Hellenic Navy General Staff (HNGS/C4) for approval.

20.1.2. The Contractor shall submit the complete file of the construction permits, supplemented by any other studies and permits that are required at the radio site locations.

20.1.3. The submittal of the construction permit file shall meet respective THN laws and regulations.

20.1.4. The Contractor shall be solely responsible for preparation and submittal of the construction permit file in terms of its completeness, correctness and timely presentation to relevant THN authorities.

20.1.5. The Contractor shall be solely responsible for all required administrative efforts associated with construction permit application (for example meetings with local authorities, electricity providers, fire brigade, preparation of required documents, reports, analysis etc.)

20.1.6. The works can only start after obtaining the construction permit. If necessary, the Contractor shall adapt its Civil Works design and technical solutions by implementing any modifications, required by the relevant THN authorities in order to bring the file into full compliance with THN laws and regulations. This entire process shall be executed at no additional cost to the Purchaser.

## **SECTION 21 CIVIL WORKS INFRASTRUCTURE**

### **21.1 Site organization criteria**

21.1.1. The organisation of the site shall be proposed by the Contractor.

21.1.2. The solution chosen by the Contractor shall reduce or even prevent any nuisance to the environment and the surrounding area, such as noise, dust, mud, debris etc. In particular, the public roads leading to the site shall be kept free in all circumstances, unless prior agreement has been obtained from the local authority.

### **21.2 Fences, signs and marking**

21.2.1. The Contractor does not have the exclusive right to use the accesses to the site. Free access for the Purchaser, THN personnel as well as their vehicles shall be ensured throughout the duration of works in compliance with civil and military security rules.

21.2.2. Before the start of any works at the site the Contractor shall close the work site/area by means of a fence. This fence shall:

- a. Assure the necessary access to the site (including emergency gate(s))
- b. Be made using prefabricated panels with a minimum height of 1.80 m and composed of a galvanized steel frame and covered with a galvanized steel trellis
- c. Be installed in a solid manner in accordance with respective THN regulations in force.
- d. Include the necessary signage, lighting and beaconing
- e. Remain the property of the Contractor (including the necessary signage, lighting and beaconing) throughout the duration of the contract and the Contractor shall ensure its maintenance and if necessary, repairs.

21.2.3. The Contractor shall keep in place the work site/area fence:

- a. Until the work site/area is declared jointly, by the Contractor and the Purchaser, as secured and safe and
- b. Until the work site/area fence replacement by a permanent new fence, provided by the Contractor where applicable

### **21.3 Contractor's facility and equipment at the site**

21.3.1. Except for facilities and installations offered to and agreed by the Contractor for use for the entire duration of the project, the Contractor is responsible for provision of all necessary facilities and installations at the site for its staff and subcontractors. This includes provision and installation of electricity, water and gas meters.

21.3.2. All of the facilities and installations mentioned in the paragraph right above shall meet the regulations and legal prescriptions in accordance with respective THN regulations in force.

21.3.3. The Contractor shall make available to the Purchaser, at the latter's request, for the duration of the work, up to and including the date of Provisional Acceptance, all prescriptions, specifications, standards, measurement code and all other documents deemed necessary for planning, designing and execution of works. The document shall be made available both at the site during site visits and via email when required.

21.3.4. In addition, the Contractor shall make available on an ad hoc basis to the Purchaser, at the latter's request, all the measuring instruments (theodolite, leveler, level, measure tape, rangefinder etc.) necessary to control the proper performance of the work at the site.

#### **21.4 Demolition and site preparation works**

21.4.1. The dismantling and demolition of any required work shall be executed with the greatest care in order to preserve the infrastructure, installations and equipment remaining in place and in compliance with best industry practices and with respective THN regulations in force (including the regulations on the protection of the environment).

21.4.2. Any damage caused by lack of care and / or precision by the Contractor shall be repaired by the Contractor at the Contractor's expense and to the satisfaction of the Purchaser.

21.4.3. The dismantling and demolition works shall include as required indoor and outdoor elements of all kinds, visible, buried, concealed, over ground regardless of their dimensions, location, height in the building, including all incorporated and adjoining elements such as means of anchoring, assembling, fixing, etc.

21.4.4. The remaining in place infrastructure, installations and equipment shall be preserved in their stable state by any suitable means such as props, scaffolding, woodwork, pinning, excavation formwork, anchoring, temporary supporting structures etc.

21.4.5. Unless specifically mentioned elsewhere in the SOW and / or subsequently in any Purchaser's communication to the Contractor, the products of dismantling and demolition (including asbestos), as well as the earthworks products shall be evacuated from the site by the Contractor at its expense.

21.4.6. Amongst other THN rules and regulations in force the Contractor shall also apply requirements stipulated in (or THN legislative equivalent):

- a. Council Directive 1999/31/EC of 26 April 1999 on the landfill of waste
- b. Directive 2008/98/EC of the European Parliament and of the Council of 19 November 2008 on waste and repealing certain Directives

21.4.7. The cost for disposal at facilities to which the products of dismantling, demolition and earthworks are evacuated is the sole responsibility of the Contractor. The Contractor shall strictly comply with the latest regional regulations in force governing these matters.

21.4.8. The Contractor shall evacuate the products of dismantling, demolition works and any other waste generated by the Contractor's activities only to the approved facilities for disposal, sorting and recycling.

21.4.9. The Contractor shall provide to the Purchaser certificates of destruction, recovery or recycling of the products scoped for disposal.

21.4.10. The Contractor shall also provide official proof (approval by local/regional authorities) confirming its qualification as a collector / transporter for the products mentioned herein in this Annex. Otherwise, the Contractor shall entrust the collection and/or transport of these products to a subcontractor duly approved by the local/regional authorities, for which the Contractor shall also provide the official proof requested above.

### **21.5 Possible pollution**

21.5.1. Identification of soil pollution not known before effective date of contract signature.

- a. In the event of the identification of soil pollution during earthworks (for example, but not limited to hydrocarbons), the Contractor shall immediately notify the Purchaser.
- b. The Contractor shall take all precautionary measures without delay and shall follow the procedures outlined by the municipal and regional authorities for the removal of polluted land and its treatment on an approved site.
- c. If the quantity of polluted soil does not exceed 20 m<sup>3</sup> no additional costs to the Purchaser shall be claimed by the Contractor.
- d. For the quantities above 20 m<sup>3</sup>, the Contractor can submit an ECP claim to the Purchaser in accordance with Clause 37 of the Contract Special Provisions.

### **21.6 Tree felling/Shrub Removal**

21.6.1. Where required tree felling permits and tree felling execution is the responsibility of the Contractor and shall be executed at no additional cost to the Purchaser.

21.6.2. Required tree felling/shrub removal also includes the complete removal of stumps and roots within a radius of at least 2.50 m from each removed tree and to a depth of at least 1.00 m by any appropriate means (the use of explosives is however prohibited) as well as the leveling off the ground by filling the void by means of arable earth or native soil, free of all waste of organic origin, hard elements, rubble of all types and implemented in layers of 0.20 m thickness and compacted.

21.6.3. The Contractor will be instructed to cut the trees, shrubs and any other vegetation only if necessary for the SSSB project implementation and not for Contractor's convenience and/or additional profit. Therefore, it shall be noted that in case Territorial HN Law and regulations require to pay compensation (to national authorities, local authorities or any other public or private institution or entity) for

trees, shrubs and any other vegetation that have been cut and/or requires replanting any of them in other areas as a form of that compensation, or combination of both those measures, it shall be the Territorial HN responsibility.

### **21.7 Disassembly and disconnection of existing utilities**

21.7.1. In case any works at the site (including dismantling and demolition works) require temporary termination of utilities and services delivered to the site and/or to any other property that is affected by this temporary termination, it shall be the Contractor's responsibility to coordinate all efforts and obtain necessary approvals from local THN authorities, utility providers etc. in accordance with respective THN regulations in force.

21.7.2. The temporary termination of utilities and services includes disconnections and dismantling works, which shall also be the Contractor's responsibility.

21.7.3. The disconnections and dismantling works shall be conducted only if necessary and with the greatest care in order to preserve utilities which must remain in place.

21.7.4. The works shall be conducted in compliance with best industry practices and with respective THN regulations in force (including the regulations on the protection of the environment).

21.7.5. Any damage caused by lack of care and/or precision by the Contractor shall be repaired by the Contractor at their own expense and to the satisfaction of the Purchaser and local authorities governing respective utilities.

21.7.6. Before starting any dismantling, the Contractor shall disconnect, under its responsibility the electrical, telephone, fiber optic, heating and water supply networks, including emptying of these installations when required.

21.7.7. The products and waste generated in conjunction with dismantling works shall be removed by the Contractor at his expense in accordance with the requirements stipulated in relevant paragraphs above.

### **21.8 Protection of adjacent infrastructure and installations**

21.8.1. The Contractor shall be responsible for provision and installation of all necessary equipment and measures for the protection of the infrastructure and installations adjacent and located in the immediate vicinity to the works executed under this contract, as necessary.

21.8.2. The equipment and measures shall be installed and implemented in accordance with respective THN regulations in force.

21.8.3. The equipment and measures shall meet the following requirements (non-exhaustive list):

- a. Provide temporary protection against shock, water, dust, etc.
- b. Assure passage of people and vehicles as required
- c. Meet requirements of respective THN health and safety regulations

21.8.4. The Contractor shall be responsible for the removal of any temporary equipment and measures as soon as possible, depending on the work progress and upon the agreement with the Purchaser and relevant THN authorities.

### **21.9 Site connection to utilities**

21.9.1. The Contractor shall be responsible for connection of the site to all utilities (electricity, telephone network, fiber optic cabling, drainage networks etc.).

21.9.2. The connection to all utilities shall be planned and implemented in accordance with respective THN regulations.

21.9.3. The Contractor shall be responsible for payment of all costs for utilities used by the Contractor and its Sub-Contractors during the entire duration of the project.

21.9.4. The cost for the utilities shall be billed directly to the Contractor by the companies providing respective utilities and services.

21.9.5. It is the Contractor's responsibility to make arrangements for the provision of all utilities and services (including payment arrangements) with respective providers.

21.9.6. The removal of any temporary site connections to utilities (electricity, telephone network, fiber optic cabling, water distribution and drainage networks), as well as the restoration of all utilities connections to their initial state before the Contractor started activities at the site, are the Contractor's responsibility.

### **21.10 Cleaning before commissioning**

21.10.1. The Contractor is responsible for cleaning, restoration and making good of all areas, facilities, installations and site terrain (indoor and outdoor) that were affected by the Contractor's activity.

21.10.2. This cleaning, restoration and making good shall take place before the provisional acceptance preceding the commissioning of the installations, equipment and facilities at given site.

21.10.3. The result of this cleaning, restoration and making good of all areas, facilities, installations and site terrain (indoor and outdoor) shall be to a high sanitary condition allowing commissioning and immediate use at the latest upon provisional acceptance of this civil works part.

21.10.4. The cleaning, restoration and making good activities shall also include the site immediate vicinity, access road and any other infrastructure and terrain outside of the site that were affected by the Contractor's activity.

### **21.11 Earthworks**

21.11.1. The Contractors' attention is specifically drawn to the existence of underground pipes, cables and other infrastructure located in the works area. The plans, maps and layouts will be provided at or prior to provision of the Bidder's Information Package.

21.11.2. It is the Contractor's responsibility to verify by any means deemed useful (i.e. by field survey with the utilisation of ground penetration radar etc.) the accuracy of any plans, maps and layouts and to supplement them if necessary before any earthworks. No additional costs by the Purchaser will be accepted in this context.

21.11.3. It is the Contractor's responsibility to execute all of the required earthworks under this contract in accordance with respective THN regulations. This activity includes the following (non-exhaustive list) tasks:

- a. Excavations
- b. Trenching and ditching
- c. Profiling and compacting
- d. Landfills and backfills
- e. Slope and cut works (including strengthening of any surfaces by means of chemical, mechanical and any other engineering method (including retaining walls))
- f. Stabilisation works for any earthworks as directed by A/E design and results of soils tests and studies
- g. Move of earth masses within the site and outside if any surplus of earth requires evacuation to designated areas
- h. Demolition of all types of rock masses, roots, installations and structures of any type and size buried in the earthworks area
- i. All soils tests, studies and samplings deemed necessary by the project author (A / E)
- j. The tests shall be executed by approved THN official laboratory in the presence of a qualified engineer or other qualified representative from the Contractor's A/E or Sub-Contracted A/E.

21.11.4. The following topsoil cutting requirements shall be taken into account:

- a. The topsoil layer shall be removed to an average thickness of 20 cm over the entire extent of the work area.
- b. Depositing of this topsoil layer shall be done at a location designated in the implementation plans and designs on the site with the aim for its re-use in the locations provided for in the plans and designs.
- c. The topsoil level shall be free of stones greater than 5cm diameter and free of foreign impurities.

21.11.5. The Contractor shall take into account any required groundwater recovery works and groundwater lowering.

**21.12 Protection, against any damage, of all existing utilities and structures crossing and located along the earthworks.**



21.12.1. The Contractor shall take into account any protection against damage of existing utilities and structures crossing and located along the earthworks. Where necessary the utilities and structures shall be hanged or supported by temporary fixings to allow continuity of services provided by those utilities and structures.

21.12.2. During the earthworks, the Contractor is obliged to maintain a safe distance (vertically and horizontally) from water, gas, sewage, electricity, telephone lines etc.

21.12.3. In case of encountering utilities and structures not shown in the project documentation or hazardous material of any type (including unexploded ordnance, explosive remnants of war etc.) the Contractor shall mark the place immediately and notify ASAP the Force Commander relevant of the THN/local authorities, companies (such as energy providers, water providers etc.) as well as the Purchaser, through the designated H&S chain of command.

21.12.4. The Contractor shall carry out hand excavation in every case where the depths and location of executed works imply risk of damage to other existing infrastructure and/or utilities. Notwithstanding the above, when using mechanical equipment, the earthworks shall be continuously observed so each excavated volume of soil is monitored.

### **21.13 Evacuation of rainwater**

21.13.1. The Contractor shall design and build the complete drainage system for the new SSSB building and when required shall connect it to existing site drainage system, according to the requirements of the THN local authorities.

21.13.2. The Contractor shall make coordination with the local authority and if required develop a study to be approved by the latter.

21.13.3. Description:

- a. Where rainwater pipes will be placed in the same trench with existing wastewater drainage pipes, the design and work shall be carried out so that no confusion is possible between the two types of pipes.
- b. The piping system shall be built with adequate slopes so that the rainwater flows properly.
- c. The drillings at the pipe entries to the buildings shall be executed with good care and without burrs.
- d. The penetrations shall be fitted with sheaths/ sleeves on the entire thickness of the walls and floors.
- e. These sheaths/ sleeves shall have a larger diameter (about 1cm) than the outside diameter of the pipe to be protected. The filling of the joints and spaces between pipes and sheaths/ sleeves shall be made from a waterproof material with perfect elasticity and great thermal and chemical characteristics.
- f. The installation shall provide all necessary elements according to A/E design, such as fixed and removable assemblies, elbows, fittings,

expansions, supports, manholes, air intake for atmospheric pressure, connections and joints, sumps, cast iron covers for manholes and sumps in accordance with EN-124 of THN equivalents etc.

- g. Before testing and commissioning of the installation, the Contractor shall conduct a complete cleaning of the installation.

**21.14 Buried Cables, Sheaths and Conduits - Construction of Trenches**

21.14.1. In principle, the trenches and embankments shall be executed during the earthworks phase, before any construction of roads, paths and/or other paved areas.

21.14.2. The cable laying shall be completed in trenches for all outdoor cables as stipulated in this Annex and in site specific Appendixes.

21.14.3. The cable laying shall be done in accordance with respective THN regulations, including the foundation layer, protective conduits and sheaths, safety marking, backfill etc.

21.14.4. Whenever cables are placed in protective conduits and sheaths:

- a. The inside surfaces of any protective conduits and sheaths shall be even and smooth without any burrs;
- b. Shall be of a sufficient size to ensure at least 50% of reserve;
- c. Shall be fitted with a wire puller;
- d. In case of a cable pull, the activity shall be followed by a replacement wire puller.

21.14.5. All of the cables (data, signal, electrical) shall be provided as armoured (galvanized steel wire armor cables), UV and weather resistant (ISO 4892).

## **SECTION 22 NEW SSSB BUILDINGS, ANTENNA FIELDS AND MISCELLANEOUS**

### **22.1 Earthworks**

22.1.1. The earthworks for the foundations of the new SSSB building, antenna masts and other structures (such as roads, fences, parking, fuel installations, sign poles etc.) shall be executed in accordance with respective THN regulations.

22.1.2. When conducting earthworks, the Contractor shall protect personnel, machinery and equipment against landslides by adequately supporting and strengthening the earthworks.

22.1.3. If for any reason the supporting and/or strengthening of the slopes is not possible, the Contractor shall execute the earthworks assuring natural slope inclination in given soil conditions.

22.1.4. The Contractor is also responsible for backfilling of all excavations to ensure required stability of the backfill and structures affected by and related to given earthworks.

22.1.5. The backfill shall be conducted with compactions of all successive layers with the thickness of each layer not exceeding 20 cm.

### **22.2 Foundations**

22.2.1. The foundations of the new SSSB building, antenna masts and other structures (such as roads, fences, parking, fuel installations, sign poles etc.) shall be executed in accordance with respective THN regulations.

22.2.2. All required foundation shall be built in prepared excavations where the bottom of the excavation shall be levelled and covered with a sub-base material layer to ensure stability of the built foundation.

22.2.3. The design of the foundation shall be developed with due consideration given also to the frost depth (also known as frost line) where the location requires it.

22.2.4. The foundation shall be protected by vertical and horizontal hydro insulation (damp course) according to requirements driven by local hydrological conditions, soil type and terrain shape (also known as landform) around the foundations.

22.2.5. The horizontal hydro insulation (damp course) shall be tightly connected with the vertical one so that the joints of the insulations materials do not become places where water ingress occurs.

### **22.3 New SSSB Building structure**

22.3.1. Choice of structures.

22.3.2. As part of the “turnkey” analysis, for any new build infrastructure, the Contractor shall offer the best quality / price ratio for building structures (including maintenance and repair costs over the lifetime), taking into account the following:

- a. The requirements stipulated herein in this Annex and in site specific Appendixes
- b. Fire compartmentalization
- c. The specific function of each room and installation
- d. The load bearing structural elements such as foundations, floors, ceilings, beams and lintels etc. shall be made of reinforced concrete.

22.3.3. The walls (both load bearing and non-load bearing), external and internal, shall be made of one of the below listed materials or combination of those:

- a. Reinforced concrete
- b. Masonry
- c. Pre-Panelized Load Bearing Metal Stud Walls
- d. Engineering Brick
- e. Stone
- f. Calcium silicate board – only for internal partitioning walls and ceilings

22.3.4. All of the premises shall be free of any columns.

22.3.5. Modular layouts shall be used wherever possible.

22.3.6. The materials used to construct buildings and other infrastructure shall not contain asbestos. The Contractor shall confirm this by providing the Purchaser with an “asbestos-free” certificate for the new SSSB building and "asbestos-safe" for a renovated building, issued by accredited body in the THN.

## **22.4 Concrete**

22.4.1. Concrete used can be either poured in place or as precast concrete (unless specific requirements are further formulated for given infrastructure).

22.4.2. The used technology shall be presented in the form of drawings and narrative including as a minimum:

- a. Detail plans
- b. Formwork and reinforcement plans
- c. The execution methods and the special precautions to be taken during the construction of reinforced concrete structures
- d. Concrete and steel inspection requirements

22.4.3. The requirements for any pre-fabricated concrete elements shall refer to standards, codes of best practice and guidelines applicable in the THN and issued by recognized organizations such as:

- a. CE certification of factory production control
- b. Federation of the European Precast Concrete industry

## **22.5 Masonry**

22.5.1. Masonry shall meet the characteristics and performance requirements as specified in EN 771-1+A1: 2015 'Specification for masonry units' or the THN national equivalent.

22.5.2. The implementation of the masonry shall be based on specialised techniques in order to allow perfect incorporation of various equipment and installations in the masonry.

22.5.3. The Contractor shall be allowed to use hollow masonry blocks. These blocks shall ensure the stability of load-bearing masonry, and meet the specific requirements for masonry including respective requirements applicable to:

- a. Hollow masonry blocks
- b. Structural galvanized steel reinforcements
- c. Mortar
- d. Build and installation techniques

## **22.6 Metallic structures**

22.6.1. The following standards or THN equivalents shall apply (non-exhaustive list):

- a. EN 10025-2:2019 Hot rolled products of structural steels
- b. EN 10025-3:2019 Hot rolled products of structural steels - normalized rolled weld able fine grain structural steels
- c. EN 10025-4:2019 Hot rolled products of structural steels - thermomechanical rolled weld able fine grain structural steels
- d. EN 10025-5:2019 Hot rolled products of structural steels with improved atmospheric corrosion resistance
- e. EN 10025-6:2019 Hot rolled products of structural steels - flat products of high yield strength structural steels in the quenched and tempered condition
- f. EN 10248-1:1996 Hot rolled sheet piling of non-alloy steels
- g. EN 10269:2013 Steels and nickel alloys for fasteners with specified elevated and/or low temperature properties
- h. EN ISO 898-3:2018 Mechanical properties of fasteners made of carbon steel and alloy steel. Flat washers with specified property classes
- i. EN ISO 898-1:2013 Mechanical properties of fasteners made of carbon steel and alloy steel. Bolts, screws and studs with specified property classes. Coarse thread and fine pitch thread
- j. EN ISO 3506-1:2020 Fasteners. Mechanical properties of corrosion-resistant stainless steel fasteners. Bolts, screws and studs with specified grades and property classes

- k. BS EN ISO 3506-2:2020 Fasteners. Mechanical properties of corrosion-resistant stainless steel fasteners. Nuts with specified grades and property classes
- l. EN ISO 3506-4:2009 Mechanical properties of corrosion-resistant stainless steel fasteners. Tapping screws
- m. EN ISO 9606-1:2017 Qualification testing of welders. Fusion welding. Steels
- n. EN 287-6:2018 Qualification test of welders. Fusion welding. Cast irons
- o. EN ISO 9606-2:2004 Qualification test of welders. Fusion welding. Aluminum and aluminum alloys
- p. EN 1708-1:2010 Welding. Basic welded joint details in steel. Pressurized components

## **22.7 Wooden structures**

22.7.1. The following standards or THN equivalents shall apply (non-exhaustive list):

- a. EN 338:2016 Structural timber. Strength classes
- b. EN 14081-2:2018 Timber structures. Strength graded structural timber with rectangular cross section. Machine grading; additional requirements for type testing
- c. EN 384:2016+A1:2018 Structural timber. Determination of characteristic values of mechanical properties and density

## **22.8 Facades**

22.8.1. As part of the “turnkey” study, for the new SSSB building the Contractor shall offer the best quality / price ratio for building structures (including maintenance and repair costs over the lifetime), taking into account of the following:

- a. Respective requirements stipulated in this Annex and in site specific Appendixes
- b. Fire compartmentalization
- c. The specific function of each room and installation

22.8.2. Facades shall be designed in the light of the following criteria:

- a. Lighting
- b. Insulation
- c. Protection, etc.

22.8.3. Facades shall not contain crevices or protrusions that might serve as footholds for anyone climbing up or along the facade.

22.8.4. There shall be no external stairways.

22.8.5. Facades and other surfaces shall be easy to clean and sandblast.

22.8.6. Facade surfaces shall be made of materials which do not require the use of cleaning products based on dichloromethane (methylene chloride). Surfaces shall therefore be cleanable using high-pressure water jets without chemical additives.

22.8.7. Facades shall not include crevices or protrusions that might serve as a shelter or perch for birds.

22.8.8. For finishing material of the facades the Contractor will have the choice between (in no order of priority):

- a. Treatment and finishing of cast-in-place concrete
- b. Architectural concrete elements
- c. Exterior masonry facings of concrete blocks or terracotta bricks
- d. Metal or other cladding elements.

## **22.9 Canopy type metal cladding**

22.9.1. The Contractor shall supply and install self-supporting canopy type metal cladding made of stainless steel, rigid metal sheets.

22.9.2. The used technology shall be presented in the form of drawings and narrative including as the minimum:

- a. Sizing and type of steel
- b. The load-bearing structure
- c. The cladding panels
- d. The finishes and the installation requirements

22.9.3. The canopy type claddings shall be installed above all entries to the new SSSB building that serve as daily-use doors.

22.9.4. It is not required to install the canopy type claddings above doors that are only emergency doors or that serve only to introduce equipment into the building (such as, power room door, HVAC room door).

## **22.10 Metal protection plates**

22.10.1. Depending on the requirements relating to Physical Security the need for steel protection plates (minimum thickness 6 mm) may appear.

22.10.2. The used technology shall be presented in the form of drawings and narrative including as the minimum:

- a. Sizing and type of steel
- b. The finishes and the installation requirements
- c. Any special parts and fixings

## **22.11 Roofs**

### **22.11.1. General**

- a. This section addresses the use of materials and the realization of all works that provide roof cover for the buildings. The roofs of the various areas of the design shall not negatively affect the stability of the whole building, and shall protect the buildings in a watertight and durable manner against bad weather.
- b. All the elements used shall withstand agents and atmospheric impact, as well as the weight of equipment and maintenance personnel.
- c. If THN regulations dictate, then the structural elements shall be the subject of a stability study (calculation notes) including the definition of materials (type, composition, protection and finishes), execution methods and special precautions to be taken during the implementation of these works.
- d. Detail drawings, steel schedules and other relevant documents shall be provided before execution.
- e. Regardless of the solutions proposed, they shall include all the special parts necessary for the construction of the roofs, such as fittings, fixings, reinforcements, flaps, corner profiles, closures, hatches, gutters, etc.
- f. The design, production and installation of roof covers and other relevant elements shall be carried out in perfect coordination with the various elements of other installations that must pass through the roofs (for example cable passages).

**22.11.2. Rainwater evacuation**

- a. In principle, all the elements relating to the collection and evacuation of rainwater from the roofs (gutters and downspouts) shall be plastic rainwater piping systems.
- b. The rainwater evacuation system from the roofs shall meet requirements stipulated in following standards or THN equivalent (no exhaustive list):
  - i. EN 12200-1:2016 Plastics rainwater piping systems for above ground external use. Unplasticized poly (vinyl chloride) (PVC-U). Specifications for pipes, fittings and the system.
  - ii. EN 607:2004 Eaves gutters and fittings made of PVC-U. Definitions, requirements and testing

**22.12 Sealing**

22.12.1. The Contractor shall design and execute waterproofing membranes for the buildings and other foundations including all the elements providing the waterproofing of the entire new SSSB building and as required for building renovation works at various sites (respective scope at each site is described in site specific Appendixes).

22.12.2. The waterproofing membranes shall be implemented in accordance with various standards and technical specifications in force in the THN.



22.12.3. Waterproofing membranes for foundations shall protect against humidity, runoff and temporary standing water.

22.12.4. The detailed design shall be tailored to local hydrological conditions, soil type and terrain shape (also known as landform) around the foundations.

22.12.5. The chosen material shall be free of any solvent and odorless. It shall clog pores and prevent water absorption from cementing masonry and concrete by capillary action.

22.12.6. The Contractor shall also install a waterproofing membrane under floor and wall tiles in the form of:

- a. Liquid foil as one-constituent substance made of synthetic resins, minimum two layers, or
- b. Sealing compounds manufactured on the basis of synthetic resins and cement, minimum two layers, with additional sealing reinforcements made of glass-fiber tapes or mats.
- c. Regardless of chosen technology, the Contractor shall strengthen the corners, inlets and pipe penetrations. They shall be covered with sealing tapes and mats (flanges, bands). Ideally, all these products should come from one manufacturer.
- d. Regardless of chosen technology, the Contractor shall assure waterproofing membrane minimum thickness of 1.5 mm.

22.12.7. Regardless of chosen technology, as the minimum, the Contractor shall provide a waterproofing membrane as follows:

- a. To cover the entire floor surface under the tiles
- b. To cover walls to the height of a minimum 0,1m from the floor top surface

22.12.8. The Contractor shall also provide a waterproofing membrane and other technical solutions (for example open joints) in order to control the descending humidity of the cavity walls:

- a. At the bottom of cavity walls
- b. At the top of the door and window openings

### **22.13 Thermal insulation of the new SSSB building**

22.13.1. The thermal insulation shall be implemented in accordance with various standards and technical specifications in force in the THN.

22.13.2. The following standards and directives shall be applied for the thermal insulation design, calculation of losses and installation works (not exhaustive list):

- a. Directive 2010/31/EU of the European Parliament and of the Council of 19 May 2010 on the energy performance of buildings or THN equivalent.

- b. ISO 13789:2017 Thermal performance of buildings — Transmission and ventilation heat transfer coefficients
- c. ISO 52000-1:2017 Energy performance of buildings — Overarching EPB assessment
- d. EN 12667:2001 Thermal performance of building materials and products. Determination of thermal resistance or THN equivalent.

22.13.3. The thermal insulation shall be water repellent, it shall be neither hygroscopic nor capillary. It shall not shrink, shall not sag after installation, shall not promote the development of mould and shall not be a growing medium for bacteria.

22.13.4. All the walls of the exterior shell (facades, pitched and flat roofs) shall be the subject of a hygrometric analysis taking into account the expected interior climate and the characteristics of the various materials that might be included in the composition of the walls. The final composition of the walls shall be adjusted in light of the findings of the study in order to avoid any condensation and associated damage, especially in air-conditioned premises in winter.

22.13.5. The class of vapour barrier shall be determined either by calculation or on the basis of the recommendations listed in respective THN standards, having regard to transitory weather extremes, the thermal and hydrological inertia of the roofing materials.

22.13.6. Heat bridges are to be avoided as far as possible.

22.13.7. All heat insulation, for walls, floors, roofs and ducts, including ventilation ducts, shall be made of environmentally-friendly materials. It shall not give off volatile organic compounds. Their heat conductivity should be lower than 0.044W/mK.

22.13.8. In the event of fire, there shall be virtually no development (or low) of smoke and no toxic gases. Fire class minimum A2-s1d0, according to EN 13501-1:2018 or THN equivalent.

22.13.9. The material used for insulations shall be tested for determining the non-combustibility performance according to ISO 1182:2020 Reaction to fire tests for products — Non-combustibility test.

#### **22.14 Protective sheaths/ sleeves**

22.14.1. The Contractor shall supply and install protective sheaths/sleeves for every passage of utility pipes and lines (for example ventilation, electrical, HVAC pipes and any other ducts) when passing between compartments.

22.14.2. The sheaths/sleeves shall be of the same Fire Class as the partition in which they are installed.

22.14.3. The sheaths shall guarantee the fire-resistant sealing of all penetrations by expansion under the effect of heat.

22.14.4. The sheaths shall be made of non-flammable, low smoke halogen-free thermoplastic material and shall be placed in line with the walls, floors and ceilings to be crossed over their entire thickness.

22.14.5. The sheaths shall protrude 3 cm on each side of the crossings.

22.14.6. The inner diameter of the sheath shall be 1 cm larger than that of the pipes to be protected. The space between the pipe and the sheath shall be filled with a fire-proof acoustic material presenting a durable elasticity over time and perfect chemical inertia between the different materials present.

22.14.7. The fire-proof acoustic material shall be of the same Fire Class as the partition in which it is installed.

### **22.15 Interior flooring**

22.15.1. The internal flooring shall be implemented in accordance with various standards and technical specifications in force in the THN.

22.15.2. The floors shall be of heavy-duty industrial type with surface finish.

22.15.3. The floor surfaces shall be non-reflecting, fire-resistant and non-toxic.

22.15.4. They shall neither attract nor harbour dust and be easy to clean. Therefore, no carpeting material shall be used.

22.15.5. The floors shall be resistant to shocks caused by the use and transport of equipment to be installed under this contract.

22.15.6. The floors shall withstand rain, sleet and snow falling/dripping off boots and/or equipment moved in as well as salt from rain water.

22.15.7. In all facilities housing SSSB electronic equipment, UPS, HVAC, power generators, MPDP anti-static flooring shall be provided in accordance with:

- a. EN 61340-5-1:2016 Electrostatics. Protection of electronic devices from electrostatic phenomena or THN equivalent.
- b. EN 61340-4-1:2004+A1:2015 Electrostatics. Standard test methods for specific applications. Electrical resistance of floor coverings and installed floors or THN equivalent.

22.15.8. The anti-static flooring shall maintain electrostatic dissipative (ESD) and conductive coating performance without the need for special ESD waxes or polishes.

### **22.16 Tile floor**

22.16.1. Unless specifically required to provide a raised floor for cabling, piping and HVAC installations, the following facilities shall not be provided with raised floor and shall be finished with ceramic tiles:

- a. Corridors, hallway, vestibule
- b. Walls in all premises with floor tiles - to the height of minimum 0,1m from the floor top surface

22.16.2. When making the choice of tiles the Contractor shall adhere to EN-14411:2016 Ceramic tiles. Definition, classification, characteristics, assessment and verification of constancy of performance and marking or THN equivalent.

22.16.3. The tiles shall meet the following requirements:

- a. Anti-slip finish - R13 (Non Slip Tiles) according to DIN 51130 CEN/TS 16165 (B) standard
- b. Hardness: PEI (Porcelain Enamel Institute) abrasion class – minimum 4
- c. Number of revolutions – minimum 6000
- d. Stain resistance class – minimum 4
- e. Chemical resistance - Class A according to ISO 10545-13 Ceramic tiles — Part 13: Determination of chemical resistance
- f. Bending resistance and breaking strength – minimum values for chosen material according to ISO 10545-4:2019 Ceramic tiles — Part 4: Determination of modulus of rupture and breaking strength
- g. Minimum dimensions: 45 cm x 45 cm
- h. Neutral Colour
- i. The colour of the joints shall be determined by the Contractor according to the colour of the tiles that have been chosen.
- j. The Contractor shall also install PVC (or aluminum) edge tile trims integrated into the tiling and protecting all edges. The colour of the tile trims shall be determined by the Contractor according to the colour of the tiles that have been chosen.
- k. The tiles shall be the same in all premises (including the producer, the brand, color, type and model)

### **22.17 Raised Floor**

22.17.1. The raised floor shall meet requirements stipulated in EN 12825:2001 Raised Access Floors or THN equivalent.

22.17.2. The free height under the raised floor panels shall be determined by the Contractor taking into account the pipes and equipment of any kind to be installed under the false floor as well as the needs resulting from the HVAC calculations.

22.17.3. The load bearing capacity of the raised floor shall be determined by the Contractor taking into account all of the loads imposed on the floor in given premises. However, the minimum load bearing capacity shall be 10 kN/m<sup>2</sup>.

22.17.4. The raised floors shall be made of a metal pedestal structure with floor panels of standardized dimensions 60cm x 60cm.

22.17.5. The Contractor shall determine the need for special floor panels with ventilation grills taking into account needs resulting from the HVAC design and calculations. If such needs exist, the Contractor shall provide those special floor panels with ventilation grills.

22.17.6. The pedestal structure shall meet the following requirements:

- a. Baseplates of galvanized steel
- b. Galvanized steel columns welded to the baseplate

- c. Die-cast aluminum or steel heads
  - d. Locking nuts for height adjustment
  - e. When required - lockable stringers made of galvanized steel, to assure rigidity to the understructure and stability against lateral strain
  - f. When pedestals are omitted due to obstructions, i.e. electrical services, air ducting, etc., special bridging stringers shall be used
- 22.17.7. The floor panels shall meet following requirements:
- a. Easily removable and replaceable by means of the suction cup
  - b. Neutral Colour
  - c. The tiles shall be the same in all premises (including the producer, the brand, color, type and model)
  - d. Fire class A1, according to EN 13501-1:2018 or THN equivalent.
  - e. Fire resistance class minimum REI 30 according to EN 13501-2:2016  
Fire classification of construction products and building elements or THN equivalent.

## **22.18 Interior walls**

22.18.1. Fixed dividing walls shall be made of masonry with a minimum thickness of 10 cm.

22.18.2. The walls shall have the following fire resistance: FR60/FR1hr/REI60 or FR120/FR2hr/REI120 depending on the prevailing laws and standards. The Contractor shall note that respective THN regulations and standards in force may introduce stricter requirements for specific premises i.e. power generator rooms. In such case, the Contractor shall follow these requirements.

22.18.3. It should be possible to remove these masonry walls without compromising the stability or load-bearing capacity of the structure.

## **22.19 Interior walls finishing**

22.19.1. Interior wall finishing for example cementing shall be carried out over the total height and width of the wall to be treated on all exposed surfaces.

22.19.2. It is the Contractor's responsibility to identify solutions according to various standards and technical specifications in force in the THN respectively to given premises.

22.19.3. The top layer of the finishing shall be intended to correct the flatness of the exposed wall surfaces as well as the surfaces out of tolerance. Smooth and finished topcoat for painting shall be assured.

22.19.4. The design and execution shall be conducted in accordance to following standards or THN equivalent (not exhaustive list):

- a. EN 13914-1:2016 - Design, preparation and application of external rendering and internal plastering. External rendering

- b. EN 15824:2017 - Specifications for external renders and internal plasters based on organic binders
- c. EN 998-1:2016 - Specification for mortar for masonry. Rendering and plastering mortar

## **22.20 Paint**

22.20.1. The Contractor shall paint all interior and exterior walls, ceilings and other elements of structure (such as beams, lintels etc.), regardless the material they are made of, with adequate painting for given material and its location (indoor versus outdoor) and with approval of the THN:

- a. The exterior elements painting shall be adequate for local climatic conditions.
- b. The interior painting shall be water repellent.
- c. In principle, all paint shall have a matt finish.
- d. All paints used in the building, whether acrylic, latex or enamel, shall meet the most stringent environmental criteria. Preference shall be given to products which have a European Ecolabel or THN equivalent.
- e. When paint and fungicides are being applied to surfaces, any materials such as varnish and lacquers that release organic hydrocarbons shall be avoided.
- f. Preference shall be given to water-based products (acrylic paints), paints with a high concentration of solid substances (high-solid paints) or powder-based paints (used on industrially prefabricated construction elements).
- g. When finishing, repair or renovation work is being carried out, waste materials from painting (brushes, tins, rags, etc.) shall be treated as hazardous waste, and the Contractor shall observe the regulations governing the disposal of these types of materials.
- h. Acrylic paint on smooth surfaces
- i. Decorative matt paint for interior use coated in varnish shall not contain solvents based on copolymers in aqueous dispersion.
- j. Primarily, it shall be used on porous or permeable mineral-based surfaces such as plasterwork, masonry, concrete, etc. It can be also used for plasterboard, fibre glass fabric, rough-cast surfaces and wallpaper.

22.20.2. It shall meet the following requirements:

- a. Odourless, solvent-free, shall not emit organic substances
- b. Washable in accordance with ISO 11998:2006 Paints and varnishes — Determination of wet-scrub resistance and cleanability of coatings
- c. Negligible surface tension

- d. Permeable

### **22.21 Wood varnish**

22.21.1. It shall be aqueous colorless varnish for interior use, based on a polyurethane-acrylic dispersion.

22.21.2. It shall meet the following requirements:

- a. Non-toxic
- b. Very low odour
- c. Scratch-resistant, durable and UV-resistant
- d. Easy to clean

### **22.22 Concrete floor paint**

22.22.1. Concrete floor paint shall be applied for the entire floors as part of building renovation works stipulated in site specific Appendixes.

22.22.2. It shall meet the following requirements:

- a. Two-component (a resin base component supplied with a separate chemical activator to be mixed together before use) paint either epoxy or polyurethane paint
- b. Shall be able to withstand oil, petrol and other chemical spills, without eroding through or corroding the floor paint
- c. Shall withstand excessive sun and UV exposure.
- d. Shall withstand rain, sleet and snow falling/dripping off boots and/or equipment moved in as well as salt from rain
- e. Neutral colour.

### **22.23 Ceilings**

22.23.1. Ceilings shall be designed to prevent condensation and the accumulation of dirt and shall be easy to clean.

22.23.2. The Contractor is allowed to install suspended ceilings.

22.23.3. The suspended ceilings shall meet requirements stipulated in EN13964:2014 Suspended Ceilings Requirement and Test Methods or THN equivalent.

22.23.4. Fully finished suspended ceilings shall meet the requirements for acoustics, the integration of all piping and technical installations, fire resistance as well as other specific requirements of this project.

22.23.5. The possible presence of expansion joints shall be taken into account in the design and the installation of suspended ceilings as the joints shall comply with the manufacturer's instructions.

22.23.6. The suspended ceiling shall be made with application of materials and installation technology suitable for temperature and humidity conditions in given premises.

22.23.7. The suspended ceiling shall be provided as a complete solution including all necessary elements such as (not exhaustive list):

- a. Support nets for the slats or the plates, the suspensions
- b. The supply, the installation and the finishing of the metal slats and the plates
- c. An absorbent mattress above the false ceiling and / or an anti-dust veil according to need
- d. The creation of at least one access hatch per room
- e. The peripheral finishes
- f. The housings for luminaires and ventilation and possible suction grilles
- g. The equipotential bonding according to relevant standards in force
- h. Neutral Colour

## **22.24 Doors**

### **22.24.1. Exterior doors**

- a. Exterior doors shall be provided as complete solution including all necessary elements such as (not exhaustive list):
  - i. Frames with anchoring and doors sets
  - ii. Full door panels/ door leaf (no glazing)
  - iii. All necessary accessories, tightening of joints, finishes and seals
  - iv. Locks and door handles
  - v. Hinges (minimum four brushed stainless steel hinge plates on each single door and eight on each double door)
  - vi. Door stops and draught excluders
- b. A written guarantee of at least 10 years on the profiles and their finishes shall be assured.
- c. All the means of anchoring the joinery to the structural work shall be made of stainless steel, and shall not be visible after installation.
- d. The door frames shall meet following requirements:
  - i. Metal angular profile made of at least 2 mm steel sheet galvanized on both sides
  - ii. Stainless steel threshold with perforation
- e. The door panels/ door leaf shall meet following requirements:



- i. Steel core reinforced with horizontally and vertically welded steel profiles.
- ii. The exterior side of the door shall be covered with the steel sheet of minimum 2 mm of thickness and inside with the steel sheet of 1.5mm.
- iii. Internal isolation made of high density rockwool
- f. The doors shall meet following requirements as the minimum:
  - i. Shall be equipped with safety hinges reinforced with anti-rising mechanisms
  - ii. Burglary resistant class CR4 according to EN 1627:2011 or THN equivalent
  - iii. Mechanical resistance M+5 according to EN 1192:2000 or THN equivalent
  - iv. Frequency of use f6 (200,000 cycles) according to EN 1191:2012 or THN equivalent
  - v. Fire resistance minimum E60/EW60 according to EN 13501-2:2016 or THN equivalent. The Contractor shall note that respective THN regulations and standards in force may introduce stricter requirements for specific premises i.e. power generator rooms. In such case, the Contractor shall follow these requirements.
  - vi. Thermal insulation T3  $\leq 2.5$  W/m<sup>2</sup>K according to EN 10077-1:2017 and EN 10077-2:2017 or THN equivalent
  - vii. Airtightness L2 according to EN 12207:2016 and EN 1026:2016 or THN equivalent
  - viii. Water tightness 6A according to EN 1027:2016 and EN 12208:2000 or THN equivalent
  - ix. Wind resistance VC4 according to EN 12211:2016 and EN 12210:2016 or THN equivalent
  - x. Galvanized steel base with a high performing powder coat finish according to EN 12944-6:2018 or THN equivalent
  - xi. The door size shall allow introduction and removal of all equipment into all intended premises. Nevertheless, minimum dimensions for door opening shall be:
    - xii. Single hung door (minimum dimensions): breadth – 90 cm, height – 210 cm
    - xiii. Double hung door (minimum dimensions): breadth – 150 cm, height – 210 cm
  - xiv. Neutral Colour

**22.24.2. Internal doors**

- a. Internal doors shall be provided as complete solution including all necessary elements such as (not exhaustive list):
  - i. Frames with anchoring and doors sets
  - ii. Full door panels/ door leaf (no glazing)
  - iii. All necessary accessories, tightening of joints, finishes and seals
  - iv. Locks and door handles
  - v. Hinges (four brushed stainless steel hinge plates on each single door and eight on each double door)
  - vi. Door stops and draught excluders
- b. A written guarantee of at least 10 years on the profiles and their finishes shall be assured.
- c. All the means of anchoring the joinery to the structural work shall be made of stainless steel, and shall not be visible after installation.
- d. The peripheral connections of the doors with the shell shall be adapted to the configuration of the building. They shall take into account the nature, thickness and position of adjoining materials.
- e. Each door should comprise a frame (made of wood, metal or prefabricated sections) and a door leaf (consisting of a solid wooden core with extra-hard facing panels, wooden edges and edge-strips, finished with decorative paint or panels, or enameled sheet-steel facing).
- f. The decorative facing should consist of laminated plates, natural wood panels, sheet steel or thermolacquered sheet aluminum.
- g. Door furniture shall be made of brushed stainless steel.
- h. Door fire resistance shall be minimum E60/EW60 according to EN 13501-2:2016 or THN equivalent. The Contractor shall note that respective THN regulations and standards in force may introduce stricter requirements for specific premises i.e. power generator rooms. In such case, the Contractor shall follow these requirements.
- i. The door size shall allow introduction and removal of all equipment into all intended premises. Nevertheless, minimum dimensions for door opening shall be:
  - i. Single hung door (minimum dimensions): breadth – 90 cm, height – 210 cm
  - ii. Double hung door (minimum dimensions): breadth – 150 cm, height – 210 cm
  - iii. The total thickness of the door leaf shall be a minimum of 39mm
  - iv. Neutral Colour
- j. Single hung door shall be provided for:

- i. Environment Control room (HVAC) and SSSB Equipment room
  - ii. Between Main Power Switchgear room and SSSB Equipment room
  - iii. For graphically presented concept see **Error! Reference source not found.**
- k. Double hung door shall be provided for all other premises in between them and also to the outside of the building (including emergency exit):
- i. For graphically presented concept see **Error! Reference source not found.**

### **22.25 Hatches**

22.25.1. Large ducts shall be equipped with man-sized access hatches to enable internal cleaning. Smaller ducts shall be equipped with hatches large enough to allow access to cleaning tools. These hatches shall be accessible and shall be placed at regular intervals so that access to the full length of the duct is possible. Hatches have to have a suitable locking mechanism fitted to prevent unauthorised entry to cabling routed in the ducts.

22.25.2. Each hatch shall have a suitable locking mechanism fitted to prevent unauthorised entry to cabling routed in the ducts. One such example is a hinged, locking pit bar set in concrete surround of the pit structure. Hinge at one end and a steel bar that covers the length of the hatch/cover, with a security approved padlock fixing at the other end. To protect from weather erosion, the padlock housing shall be covered where necessary.

22.25.3. When hatches are required to access space overhead (for example to access HVAC installations, plenums under roofs etc.) they shall meet the following requirements:

- a. When hatches are required to access space overhead. This item shall include the frame, the cover, and the ladder.
- b. Such hatches should be secured with an appropriate locking mechanism e.g. security approved padlock
- c. The frame of the access hatch cover shall be made of aluminum. The frame shall be perfectly integrated into the ceiling slab. The frame shall be fitted with a polyethylene soundproofing seal which prevents any metal-to-metal contact and ensures a stable seat for the cover
- d. The telescopic or retractable ladder system shall be provided as sturdy and rigid when deployed. The ladder system shall be made of selected steel with electrolytic treatment.
- e. It shall comply with EN 14975:2006+A1:2010 Loft ladders or THN equivalent. Requirements, marking and testing
- f. The ladder rungs shall be equipped with an anti-slip profile

### **22.26 Locks**

22.26.1. **General**

- a. The locks shall remain the property of the Purchaser and all keys shall be returned to the Purchaser; in the event of a breach of this condition, the lock fittings concerned shall be replaced at the Contractor's expense.
- b. Locks shall carry a ten-year guarantee against manufacturing defects, corrosion or malfunctions.
- c. Unless specified differently further in this Annex, for Class I and Class II areas (defined according to AC/35-D/2001-REV3 NATO Security Committee Directive on Physical Security, 25 November 2020), the Contractor shall provide and install locks that meet respective THN security requirements.

22.26.2. **Internal doors locks**

- a. Internal doors shall be fitted with five-pin cylinders, with keys duplicated according to a key chart of the type set out below. In all cases keys shall be compatible with European-type, or THN equivalent, profiled cylinders or half-cylinders and have a minimum basic length of 60 mm, with the possibility of adding standard extension sections on one or both sides up to a total length of 140 mm.
- b. In relevant cases this compatibility standard shall also apply to:
  - i. extendable cylinders
  - ii. tubular locks
  - iii. padlocks
  - iv. safety bolts
  - v. cam locks
  - vi. contact cylinders
- c. The key chart shall be structured as follows:
  - i. One general master key
  - ii. One master key for plant areas (power, UPS, HVAC etc.)
  - iii. One master key for other areas (workshop, storage)
  - iv. One master key for Class I and Class II areas
- d. The Contractor shall make further consultation with THN on type of locks to be fitted. Further consideration may be needed with the THN once proposed designs of areas are known.
- e. The installation of locks shall be based on several different key profiles, both in terms of individual keys and in terms of the various master keys; the purpose of this is to avoid any re-cutting.
- f. All doors must be fitted with cylinders, including doors to storage cavities, trapdoors leading to ducts, etc.

- g. Internal doors giving access to Class I and Class II areas shall be equipped with protected cylinders and non-duplicable keys. In such cases, the Contractor shall provide a factory certificate stating that:
  - i. The keys will not be duplicable for a period of at least 15 years, certified by an international guarantee
  - ii. Rotors and stators contain steel or tungsten carbide inserts or plates protecting the cylinder against drilling
  - iii. Some of the pins are of the mushroom type to enhance resistance to lock-picking
  - iv. Each cylinder shall have five keys, and three of each master key should be supplied

**22.26.3. External doors locks.**

- a. External doors shall be fitted with at least five-pin protected cylinders, with keys duplicated according to a key chart of the type set out for internal doors. In all cases keys shall be compatible with European-type profiled cylinders used with multi-point locking systems.
- b. External doors giving access to Class I and Class II areas shall be equipped with protected cylinders and non-duplicable keys. In such cases, the Contractor shall provide a factory certificate stating that:
  - i. The keys will not be duplicable for a period of at least 15 years, certified by an international guarantee
  - ii. Rotors and stators contain steel or tungsten carbide inserts or plates protecting the cylinder against drilling
  - iii. Some of the pins are of the mushroom type to enhance resistance to lock-picking
  - iv. Each cylinder shall have five keys, and three of each master key should be supplied

**22.27 Handles**

- a. These shall be U-shaped with a diameter of approximately 20 mm, a length of approximately 135 mm and a projection of 70 mm. They should be attached by means of pressure screws and mounted on two circular rosettes.
- b. Two material groups shall be used for handles pending the Contractor's choice are as follows:
  - i. **Polyamide.** Door handles shall be made of coloured nylon material and reinforced along their full length. The nylon shall have a smooth, non-porous surface resistant to oil, detergent, acid and disinfectant and should be non-flammable and non-combustible. A selection of colours shall be available so that door fittings can be harmonised with the colours of other fittings and the doors themselves.

- ii. **Metal.** These fittings shall be made of stainless steel or of a light metal with a high magnesium content; they shall not be susceptible to scratches or cracks and should be free of corrosive materials. Zamak zinc alloy and other less robust alloys shall be avoided.

#### **22.28 Door-blocking device**

- a. Access doors shall be fitted with a device allowing them to be automatically blocked open at a 90° (or greater) angle if necessary.
- b. Each door shall be equipped with stainless steel door stopper with plastic or rubber covers.

#### **22.29 Emergency exit door-bars**

- a. Emergency doors shall meet requirements as stipulated herein in this Annex above and should be fitted with electro-magnetic (or similar) contact switches as part of an Intruder Detection System.
- b. There should be no external means of opening emergency doors.
- c. Emergency doors shall facilitate evacuation of the building without allowing entry from the outside.
- d. In order to protect occupants emergency exit doors shall close automatically.
- e. Emergency exit doors shall remain closed at all times.
- f. Emergency exit bars (panic-bars) shall be fitted to allow emergency doors to be opened from the inside in the event of an evacuation.
- g. Panic bars should have a three point locking mechanism or be equipped with a mortise lock. They shall meet building standard EN 1125:2008 Building hardware or THN equivalent. Panic exit devices operated by a horizontal bar, for use on escape routes. Requirements and test methods.

#### **22.30 Drainage**

- a. Administrative & design activities, equipment and installation characteristics, as well as execution of the works, including works supervision, quality assurance, quality control, testing & commissioning and health & safety measures shall be planned, organized and executed in compliance with standards and legislation applicable and in force in THN. Following documents are applicable (the list is neither exhaustive nor limitative):
  - i. Directive 2000/60/EC of the European Parliament and of The Council of 23 October 2000 establishing a framework for Community action in the field of water policy or THN equivalent.
  - ii. Directive 2006/118/EC of the European Parliament and of the Council of 12 December 2006 on the protection of groundwater against pollution and deterioration or THN equivalent.

- iii. Directive 2008/105/EC of the European Parliament and of the Council of 16 December 2008 on environmental quality standards in the field of water policy, amending and subsequently repealing Council Directives 82/176/EEC, 83/513/EEC, 84/156/EEC, 84/491/EEC, 86/280/EEC and amending Directive 2000/60/EC of the European Parliament and of the Council or THN equivalent.
- iv. BS EN 12056-3:2000 Gravity drainage systems inside buildings. Roof drainage, layout and calculation or THN equivalent.
- b. The capacity of the drainage shall be determined by the Contractor taking into account the size of facility, its location (including meteorological data), function and its occupancy.
- c. Before testing and commissioning of the installation, the Contractor shall:
  - i. Clean the drainage network
  - ii. Check the tightness of the installation
  - iii. Tighten all fixings of devices and accessories

### **22.31 Various interior equipment**

22.31.1. The Contractor shall provide and install various stairs, doormats, pictograms, signs, fire extinguishers etc.

22.31.2. When applicable, the interior equipment (for example fire extinguishers) shall comply with THN regulations and standards in force.

22.31.3. The locations and number of all interior equipment shall be determined by the Contractor according to the function of given premises and site occupancy.

22.31.4. The interior equipment choice, its material and proposed locations, before purchase from vendors, shall be presented by the Contractor to the Purchaser for approval.

22.31.5. All markings and descriptions shall be provided in THN official language and in English.

22.31.6. The Contractor shall provide undermentioned interior equipment and accessories.

22.31.7. Premises numbering plates:

- a. Numbering and identification plates for the premises to be installed on each/by each door
- b. The plates shall be made from extruded aluminum plates
- c. The format of the plate shall be approximately 14x11 cm:
  - i. finish: thermos-lacquered
  - ii. tint: to be determined by the Architect
  - iii. cover: transparent polycarbonate

- iv. shape: convex with longitudinal toothed edges
- v. leaf: 100% recycled paper
- vi. color: to be determined by the Architect

**22.31.8. Pictograms:**

- a. Rigid, unalterable plastic pictograms in square or rectangular shape.
- b. Colored and standardized in accordance with respective THN regulations and standards in force.
- c. The graphics, wording and acronyms shall be legible
- d. Fixing:
  - i. the pictograms related to prohibitions, obligations and warnings shall be glued to the walls using a special glue, with a high coefficient of resistance to tearing
  - ii. when attached to the equipment, the pictograms shall be fixed with a high coefficient of resistance to tearing
  - iii. the pictograms related to rescues, evacuation routes and indications of services shall be suspended from ceilings or false ceilings, by cables, with cable ends of elements suitable for fixing to false ceilings and at the other end, a plate clamp shall allow the fixing of the plates
  - iv. the evacuation plans shall be fixed to the walls by screws and nylon plugs

**22.31.9. Fire extinguishers:**

- a. Shall comply with THN regulations and standards in terms of their characteristic, capacity, number, access to them, their marking and locations
- b. The following standards shall apply:
  - i. BS EN 3-7:2004+A1:2007 Portable fire extinguishers. Characteristics, performance requirements and test methods or THN equivalent.
  - ii. BS EN 3-8:2006 Portable fire extinguishers. Additional requirements to EN 3-7 for the construction, resistance to pressure and mechanical tests for extinguishers with a maximum allowable pressure equal to or lower than 30 bar or THN equivalent.
  - iii. BS EN 3-9:2006 Portable fire extinguishers. Additional requirements to EN 3-7 for pressure resistance of CO2 extinguishers or THN equivalent.
  - iv. BS EN 3-10:2009 Portable fire extinguishers. Provisions for evaluating the conformity of a portable fire extinguisher to EN 3-7 or THN equivalent.
- c. Portable fire extinguishers of minimum 6 kg:



- i. Dry powder extinguisher: Class ABC and suitable for fires involving electronic equipment up to 1000 V
- ii. Carbon dioxide (CO<sub>2</sub>) extinguisher: Class B and Electrical Equipment
- d. Fixing devices by which each extinguisher is hung on the wall shall be dimensioned to withstand the weight of the latter and its contents, as well as immediate and easy access to each fire extinguisher
- e. The Contractor shall assure commissioning of the fire extinguishers by an authorized and accredited in THN fire expert
- f. The commissioning shall include checking that:
  - i. The extinguishers have been installed properly
  - ii. Hoses and horns are attached correctly
  - iii. Each extinguisher is the right weight and pressure
  - iv. They are completely undamaged
- g. The commissioning shall be confirmed with a certificate verifying that extinguishers have been commissioned in accordance with THN regulations.

### **22.32 Outdoor equipment**

22.32.1. The Contractor shall provide and install various outdoor equipment as necessary for efficient and safe operation of buildings, installations and other infrastructure subject to this contract.

22.32.2. The components of the outdoor equipment include the building identification panels as well as all other indications and signs allowing an unambiguous identification of provided site infrastructure, as well as all the equipment related to the site operation.

22.32.3. When applicable, the outdoor equipment (for example marking of EM Field Zones, marking of fuel tank areas, evacuation assembly point, escape routes etc.) shall comply with THN regulations and standards in force.

22.32.4. The locations and number of all outdoor equipment shall be determined by the Contractor according to the function of given SSSB equipment and required Health and Safety measures.

22.32.5. The exterior equipment choice, its material and proposed locations, before purchase from vendors, shall be presented by the Contractor to the Purchaser for approval.

22.32.6. All markings and descriptions shall be provided in THN official language and in English.

22.32.7. All components of the outdoor equipment shall be UV resistant (confirmed by relevant CoC or at least Product Data Sheet issued by respective manufacturers).

22.32.8. All components of the outdoor equipment shall be capable of withstanding environmental condition as stipulated herein in this Annex, without suffering permanent mechanical damages.

22.32.9. All of the markings, which are not installed on building walls, fences or antenna masts shall be mounted on support elements made of either hot dip galvanized steel tubes or extruded aluminum profiles.

22.32.10. The tubes made of hot dip galvanized steel shall meet relevant requirements stipulated herein in this Annex.

22.32.11. The top surface of the supporting elements shall be provided with finishing profiles, in synthetic material, adapted to the shapes and dimensions of the tubes or extruded aluminum profiles.

22.32.12. The supporting elements shall be mounted on concrete foundations by chemical anchoring, the number of which shall depend on the dimensions of marking plate installed on given support elements and the loads that shall be transferred to the ground through respective foundation.

22.32.13. The Contractor shall provide and install building identification panels near each building. The panels shall meet following characteristics:

- a. Precise location shall be proposed by the Contractor and is subject to the Purchaser's approval
- b. Mounted on supporting elements mentioned above in such a way that its bottom edge shall be approximately 120 cm above ground level
- c. Panel frame made from extruded aluminum profiles and installed on supporting elements in a way that allows the identification panel to be slid in the frame from one side
- d. Panel frame fitted with fixing lugs assuring solid connection to the supporting elements
- e. Panel made from profiled aluminum sheet and fitted with fixing lugs assuring solid connection to the panel frame
- f. Dimensions of the panel: height – 40 cm; width – 160 cm
- g. Color (RAL – International Colour Standards):
  - i. Supporting elements: RAL (TBC by THN)
  - ii. Panel Frame: RAL (TBC by THN)
  - iii. Panel: RAL (TBC by THN)
  - iv. Letters: RAL (TBC by THN)
- h. The shape of the letters shall be "ARIAL BLACK", the height of the letters shall depend on the number of letters to be entered, depending on the panel. The texts shall be produced by screen printing. The system shall allow all subsequent modifications without changing the structure of the panels.

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- i. The system shall have an evolutionary character and a great flexibility of modification on demand as well as the possibility of adaptation in the same product range. All elements shall comply with the requirements of ISO 9001.

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## **SECTION 23 ANTENNA MAST SPECIFICATION**

### **23.1 General Remark**

23.1.1. The Contractor shall design, provide and install required number of new antenna masts at each site capable of supporting the SSSB system.

23.1.2. The term antenna masts includes also DLOS towers.

23.1.3. The Contractor shall provide suitable antenna mast foundations required for the installation of new antenna masts.

23.1.4. The Contractor shall obtain all necessary Military and Civil permissions for the installation and operation of these masts and all related installation activities.

23.1.5. The Contractor shall conduct geotechnical soil analysis and Multichannel Analysis of Surface Waves (MASW) at the locations of the antenna field in order to determine the required design and size of antenna foundations as well as collect data for the SSSB system design.

23.1.6. The Contractor shall execute all works for antenna field preparation and subsequent installation of masts, antennas and associated cabling, including but not limited to:

- a. Cutting and removal of trees, shrubs, any other vegetation and their roots
- b. Excavation and trenching works
- c. Levelling, profiling, compacting, backfilling
- d. Erosion prevention measures including drainage installations, retaining walls, sodding and planting, strengthening of slopes and antenna fields with geotechnical materials, geotechnical composite crates, and any other technology as required
- e. Provision of the necessary RADHAZ signage around antenna fields in accordance with THN Health and Safety Regulations.

23.1.7. The Contractor shall implement Health and Safety measures, according to THN legislation and standards in force, including but not limited to safe to climb structures, sharp corners avoidance, anti-slip surfaces, safety bars and grips, and proper safety marking (including identification and marking of EM Field Zones).

23.1.8. The Contractor shall provide and install mast ancillaries including but not limited to:

- a. Grounding system
- b. Lightning protection system
- c. Air obstacle lights
- d. Required cabling
- e. Cable support structures (ladders, trays, cable hangers and their fixings, cable cleats etc.)

- f. Electrical, radio and grounding connections to the mast and relevant equipment installed on it
  - g. Cathodic protection system
  - h. Sufficient RADHAZ signs surrounding each antenna field line in accordance with THN H&S legislation and regulations
- 23.1.9. The installation of antenna masts and all ancillaries shall be done in accordance with respective manufacturer instructions and guidance.
- 23.1.10. All equipment and material delivered shall be:
- a. New
  - b. High quality and high efficiency
  - c. To the most possible extent of standard manufacturing
  - d. Known brand and manufacturer with good logistic support
- 23.1.11. The expected lifetime of the mast, antennas, foundation and ancillaries shall be at least 30 years without the need for substantial maintenance and replacement.
- 23.1.12. All components of the mast, antennas, foundation, safety marking and ancillaries shall be UV resistant (confirmed by relevant CoC or at least Product Data Sheet issued by respective manufacturers).

## **23.2 Environmental requirements**

- 23.2.1. The antenna sub-systems mounted on the antenna masts, as well as the antenna masts themselves, their foundation and ancillaries (including air obstacle lights) shall be capable of withstanding following environmental conditions without suffering degradation of system performance (gain, pattern type, sensitivity) and without suffering permanent mechanical damages:
- a. Local climatic conditions are defined according to STANAG 4370, edition 7, November 2019 – AECTP-230 Climatic Conditions (Edition 1), where following climatic categories are applicable:
    - i. A3 Intermediate and
    - ii. C0 Mild Cold
  - b. Ice accumulation: glaze ice 0.9 g/cm<sup>3</sup>
  - c. High Temperature: + 49° C for operation
  - d. Low Temperature: - 19° C for operation
  - e. When designing and erecting masts with all associated ancillaries, the Contractor shall apply Eurocode EN1991-1-4 (Eurocode 1 Part 1-4: General actions Wind actions). This publication provides guidance on the determination of natural wind actions for the structural design of buildings and civil engineering works. For the calculation procedure and

especially for the determination of wind actions following shall be applied:

- i. The fundamental basic wind velocity  $v_{b,0}$  which is the 10 minute mean wind velocity with an annual risk of being exceeded of 0.02 irrespective of wind direction at a height of 10m above flat open country terrain, has a value in the National Annex  $v_{b,0}=33\text{m/s}$  for the Greek Islands in general.
- ii. The basic wind velocity  $v_b$ , which is the fundamental basic wind velocity modified to account the direction of the wind and the season, shall be calculated from the equation:  $V_b=C_{dir} \times C_{season} \times V_{b,0}$ . The recommended value for  $C_{dir}$  (the directional factor) and  $C_{season}$  (the season factor) is 1.
- iii. Terrain roughness: There are 5 terrain categories. For the two sites in Skyros Island (Kartsinouli and Limnonari) as well as Site Sideros in Crete, the terrain category is No 0 (sea or coastal area exposed to the open sea). For the Site Kythira and Site Mavros in Crete the terrain category is No III (Area with regular cover of vegetation or building or with isolated obstacles with separations of maximum 20 obstacle heights (such as villages, suburban terrain, permanent forest).
- f. Hailstones of up to 25 mm diameter,  $0.9 \text{ g/cm}^3$  density and 58 m/s terminal velocity
- g. Sand and dust concentrations up to  $1 \text{ g/m}^3$ , with particle size down to  $20 \mu\text{m}$  at an air speed up to 20 m/s
- h. The antenna design and manufacturing must ensure that it is resilient against salt corrosion as many of the radio sites are located close to the sea. Further requirements provided in site specific Appendixes.

### 23.3 Applicable Publications

23.3.1. The calculation notes and the complete structure design shall be based on principles presented in the following publications or THN equivalent (not exhaustive list):

- a. ISO 2394:2015 - General principles on reliability for structures
- b. EN 1990: Eurocode - Basis of structural design
- c. EN 1991: Eurocode 1 - Actions on structures
- d. EN 1992: Eurocode 2 - Design of concrete structures
- e. EN 1993: Eurocode 3 - Design of steel structures
- f. EN 1994: Eurocode 4 - Design of composite steel and concrete structures
- g. EN 1997: Eurocode 7 - Geotechnical design
- h. EN 1998: Eurocode 8 - Design of structures for earthquake resistance

23.3.2. All outdoor installations, unless stated otherwise below, shall assure level of protection against dust and water minimum IP 65 according to IEC60529:1989/AMD2:2013/COR1:2019 - Corrigendum 1 - Amendment 2 - Degrees of protection provided by enclosures (IP Code).

#### **23.4 Antenna field Preparation**

23.4.1. Antenna field preparation works includes tasks as stipulated herein in this Annex above.

23.4.2. Additionally the following works shall be executed:

- a. For the antennas that require a ground plane, the Contractor shall:
  - i. Excavate the soil layer approximately 30 cm thick in the area intended for the ground plane installation
  - ii. Assure the flatness as per the antenna manufacturer installation guide
  - iii. Place pins on the area to allow position identification of antenna and guy line plinths
  - iv. Put in place a layer of dry rubble on the levelled area
  - v. Install the ground plane as per the antenna manufacturer installation guide
  - vi. Cover the ground plane with a layer of at least 10cm thick of mixed quarry.
  - vii. Place pins on the area to allow position identification of antenna and guy line plinths
  - viii. Prepare the base of the antenna for the RF cable joint, and the other devices such as service power socket, discharger, air obstacle light power transformer etc.
- b. For antennas that do not require ground plane the Contractor shall:
  - i. Clean and prepare the area as stipulated earlier in this Annex
  - ii. Place pins on the area to allow position identification of antenna and guy lines plinths
  - iii. Prepare the base of the antenna for the RF cable joint, and the other devices such as service power socket, discharger, air obstacle light power transformer etc.

#### **23.5 Foundation**

23.5.1. The foundation shall be made of reinforced concrete.

23.5.2. The size of the foundation blocks shall be compatible with the manufacturer specifications, the results of the soil tests and relevant design and calculations made by the Contractor.

23.5.3. The foundation at the base of the antenna mast shall be large enough to avoid that grass and other vegetation growing around the area come in contact with the antenna structure.

23.5.4. The foundation blocks shall be profiled in a way that assures easy evacuation of water from the foundation blocks and antenna mast elements mounted on them. Under no circumstances, the foundation blocks shall accumulate water on their surfaces.

23.5.5. All required foundation shall be erected in prepared excavations where the bottom of the excavation shall be levelled and covered with subbase material layer to assure stability of the erected foundation.

23.5.6. The foundation shall be protected by hydro insulation according to requirements driven by local hydrological conditions, soil type and terrain shape (also known as landform) around the foundations.

### **23.6 Mast structure**

23.6.1. The mast structure shall be in accordance with the following:

- a. The mast, safe to climb devices, anti-slip surfaces, safety bars and grips and cable support structures, further called mast structures, shall be made of steel, hot deep galvanised or sherardized (vapour/dry galvanised).
- b. The mast shall be designed and built preferably as a tubular structure.
- c. The fundamental resonance frequency of the mast structures with equipment shall be greater than 3 Hz.
- d. The design, production and installation of the mast structures shall comply with following standards or THN equivalent (not exhaustive list) respectively to the technical solution defined by the Contractor:
  - i. BS EN 10204:2004 – Metallic products. Types of inspection documents
  - ii. BS ISO 404:2013 – Steel and steel products. General technical delivery requirements
  - iii. BS EN 10025-1:2004 – Hot rolled products of structural steels. General technical delivery conditions
  - iv. BS EN 10025-2/3/4:2019 – Hot rolled products of structural steels. Technical delivery conditions
  - v. BS EN 10025-5:2019 – Hot rolled products of structural steels. Technical delivery conditions for structural steels with improved atmospheric corrosion resistance
  - vi. BS EN 10210-1:2006 – Hot finished structural hollow sections of non-alloy and fine grain steels. Technical delivery requirements



- vii. BS EN 10210-2:2019 – Hot finished steel structural hollow sections. Tolerances, dimensions and sectional properties
- viii. BS EN 10210-3:2020 – Hot finished steel structural hollow sections. Technical delivery conditions for high strength and weather resistant steels
- ix. ISO 14713-1:2017 – Zinc coatings — Guidelines and recommendations for the protection against corrosion of iron and steel in structures — Part 1: General principles of design and corrosion resistance
- x. ISO 14713-2:2019 – Zinc coatings — Guidelines and recommendations for the protection against corrosion of iron and steel in structures — Part 2: Hot dip galvanizing
- xi. ISO 14713-3:2017 – Zinc coatings — Guidelines and recommendations for the protection against corrosion of iron and steel in structures — Part 3: Sherardizing
- xii. ISO 898-1:2013 – Mechanical properties of fasteners made of carbon steel and alloy steel — Part 1: Bolts, screws and studs with specified property classes — Coarse thread and fine pitch thread
- xiii. ISO 898-2:2012 – Mechanical properties of fasteners made of carbon steel and alloy steel — Part 2: Nuts with specified property classes — Coarse thread and fine pitch thread
- xiv. ISO 898-3:2018/AMD 1:2020 – Mechanical properties of fasteners made of carbon steel and alloy steel — Part 3: Flat washers with specified property classes — Amendment 1
- xv. ISO 898-5:2012 – Mechanical properties of fasteners made of carbon steel and alloy steel — Part 5: Set screws and similar threaded fasteners with specified hardness classes — Coarse thread and fine pitch thread
- xvi. ISO 2320:2015 – Fasteners — Prevailing torque steel nuts — Functional properties
- xvii. ISO 16047:2005/AMD 1:2012 – Fasteners — Torque/clamp force testing — Amendment 1
- xviii. ISO 10684:2004/COR 1:2008 – Fasteners — Hot dip galvanized coatings — Technical Corrigendum 1
- xix. BS EN 10269:2013 – Steels and nickel alloys for fasteners with specified elevated and/or low temperature properties
- xx. ISO 5817:2014 – Welding — Fusion-welded joints in steel, nickel, titanium and their alloys (beam welding excluded) — Quality levels for imperfections

xxi. ISO 6520-1:2007 – Welding and allied processes — Classification of geometric imperfections in metallic materials — Part 1: Fusion welding

xxii. ISO 6520-2:2013 – Welding and allied processes — Classification of geometric imperfections in metallic materials — Part 2: Welding with pressure

23.6.2. The mast structure protective treatment technology shall assure that the complete structures can withstand installation in proximity of the sea.

### **23.7 Protective paint**

23.7.1. The steel structure of the mast as well as access ladder or stairs, cable ladder, floor of platforms shall be painted in accordance with the RAL colour coding schema which will be provided to the Contractor at the PDR.

23.7.2. The time between the galvanisation and the painting shall be as short as possible.

23.7.3. After cleaning of the steel galvanised structure, one coat of primary and two coats of polyurethane paint shall be applied as a minimum. A minimum thickness of 80µm shall be obtained.

23.7.4. The protective paint shall meet requirements as stipulated in following standards:

- a. ISO 12944-2:2017 Paints and varnishes — Corrosion protection of steel structures by protective paint systems — Part 2: Classification of environments
- b. ISO 12944-3:2017 Paints and varnishes — Corrosion protection of steel structures by protective paint systems — Part 3: Design considerations
- c. ISO 12944-4:2017 Paints and varnishes — Corrosion protection of steel structures by protective paint systems — Part 4: Types of surface and surface preparation
- d. ISO 12944-5:2019 Paints and varnishes — Corrosion protection of steel structures by protective paint systems — Part 5: Protective paint systems

### **23.8 Grounding and lightning protection**

23.8.1. The mast structures shall be equipped with suitable lightning protection and grounding kit, which shall ensure lightning protection of installed equipment.

23.8.2. It shall consist of adequate lightning rods, surge arresters, grounding rings, connection, special anticorrosive protection for buried sections and such forth.

23.8.3. The design, production and installation of the grounding and lightning shall be compliant with requirements stipulated herein in this Annex.

### **23.9 Air Obstacle Lights**

23.9.1. The installations of air obstacle lights shall be implemented in accordance to ICAO Annex 14, Volume 1, Chapter 6, "Visual aids for denoting obstacles", latest edition.

23.9.2. Each light kit shall include a double toroid transformer to be connected to light power supply at the base of the related antenna.

23.9.3. The air obstacle lights shall be of following characteristics:

- a. Based on LED technology
- b. High-intensity lights
- c. Equipped with alarm/remote status control device(s)
- d. Equipped with galvanized steel wire protection guard
- e. Low wind load factor
- f. No RF-radiations
- g. The level of protection against dust and water shall be minimum IP 66 according to IEC 60529:1989/AMD2:2013/COR1:2019 - Corrigendum 1 - Amendment 2 - Degrees of protection provided by enclosures (IP Code)
- h. High-temperature resistant borosilicate glass
- i. Body made of marine grade copper free aluminium

### **23.10 Cabling and cable support structures**

23.10.1. The design, production and installation of cabling and cable support structures shall be compliant with requirements stipulated herein in this Annex.

## **SECTION 24 HEATING VENTILATION AND AIR CONDITIONING (HVAC)**

### **24.1 General**

24.1.1. The HVAC system shall include at the minimum the following main elements:

- a. The environmental control system, Air Conditioning (AC) in:
  - i. The premises as specified in site specific Appendixes
  - ii. Minimum, in the following premises of the new SSSB building
    - SSSB Equipment room
    - UPS/Battery room
    - Supply Storage Room/ Workshop and Test facilities for electronic equipment
    - Vestibule and corridor
- b. The Heating and Ventilation system in all other areas of the new SSSB building
- c. Fire valves in air ducting system to isolate different sections
- d. Acoustic noise dampers in air ducting system
- e. Fire dampers in air ducting system
- f. Heating elements/radiators
- g. All related equipment and accessories
- h. The Legal Inspection

24.1.2. The Contractor shall provide a reliable and efficient Environment Control System over its service life.

24.1.3. The HVAC system in the new SSSB building shall have as the minimum 20% of spare capacity for future expansion in heat loads.

24.1.4. The HVAC system at all sites shall be designed in such way that it can provide essential services during maintenance or system breakdown of a unit.

24.1.5. Continuity of operation shall be assured by dividing the total HVAC load into two or more small units, as economically suitable. The HVAC system shall be flexible enough so that in the event of breakdown of part of the system, the remaining units shall be capable of meeting the SSSB system load requirements.

24.1.6. The equipment used shall comply with the documents listed below (the list is neither exhaustive nor limitative):

- a. IEC 60335-2-88:2002 Household and similar electrical appliances - Safety - Part 2-88: Particular requirements for humidifiers intended for

use with heating, ventilation, or air-conditioning systems or THN equivalent or THN equivalent.

- b. IEC 60335-2-40:2018 Household and similar electrical appliances - Safety - Part 2-40: Particular requirements for electrical heat pumps, air-conditioners and dehumidifiers or THN equivalent.
- c. ISO 52016-1:2017 Energy performance of buildings — Energy needs for heating and cooling, internal temperatures and sensible and latent heat loads — Part 1: Calculation procedures or THN equivalent.
- d. EN 16798-1:2019 Energy performance of buildings. Ventilation for buildings. Indoor environmental input parameters for design and assessment of energy performance of buildings addressing indoor air quality, thermal environment, lighting and acoustics or THN equivalent.
- e. EN 16798-3:2017 Energy performance of buildings. Ventilation for buildings. For non-residential buildings. Performance requirements for ventilation and room-conditioning systems or THN equivalent.
- f. EN 16798-7:2017 Energy performance of buildings. Ventilation for buildings. Calculation methods for the determination of air flow rates in buildings including infiltration or THN equivalent.
- g. European Council Directive 93/68/EEC of 22 July 1993
- h. Directive 2014/30/EU of the European Parliament and of the Council of 26 February 2014 on the harmonization of the laws of the Member States relating to electromagnetic compatibility or THN equivalent.
- i. MIL-STD 461G (or THN equivalent) – Requirements for the control of electromagnetic interference characteristics of subsystems and equipment, December 2015.
- j. Regulation (EC) No 1005/2009 of the European Parliament and of the Council of 16 September 2009 on substances that deplete the ozone layer amended by Commission Regulation (EU) 2017/605 of 29 March 2017 or THN equivalent.
- k. Pressure Equipment Directive 2014/68/EU, CE marked and provided with EC Declaration of Conformity or THN equivalent.

24.1.7. In order to assure suitable indoor air quality the Contractor shall use a HVAC system that shall use a refrigerant that shall be commercially available for the system' life expectance or at least assure the capacity to switch to new refrigerant without major modifications.

## **24.2 Quality criteria**

24.2.1. All equipment used shall be ambient physicochemical and fluids resistant.

24.2.2. Equipment, materials and accessories as well as technical installation non explicitly described in this SOW shall be conceived by the Contractor such that they satisfy the following conditions:

- a. Good operation of installation they belong to
- b. Perfect integration in the environment (for instance in false ceiling or under raised floor)
- c. Easy operation by the users
- d. Long MTBF
- e. Simplified operation and maintenance
- f. Quick repair
- g. Possibility to upgrade or modify without important re-engineering

24.2.3. All equipment and material delivered shall be new, of high quality, of high efficiency, of standard manufacturing, known brand and manufacturer with good logistic support.

24.2.4. Hybrid and self-made equipment are not allowed.

### **24.3 Automatic Control Systems**

24.3.1. For effective control of design conditions and economical operation, the Contractor shall group together areas having similar load characteristics, such as electronic equipment module or the power module. The following criteria shall be applied:

- a. Control arrangement shall be as simple as possible for minimum maintenance and maximum performance
- b. Electric heaters, shall be thermostatically controlled
- c. According to accepted criteria for winter comfort of personnel (ASHREA Comfort or other applicable standards) the wet bulb temperature in the various areas should be comprised between 18°C and 21°C, however to obtain indoor Relative Humidity of 40% or higher, it may be necessary to add moisture to humidify the air.

24.3.2. Where heating, air conditioning, and/or ventilation system are provided, the heating system shall be designed to operate integrally with other systems. When more than one system is installed in one area, necessary equipment to control systems shall be provided to ensure that the requirements are continuously met and the systems are not working against each other.

### **24.4 Acoustic noise requirement**

24.4.1. The noise level generated on site when all equipment, that includes electronic equipment, transmitters, HVAC, power generators, UPS etc. are operating simultaneously shall not exceed Noise Rating NR55 (defined by ISO 1996) measured 10 m distant from the perimeter fence.

24.4.2. If one duct or one duct system includes air inlet or air outlet grills for ventilation or air conditioning of different rooms, the noise produced in any of these rooms and transmitted through these ducts to any other of these rooms shall have

from room to room an attenuation minimum in dB at least equal to the attenuation guaranteed by the partition separating these rooms.

24.4.3. It is the Contractor's responsibility to determine and foresee, in function of the materials used, all precautions/method/measures to guaranty that the specifications in this SOW are met. Some measures can be amongst others, acoustic baffles, acoustic insulation materials in some ducts, mechanic and elastic suspension of some equipment groups etc.

24.4.4. The Noise Rating level shall not exceed following values:

- a. Supply Storage Room/Workshop and Test facilities for electronic equipment – NR60
- b. SSSB Equipment room (if no HVAC inside– NR50
- c. Corridor and vestibule– NR45
- d. Power Generator room – NR75
- e. Main Power switchgear room – NR70
- f. UPS/Battery room – NR70
- g. Environment Control room (HVAC) – NR75

24.4.5. Diesel Generators room

- a. It is the Contractor's responsibility to foresee in his offer all thermal and acoustic protection measures required to satisfy the conditions specified in this SOW for the rooms adjacent to the diesel generators room considering the acoustic pressure level generated by the proposed materials.
- b. Acoustic baffles to reduce the noise generated by the diesel generators and cooling fans to the level specified in this SOW for the outside of the building shall also be provided.

## **24.5 Heating system**

24.5.1. Where an air conditioning system is not provided, the heating system shall be provided by means of fixed heating elements/radiators.

24.5.2. It is the Contractor's responsibility to proposed the most suitable solution taking into consideration the most economic and ecologic parameters.

24.5.3. The heating system shall be designed to provide essential services during maintenance or system breakdown. The following criteria shall be met:

- a. Normal Operation Conditions: Continuity of operation shall be assured by dividing the total design into sections as economically suitable.
- b. Emergency Operation Conditions: The minimum possible standby equipment shall be provided only where operation of a complete system is absolutely essential for any of the following reasons:
  - i. Site survival

- ii. Personnel safety
- iii. Maintenance of essential services

## **24.6 Heating capacity**

24.6.1. It is the Contractor's responsibility to establish the heating budget to determine the capacity of the heating system.

24.6.2. The following norms and standards shall apply for the design of the buildings regarding energy performances and heat loss calculations:

- a. Respective THN standards and regulations.
- b. Directive (EU) 2018/844 of the European Parliament and of the Council of 30 May 2018 amending Directive 2010/31/EU on the energy performance of buildings and Directive 2012/27/EU on energy efficiency or THN equivalent

24.6.3. Subject to the prescriptions of the paragraph above that have precedence, the basis for heat loss calculation during winter time shall be as follows:

- a. External conditions:
  - i. External temperature
  - ii. Relative humidity
  - iii. Wind speed
- b. Internal conditions T°C/ RH:
  - i. Workshop and Test facilities for electronic equipment: 20°C/ 40%
  - ii. SSSB Equipment room: 20°C/ 40%
  - iii. Corridors/ vestibule: 18°C/ not considered
  - iv. Power Generator room: 18°C/ not considered
  - v. Main Power switchgear room: 18°C/ not considered
  - vi. UPS/Battery room: 18°C/ not considered
- c. Characteristics of the new SSSB buildings. The expected transfer coefficients K (in W/m<sup>2</sup>K) are to be defined by the A/E during the design of the new SSSB buildings in order:
  - i. To comply with the most recent regional regulations in the respective THN
  - ii. To optimize the life cycle costs of the site installations.

## **24.7 Radiators**

24.7.1. Radiators shall be provided in premises where full environment control system is not required, such as the diesel generator room, the main power switchgear room (only if no UPS is installed there).



24.7.2. The dimensions of the radiators shall be adapted to the available space, to warrant satisfactory esthetical aspect.

24.7.3. The thickness of the radiators shall not exceed 20 cm. Radiators located in escape paths, such as corridors, shall not create obstacle and safety hazard.

24.7.4. Radiators shall be mounted on brackets and solidly anchored to solid walls.

24.7.5. Sealing shall be by means of mortar. The use of plaster is not allowed.

24.7.6. The radiators shall be installed minimum 10 cm above the finished floor level.

24.7.7. The colour of radiators shall be proposed in RAL scale during contract implementation and it shall be subject to the Purchaser's approval.

#### **24.8 HVAC - Full Air Conditioning**

24.8.1. The area where full air conditioning (temperature and humidity control) is required shall be conditioned by means of local air conditioner located in the HVAC room. Note: The air conditioner units may eventually be located in the SSSB Equipment room as long as it does not interfere with the electronic equipment layout.

24.8.2. The area that requires full air conditioning is to be closed-door operated. Hence fresh air input shall be provided.

24.8.3. This area includes:

- a. SSSB Equipment room
- b. UPS room
- c. Supply Storage Room/ Workshop and Test facilities for electronic equipment
- d. Corridors and vestibule
- e. Any other area judged necessary by the Contractor based on good operation of the site.

24.8.4. The air conditioner units shall include as a minimum:

- a. One air filter
- b. One cooling bank with drip pan
- c. One heating bank
- d. One humidifier
- e. Two motor-ventilators
- f. One condensation water drainage.
- g. Filter:
  - i. The filter(s) shall be of cassette, high efficiency type
  - ii. The pressure drop when cleaned shall not exceed 150 Pa.

- 24.8.5. Cooling and heating banks:
  - a. The banks shall be made of copper pipes with aluminum fins.
- 24.8.6. Ventilators:
  - a. The ventilator groups shall be with two rotation speeds. The lower speed shall be less than approximately 450 rpm, the higher speed shall be less than approximately 1500 rpm.
  - b. The unit shall be dimensioned to deliver 70% of its capacity at lower speed.
- 24.8.7. Fresh air input (Air Handling unit):
  - a. Fresh air input for areas that require full air conditioning shall be treated through air handling unit. The fresh air shall be brought to this area through an air ducting system.
  - b. The fresh air input flow shall be constant.
  - c. The air speed measured at 50 cm from the fresh inlet grille shall not exceed 25 cm/sec.
  - d. Filter:
    - i. The air handling unit shall be equipped with air filters that comply with ISO 16890, coarse 50%.
    - ii. Filters and pre-filters shall be of pocket type.
    - iii. The mounting of air filters shall allow easy maintenance.
- 13.1.1. Heating and Cooling Banks:
  - e. Air speed through the banks shall not exceed 3 m/sec for heating bank and 2.5 m/sec for cooling bank
  - f. Heating banks:
    - i. The heating banks shall be made of copper pipes with aluminum fins.
    - ii. The pre-heating bank (the one in contact with external non heated air) shall be protected by an anti-freeze thermostat. This thermostat shall be set at +5°C.
  - g. Cooling banks:
    - i. The cooling banks shall be made of copper pipes and fins.
    - ii. Droplet breaker shall also be provided.
    - iii. A condensation drip pan shall be provided.
- 13.1.2. Motor-ventilator group:
  - h. Ventilators shall be of centrifugal type with low acoustic noise level compatible with this SOW.

- i. Ventilators shall be of asynchronous, cage type, protection IP54, and 1500 rpm.
  - j. Ventilators shall be selected for continuous operation with 45% spare capacity.
  - k. Fans shall be belt driven such that good operation is ensured with n-1 belts in service.
  - l. Bearings shall be of greased for life type.
  - m. Each fan shall be statically and dynamically balanced.
- 24.8.8. Humidifier.
- a. The humidifier shall be dimension to humidify the air at -10°C 90% RH to 20°C 50% RH with 20% spare.
- 24.8.9. Silencer.
- a. Silencers shall be provided to meet the acoustic noise levels required in this SOW.

## **24.9 Air Ducts**

- 24.9.1. Air ducting layout and dimensions shall be determined by the Contractor. The dimensions of the air ducts shall be adjusted to ensure proper balance of static pressure.
- 24.9.2. Unless otherwise specified, all air ducts shall be in galvanized steel with exception for the exhaust conduits that shall be in stainless steel.
- 24.9.3. All precautions shall be taken during the work execution to prevent back pressure from ventilators. The pressure loss shall not exceed 0.3. Changes of dimensions in ducting path shall be progressive.
- 24.9.4. After installation, the air ducting system shall be subject to air tightness test according to EN 12599:2012 or THN equivalent.
- 24.9.5. Air ducts shall comply with following requirements:
- a. All ducts shall be air tight and shall not show any opening other that required for inspection and maintenance
  - b. Elastic sleeves inserted between two ducts shall be maximum 25 cm in length; they shall be class A1 fire resistant (according to EN 13501-1:2018 or THN equivalent) and when exposed to heat shall not produce any toxic or corrosive fumes, gas or vapor.
  - c. The distance between metallic ducts and inflammable materials shall be minimum 15 cm
  - d. The length of one section shall not exceed 6 m.
- 24.9.6. Fittings. Ducts shall be equipped with:
- a. All necessary fixing devices

- b. All devices such as air baffles required for proper air balancing
- c. All required non return baffles
- d. All fire protection baffles (see also other relevant sections herein in this Annex)
- e. Air tight access panels for internal cleaning.

24.9.7. Fire protection – see other relevant sections herein in this Annex

#### **24.10 Grills**

24.10.1. Numbers and position of air inlet and air outlet grilles shall be determined by the Contractor.

24.10.2. Air inlet and outlet dimensions resulting from required air flow and air speed shall be determined by the Contractor.

24.10.3. All grills shall be integrated into the room's architecture.

24.10.4. Care shall be taken to prevent whistling due to air pressure loss through the grills.

24.10.5. The acoustic noise due to air speed through the grills shall be between NR 25 and NR 30.

24.10.6. The air inlet grill shall be double deflection type, adjustable by special tool. The speed and orientation of air flow shall be such that:

- a. The acoustic noise level applicable to the room are met
- b. The air flow does not create any uncomforted feeling to the users
- c. Uniform air temperature distribution is ensured in the rooms.

24.10.7. The air outlet shall be adjustable with a simple louver type cover compatible with the air inlet grills.

#### **24.11 Compressor**

24.11.1. The number and type of compressors shall allow multi-level of power.

24.11.2. Each compressor shall have its own control and command box.

#### **24.12 Evaporator**

24.12.1. The evaporators shall be equipped with a refrigerant circuit tightness control system to guaranty a refrigerant loss of less than 1 gr per year.

#### **24.13 Refrigerant Circuit**

24.13.1. The refrigerant circuit shall be in copper tubes specially treated for refrigerant usage.

24.13.2. The refrigerant circuit shall include as a minimum:

- a. Connecting pipes between each compressor, the condenser and the evaporator

- b. One electromagnetic valve
- c. One dryer filter
- d. One thermostatic expansion valve
- e. One liquid sight glass
- f. One refrigerant tank with stop valve, level indicator and safety valve
- g. One stop valve
- h. One refrigerant charging valve
- i. Compressor connections.

#### **24.14 Condenser**

24.14.1. The chiller shall include one or two water condensers consisting of one back flow exchanger with copper tubes with fins deck, tubular plates and steel voids. The copper tube deck shall be cleanable.

#### **24.15 Circuit condenser-cooling system**

24.15.1. Amongst other things, it shall include:

- a. Anti-vibration coupling at connection to the condenser (both ways)
- b. One stop valve
- c. One transfer pump
- d. One anti-return valve
- e. One adjustment valve

24.15.2. This circuit shall be thermal insulated and protected by heating tape (or other suitable means) capable to maintain the liquid temperature at 15°C with an ambient temperature of -25°C.

#### **24.16 Acoustic isolation**

24.16.1. The chillers and their compressors shall be mounted on vibration dampers.

24.16.2. The compressors shall be equipped with acoustic isolation such that the acoustic noise level of the chillers does not exceed NR70.

#### **24.17 Cooling system**

24.17.1. Characteristics:

- a. The cooling system shall fulfil the requirements of the climatic conditions, existing at the different geographical locations of the COMMS sites.
- b. The acoustic noise level at 10m distance from the cooling system shall not exceed 50dBA

24.17.2. It shall be composed of:

- a. Self-supporting housing in galvanized steel, with special treatment against salt corrosion and be UV light resistant.
- b. Cooling bank with copper tubes with fins in aluminum lacquered with a copper collector.
- c. Low noise helicoids balanced ventilators.
- d. Motors supplied in 3x400 V, 50 Hz, IP 55, connected to a waterproof connection box, IP 65. Each motor shall have its own safety switch.

#### **24.18 Cooling plant control panel.**

24.18.1. The cooling plant control panel shall comply with specification stipulated herein in this Annex. It shall include all command, control, alarms and protection devices required for good and safe operation of the cooling plant.

24.18.2. Operation and adjustment

- a. The operation of the cooling plant shall be automatic
- b. The adjustment of operating parameters shall be of electronic type
- c. The designed shall guaranty the imposed parameters together with maximum economy during operation of the system
- d. All devices automatically operated shall also be provided with a manual command.

#### **24.19 HVAC – Miscellaneous**

24.19.1. Ventilation of diesel generator room:

- a. The room temperature shall not exceed 35°C. When the room temperature reaches 30°C the ventilator shall start at high speed. When the room temperature decreases and reaches 15°C the ventilator shall operate at low speed. When the room temperature reaches 5°C the ventilator shall stop.
- b. Manual operation of the ventilator shall be possible.
- c. The ventilator shall be helicoids type.
- d. The speed of the ventilator shall be 1500/750 rpm
- e. The acoustic noise shall be such to meet the requirement in this SOW.
- f. The air velocity through the exhaust duct shall not exceed 7m/sec.

#### **24.20 Louvres.**

24.20.1. Given the size of air inlet/outlet required for proper operation/cooling of the diesel engines, automatically operated louvers shall be provided in front of the transfer grilles and acoustic baffles. These louvers shall automatically open when one diesel engine starts. They shall automatically close after a pre-determined time delay to allow proper cooling of the diesel engines after engine stop.

#### **24.21 Fuel Tanks and Distribution**

24.21.1. In various locations, as stipulated in site specific Appendixes, one (or two) buried fuel tanks shall be provided for the two power generators.

24.21.2. In case of providing two underground fuel tanks for power generators they shall be installed at the same level and a by-pass connection shall be provided between the tanks.

24.21.3. Two day-tanks, one for each diesel generator shall also be provided. These tanks shall be located in the diesel generator room.

24.21.4. The fuel storage tanks shall be buried in the vicinity of the diesel generators room.

24.21.5. All works required for the installation of the fuel tanks, interconnection, fuel distribution, calibration, cleaning and rinsing before use, certification and testing are part of this SOW.

24.21.6. The fuel buried tanks shall be mounted on a foundation made of reinforced concrete and anchored to the foundation assuring suitable stability also against buoyancy force even when the tanks are empty.

24.21.7. The fuel tanks and associated equipment shall be installed in accordance with regulations and standards applicable and in force in the Territorial Host Nation (THN) as well as in compliance to:

- a. AC/4-M(96)001, dated 10 July 1996- NATO Approved Technical Criteria and Standards for POL Facilities
- b. STANAG 3756, edition 4, 9 September 2002 - Facilities And Equipment for Receipt and Delivery of Aviation Kerosene and Diesel Fuels

24.21.8. The buried fuel tanks shall meet following specification, installation requirements and be equipped at the minimum with the listed below auxiliaries:

- a. Cylindrical, double walled tanks
- b. Tanks and the auxiliaries shall be provided with grounding and cathodic protection systems
- c. If required by THN regulation at this specific geographical location ground water observation bore shall be provided
- d. All tanks and pipework installations shall be fitted with leak detection switches to give the user a remote alarm before the second skin is breached
- e. Equipped with monitoring/ control equipment (i.e. a control panel)
- f. Calibration of tanks in liters (every 10 mm of depth or as appropriate)
- g. Automatic tank gauge
- h. Dip-stick for manual inventory control of the fuel level
- i. Overfill prevention equipment and tank venting equipment with flame arrestor mesh

- j. Manholes providing access from grade level to underground equipment, including tank sumps, tank riser pipes, monitoring equipment, submersible pumps, valves and piping connections etc.
  - k. Spill containers to prevent spilled product from entering the soil near the fill and vapor-return riser connections (during normal tank-fill operation, or in the event of tank overflow). The spill containers shall catch spillage to help prevent soil contamination and groundwater pollution.
  - l. Fully redundant fuel pumps enabling transfer of the fuel to both generators
  - m. In case of providing two underground fuel tanks for power generators, the fuel pumps shall enable fuel transfer from one to another tank
  - n. Emergency, manually operated fuel pumps enabling transfer of the fuel to both generators
  - o. Installation of the fuel tank (tanks) shall be executed in a way that enables convenient and safe fuel transfer from fuel trucks to the tanks
  - p. Filling pipes, which shall terminate at a suitable location near the internal road or parking area for the fuel track
  - q. Marking of the fuel tank area in THN language (i.e. smoking/ open fire forbidden etc.) and in English
  - r. Special precaution shall be taken to prevent the fuel becoming too viscous in the pipes by cold temperature.
- 24.21.9. The capacity of the tanks shall be determined by the Contractor based on the following requirements:
- a. For the diesel generators underground fuel storage tank(s) - the capacity shall assure at least 7 (seven) days (unless stated otherwise in respective site specific Appendixes) of continuous operation under maximum rated load of the power generators provided by the Contractor and additional 20% of spare capacity for expansion in power generator's loads
  - b. For the day-tanks – the capacity of each day-tank shall assure at least 24 (twenty four) hours (unless stated otherwise in respective site specific Appendixes and unless limited, by respective THN GRC legislation, to other maximum allowed indoor fuel storage capacity) of continuous operation under maximum rated load of the power generators provided by the Contractor

## **24.22 Fuel distribution**

24.22.1. A fuel pumping station comprising two motor-driven self-priming screw pumps shall be provided.

24.22.2. Both pumps shall be equipped with special cut-off valves and drain cocks plus a non-return valve including the return to the main tank.



- 24.22.3. A manually- operated mechanical pump shall also be provided.
- 24.22.4. The special cut-off valve shall be equipped with a locking contact to prevent the corresponding pump from operating when the valve is not secured in the safe position, i.e. open for delivery and closed for bleeding or drainage.
- 24.22.5. The two day-tanks for power generators shall include:
- a. A drainage pipe with a drain cock fitted with a stopper
  - b. A sampling nozzle with a cock with stopper
  - c. All associated piping, valves, stopcocks etc.
- 24.22.6. The refilling of the day-tanks from the buried tank(s) shall be fully automatic, and possible from each buried diesel generator tank to each daily tank.
- 24.22.7. The automatic refilling shall be initiated automatically when the fuel level in a daily tank drops below programmed level.
- 24.22.8. Manual refilling of the daily tanks shall also be possible.
- 24.22.9. A visual fuel-level indicator shall be provided on each day-tank.
- 24.22.10. The Contractor shall also provide a technical solution that allows safe and fast fuel transfer from daily tanks to the buried fuel tanks in case of emergency. This technical solution shall be in compliance with THN Law and regulations concerning firefighting and protection measures.

## **SECTION 25 FIRE PROTECTION AND FIRE FIGHTING**

### **25.1 General**

25.1.1. The Contractor shall pay special attention to the coordination between this section and all the other sections in order to present a coherent overall solution without contradiction.

25.1.2. In this context, the Contractor shall pay special attention to the design of the ventilation and smoke extraction systems that shall be provide according to respective THN regulations and standards in force.

25.1.3. Administrative & design activities, equipment and installation characteristics, as well as execution of the works, including works supervision, quality assurance, quality control, testing & commissioning and health & safety measures shall be planned, organized and executed in compliance with following standards and reference documents (the list is neither exhaustive nor limitative):

- a. Commission Decision of 3 May 2000 implementing Council Directive 89/106/EEC as regards the classification of the resistance to fire performance of construction products, construction works and parts thereof or THN equivalent.
- b. 2000/553/EC: Commission Decision of 6 September 2000 implementing Council Directive 89/106/EEC as regards the external fire performance of roof coverings or THN equivalent.
- c. BS EN 54 series: Fire detection and fire alarm systems or THN equivalent.
- d. BS EN 1125:2008 Building hardware. Panic exit devices operated by a horizontal bar, for use on escape routes. Requirements and test methods or THN equivalent.
- e. BS EN 1366-2:2015 Fire resistance tests for service installations. Fire dampers or THN equivalent.
- f. BS EN 1366-8:2004 Fire resistance tests for service installations. Smoke extraction ducts or THN equivalent.
- g. BS EN 1634-1:2014+A1:2018 Fire resistance and smoke control tests for door and shutter assemblies, openable windows and elements of building hardware. Fire resistance test for door and shutter assemblies and openable windows or THN equivalent.
- h. BS EN 1634-2:2008 Fire resistance and smoke control tests for door, shutter and openable window assemblies and elements of building hardware. Fire resistance characterization test for elements of building hardware or THN equivalent.
- i. BS EN 1634-3:2004 Fire resistance and smoke control tests for door and shutter assemblies, openable windows and elements of building

- hardware. Smoke control test for door and shutter assemblies or THN equivalent.
- j. ISO 3864-1:2011 Graphical symbols — Safety colours and safety signs — Part 1: Design principles for safety signs and safety markings
  - k. BS EN 12101-2:2017 Smoke and heat control systems. Natural smoke and heat exhaust ventilators or THN equivalent.
  - l. BS EN 12101-3:2015 Smoke and heat control systems. Specification for powered smoke and heat control ventilators (Fans) or THN equivalent.
  - m. BS EN 13238:2010 Reaction to fire tests for building products. Conditioning procedures and general rules for selection of substrates or THN equivalent.
  - n. BS EN 13501-1:2018 Fire classification of construction products and building elements. Classification using data from reaction to fire tests or THN equivalent.
  - o. BS EN 13501-2:2016 Fire classification of construction products and building elements. Classification using data from fire resistance tests, excluding ventilation services or THN equivalent.
  - p. BS EN 13501-3:2005+A1:2009 Fire classification of construction products and building elements. Classification using data from fire resistance tests on products and elements used in building service installations: fire resisting ducts and fire dampers or THN equivalent.
  - q. BS EN 13501-4:2016 Fire classification of construction products and building elements. Classification using data from fire resistance tests on components of smoke control systems or THN equivalent.
  - r. BS EN 13501-5:2016 Fire classification of construction products and building elements. Classification using data from external fire exposure to roofs tests or THN equivalent.
  - s. BS EN 14306:2015 Thermal insulation products for building equipment and industrial installations. Factory made calcium silicate (CS) products. Specification or THN equivalent.
  - t. BS EN 14604:2005 Smoke alarm devices or THN equivalent.
  - u. BS EN 15650:2010 Ventilation for buildings. Fire dampers or THN equivalent.
  - v. BS EN 15725:2010 Extended application reports on the fire performance of construction products and building elements or THN equivalent.
  - w. BS EN 50200:2015 Method of test for resistance to fire of unprotected small cables for use in emergency circuits or THN equivalent.

## 25.2 Fire detection

25.2.1. Fire detection system shall be equipped with safety wiring with the following characteristics:

- a. Category F3- resistance to fire with mechanical shock and water assessed in combination
- b. Hard PVC outer casing with aluminum protection
- c. Solid copper conductors with silicone rubber
- d. Tinned copper earthing conductor

25.2.2. All detectors, warning pushbuttons, as well as evacuation buttons, shall be connected to separate iteration loops so that in the event of a wiring interruption, all other points remain operational. Deviations from the main loop are not permitted. At the connections, the cables shall be protected with eyelets. The cabling between the detectors, the alarms and the fire detection/alarm control panel shall be done in F3 cable, placed in a cable duct or in a 3/4 "PVC tube.

### **25.3 Fire detection/alarm control panel**

25.3.1. The panel shall be installed in a TBD location for the entire new SSSB building and various premises as stipulated in site specific Appendixes. Under no circumstances, this control panel(s) shall be located within other control panels of any equipment.

25.3.2. The control panel shall be controlled by microprocessors and enable monitoring and command of at least following functions:

- a. Fire detection
- b. Fire warning (transmitted by alarm, sirens, etc.)
- c. Fault monitoring

25.3.3. It shall be equipped with a printer (with paper roll) which shall print all of the incidents.

25.3.4. It shall be contained in a cabinet of solid manufacture and robust finish, which shall be closed by means of a key and a security lock. 6 (six) keys shall be included in the delivery.

25.3.5. The control panel shall be equipped with a user manual indelibly affixed to an aluminum or plastic plate and affixed on the wall next to the control panel or directly on the control panel.

25.3.6. The site plan shall be hung near the control panel. The plan shall include the location of the detectors, pushbuttons and the control panel(s).

25.3.7. A test button(s) for testing all LED indicators shall be provided.

25.3.8. For each monitored zone, the control panel shall record as the minimum:

- a. all fire alarms
- b. all faults in the control units as well as disconnection of a zone, a detector or a push button

- c. all power interruptions
- d. on battery operation
- e. "Out of service" - "In test" - "Fault" signals
- f. earthing error in the network, siren circuit and supply circuit
- g. Data on automatic extinguishing systems i.e. out of service state, in service state, empty bottles/tanks, full bottles/tanks, etc.

25.3.9. When the control panel detects a fire alarm, the ventilation and cooling shall always stop, the fire valves shall close.

25.3.10. The power supply shall be integrated in the control unit and protected against any contact by means of modular protective plates. It shall be protected against electrical disturbances (lightning, overvoltage, etc.).

25.3.11. The control panel shall be equipped as the minimum with:

- a. Automatic switch: mains – back up power/back up power – mains
- b. A button that triggers a general evacuation alarm. The tone of this alarm shall be clearly different from that of the fire alarm
- c. Indicator of battery low voltage
- d. Indicator (both in optical and acoustic form) showing the panel operation on battery
- e. Full control of complete power supply and battery charger (including fuses); any anomaly shall trigger error indication in optical form
- f. All cables shall be introduced into the control panel through the rear of the panel

25.3.12. The control panel shall have following characteristics:

- a. 230V power supply. +/- 10% (48-62Hz.)
- b. Ambient temperature: 0°C to 50°C
- c. Degree of humidity: 95%

25.3.13. Fire detection system shall be provided with backup power with the following characteristics:

- a. An autonomous emergency power supply with sealed lead acid (SLA) rechargeable batteries and charging units (including transformer, rectifier etc.) shall be an integral part of the system
- b. Battery charger with automatic control of the charging current according to the temperature
- c. Fast charging of batteries in case of complete discharge
- d. The batteries shall be completely airtight (no formation of corrosive or explosive gases). They shall always maintain their full capacity with the use of an automatic and constant control system of voltage and power

- e. The batteries shall automatically switched on and off, without operator intervention, depending on whether the mains supply is switched off or restored
  - f. The autonomy of batteries shall assure at least 72 hours of operation for the surveillance functions and 60 minutes for the sirens
  - g. A fault signal shall be transferred to the fire detection/alarm control panel if any of the above mentioned conditions are not met
  - h. Surge protection shall be provided
  - i. The operating state of the installation shall be indicated by a control lamp at the fire detection/alarm control panel
- 25.3.14. The fire detection/alarm control panel shall display with optical and acoustic signals:
- a. FIRE
  - b. DANGER
- 25.3.15. It shall be possible to stop the acoustic signal by means of a switch. However, detection of any other alarm shall automatically restore the acoustic signal.
- 25.3.16. The optical signal shall only switch off after the alarm has been canceled or the fault has disappeared.
- 25.3.17. Optical signals on the control panel shall be realized be means of LEDs.
- 25.3.18. A "TEST" button(s) shall be provided for activation/deactivation of the acoustic warning of a circuit to be tested. The other circuits remain in standby state for a possible warning.
- 25.3.19. The fire detection/alarm control panel shall process the information coming from various fire detection circuits and generate the following alarm signals:
- a. Fire detection alarm – when a fire is detected by fire detectors or by manual activation of a push button. All sirens in the same building are activated. The signal sounds a continuous tone
  - b. Evacuation alarm - the alarm which can be activated by means of a button at the fire panel. The tone must be clearly distinguishable from the fire detection alarm. Audible throughout the entire building and its immediate vicinity.
- 25.3.20. The fire detection/alarm control panel shall be fitted with an automatic telephone selector which shall notify the programmed telephone numbers in the event of an error or an alarm;
- a. The telephone selector shall be suitable for use on digital as well as analogue telephone lines
  - b. The telephone numbers to be programmed will be determined later by the Purchaser in the execution phases.

- c. The recorded message shall be in the THN official language and in English

#### **25.4 Fire/smoke detectors**

25.4.1. Fire/smoke detectors, further called detectors, shall meet requirements as per respective standards stipulated herein in this Annex above.

25.4.2. The communication protocol between the fire detection/alarm control panel and the detectors shall be insensitive to induction fields from electrical devices such as frequency controls, electric variations, high current power supplies, etc.

25.4.3. The detectors shall present an aesthetically pleasing exterior appearance. Visible areas must be finished to a high standard and be free from defects (no burrs or cracks).

25.4.4. In case the detectors are installed in a concealed manner (for example in rooms with suspended ceiling to monitor the space above the suspended ceiling) then they shall be indelibly marked as follows:

- a. This marking shall mention the detector number as indicated on the display of the fire detection/alarm control panel
- b. The detector number shall be stamped on or next to each detector base

25.4.5. Manufacturing and composition:

- a. Each detection point shall consist of a removable detector and a fixed base
- b. The detectors shall contain no putrescible liquid elements
- c. The detectors shall not include elements capable of oxidizing and rusting or which may become unstable under the effect of normal temperature and a normal degree of humidity of the rooms in which they are installed
- d. The detectors shall be designed in such a way to enable their removal with a suitable tool, mounted on a rod, without having to use a ladder or stepladder

25.4.6. Interchangeability:

- a. The detection elements of all models shall be easily interchangeable without affecting the nature of the circuits, by using a standardized base

25.4.7. Operation and signaling:

- a. The detectors shall trigger respective alarm as soon as the pre-set chemical or physical conditions are met for their activation
- b. The detectors shall not trigger the warning in the following situations:
  - i. Normal change in the situation and composition of the air
  - ii. Normal vibrations of the elements where they are fixed
  - iii. Normal changes in temperature and humidity of the premises in which they are installed

- iv. Electromagnetic disturbances (high frequency and magnetic radiation)
  - c. The detectors shall not become deranged due to aging within the timeframe, stipulated by their manufacturer, assuring that they are fully operational and safely reach the recommended intervals of their sensitivity adjustment
  - d. The detectors shall maintain the warning signal until it is stopped by manual operation at the control panel. At this time, the detectors shall automatically switch back to standby mode
  - e. Each detector shall assure operation of an individual light signal. This light shall be an integral part of the base or of the detector itself. The light intensity must be sufficient for the light signal to be visible at human height in daylight and in dusty rooms or in other difficult conditions.
- 25.4.8. Installation:
- a. The number of detectors to be installed shall be determined by the Contractor in their design based on respective THN standards and legislation
  - b. In principle, smoke detectors shall also be placed in any attics, plenums, in all corridors and technical rooms
  - c. Ionization smoke detectors shall not be used at all.

## **25.5 Fire alarm**

25.5.1. The Contractor shall delivery and install manually operated alarm push buttons, further called buttons, in order to report any outbreak of fire.

25.5.2. The number, location and characteristics of the buttons shall be determined by the Contractor in their design based on respective THN standards and legislation in force.

25.5.3. The buttons shall consist of a small, unalterable red box (PVC) colored in the mass and recessed.

25.5.4. The buttons shall be made of fire-retardant red PVC which is protected by a small easily breakable (plasticized) glass pane.

25.5.5. The buttons shall be activated by breaking the plasticized glass without tools. Broken glass shall not injure the user.

25.5.6. In the event of glass breaking and pressing the button, it shall transmit automatically the electrical signal to the sirens.

25.5.7. Each button shall be equipped with perfectly visible and legible note: "In case of fire, break the glass" written in the official language of THN and in English.

25.5.8. It shall be possible to test the button using a small wrench/key included with the delivery (one for each button) without having to break the glass or cause an unwanted fire signal.



- 25.5.9. The button shall have a recessed LED, which lights up when the fire alarm is activated.
- 25.5.10. Installation of the alarm push buttons shall meet following requirements:
- a. The mounting height shall be 1.5 m above finished floor level
  - b. Minimum degree of IP protection: IP 30
  - c. All safety circuits connected to detectors, sirens and alarm buttons shall have cables with a minimum cross section of 1.5 mm<sup>2</sup>
  - d. All wiring of category F3 - resistance to fire with mechanical shock and water assessed in combination
  - e. Authorized ambient temperature: from -10 to + 50 ° C.

### **25.6 Alarm Sirens**

- 25.6.1. The Contractor shall delivery and install electromechanical or electronic alarm sirens, further called sirens.
- 25.6.2. The number, location and characteristics of the sirens shall be determined by the Contractor in their design based on respective THN standards and legislation in force.
- 25.6.3. The sirens shall meet the following requirements:
- a. It shall be possible to monitor and control them from the fire detection/alarm control panel
  - b. They shall be in red color and made of fire-retardant PVC
  - c. Equipped with a built-in LED light with flashing light effect
  - d. The red LED shall blink in conjunction with the alarm sound
  - e. They shall have several tones – minimum as stipulated herein tin this Annex above
  - f. They shall emit sound minimum 110 dB over 1 m or 95 dB over 3 m
  - g. minimum degree of IP protection:
    - i. for indoor sirens: IP 54
    - ii. for outdoor sirens: IP 65

### **25.7 Fire door closing mechanisms and holders (retainers).**

- 25.7.1. The Contractor shall delivery and install fire door closing mechanisms and holders (retainers) as and when required.
- 25.7.2. The fire door number, location and characteristics shall be determined by the Contractor in their design based on respective THN standards and legislation in force.
- 25.7.3. Fire door closing mechanisms and holders (retainers) shall meet the following requirements:

- a. Each leaf of the fire doors located in the corridors and fire doors leading to the different parts of the buildings shall be equipped with an electromagnetic door holder (retainer) combined with a door closer
- b. The electromagnetic door holder (retainer) shall consist of a backing/keeper plate and a magnet
- c. The backing/keeper plate shall be provided with movable fixing brackets
- d. It shall be possible to monitor and control them from the fire detection/alarm control panel
- e. The electromagnetic door holder (retainer) shall be equipped with a push button mounted on the magnet base to allow manual closing of the door leafs with zero residual force for instant release
- f. Power supply: 24V DC from the fire detection/alarm control panel
- g. Die cast zinc alloy mounting base
- h. Steel, electro plated magnet and backing/keeper plate
- i. Operating temperature: 0 to + 50 ° C
- j. The door closer shall ensure automatic and reliable closing of the door leaf when the fire detection system is activated
- k. In normal situation, the fire doors are blocked in the open position by the energized magnets
- l. In the event of a fire alarm, the magnets shall be de-energized and the doors shall close automatically.

### **25.8 Fire safety signs and safety markings**

25.8.1. The Contractor shall deliver and install fire safety signs and safety markings as and when required.

25.8.2. Their number, location and characteristics shall be determined by the Contractor in their design based on respective THN standards and legislation in force.

25.8.3. Fire safety signs and safety markings shall meet following requirements:

- a. Made in synthetic material, resistant to discoloration
- b. Suitable for both exterior and interior use
- c. Assembly is carried out in the places indicated, according to the manufacturer's instructions.
- d. They shall be installed in such a way that they are clearly visible from the entrance doors, escape routes, etc.
- e. When required, the necessary evacuation plans shall be provided as well

### **25.9 Fire fighting**

25.9.1. Requirements for portable fire extinguishers are already described in other sections of this Annex.

25.9.2. This paragraph concerns the additional means that shall be provided by the Contractor according to their design based on respective THN standards and legislation.

25.9.3. The additional means the Contractor shall provide and install are:

- a. Fire dampers
- b. Automated full volume fire suppression system for the site of Kythira, Naval Entity 47 South (TX-RX)

25.9.4. The fire dampers, the automated full volume fire suppression system, fire detection and fire alarm shall be integrated into one cohesive fire protection and fighting system that shall be fully compatible with fire zones identified in the design for the new SSSB building and for various premises as stipulated in site specific Appendixes.

### **25.10 Fire dampers**

25.10.1. The number, location and characteristics of the fire dampers shall be determined by the Contractor in their design based on respective THN standards and legislation in force.

25.10.2. The fire dampers shall meet following requirements:

- a. installed at the HVAC ducts
- b. fitted with a servomotor and limit switches
- c. the servomotor shall be installed in a heat-resistant box
- d. the mode of operation shall be "fail-safe", that is to say that in the event of a voltage drop, the valve is controlled to close by a spring device specially developed for this purpose
- e. The actuator shall comply with standards BS EN 61000-6-3:2007+A1:2011 and BS EN IEC 61000-6-4:2019 or THN equivalent.
- f. the valves shall be maintenance free
- g. the valve position indicator shall be present in the external part thereof
- h. an easily removable and efficient inspection hatch shall be provided in the ventilation duct to the fire damper
- i. when a fire damper cannot be fitted in line with the fire walls, the ventilation ducts protruding from the fire walls shall be provided with a fire protection covering of the same fire resistance as the corresponding fire wall.
- j. made of galvanized steel sheet
- k. fitted with a shutter consisting of a mineral fiber panel with metal sheet coating on both sides; minimum thickness of the shutter shall be 40 mm

- l. accessory parts in galvanized steel
- m. servomotor supply voltage determined according to the chosen fire panel (shall be coordinated with relevant requirements which address Fire Detection in this Annex)
- n. fire resistance rating value of the damper shall be equal to the resistance of the corresponding fire wall

### **25.11 Automated full volume fire suppression system**

25.11.1. The automated full volume fire suppression system shall meet the undermentioned requirements.

- a. The design and implementation, further called the solution, shall assure safeguarding of site personnel and the equipment in following premises as the minimum:
- b. Supply, Storage Room/ Workshop and Test facilities for electronic equipment
- c. SSSB Equipment room
- d. Power Generator room
- e. Main Power switchgear room
- f. UPS/Battery room

25.11.2. The above indicated areas shall be protected including their respective upper and lower plenums (entire volume above the suspended ceiling and below the raised floor); this shall be known as a full-volume solution.

25.11.3. The solution shall include any requirements for integration with other systems in the facility. Such systems shall include (but are not limited to) fire detection & alarm, heating, ventilation and air conditioning (HVAC) and electrical systems.

25.11.4. The solution shall be certified by an authorized representative or government body in THN and respective certificates of compliance shall be issued.

25.11.5. The fire suppressant shall be based on chemical compound FK-5-1-12.

25.11.6. The solution shall be compliant with following publications or their THN equivalents:

- a. Regulation (EU) No 517/2014 of the European Parliament and of the Council of 16 April 2014 on fluorinated greenhouse gases and repealing Regulation (EC) No 842/2006
- b. ISO 14520-5:2019 Gaseous fire-extinguishing systems — Physical properties and system design - Part 5: FK-5-1-12 extinguishant
- c. ISO 16003:2008 Components for fire-extinguishing systems using gas— Requirements and test methods — Container valve assemblies and their

actuators; selector valves and their actuators; nozzles; flexible and rigid connectors; and check valves and non-return valves

- d. ISO/TS 21805:2018 Guidance on design, selection and installation of vents to safeguard the structural integrity of enclosures protected by gaseous fire-extinguishing systems

25.11.7. The solution shall provide an automatic leak detection system defined as a calibrated mechanical, electrical or electronic device for detecting leakage of F-Gases which, on detection, alerts the operator or a service company of any leakage.

25.11.8. The design shall identify all safety characteristics of the recommended solution which shall be included in the SSSB Site Safety Case.

25.11.9. The solution shall result in integrated fire detection and fire suppression system.

13.1.3. Suppression System.

- a. The solution shall identify detailed descriptions of essential specifications considered in the design; examples shall include (but are not limited to);
  - i. temperature assumptions
  - ii. applicable standards
  - iii. over and under-pressure assumptions
  - iv. suppression materials and characteristics
  - v. Compatibility with the design of raised floor and suspended ceiling structure (including but not limited to pedestal base, pedestal head, pedestal, diagonal bracing, floor tiles, ceiling panels etc.)
  - vi. airflow requirements in conjunction with HVAC design
  - vii. physical components of the solution including quantities

25.11.10. The Contractor shall determine the maintenance policy (MP) and provide technical manuals and As-built drawings as appropriate to that MP that include description of the integrated system, description of the sequence of operation of fire detection and fire suppression systems installed in the facility, system test requirements; and user system maintenance requirements.

25.11.11. The solution shall consider how the system is to be installed (locations of components).

25.11.12. The solution shall address each of the issues identified in this Annex as well as any additional issues identified by the Contractor.

25.11.13. The solution shall consider siting and mounting of all components, including gas bottles and associated frames. Consideration shall be given to the effect of blast on the mounted equipment.

25.11.14. The solution shall consider differing methods of pressure management including airflow apertures between the protected premises, pressure relief valves as needed etc.

25.11.15. The solution shall consider and identify all tests to be conducted as proof of the design.

25.11.16. The solution shall identify any incident recording capability and built-in-test interrogation capability.

25.11.17. The solution proposal shall include all configuration management activities.

25.11.18. The solution shall include approval by the government or designated authority in THN and issue of certificates of compliance.

25.11.19. The solution shall identify annual support costs, including annual safety checks and issue of certificates of testing.

25.11.20. The solution shall identify suppression material replenishment costs in the event of operation of the system.

25.11.21. The solution shall explain annual support contracts offered by the selected sub-contractor, including any call-out or annual help desk costs.

## **SECTION 26 ELECTRICAL WORKS**

### **26.1 General**

26.1.1. The Electrical Works shall include:

- a. The High Voltage/ Medium Voltage Power Station
- b. The Low Voltage (LV) Main Power Distribution Board (MPDB) and/or the integration with existing LV MPDB
- c. The Electrical Distribution Panels
- d. The Distribution Cables and Wiring
- e. The Electrical Equipment
- f. The Emergency Lighting
- g. The Power Back-up
- h. The Uninterruptible Power Supply
- i. The Lightning Protection and Grounding Connection
- j. The External Lighting
- k. The Electrical Works Legal Inspection

### **26.2 Applicable documents**

26.2.1. The below list is nor exhaustive neither limitative.

26.2.2. The electrical installations and the equipment used shall comply with the documents listed below:

- a. IEC 60038: IEC standard voltages or THN equivalent.
- b. IEC 60364: Electrical installations of buildings or THN equivalent.
- c. IEC 60309: Plugs, socket-outlets and couplers for industrial purposes or THN equivalent.
- d. IEC 61009: Residual current operated circuit-breakers with integral overcurrent protection for household and similar uses or THN equivalent.
- e. IEC 61537: Cable management - Cable tray systems and cable ladder systems or THN equivalent.
- f. IEC 61643: Low-voltage surge protective devices or THN equivalent.
- g. IEC TR 60083: Plugs and socket-outlets for domestic and similar general use standardized in member countries of IEC or THN equivalent.
- h. IEC 60529: Degrees of protection provided by enclosures (IP Code) or THN equivalent.
- i. EN 60598-1:2015+A1:2018 Luminaires. General requirements and tests or THN equivalent.

- j. Directive 2014/30/EU of The European Parliament and of The Council of 26 February 2014 – electromagnetic compatibility or THN equivalent.
- k. MIL-STD 461G (or THN equivalent) – Requirements for the control of electromagnetic interference characteristics of subsystems and equipment, December 2015
- l. Directive 2014/35/Eu of The European Parliament and of The Council of 26 February 2014 – ‘low voltage directive’ or THN equivalent.
- m. Particular rules imposed by the electrical power supply company

### **26.3 Quality criteria**

26.3.1. All equipment used shall be ambient physicochemical and fluids resistant.

26.3.2. All equipment and material delivered shall be new, of high quality, of standard manufacturing, known brand and manufacturer with good logistic support.

26.3.3. All equipment shall fulfil the THN legislation requirements for electrical equipment.

26.3.4. Hybrid and self-made equipment are not allowed.

26.3.5. Equipment, materials and accessories as well as installation techniques not explicitly described in this SOW shall be conceived by the Contractor such that they satisfy the following conditions:

- a. Good operation of installation they belong to
- b. Perfect integration in the environment (for instance in false ceiling)
- c. Easy operation by the users
- d. Long MTBF
- e. Simplified operation and maintenance
- f. Quick repair
- g. Possibility to upgrade or modify without important re-engineering.

### **26.4 HV Electrical Power Station**

26.4.1. Existing electrical power situation and details are available within the SIDP Annex.

### **26.5 New HV/MV Power Station.**

26.5.1. The Contractor shall provide a New HV/MV power station that shall comply with the documents listed below. The below list is nor exhaustive neither limitative:

- a. Commission Regulation (EU) 2019/1783 of 1 October 2019 amending Regulation (EU) No 548/2014 on implementing Directive 2009/125/EC of the European Parliament and of the Council with regard to small, medium and large power transformers or THN equivalent.



- b. Commission Regulation (EU) No 548/2014 of 21 May 2014 on implementing Directive 2009/125/EC of the European Parliament and of the Council with regard to small, medium and large power transformers or THN equivalent.
- c. Directive 2009/125/EC of the European Parliament and of the Council of 21 October 2009 establishing a framework for the setting of eco-design requirements for energy-related products or THN equivalent.
- d. EN 50708-1-1:2020 Power transformers. Additional European requirements. Common part. General requirements or THN equivalent.
- e. EN 50708-2-1:2020 Power transformers. Additional European requirements. Medium power transformer. General requirements or THN equivalent.
- f. EN 50708-3-1:2020 Power transformers. Additional European requirements. Large power transformers. General requirements or THN equivalent.

26.5.2. The size of the HV/MV station shall be determined by the Contractor taking into consideration:

- a. directives from the HV/MV power supply provider
- b. the total site power requirements plus 30% spare capacity for future expansion

26.5.3. Inspection and acceptance of the HV/MV station by an accredited company shall take place prior to acceptance by the Purchaser.

26.5.4. The aim of this HV/MV power station is primarily to provide the required power supply to the site.

26.5.5. Should the commercial power supply company request the Contractor to increase the capacity of the power station for their own need, for instance local distribution of electrical power supply, then the related costs shall be supported by the commercial power supply company. The Purchaser will only support the cost related to this SOW.

26.5.6. The design, procurement and installation of the HV/MV power station shall be in accordance with local regulations and shall be closely coordinated with the local HV/MV power supply provider.

26.5.7. The HV/MV power station shall be subdivided in cubicles/cabinets and include as a minimum:

- a. HV/MV disconnecting switches
- b. ON-OFF switch with HV/MV fuses
- c. HV/MV circuit breaker
- d. lightning arresters
- e. Capacitive Divider Bridge to supply three "live" warning lights

- f. Earth disconnecting switch
  - g. Warning lights showing the open and closed positions of the disconnecting switches
  - h. Auxiliary contacts shall be provided for remote warning signals
  - i. All other equipment that are required by National and local regulations (e.g. interlocking and padlocking equipment for use with local system with loop or multiple distribution)
  - j. Footstool, rod, hook, rubber gloves etc.
  - k. Warning and operating voltage signs
  - l. HV/MV equipment circuit diagram
  - m. Rechargeable portable lamp with 2 hours autonomy
- 26.5.8. The blowing of one HV fuse shall cause the three-pole break to trip.
- 26.5.9. The control for the disconnecting switches shall be manual; they shall be locked to each other and to the access door to obviate any risk of mistake.
- 26.5.10. The transformer fed by this station shall be protected on the low voltage side.
- 26.5.11. Rated power: To be determined by the Contractor
- 26.5.12. Frequency: 50 Hz
- 26.5.13. The neutral shall be grounded
- 26.5.14. Connections:
- a. On HV/MV side: to be defined by the Contractor in co-ordination with the commercial power supply company
  - b. On LV side: Underground cable

## **26.6 Tests**

- 26.6.1. The test shall comply with national and local Standards. The tests shall include the following:
- a. Measurement of heating
  - b. Short-circuit resistance tests
  - c. Overload curves with prior load of 50, 75 and 90%
  - d. Measurement of winding resistance when cold
  - e. Dielectric rigidity tests with applied and induced voltages
  - f. No-load tests
  - g. Transformation ratio measurement
  - h. Thermometers operation.

## **26.7 HV cables**

26.7.1. The HV/MV cables shall conform to IEC 60183:2015 or THN equivalent.

26.7.2. The size of the cables shall be determined by the Contractor taking into consideration Voltage drop.

## **26.8 Mains Power Distribution Board (MPDB)**

### **26.8.1. General Requirements for the MPDB.**

- a. The MPDB shall comply with EN 61439-6:2012 Low-voltage switchgear and control gear assemblies, Busbar trunking systems (busways) or THN equivalent.
- b. In addition to the sub-paragraphs below, the general requirements for Electrical Distribution Panels mentioned in relevant paragraphs below also apply to the MPDB.
- c. The board shall be located in the Main Power switchgear room. It shall be of steel sheet construction and shall incorporate easy access to all components for maintenance.
- d. The MPDB shall be divided in cabinets. The front doors of each cabinet shall be of hinged type and have locking devices with single handle and be lockable with a key. The rear access shall be of the panel type and fitted with snap-on screws for easy removal.
- e. All doors shall be connected to the cabinet or box framework by two tinned copper stranded conductors.
- f. Meters, switches, alarm lights/led, indicator lights/led shall be mounted on the front doors or behind an outer doors when required due to H&S regulations. Adjustable devices shall be lockable.
- g. An Emergency OFF push button shall be mounted on the board. It shall be protected to prevent inadvertent operation.
- h. A mimic diagram, showing the operation positions of the switches, controls, meters and indicator lights in the circuit order shall be provided on the front doors of the board.
- i. All components, cables and cable connections shall be properly labelled.
- j. The MPDB shall contain all switching, control protection, lightning arrestors, metering, alarms indication and connection devices for the distribution of AC power supply to the electronic equipment (no-break), domestic utilities and auxiliary loads (short-break).
- k. The MPDB shall also contain an automatic change over switch, which shall switch over from the mains input to the standby power input or vice versa.
- l. A copper earthing bus bar shall also be provided.
- m. The power distribution throughout the site shall be 400V/230V – four wire + ground, TN-S.

- n. The TN-C segments of electrical installation will be only allowed if in conformity to IEC 60364 and when it is required. An example when TN-C connections might be required is on the input to the UPS, as it requires constantly-connected PE & N conductors to ensure an ever-present earth reference.

26.8.2. **MPDB input connections.**

- a. The MPDB shall be equipped as the minimum with input connections for:
  - i. LV connection from the secondary side of the main step-down transformer
  - ii. Standby power (short-break) connections from the Diesel Control Boards
  - iii. Control alarm signal cables from main step-down transformer
- b. The input connections shall be equipped with motor controlled circuit breakers with thermo magnetic protection.

26.8.3. **MPDB output connections.**

- a. The MPDB, as the minimum, shall be equipped with output connection to:
  - i. The Equipment Power Distribution Board (EPDB)
  - ii. The power input to the UPS rectifier
  - iii. The power input to the Diesel Control Board
  - iv. The Power Panels for building utilities
  - v. The Power Panel for the Environment Control (HVAC) equipment
- b. All power outputs shall be equipped with circuit breaker and contactors. The contactors shall be controlled on the one hand by "ON-OFF" push buttons on the front surface of the panel and on the other hand by time delay relays, enabling a supply cut-off to be followed by cascaded re-connections to various users so that whole load is not abruptly connected to the stand-by generator. The control system (push button or time delay relay) shall be selected by means of "manual-automatic" switches.
- c. All circuit-breakers shall comply with EN 60947-2:2017+A1:2020 Low-voltage switchgear and control gear or THN equivalent.
- d. The integration with existing MPDB shall include installation of adequate circuit breakers, and modification of existing power distribution system and the power boards/ panels as required to connect power cables for SSSB electrical installation.

26.8.4. **Capacitor Bank**

- a. When require, a capacitor bank shall be provided and integrated with the MPDB to maintain a power factor equal to 0.95.
- b. The capacitor bank shall be compliant with (the list is nor exhaustive neither limitative) IEC 60871, IEC 60831, IEC 61921, IEC 60099, IEC 60076, IEC 61869 or THN equivalent.
- c. The capacitor bank shall be controlled by an electronic regulator with selector of power factors, auto-manual selector, and step indicators.

**26.8.5. Measurement equipment.**

- a. The MPDB shall, as a minimum, have the following meters:
  - i. One voltmeter with associated selector switch to permit measurement of the HV input between phases;
  - ii. One voltmeter with associated selector switch to permit measurement of the LV input between phases and between phase and neutral;
  - iii. Three ammeters to permit measurement of the phase current from the LV side of the HV transformer on the input bus-bar;
  - iv. Three ammeters to permit measurement of the phase current on the output bus-bars;
  - v. One kilowatt meter;
  - vi. One frequency meter;
  - vii. One power factor meter;
  - viii. One kilowatt hour meter.
- b. Alarm indicators, as the minimum, shall be provided on the MPDB for the following fault conditions:
  - i. Mains supply disconnected;
  - ii. HV breaker tripped;
  - iii. Transformer over temperature;
  - iv. Earth fault on HV.
- c. All alarms for the HV/MV, LV, Stand-by and UPS power supplies shall be remotely indicated at the SSSB operator control console.

**26.9 Site Monitoring System (SMS)**

26.9.1. Site Monitoring System is a COMMS site sub system (not PFE) in order to supervise the correct operations of infrastructure and equipment. On the other hand, the major function of the system is to reveal the status of operation of a site. It shall adapt, to an already installed SMS, taking over the Alarm/States of the monitored components.

26.9.2. Site Monitoring System is distributed over all SSSB COMMS sites.

26.9.3. The system consists of an alarm panel per site allowing visualizing (via LEDs) and audible (via buzzer) alarms, managed by the SMS. Furthermore, it shall have an Alarm Acknowledge button, LED Test functionality and a Power LED.

26.9.4. The Alarm Panel shall be installed in the equipment room (SSSB COMMS room) into the front of a rack.

26.9.5. One desk mountable Alarm Panel, if requested by the THN, shall be installed at remote/local location chosen by the THN. It shall have the identical functionality as the Alarm panels, installed at the SSSB COMMS sites – but here representing Alerts/States for all SSSB COMMS sites dedicated to a SSSB Buffer Centre.

26.9.6. The SMS shall communicate all alerts/states to the SSSB Opens System Communication Control System (OSCC), which will present the states of the different SSSB COMMS sites and COMMS devices at all OSCC components (e.g. to the SSSB Operator at the SSSB Buffer Centre).

26.9.7. The bi-directional exchange of information between the SMS and the SSSB OSCC shall be performed preferably by SNMP v.3x or by Dry-Contacts (I/O device). The Contractor is invited to recommend other techniques for the information exchange between SMS and OSCC, where a final decision shall be performed by the Purchaser.

26.9.8. All SSSB COMMS devices, including Purchaser Furnished Equipment (PFE) shall be monitored by the SMS. This shall be valid for all devices providing an alarm or status by any means (IP, Serial, Dry-Contact, or any other).

**REMARK:**

The OSCC will perform control of SSSB COMMS key equipment. For COMMS devices, where "concurrent" access of SMS and OSCC is not possible – OSCC will take precedence to intercept alarms/states and will provide them to the SMS for further processing.

The THN shall have the final decision on the device alarms/states to be indicated at the Alarm Panels. The THN shall also have the final decision on multiple sub-alerts causing an active alarm indication at the Alarm Panel LED.

26.9.9. The Contractor shall provide an ICD to the Purchaser latest at the Critical Design Review Meeting (CDR), representing the SW interface between the SMS and the OSCC.

**26.10 Electrical Distribution Panels**

26.10.1. Equipment shall be designed for rated voltage of 500 V AC. It shall be capable of withstanding, for one second, the dynamic and thermal effects produced by the short-circuit current to be determined by the Contractor but in any case not less than:

- a. 15 kA effective
- b. 37.5 kA asymmetrical amplitude

- 26.10.2. The Contractor shall indicate on his drawings the rating and characteristics of the equipment offered.
- 26.10.3. All electrical equipment fitted in electrical panels or used to control lighting and power supply circuits shall be designed to withstand the stress resulting from maximum short-circuit current that might occur at the point where the equipment in question is located.
- 26.10.4. The equipment layout in the panels shall be clear, logical and rational, enabling all the items to be easily mounted, connected and maintained and the relationship between the various components to be easily understood.
- 26.10.5. The compartment within the cabinets and the boxes shall be of a size to permit rapid and safe access to the equipment housed in them. The overall size of each panel shall be such that new lead-outs can be added.
- 26.10.6. The degree of protection shall be at least IP 30.
- 26.10.7. The cabinets shall include a framework to hold the equipment, enclosed with panels of fire-proof insulating material.
- 26.10.8. The frame works shall be equipped with DIN rails to which equipment shall be mounted.
- 26.10.9. The covering panels shall have openings through which the cut-off controls can be reached while all live parts remain protected. Protection of the complete unit with cabinet door open shall be at least IP 20.
- 26.10.10. The front doors shall be of hinged type and have locking devices with single handle and be lockable with a key.
- 26.10.11. All doors shall be connected to the cabinet or box framework by two tinned copper stranded conductors.
- 26.10.12. Meters, switches, alarm lights/led, indicator lights/led shall be mounted on the front doors or behind an outer doors when required due to H&S regulations. Adjustable devices shall be lockable.
- 26.10.13. Each board/panel shall include 30% spare, non-equipped space.
- 26.10.14. Each board/panel shall be clearly marked on the outer side of the door by means of thermoplastic plate engraved with following information:
- a. Voltage (for instance 3 x 400 V + N – 50 Hz)
  - b. Destination (for instance EPDB – No-Break)
  - c. Type of distribution (for instance TN-S)
- 26.10.15. Each board shall be equipped with internal lighting.

## **26.11 Distribution Boards/Panels Equipment**

### **26.11.1. Switches**

- a. Switches shall conform to IEC 60669, IEC 60947, IEC 62626 or THN equivalent.

- b. Each pole shall provide a double break, with breaking and making speed independent of the operator.
- c. The switches shall be of rotary, bar or knife type.
- d. If switches have associated fuses, the switch-fuse assembly shall be fitted in the same compartment box.
- e. Each switch shall be operated by means of rugged handle at the front which, by its position and markings, clearly shows whether the switch is open or closed.
- f. If the control handles are located on the doors, they shall be equipped with a coupling system enabling the doors to be opened without handles being dismantled. In no circumstances shall this system permit the position of the handle to be inverted in relation to the position of the switch it controls.

**26.11.2. Circuit-breakers**

- a. The circuit-breakers shall conform to IEC 60947, IEC 60898, EN 61008, EN 61009 or THN equivalent.
- b. The circuit-breakers shall have a breaking capacity at least equivalent to the short-circuit current assumed possible where they are located.
- c. When circuit-breakers do not have the required breaking capacity, they must be linked with high breaking-capacity fuses.
- d. The breaking capacity of the circuit-breakers shall not be lower than 10 kA with a 400 V power supply.
- e. The circuit-breakers shall be of the air, dry-breaking type with a manual reset system. In the event that the assumed established current is over 15 kA, control must be effected by energy storage devices operated by hand or by electric motors.
- f. The control device shall always be situated on the front of the circuit-breaker.
- g. Each pole shall be equipped with and adjustable thermo-magnetic release.

**26.11.3. Small Automatic Switches**

- a. Single pole automatic switches will be accepted. The Contractor shall determine the type and rated current of the equipment on the basis of the circuits to be protected. They shall be of the fixed type. Manually controlled and fitted with a thermos-magnetic trip device.
- b. In the case of equipment not protected by upstream fuses, the effective breaking capacity shall be at least 15 kA. The electrodynamic resistance and closing capacity shall be at least 37.5 kA asymmetrical amplitude.



26.11.4. **Earth Leakage Circuit Breaker**

- a. An earth Leakage Circuit Breaker shall be provided as required by the IEC 60364.

26.11.5. **Tele breakers**

- a. Tele breakers are accepted. These devices shall have solid silver contacts or a mercury-contact relay system.
- b. The connecting screws shall be made of nickel-plated brass, with oscillating clams, for connecting conductors with a cross-section of up to 2.5 mm<sup>2</sup>.
- c. They shall be fitted with a built-in or separate indicator or light showing the position of the contacts and with an operating lever or push-button.
- d. The rated voltage shall be at least 250 V and the rated current 10 A.
- e. The heating, in continuous operation, shall not exceed 80°C.

26.11.6. **Fuses**

- a. The fuses shall be of the blade cartridge type with handle, have a high breaking capacity and have enclosed quick-melting system. In motor supply circuits, fuses of time-lag type shall be installed if motor starting current makes it necessary.
- b. The fuses shall conform to IEC 60269-2, Low-voltage fuses – fuses mainly for industrial application.
- c. As far as possible thermomagnetic circuit-breakers shall be used and fuse cut-outs only be accepted for capacities of 2 amps or less or in any cases where the best thermomagnetic circuit-breaker on the market have less breaking capacity than the estimated short-circuit current at the point where they are installed.
- d. When fuse cut-outs are used they shall always be mounted on a fuse-holder disconnecter.
- e. The disconnectors shall be of the load-break type.

26.11.7. **Contactors**

- a. The contactors shall conform to IEC 60947-4-2, IEC 60947-4-1, and IEC 61095 or THN equivalent.
- b. The contactors shall have a double-break system on each pole. Motor – controlling contactors shall be linked to adjustable thermal relays in the absence of a circuit-breaker.
- c. The relays shall be adjusted such that the extremes temperature permissible for which the motors are protected cannot be exceeded, i.e. maximum 1.5 x in for less than two minutes.
- d. The associated relays shall act on all phases.

- e. Upstream protection by means of fuses or circuit-breakers shall be suitably rated and shall have a breaking capacity at least equivalent to the short-circuit current which might occur where they are located. This protection shall be grouped in the same compartment as the corresponding contactor.
  - f. Each contactor shall be equipped with at least two auxiliary “NO” contacts and two auxiliary reverse contacts.
  - g. The thermal relays shall also have auxiliary contacts, either one “NO” plus one “NC”, or a reverser.
- 26.11.8. **Instrument transformer**
- a. When required, the Contractor shall provide and install the instrument transformer that shall be of a dry type, insulated with Araldite.
- 26.11.9. **Equipment Power Distribution Board (EPDB)**
- a. One EPDB shall be provided in the SSSB Equipment room. It shall be of steel sheet construction and shall incorporate easy access to all components for maintenance.
  - b. The EPDB shall be divided in two sections:
    - i. One No-Break section supplied from the UPS
    - ii. One Short-Break section supplied from the MPDB
  - c. The compartment within the cabinet shall be of a size to permit rapid and safe access to the equipment housed in them. The overall size of each panel shall be such that new lead-outs can be added.
  - d. The degree of protection shall be at least IP 30.
  - e. The two front doors shall be of hinged type and have locking devices with single handle and be lockable with a key.
  - f. The two doors shall be connected to the cabinet or box framework by two tinned copper stranded conductors.
  - g. The No-Break section and the Short-Break section shall each be equipped with:
    - i. One four-pole bus bar
    - ii. One four-pole input circuit-breaker with thermomagnetic protection. However, if there are any upstream panels with overcurrent protection devices, the EPDB shall have instead input switches (contactors) as this is not a good engineering practice to have two overcurrent protection devices directly in series.
    - iii. One voltmeter with selector switch (phase-phase and phase-neutral)
    - iv. Three ammeters
    - v. A copper grounding bus bar

- vi. Output power feeders;
- h. Meters, switches, alarm lights/led, indicator lights/led shall be mounted on the front doors or behind an outer doors when required due to H&S regulations.
- i. An Emergency OFF push button shall be mounted on the panel. It shall be protected to prevent inadvertent operation (see also relevant sections herein in this Annex below).
- j. The No-Break section shall provide power supply distribution to all SSSB equipment that cannot suffer any power supply interruption.
- k. The Short-Break section shall provide power supply to all SSSB equipment that can accept short power interruption and to all auxiliary and utility loads.
- l. Note: The power interruption is dictated by the time required for the change over from mains to stand-by power supply.

### **26.12 Power Panel (PP)**

- 26.12.1. Power Panels shall be provided for utilities and auxiliary loads and shall be provided and installed throughout the new SSSB building and in other premises as stipulated in site specific Appendixes.
- 26.12.2. They shall be of steel sheet construction, mounted on walls. The general degree of protection shall be at least IP 30. The degree of protection for the power panel in the air conditioning room shall be IP 54.
- 26.12.3. The front doors shall be of hinged type and be lockable with a key.
- 26.12.4. The doors shall be connected to the cabinet by two tinned copper stranded conductors.
- 26.12.5. The panels shall contain:
- a. One four-pole set of bus-bars
  - b. One copper earthing bar
  - c. One four-pole input circuit breaker
  - d. All the required switching, overload protection circuit-breakers and fuses, switches, etc. in accordance with national and local regulations
  - e. Earth leakage current circuit-breakers shall be provided whenever required in accordance with IEC 60364 or THN equivalent.
- 26.12.6. All equipment and accessories in the panels shall be mounted on DIN rail.
- 26.12.7. The load connected to each 3-phase supply shall be equally distributed between the three phases, as far as practicable, to ensure optimum balance between the phases.
- 26.12.8. All auxiliary and utility loads shall be connected to the short-break (mains and stand-by) power supply.

### **26.13 Cables and wiring**

26.13.1. The following cables and wiring are required:

- a. The LV power cable between the HV transformer, LV, side and the MPDB;
- b. The power cables between the stand-by generating sets and the MPDB;
- c. The LV cables to connect the Mains Power Distribution Board to the Equipment Power Distribution Board and Power Panels;
- d. The LV cable to the UPS power input;
- e. The LV cable from the UPS to the Equipment Power Distribution Board
- f. All wiring for distribution of power from the Equipment Power Distribution Boards and Panels to electronic equipment, lighting, outlets, utilities, etc.
- g. All required power cables from the buildings to various antenna locations
- h. LV cables between the MPDB and the Diesel Generator Control Boards;
- i. All remote control and signaling cables
- j. All cables to connect external lighting, fire detection and alarm system
- k. All cabling and wiring required for proper and intended functioning of all equipment provided under this statement of work
- l. All earthing cables

26.13.2. **Technical requirements.**

- a. All cables and wires shall be rated for current carrying capacity in accordance with the applicable industry standards.
- b. Free movement of cables shall be assured when equipment is pulled out for maintenance/repair.
- c. Wires and cables shall be placed and protected as to prevent contact with rough irregular surfaces and sharp edges. Cables connecting to components mounted onto doors or panels shall be protected so that no possibility of damage arises during opening and closing of doors or panels.
- d. Cable harnesses shall be routed away from heat generating equipment and no wire or cable connection shall be in tension.
- e. For the dimensioning of the bending radius of cables the regulations of DIN VDE 0298, part 3 or equivalent shall be followed.
- f. All soldered connections shall be clean and smooth in appearance and shall provide excellent electrical conductivity. The insulation of soldered wires shall not show damage from the heat of the soldering operation.
- g. All electrical cables shall conform to IEC 60228, IEC 60287-3-2 (Economic optimization of power cable size) or THN equivalent.

**26.13.3. Redundant cables**

- a. Redundant cables shall be removed or stop-ended and clearly marked:
- b. The term “STOP END” means the provision of a permanent seal in which all cores are insulated and protected so that the cable can be energized safely.
- c. Removed cables shall be disposed of in accordance with THN local standards and regulations in force.

**26.13.4. Jointing and terminating of cables**

- a. All joint and termination equipment shall be used to the Manufacturer’s recommendations.
- b. The Contractor shall provide evidence that the joint or termination Manufacturer has stated that the materials to be employed are suitable for the type of cable to be jointed or terminated.
- c. A cable shall not be cut until the jointing or terminating commences and the work shall proceed continuously until it is completed. All necessary precautions shall be taken to prevent damage and ingress of moisture and impurities. Cable ends shall be free from moisture before jointing commences. Where circumstances prevent completion the cable ends shall be sealed.
- d. Core identification shall be matched at each joint without twisting or crossing of the cores. Where numbered cores are jointed to coloured cores, the system adopted shall be consistent throughout all cable runs and, on sites with existing installations, consistent with the system already in use. The location of the joint shall be recorded and included in the handover documentation.
- e. Joints selected for use with armoured cables shall not reduce the fault current withstand capacity nor increase the impedance of the circuit protective conductor.
- f. Armouring and metal sheaths shall be connected by a bonding conductor directly to the external earthing terminal of the equipment at all terminations. Metal sheaths of single core cables shall be bonded and earthed at one point only, unless indicated otherwise, and insulated glands shall be used at the open-circuit end or ends.
- g. Cable tails at terminations shall be formed by separating and bringing out the cores. Each tail shall be long enough to connect to the terminals of the equipment.
- h. For three phase circuits the phase conductors shall be arranged, where practical, in trefoil formation where they pass through enclosures of equipment.
- i. For HV/MV and LV terminations coloured or numbered discs shall be provided on the outside of sealing boxes to indicate the disposition of the

phases and neutral conductors inside. Insulating tape shall not be used for marking cables inside joints or terminations.

- j. Continuity of spare cores shall be maintained at joints, and at terminations the cores shall be connected to earth at the supply end and in a spare terminal at the load end.
- k. For screened cable, continuity of screening shall be maintained across the joint.
- l. Armour Termination shall be by means of mechanical cable glands. For armoured cables the glands shall have an earth bond attachment.

#### 26.13.5. **Marking and notices**

- a. A marking system, including all information fields of the labels, shall be presented to the Purchaser for acceptance.
- b. Identification labels shall be fixed to the outside of equipment enclosures. Label format and materials shall be appropriate to the installation and shall be fixed by non-corrosive materials appropriate to the intended application and location.
- c. Characters for labels fixed on the means of isolation at the origin of each installation shall be at least 10mm high and 1.5mm thick. On all other labels characters shall be at least 4mm high and 0.5mm thick.
- d. Where there are two or more incoming supplies this shall be clearly indicated at each point of isolation. Labels on single-phase equipment supplied from a three-phase supply shall indicate the phase to which it is connected.
- e. A label indicating the system concerned shall identify all joint boxes.
- f. A diagram showing the allocation of terminals for each incoming cable shall be permanently fixed inside each joint box cover. The diagram shall be afforded protection suitable for the environment in which it is located.

#### 26.13.6. **Marking of cables**

- a. Marker slabs, with cast iron marker plates secured to a concrete base, shall permanently identify the location of buried cables. The wording on the markers shall be "HV CABLE" or "LV CABLE" as appropriate; in addition the word "JOINT" shall be added where appropriate. Alternatively, marker posts shall only be used where they do not cause obstruction or danger.
- b. Cable marker slabs shall be installed, as required, flush with the finished ground level, on the precise line of the cable.
- c. Cable markers shall be located at every point where a cable enters a building, sub-station, plinth or distribution pillar, at each joint, change of direction, road and pathway crossing, and along the route of the cable at intervals not exceeding 45m.

- d. Trunking and ducting shall be permanently and conspicuously identified.
- e. Cables shall be permanently and conspicuously identified.
- f. Cable identification shall be located within 500mm of terminations and joints, at least once within each separate compartment through which the cables pass, at intervals not exceeding 24m, and shall coincide with the colour bands, where used. Consideration shall also be given to identifying cables at entry or exit points and where buried cables emerge from the ground.
- g. Every cable end shall be provided with a means of identification showing the designation, number and cross-sectional area of cores and rated voltage of the cable.
- h. All cables, conductors and wires shall be easily, clearly, permanently identified, and each cable, conductor or wire used for interconnection in any power board and equipment or outside connection between any power equipment and power boards, shall be labelled at both ends with the same number or letter. Permanent cable tags, labels, marking clips, heat shrinkable sleeves, etc. shall be used for that purpose. The identification number or letter shall be given on the installation drawings.
- i. The colour identification of cores shall comply with EN 60445:2017 Basic and safety principles for man-machine interface, marking and identification. Identification of equipment terminals, conductor terminations and conductors or THN equivalent.
- j. For live conductors the identification shall extend throughout the length of the cables.
- k. Cables forming part of alarm, control, communication or monitoring circuits shall have identification sleeves at their terminations with specific circuit identification. Identification shall be consistent with the relevant wiring diagrams.

**26.13.7. Cable separation**

- a. Metallic information technology cabling and mains power cabling shall be separated as specified in EN 50174-2:2018 - Information technology. Cabling installation. Installation planning and practices inside buildings or THN equivalent.
- b. However, whenever there is RED and BLACK equipment installed, separation requirements for cabling and the actual equipment shall meet requirements stipulated in SECAN Doctrine and Information Publication (SDIP) - Selection and Installation of Equipment for the Processing of Classified Information: SDIP-29/2.
- c. 30% of additional space shall be allowed along cable routes for future additions and cable supports shall be of adequate size for the ultimate load.

- d. Adequate space shall be left between cable runs and the building fabric and other services to allow for the future removal or installation of cables.

**26.13.8. External cabling**

- a. All electrical connection between buildings, antenna locations and external lights shall be made with underground cables which run in ducts/trenches to facilitate cable replacement. Each cable shall be run in one piece without splices or junctions.
- b. The cables shall be provided as armoured (a steel or aluminium armour in the form of tape(s), wires or braids) and compliant with IEC 60502, EN 50267, EN 60332-1-2 (for single core cables) or THN equivalent.
- c. The cables shall be covered by sheaths and insulation protecting against local climatic condition and assuring sufficient UV resistance in accordance with EN 50289-4-17:2015 or THN equivalent.
- d. The size and insulation shall be in accordance with national and local standards/regulations, taking into account the maximum load and ambient temperature.

**26.13.9. Laying cable in trenches:**

- a. The cables runs must be protected against damages by earth settlement, contact with hard objects and the impact of hand tools in the event of excavation work and also against chemical action due to soil ingredients.
- b. In ground subject to long or frequent flooding, when the cable lies in ground water for two months per year or when the trench acts as a drain, the cables shall be considered as permanently immersed and shall be laterally (water shall not penetrate into the cores of the cable) and longitudinally (with a barrier that shall prevent the spread of moisture along the cable length) watertight.
- c. The cables shall be buried at a minimum depth of:
  - i. 0.6 m for low voltage cables, signal cables and telephone cables;
  - ii. 0.8 m for high voltage cables
- d. 1 m below ground accessible to vehicles.
- e. The trenches shall be as narrow as possible:  $\pm 50$  cm for one cable.
- f. The depth of the trench shall be 10 cm more than the depth at which the cables are to be buried. The bottom of the trench must be free of any rough objects that may damage the external sheath of the cables.
- g. The cables shall be laid on a 10 cm layer of sand or fine earth. They shall then be covered with another 10 cm layer of sand or fine earth. A marker shall be placed 20 cm above the upper part of the cables. The trench shall then be filled in with a layer of maximum thickness 15 cm,



carefully tamped to give the sub-soil the same consistency as it had before the trench was dug.

- h. In principle, the radius of the curve shall be 20 times the diameter of the cable with the biggest external diameter.
- i. Cables installed on the surface shall be parallel with the lines of the building construction and properly aligned.
- j. Cables buried below ground shall, as far as practicable follow the features of the site such as roadways and building lines. Ducts at road and crossings shall normally be at right angles to the line of the road.

#### 26.13.10. **Internal cabling**

- a. All cables between the MPDB and Power Boards or Power Panels shall be shielded. Electrical continuity of cable shielding shall be provided to assure correct grounding. All cabling shall run in cable ducts or on cable racks/trails.
- b. The wiring for lighting fixtures, power sockets and any other auxiliary equipment shall run in tubing embedded in wall or ceiling or in tubing on the surface of walls and ceilings.
- c. All cables shall have non-toxic, non-flammable coating.
- d. All cables shall be halogen-free, low smoke, thermoplastic insulated and sheathed cables in compliance with IEC 62821 or THN equivalent.

#### 26.13.11. **Signaling and data cables**

- a. Following standards apply (the below list is not exhaustive neither limitative):
  - i. ISO/IEC 11801 – Information technology - Generic cabling for customer premises
  - ii. ISO/IEC TR 14763-2-1:2011 Information technology - Implementation and operation of customer premises cabling - Part 2-1: Planning and installation - Identifiers within administration systems
  - iii. EN 50174-1:2018+A1:2020 Information technology. Cabling installation. Installation specification and quality assurance or THN equivalent.
  - iv. EN 50174-2:2018 - Information technology. Cabling installation. Installation planning and practices inside buildings or THN equivalent.
  - v. EN 50174-3:2013+A1:2017 Information technology. Cabling installation. Installation planning and practices outside buildings or THN equivalent.
  - vi. EN 50346:2002+A2:2009 Information technology. Cabling installation. Testing of installed cabling or THN equivalent.
  - vii. EN 50173 series - Information technology. Generic cabling systems

- viii. EN 50310:2016+A1:2020 Telecommunications bonding networks for buildings and other structures or THN equivalent.
  - ix. IEC 61754 series - Fibre optic interconnecting devices and passive components - Fibre optic connector interfaces or THN equivalent.
  - x. IEC 61935-1:2019 Specification for the testing of balanced and coaxial information technology cabling - Part 1: Installed balanced cabling as specified in ISO/IEC 11801-1 and related standards or THN equivalent.
  - xi. ISO/IEC 14763-3:2014+AMD1:2018 CSV - Information technology - Implementation and operation of customer premises cabling - Part 3: Testing of optical fibre cabling or THN equivalent.
  - xii. GRC MINISTERIAL DECISION 72146/2316/30.12.2018 (Government Gazette 21/B'7.01.2009 ) - Determination of the technical specifications of the works regarding the telecommunication networks outside buildings.
- b. Additionally the construction of the F/O network shall comply with ITU's International Standards and Recommendations.  
All conductors not in used in a cable shall be grounded at both ends.

**26.13.12. List of cables**

- a. The list of cables shall include:
  - i. Cable number
  - ii. Cable standardised cross-section
  - iii. Cable diameter
  - iv. Operating voltage
  - v. Insulating voltage of the cable guaranteed by the manufacturer
  - vi. Length laid in meters
  - vii. Type of cable (according to Standards)
  - viii. Colour of external covering
  - ix. Wiring diagram
  - x. Cable course from the beginning to the end of the cable

**26.13.13. Cable supports**

- a. Cable support management shall be compliant to EN 61537:2007 Cable management. Cable tray systems and cable ladder systems or THN equivalent.
- b. The type and sizes of cable support systems shall be selected by the Contractor to suit the circumstances of the installation, unless otherwise indicated. Following preferences shall be taken into account:

- i. For horizontal runs - cable tray or cable rack
- ii. For vertical runs - cable cleats or cable tray or cable rack
- iii. Where marshalling of cables occurs (eg. at switchboards) - cable racks.

**26.13.14. Protective finishes for ferrous materials**

- a. All ferrous metal for cable tray, cable racks, cable ladder, cable hangers and their fixings and suspensions shall have a galvanised finish.
- b. Galvanised finishes shall be hot dipped to EN ISO 1461 or THN equivalent, except that support steelwork in dry indoor unpolluted areas shall be galvanised to EN 10346 or THN equivalent.
- c. In coastal and polluted areas where ferrous materials are used, consideration shall be given to the use of stainless steel or silicon steel with 1200 g/m<sup>2</sup> coating ISO 1461.

**26.13.15. Cable trays**

- a. Cable of different categories (HV cable, LV cables, Signalling cable etc.) shall be laid in different cable trays.
- b. The cable trays shall be made of hot-galvanised (450 gr/m<sup>2</sup>) mild steel with minimum zinc thickness of 30 µ. The cable trays may take various forms as follows:
  - i. Type A: A unit consisting of angle-iron uprights and bars in bent sheet metal forming a closed U. This type shall mainly be reserved for cables with a large cross-section.
  - ii. Type B: In perforated sheet metal. This type shall mainly be used for cables with small cross section such as remote signaling, remote control and telephone cables, etc.
  - iii. Type C: In wide-gauge metal mesh (± 5 x 5 cm). This type is suitable for all kinds of cable.
- c. When made from metal plate they shall comply with EN 10130:2006, EN 10131:2006 or EN 10149-3:2013 as appropriate or THN equivalent.
- d. The cable tray units shall be self-supporting, their strength and the spacing of the bearing elements shall be such that the maximum sag in the horizontal run shall be 1/220 of the span.
- e. Bends, tees, risers, reducers and four-way crosspieces shall be factory made wherever possible, and shall be of the same construction, material, thickness and finish as the cable tray. All tees and crosspieces shall have a 45° gusset on each side from the point of intersection.
- f. Cable trays shall be cut along a line of unperforated material. Holes cut in cable trays for the passage of cables shall be fitted with grommets, bushes or other lining. Cutting of cable trays shall be kept to a minimum.

- g. Each length of a cable tray shall be securely bolted to an adjacent length with factory made couplings of adequate dimensions to prevent sagging or twisting in accordance with the Manufacturer's recommendations. Where required, bolts and nuts shall be appropriately dimensioned mushroom-head steel roofing type. Ends of coupling bolts shall not come into contact with the cables. No welding shall be used in the joining of cable trays.
- h. Where cables are laid on the cable tray they shall be secured by ties, each tie securing the cables of only one circuit. The ties shall be of a proprietary type low in halogen, self-extinguishing and ultra-violet resistant. The use of wire or similar material is not permitted. Ties shall be used at less than 600mm intervals along each cable, and within 100mm of each bend or set.
- i. Cables shall be supported by cable cleats where cable trays are vertical.
- j. Cable trays shall be fixed at regular intervals in accordance with Manufacturer's recommendations but not exceeding 1200mm and at 225mm from bends and intersections. A minimum clear space of 25mm shall be left behind all cable trays.
- k. Cable trays shall be installed with a 20mm gap at building or structural expansion joints.
- l. Cable tray supports shall be installed within 150mm on either side of the joint.

26.13.16. **Cable cleats**

- a. Cable cleats shall be made from materials that are resistant to corrosion without the need for treatment or special finish. Plastic materials shall be non-brittle down to minimum - 20°C. Non-metallic cleats used for low smoke fume (LSF) cables shall be of LSF material.
- b. Cable cleats shall be of a size such that they can be tightened down to grip the cables without exerting undue pressure or strain on them. For vertical cables two-bolt cable cleats shall be used which shall grip the cables firmly enough to prevent them slipping.
- c. The cable cleats shall comply with IEC 61914:2015 Cable cleats for electrical installations or THN equivalent.
- d. The spacing of cable cleats shall:
  - i. Assure the ability of the cleat to withstand axial slippage forces
  - ii. Assure resistance to electro-mechanical forces – i.e. the ability of the cleat to withstand the forces between the cables in the event of a short-circuit
  - iii. Assure the cleats shall be located immediately on each side of bends in the cable.

- e. Single core cables shall be cleated with trefoil cleats where appropriate.

**26.13.17. Cable racks and cable ladders**

- a. Cable racks shall comply with relevant standards referenced herein in this Annex and shall be constructed from proprietary systems using channel sections with return lips and compatible fixing accessories.
- b. Ladder rack shall be factory made from steel complying with relevant standards referenced herein in this Annex.
- c. Racks and supports shall be selected to provide adequate support without racks sagging more than 1/360 of the support span.
- d. Cable racks and ladders shall be installed with a 20mm gap at building or structural expansion joints. Supports shall be installed within 150mm on either side of the joint.
- e. Cables shall be fixed to racks and ladders by cable cleats.

**26.13.18. Suspension and fixing**

- a. Proprietary suspension systems comprising channel sections with return lips and compatible fixing accessories or slotted angles complying with BS 6946 shall be used. Fixings may be fabricated from mild steel flat bar where necessary. Metal arc welding shall comply with EN 1011 or THN equivalent.
- b. Suspensions and fixings shall comply with respective paragraphs stipulated herein in this Annex.
- c. Bolts, nuts, washers and screws shall be non-corrosive and compatible with the environment in which they are installed.

**26.13.19. Bonding**

- a. Metallic cable trays, racks and ladders shall be electrically and mechanically continuous throughout and bonded to the earth system.
- b. Supplementary bonding shall be installed wherever necessary, between component parts of cable trays, racks or ladders where the method of mechanical connection does not provide permanent and reliable metal-to-metal joints of negligible impedance.
- c. After the cables are laid all the openings pierced through obstacles/walls shall be properly sealed, so that they remain watertight and dust proof and have the same fire resistance as the walls. After assembly, damage to galvanisation shall be made good by the application of a zinc-rich paint or by a cold galvanisation substance.
- d. The bearing elements shall be made of galvanised steel (450 gr/m<sup>2</sup>) at least 30 µ thick. All precautions shall be taken to obviate corrosion resulting from the Fe-Zn galvanic couple.

- e. One the side of the cable tray shall be left with free access along its entire length so that operations (laying or removing of cables) are not hampered by the bearing elements.
- f. Bearing elements shall be fixed to partitions, walls, ceiling or the framework of the building. In no circumstances bearing elements may be fixed to parts liable to be subsequently removed.
- g. For the purpose of assembling the units and making cross-points, accessories produced by the manufacturer shall be used as far as possible.

## **26.14 Electrical equipment**

### **26.14.1. Standard power sockets**

- a. Standard power sockets shall conform to Directive 2001/95/EC of the European Parliament and of the Council of 3 December 2001 on general product safety or THN equivalent.
- b. There is no harmonised household plug system throughout Europe. Therefore, the standard power sockets shall fall under national legislation.
- c. They shall be designed for a rated current of 16A.
- d. At the level of lighting switch in all rooms and in corridors, one power sockets 230 V/16 A shall be provided in the wall for utility (for instance connection of a vacuum cleaner) use, conveniently placed at 30 cm above floor level. In large rooms, additional sockets shall be provided around the room at a location easily accessible (hence not behind a cupboard or behind a door). The number of additional sockets shall be determined according to the function of the room.
- e. In offices, in addition to the utility socket, three sockets per desk position shall be provided for connection of computers and peripherals. RJ45 connectors shall also be provided for data and telephony connections.
- f. Where fixed appliance is foreseen, one socket per appliance shall be provided. These sockets are in addition to the sockets mentioned above.
- g. Whenever required for instance for appliances, heating system etc., 3-phase sockets shall also be provided.
- h. The sockets shall be compliant with:
  - i. IEC 60884-1:2002+AMD1:2006+AMD2:2013 CSV Plugs and socket-outlets for household and similar purposes - Part1: General requirements or THN equivalent.
  - ii. IEC 60906-1:2009 IEC system of plugs and socket-outlets for household and similar purposes - Part 1: Plugs and socket-outlets 16 A 250 V ac. or THN equivalent.

### **26.14.2. Industrial type sockets**

- a. These sockets shall conform to:
  - i. IEC 60309-1:1999+AMD1:2005+AMD2:2012 CSV Plugs, socket-outlets and couplers for industrial purposes - Part 1: General requirements or THN equivalent.
  - ii. IEC 60309-4:2006+AMD1:2012 CSV Plugs, socket-outlets and couplers for industrial purposes - Part 4: Switched socket-outlets and connectors with or without interlock or THN equivalent.
- b. They shall be used amongst other for outdoor sockets.
- c. These sockets shall be provided with protective caps when not in used. The caps shall be solidly fixed to the sockets. Their degree of protection shall be IP 65.

**26.14.3. Lighting fixtures**

- a. Lighting throughout and outside the building as well as emergency lights shall be provided for the new SSSB building and other premises as stipulated in site specific Appendixes.
- b. The lighting fixtures shall conform to:
  - i. IEC 60598-1:2020 Luminaires - Part 1: General requirements and tests or THN equivalent.
  - ii. IEC 60598-2-1:2020 Luminaires - Part 2-1: Particular requirements - Fixed general purpose luminaires or THN equivalent.
  - iii. For the outdoor luminaires: IEC 60598-2-3:2002+AMD1:2011 CSV Luminaires - Part 2-3: Particular requirements - Luminaires for road and street lighting or THN equivalent.
  - iv. When ground recessed luminaries are used they shall conform to IEC 60598-2-13:2006+AMD1:2011+AMD2:2016 CSV or THN equivalent.
  - v. In alignment with the design of the fire protection system, when luminaire with limited surface temperatures are required, for use in operating areas with fire hazard, they shall conform to IEC 60598-2-24:2013 Luminaires - Part 2-24: Particular requirements - Luminaires with limited surface temperatures or THN equivalent.
- c. The light intensity level at 0.85 m above ground level shall be:
  - i. Supply, Storage Room/ Workshop and Test facilities for electronic equipment – 500 Lux
  - ii. SSSB Equipment room – 500 Lux
  - iii. Corridor and vestibule – 200 Lux
  - iv. Power Generator room – 200 Lux
  - v. Main Power switchgear room – 200 Lux
  - vi. UPS/Battery room – 200 Lux

- vii. Environment Control room (HVAC) – 200 Lux
  - d. All the lighting shall be LED where each LED shall have a life expectancy of a minimum 50,000 hrs in compliance with IEC 62722-2-1:2014.
  - e. The colour temperature for the LED lights installed indoor shall be 5000 K or above.
  - f. The LED lighting, both indoor and outdoor, shall conform to:
    - i. IEC 62717:2014+AMD1:2015+AMD2:2019 CSV LED modules for general lighting - Performance requirements or THN equivalent.
    - ii. IEC 62612:2013+AMD1:2015+AMD2:2018 CSV Self-ballasted LED lamps for general lighting services with supply voltages > 50 V - Performance requirements or THN equivalent.
    - iii. IEC 62722-2-1:2014 Luminaire performance - Part 2-1: Particular requirements for LED luminaires or THN equivalent.
    - iv. IEC 62031:2018 LED modules for general lighting - Safety specifications or THN equivalent
    - v. IEC 62384:2020 DC or AC supplied electronic control gear for LED modules - Performance requirements or THN equivalent.
  - g. The lights shall meet Electromagnetic (EM) immunity requirements as specified in IEC 61547:2020 Equipment for general lighting purposes - EMC immunity requirements or THN equivalent.
  - h. In order to correctly identify EM environment, measurement and testing, as well as installation and mitigation techniques, the Contractor shall comply with IEC 61000 series – Electromagnetic compatibility (EMC).
  - i. The level of protection against dust and water shall be as per IEC 60529 or THN equivalent:
    - i. For indoor luminaires: minimum IP 21
    - ii. For outdoor luminaries: minimum IP 66
  - j. The resistance of outdoor luminaires to mechanical impacts shall be minimum IK08 in compliance with IEC 62262:2002 Degrees of protection provided by enclosures for electrical equipment against external mechanical impacts (IK code) or THN equivalent.
  - k. The lighting fixtures shall be connected to the mains and standby power supply (short-break). However, in the SSSB equipment area, a number of lighting fixtures, conveniently located, shall be connected to the no-break power supply through the EPDB.
- 26.14.4. **Emergency lights**
- a. The Contractor shall provide emergency lighting complaint with:



- i. IEC 60598-2-22:2014+AMD1:2017 CSV Luminaires - Part 2-22: Particular requirements - Luminaires for emergency lighting or THN equivalent.
  - ii. IEC 61347-2-7:2011+AMD1:2017 CSV Lamp control gear - Part 2-7: Particular requirements for battery supplied electronic control gear for emergency lighting (self-contained) or THN equivalent.
  - iii. IEC 62034:2012 Automatic test systems for battery powered emergency escape lighting or THN equivalent.
  - iv. IEC 60529 - the level of protection against dust and water shall be minimum IP 65 or THN equivalent.
- b. In its design of the new SSSB building, the Contractor shall analyse which of the below listed emergency lights are required and provide them respectively in order to meet requirements stipulated in legislations and standards in force and applicable in respective Territorial Host Nations:
- i. Emergency lighting - to ensure the safety lighting is provided promptly, automatically and for a suitable time, in a specified area when the normal mains power supply to the usual lighting installation fails
  - ii. Emergency escape lighting - to enable safe exit from a location and/or building in the event of failure of the mains' normal supply
  - iii. Emergency escape route lighting - to enable the safe exit from a location or building for occupants by providing appropriate visual conditions and direction finding on escape routes, and in special locations, and to ensure that firefighting and safety equipment can be readily located and used
  - iv. Open area lighting - to reduce the likelihood of panic and to enable safe movement of occupants towards escape routes by providing appropriate visual conditions and direction finding
  - v. High risk task area lighting - to contribute to the safety of people involved in a potentially dangerous process or situation and to enable proper shut down procedures to be carried out for the safety of other occupants of the location or the building

**26.14.5. Emergency lights locations**

- a. The Contractor shall assure that the emergency luminaires are located to give appropriate illuminance, in the event of a failure of the normal lighting in the following locations (not exhaustive list):
  - i. Open areas (are often called anti-panic lighting) – these are areas larger than 60m<sup>2</sup> floor area or may be areas identified by the fire risk assessment as requiring safety illumination.
  - ii. Emergency exit and escape routes – these shall be provided with signs. The signs shall be illuminated to indicate unambiguously the

route of escape to a point of safety. Where direct sight of an emergency exit is not possible an illuminated directional sign (or series of signs) shall be provided to assist progression towards the emergency exit.

iii. Every change of direction leading to an escape door shall be illuminated. An escape lighting luminaire (complying with IEC 60598-2-22 or THN equivalent.) shall be sited near each exit door and at positions where it is necessary to emphasize potential danger or safety equipment.

iv. Emergency luminaires shall be mounted near the following positions and fire safety equipment:

Each exit door intended to be used in an emergency

Stairs so that each flight of stairs receives direct light

Change in level

Mandatory emergency exits and safety signs

Change of direction

Intersection of corridors

Outside and near to each final exit

First aid post – shall be illuminated to 15 Lux minimum at the reference plane

Firefighting equipment – shall be illuminated to 15 Lux minimum at the reference plane

Fire alarm call points – shall be illuminated to 15 Lux minimum at the reference plane

**26.14.6. Technical premises**

- a. Emergency lighting shall be provided in all power generator rooms, control rooms, plant rooms, switch rooms and adjacent to main switchgear or control equipment associated with the provision of normal and emergency lighting to the premises.
- b. External areas in the immediate vicinity of exits:
  - i. In order to assist dispersal to a place of safety, the external areas in the immediate vicinity of final exits shall be illuminated. This shall be in accordance with the illumination level for escape routes of not less than 1 Lux at the reference plane.
  - ii. If the area outside the building has hazards in darkness, such as a riverbank or steep stairs, the fire risk assessment shall determine if further emergency luminaires are needed until a place of safety can be reached. This might involve the placement of emergency lighting on the outside of a building adjacent to the final exit door.

- c. The number of emergency luminaires shall be determined by the Contractor such that the level of light intensity is:
    - i. For escape routes the horizontal illuminance on the floor along the centreline of an escape route shall be not less than 1 Lux.
    - ii. In areas of high risk minimum 15 Lux at the reference plane and the uniformity of the high-risk task area lighting illuminance shall be maintained across the area.
    - iii. In open area (anti-panic) lighting, the horizontal illuminance shall be not less than 1 Lux at the floor level of the empty core area which excludes a border of 0.5m of the perimeter of the area.
    - iv. In technical premises (power generator rooms, control rooms, plant rooms, switch rooms etc.) the illuminance shall be not less than 15 Lux in plane of visual task.
    - v. For panic bars & pads and security devices the horizontal illuminance shall be not less than 5 Lux on plane of panic bar/pad and vertical at vertically mounted/wall mounted security devices.
  - d. The emergency lights powered by batteries shall meet the following requirements:
    - i. Autonomy shall be of a minimum 1 hour
    - ii. The operational status of the emergency lighting fixture shall be indicated by green (operational) and red (action required) led
    - iii. The emergency lighting fixtures shall be testable by means of built in test push button
  - e. All emergency luminaires shall be free of harmful stroboscopic effects.
  - f. Some high output emergency luminaires can produce a glare effect which can interfere with the observation of safety signs and obstructions on the escape route. This is known as disability glare. The most common fittings to cause disability glare are the 'frog eye' type. Therefore, the Contractor should avoid this particular type of emergency lights. However, if they are to be provided, the Contractor shall take particular care when placing these types of fittings so to avoid disability glare. This can be achieved by making sure they are at least 30° out of direct line of sight from the escape route.
  - g. The emergency lighting system shall have a suitable means for simulating failure of the normal supply for testing and maintenance purposes. These shall be able to be operated by the user/owner of the system so that they can carry out regular tests of the system.
- 26.14.7. **Emergency stop push-button**
- a. The Emergency stop push-buttons shall be provided on each equipment and machinery provided under this contract unless:

- i. The emergency stop device would not lessen the risk, either because it would not reduce the stopping time or because it would not enable the special measures required to deal with the risk to be taken
      - ii. The equipment/ machinery is portable hand-held and/or hand-guided
    - b. The Emergency stop push-button shall meet the following requirements:
      - i. Tamper Resistant - an emergency stop actuator shall be constructed so that it can only be removed from the inside of a panel. Removal from the outside of the panel is acceptable if it requires a tool.
      - ii. Shall not be a replacement for proper safeguarding or automatic safety devices.
      - iii. The activation of the emergency stop shall not impair the effectiveness of other safety devices.
      - iv. A mushroom type push button, red colour.
      - v. It shall be protected to prevent inadvertent operation.
      - vi. Its activation shall be possible without opening any panels, flaps, doors or any other type of covers with easy access and no obstructions.
    - c. It shall be in conformity with the requirements of the following directives and standards. The below list is neither exhaustive nor limitative:
      - i. Directive 2006/42/EC of the European Parliament and of the Council of 17 May 2006 on machinery or THN equivalent.
      - ii. ISO 13850:2015 Safety of machinery. Emergency stop function — Principles for design or THN equivalent.
      - iii. IEC 60204-1:2016 Safety of machinery – Electrical equipment of machines or THN equivalent.
      - iv. IEC 60947-5-5:1997+AMD1:2005+AMD2:2016 CSV - Low-voltage switchgear and control gear - Control circuit devices and switching elements - Electrical emergency stop device with mechanical latching function or THN equivalent.
      - v. IEC 60947-5-1:2016 Low-voltage switchgear and control gear - Control circuit devices and switching elements - Electromechanical control circuit devices or THN equivalent.
      - vi. Local codes and installation requirements
- 26.14.8. **Legal inspections for electrical works**
- a. The Contractor shall request an independent company duly accredited in the Territorial Host Nation to execute all inspections legally required in this Territorial Host Nation.
  - b. Those inspections shall be identified in the schedule of supply and services.

- c. No electrical work shall be accepted as long as the Purchaser is not in possession of the inspection report stating the compliance of the installation.

## **26.15 Electrical Power Back Up**

### **26.15.1. General**

- a. The Contractor shall provide two fully redundant and identical diesel fuel power generators for the new SSSB building and at other sites as stipulated in site specific Annexes.
- b. The capacity of each power generator shall be sufficient to assure full operational capability of entire SSSB site with only one generator while the other is maintained/ repaired or remains in stand-by mode.
- c. The two power generators shall form the Power Generating Set (PGS). The PGS shall be designed and manufactured to comply with applicable European Union (EU) safety regulations, standards and requirements.
- d. The PGS shall meet the safety requirements as specified in ISO 8528-13:2016 Reciprocating internal combustion engine driven alternating current generating sets — Part 13: Safety or THN equivalent.
- e. The capacity of the PGS (with only one power generator working at a time) shall be determined by the Contractor and shall assure full operational capability of:
  - i. SSSB System
  - ii. Any other IT systems provided as PFE
  - iii. HVAC
  - iv. Lights (indoor and outdoor)
  - v. Fire protection and fighting
  - vi. All other needed domestic loads
  - vii. The total load imposed by the above listed components shall be increased by 20% for further expansion
- f. The PGS shall be the back-up (emergency) source of electrical power and shall be capable of providing power for the entire SSSB site in case of main power failure. Hence, the Contractor shall design the system and provide equipment to meet requirements for power generators rated as Emergency Standby Power (ESP) according to ISO 8528-1:2018.
- g. However, as stipulated in Appendix 6 (Limnonari site), the Contractor shall provide power generators rated as Prime Rated Power (PRP) according to ISO 8528-1:2018 (further requirements are stipulated herein in this Annex and in site specific Appendix) for that specific site.
- h. The PGS rating shall be established for Voltage, Phase, Frequency and Speed at 400 V, 50 Hz and 1500 rpm.

- i. Each of the power generators shall be able to provide emergency power on variable loads for guaranteed minimum lifetime of 10,000 running hours.
- j. If the COMMS site is located in an area where historical utility data indicates a large number of average yearly outages and/or substantially long outages, then the Prime Rated Power (PRP) generators shall be considered.
- k. The PGS system shall allow for both manual and automatic switchover between the two power generators. It shall be possible for the user to program the automatic switchover for a specific date and hour at intervals from 0 (zero) hrs. to 24 hrs.
- l. When the local power grid is available, the PGS shall be capable and equipped with necessary accessories to operate in standby mode, ready to automatically activate when necessary.
- m. The PGS shall withstand and operate in the environmental conditions of the COMMS site geographical location, without showing any evidence of damages, permanent deformations or reduction of performances, when assuring full operational capability of entire SSSB sites.
- n. The PGS shall be installed in a sound attenuated, weatherproof, rust resistant hard-wall enclosure.
- o. The sound insulation shall be non-hydroscopic.
- p. The enclosure shall be equipped with rodent barriers on inlets and outlets.
- q. The sound attenuated enclosure shall be removable to allow lifting of the generator set for repair. It shall be made of steel or aluminium sheets.
- r. The PGS shall be installed on a steel rust resistant chassis with chassis drain plugs.
- s. The chassis shall be equipped with anti-rollover forklift tunnels to ensure safe lifting and handling.
- t. The chassis and brackets shall be reinforced to guarantee robustness during handling and transport.
- u. The enclosure and chassis shall be fully washable both externally and internally with a nozzle.
- v. The enclosure shall be provided with internal LED lighting with micro-switches.
- w. The enclosure shall be provided with battery compartment externally accessible for easy maintenance.
- x. The enclosure shall be provided with inspection doors with double frame and airtight gasket.

- y. The inspection doors shall be equipped with snap handles and key locks.
- z. At least one of the inspection doors shall be provided with a document holder installed on the inside of the doors.
- aa. The PGS shall be mounted on oil resistant vibration insulation elements, and include adequate lifting points for movement of the PGS with a crane.
- bb. The PGSs shall include all the necessary earthing and safety equipment (cables, connectors, fire extinguishers, fire fuel shut-off valves, instructions, etc.) to protect the equipment and the personnel.
- cc. Each socket shall be equipped with a circuit breaker. The circuit breakers shall be complaint with IEC 60947:2021 series and with IEC 60898.
- dd. All connectors shall be IEC 60309 industrial type, with a minimum IP54 waterproof rating as per IEC 60529:1989/AMD2:2013/COR1:2019 and equipped with caps for weather protection when not in use.
- ee. All components of the PGS electrical system shall comply with the EMC requirements as stipulated in:
  - i. The Directive 2014/30/EU of the European Parliament and of the Council of 26 February 2014 on the harmonisation of the laws of the Member States relating to electromagnetic compatibility or THN equivalent
  - ii. MIL-STD 461G – Requirements for the control of electromagnetic interference characteristics of subsystems and equipment, December 2015 or THN equivalent
- ff. The engine/generator assembly shall be a standard product of a current manufacturer and a company regularly engaged in production of such equipment.
- gg. The Contractor shall provide the engine manufacturer's recommended lubricants/coolants and data concerning their equivalents, including the manufacturer and supplier details.
- hh. All of the PGS enclosure external surfaces, chassis, fuel tank, connector caps and covers shall be painted with protective paint.
  - ii. The paint finish shall be guaranteed against any visible deterioration for a minimum of ten (10) years.

**26.15.2. Certificates**

- a. An authorised technical surveillance authority, recognized in the THN, shall approve the mechanical and electrical safety of the PGS.
- b. The PGS shall be supplied with CE mark and EC Declaration of Conformity in compliance with the Directive 2006/42/EC of the European

Parliament and of the Council of 17 May 2006 on machinery and amending Directive 95/16/EC or THN equivalent.

26.15.3. **Engine**

- a. The diesel engine shall be of a quick start, water-cooled industrial type. It shall be designed for standby power rating (note the exception for Limnonari site where the power generators shall be rated as Prime Rated Power (PRP))
- b. The engine shall be directly coupled to the synchronous electrical alternator.
- c. The engine power shall be such to drive the alternator at full load with power factor 0.8 lagging under all environmental conditions of the COMMS site geographical location.
- d. The engine shall be capable of operating at light loads for extended periods of time and shall provide means to reduce carbonisation (periodic cleaning of exhaust parts should not be required).
- e. The engine shall meet requirements for performance class G2 or better according to ISO 8528-2:2018 Reciprocating internal combustion engine driven alternating current generating sets — Part 2: Engines.
- f. The declaration of power, fuel and lubricating oil consumption shall be determined in accordance with ISO 3046-1:2002 Reciprocating internal combustion engines — Performance — Part 1: Declarations of power, fuel and lubricating oil consumptions, and test methods — Additional requirements for engines for general use.
- g. The Specific fuel consumption and power output shall be quoted at standard (ISO) ambient conditions. The Contractor shall provide in technical documentation the de-rating curves or correction curves or formulae or calculations applicable to the generator for the power deration and fuel consumption for the environmental conditions as stipulated the COMMS site geographical location.
- h. The engine shall be started electrically using batteries. Preheating system to keep the engine ready to start and take the full load, from 0 to 100%, within 15 seconds from standstill, shall be provided.
- i. The cyclic irregularity influenced by the dynamic characteristics of the mechanical system, including engine, flywheel, alternator rotor, shaft and coupling shall be such that the flicker of lights shall be avoided.
- j. The engine start system shall allow to be operated locally and remotely.
- k. During each initial start of the engine, a system shall be provided to pre-lube at low idle speed. When the internal oil pressure reaches a predetermined safe value, the engine speed shall then increase to alternator set operating speed.



- l. Convenient access for maintenance shall be assured. For example there shall be no need to remove the sound attenuated enclosure to access coolant refill gauge, change oil and filters etc.
- m. Injection pumps and injection valves shall be of a type not requiring adjustment in service and shall be of a design allowing quick replacement by technicians without special diesel engine experience.
- n. The engines shall have an individual electronically controlled injection pump and injection valve for each cylinder, any one of which shall be removable and replaceable from stock parts.
- o. Fuel lines between injection pumps and valves shall be of heavy seamless tubing.
- p. Where applicable, air filters including pre-filters and dust traps shall be mounted behind the engine, over the alternator as not to restrict the access to rocker covers and fuel injection pump.
- q. The oil sump shall be equipped with a screw-in type stop that is easily accessible. An alternate solution shall include a cock with a pipe stopped by a mounted screw-on type stop. The length of the pipe shall be long enough that drained oil can be caught in a vessel beside the unit. If the oil cannot be drained by gravity flow, the engine sump shall be equipped with a hand pump.
- r. The following standard equipment shall be provided as the minimum:
  - i. Electrical starter
  - ii. Safety shutdown system for low oil pressure, high temperature, over-speed and low fuel level with LED, re-settable indicators of the manual reset type
  - iii. Dual fuel (fuel and fuel/ water), oil and air filters in accordance with the manufacturer's specifications
  - iv. Fuel meters to measure the net consumption of fuel by the engine in grams and litres. The meters shall have temperature correcting capability
  - v. Heavy-duty tube oil cooler with the temperature controlled by a thermostat valve
  - vi. Lubricating oil pump
  - vii. Fuel transfer pump
  - viii. Radiator and belt-driven fan with mechanical protection, capable of cooling the engine on full load at environmental conditions specified for the COMMS site geographical location
  - ix. Exhaust silencer
  - x. Oil pressure and temperature meters

- xi. Coolant temperature meter
  - xii. Low oil pressure alarm
  - xiii. Over speed alarm
  - xiv. Low coolant level alarm
  - xv. High coolant temperature alarm
  - xvi. Hot and moving parts protection
  - xvii. Anti-vibration, oil resistant shock absorbers
  - xviii. Reinforced lifting hooks for crane hoisting
  - xix. Ground connection of electrical installation
  - xx. Digital diagnostic control panel
  - xxi. Supply and spill fuel-lines with fittings and fitted to the day-tank
  - xxii. Exterior (piped to the edge of the enclosure) flexible oil and coolant drain lines with interior valves for ease of service
  - xxiii. Fill of suitable lubricating oil, and anti-freeze for cooling system to assure performance at environmental conditions specified for the COMMS site geographical location
  - xxiv. Aluminium ladder or platform, to ease check and service of the PGS, compliant with ISO 14122 series
- s. Characteristics:
- i. Engine Type: 4-stroke
  - ii. Engine speed: 1500 rpm
  - iii. Insulation: H class or better
  - iv. Protection: IP 23 or better according to IEC 60529: 1989/ AMD2: 2013/ COR1:2019

**26.15.4. Lubrication System**

- a. The lubrication system shall comprise an engine driven pump to circulate lubricating oil under pressure.
- b. Full flow filters shall be provided together with replaceable elements.
- c. Lube oil make-up shall be automatically monitored and alarmed by the control system.
- d. The lubrication system shall be provided with alarms and trip sensors for high/low oil levels and temperatures and fitted with a crankcase heater if required.

**26.15.5. Engine Cooling**

- a. The engine cooling system shall be capable of adequately cooling the diesel generator engine when the diesel generator is supporting full load at the specified maximum outdoor ambient air temperature characteristic for the COMMS site geographical location.
- b. The on-skid radiator cooling system shall be provided with the following:
  - i. Water pumps for jacket water and turbocharger intercooler cooling complete with thermostatic bypasses
  - ii. Water-air heat exchanger(s) for jacket water and turbocharger intercooler cooling complete with all necessary interconnection(s) to the on-board radiator
  - iii. Automatic control of radiator fans, including automatic cycling for even running hours
  - iv. Alarms and trip sensors for high/low coolant levels and temperatures
- c. All cooling system components shall be monitored and alarmed by the control system.
- d. The engine shall be provided with a thermostatic valve placed in the jacket water outlet between the engine and the cooling source.
- e. This valve shall maintain the proper jacket water temperature under all load conditions.
- f. A flexible connecting section shall be provided between the radiator and discharge louver frame.
- g. The radiator shall be mounted in front of the engine, onto the skid base with oil resistant anti vibration mountings.

26.15.6. **Engine Heaters**

- a. The engine shall be equipped with a thermostat controlled coolant immersion heater, (powered from the auxiliary power distribution) to aid engine starting, in cold weather specified for the COMMS site geographical location.
- b. The heater shall be automatically switched off, when the engine is running.

26.15.7. **Exhaust System**

- a. The diesel engine exhaust system shall be composed of:
  - i. The exhaust silencer of a non-spark type/ equipped with spark arrestor capable of the following:
    - Low-pressure drop
    - Damping engine pulsations, backfiring and preventing any engine resonance
    - Sound attenuation as required to meet the noise level specified

- ii. The discharge pipe work
  - iii. Flanged flexible stainless steel thermal expansion bellows at the diesel engine exhaust outlet
  - iv. Support structures and fixings
- b. The exhaust shall be stainless steel, insulated as required.
  - c. The exhaust outlet shall be stainless steel provided with a mechanical closing valve.
  - d. The discharge stack, and exhaust systems shall be supplied complete with roof, wall and ground mounts as required and complete with anti-vibration supports as required.
  - e. The exhaust shall discharge from the outside of the diesel generator room.
  - f. Other noise control measures including splitter attenuators and acoustic linings shall be considered with regard to reducing the noise levels
  - g. The complete exhaust system shall be designed such as not to exceed the noise limit of 70 dBA at a distance of about 7 meters from the output of the exhaust (in accordance with ISO 1996-1:2016) at full rated load.
  - h. The silencer shall be located outside of the power generator room and connected to the set through an INOX (stainless steel) compensator.
  - i. Fixation of exhaust pipes and silencer shall take into account thermal expansion and vibration.
  - j. Purge valves shall be foreseen at the low points to evacuate any condensation.
  - k. Exhaust emission shall meet requirements as specified in Regulation (Eu) 2016/1628 of the European Parliament and of the Council of 14 September 2016 or THN equivalent.
  - l. The fuel (diesel) level emission shall be measured according to ISO 8178-4:2020 Reciprocating internal combustion engines — Exhaust emission measurement — Part 4: Steady-state and transient test cycles for different engine applications
- 26.15.8. **Insulation**
- a. The Contractor shall provide and install thermal insulation on the diesel generator and supplied auxiliaries where required for the efficiency of the works, to meet regulatory requirements and safety of personnel.
  - b. All insulation materials shall not contain any asbestos or asbestos based products.
  - c. No part of the works that can be touched during normal operation shall have a surface temperature in excess of 50°C.

- d. All insulation applied to pipe work, machinery, and ducting shall be clad with aluminum or stainless steel cladding of appropriate thickness not less than that conforming with BS 5970:2012 (or THN equivalent standard) Thermal insulation of pipework, ductwork, associated equipment and other industrial installations in the temperature range of -100°C to +870°C. Code of practice.
- e. All insulation exposed to the weather shall be sufficiently clad to be completely weatherproof.
- f. Insulation and cladding shall be designed and applied with proper allowance for expansion and contraction.

**26.15.9. Fuel Supply**

- a. Two fuel day-tanks (fitted with locking mechanism) each having a capacity for at least 24 hours of continuous operation under rated power shall be provided in the generator room.
- b. They shall be compliant with the latest EU Safety Regulations or THN equivalent.
- c. Automatic and manual re-fill of the day-thank from storage tanks located outside the building shall be provided.
- d. Fuel level indication as well as low fuel level alarm in the daily thank shall also be provided.
- e. All associated piping, pumps, valves stopcocks etc. shall also be provided.
- f. The fuel supply system shall be equipped with an automatic stop system due to lack of fuel.
- g. The tank shall be provided with the necessary equipment to supply the generator with fuel and as a minimum shall include the following:
  - i. A fuel level indicator
  - ii. A pump with in and out pressure gauges and automatic and manual ON/OFF operation
  - iii. Low and high level alarms (sound alarms shall be capable of being disabled for tactical reasons)
  - iv. An auxiliary hand pump and associated manual valves
  - v. A fuel strainer on supply pump inlet with water separator
  - vi. A vent cap
  - vii. A drain valve with locking handle
  - viii. Engine return pipes
  - ix. A fuel leak detector
  - x. A fuel consumption meter

- h. For detailed characteristics of the fuel tanks see also other relevant paragraphs herein in this Annex and in site specific Appendixes.

**26.15.10. Alternator**

- a. The alternator shall be a synchronous, regulated, drip proof industrial type.
- b. It shall be self-excited of a rotating field brushless design.
- c. Its hall be provided with sealed-for-life bearings.
- d. The synchronous alternator shall be rated for a nominal output and overload capacity at the specified environmental and operating conditions for the COMMS site geographical location and shall be capable of delivering rated output (kVA) at rated frequency and power factor, at any voltage not more than 5 per cent above or below rated voltage.
- e. The instantaneous voltage dip shall not exceed 20% of rated voltage when full load, at rated power factor, is suddenly applied.
- f. Recovery of stable operation shall occur within 5 seconds. Steady state modulation shall not exceed +0.5%.
- g. Alternator windings shall be braced for full line ground fault currents, with solidly grounded neutral system.
- h. The alternator housing shall be weatherproof and rated to minimum IP23 IEC 60529:1989/AMD2:2013/COR1:2019.
- i. The alternator output shall be wired to heavy-duty terminations, via an appropriately rated, moulded case circuit breaker, with overload and short circuit protection.
- j. The insulation to windings shall have an oil, moisture, salt air, fungus proof finish and epoxy coated with surface which shall not retain dust or condensation.
- k. It shall be possible to put the set in service after long periods in unheated storage without the necessity for drying up insulation.
- l. The winding insulation shall be minimum Class H according to IEC 60085:2007 Electrical insulation - Thermal evaluation and designation.
- m. The exciter shall be a fast response type, with a rotating 3-phase full-wave bridge.
- n. The exciter shall have a low time constant and large capacity to minimize voltage transients under severe load changes.
- o. The alternator shall be AVR (Automatic Voltage Regulator) controlled (digital type).
- p. The regulator shall include 1-phase/3-phase voltage sensing, automatic short circuit protection and shall include automatic under frequency

protection to allow the generator to operate at no load at less than synchronous speed for engine start-up and shutdown procedures.

- q. The AVR shall be capable of maintaining voltage at  $\pm 1.0\%$  of any value within 10% of the nominal voltage throughout the full range of rated load and power factor conditions.
- r. Droop, stability and voltage set point adjustments shall be done by operator interface.
- s. The AVR shall be capable of preventing sustained over voltage during over speed conditions following the loss of load.
- t. After a sudden load rejection at rated power factor, rated voltage shall be restored within 2 seconds.
- u. Controls shall be provided to monitor the output current of the generator set and initiate an alarm (over current warning) when load current exceed 110% of the rated current of the generator set on any phase for more than 60 seconds.
  - i. The controls shall shut down and lock out the generator set when output current level approaches the thermal damage point of the alternator (over current shutdown).
- v. Controls shall be provided to individually monitor all three phases of the output for short circuit conditions.
  - i. The control/protection system shall monitor the current level and voltage.
  - ii. The controls shall shut down and lock out the generator set when output current level approaches the thermal damage point of the alternator (short circuit shutdown).
- w. Controls shall be provided to monitor the kW load on the generator set and initiate an alarm condition (overload) when total load on the generator set exceeds the generator set rating in excess of 5 seconds.
- x. All software, programming leads and software dongles and the like shall be provided if a PC/ laptop programmable system is offered.
- y. The excitation system shall include the following features and facilities as the minimum:
  - i. Voltage setting control
  - ii. Power factor control
  - iii. Protection against AVR failures (e.g. over/under excitation combined with over/under voltage)
  - iv. Supervised fault detection

- v. An excitation system which shall withstand short circuits and synchronising of the machine up to 90° out of phase without failure of the components
- vi. A brushless excitation system.
- z. Alternator characteristics:
  - i. Nominal Voltage: 400 V, three phase
  - ii. Nominal frequency: 50 Hz
  - iii. Rated output: to be determined by the Contractor
  - iv. Power factor: 0.8 lagging
  - v. Efficiency: min 90% at power factor 0.8 lagging
  - vi. Phase unbalance: < 5%
  - vii. Load: Action shall be taken to keep voltage regulations within tolerances considering disturbances generated by harmonic distortion generated by the UPS

**26.15.11. Coupling**

- a. The elastic coupling between the engine and the alternator shall be such as to prevent abnormal wear and overheating of the bearings due to slight misalignment within the specified tolerances.
- b. Any part of the elastic coupling subject to wear shall be easily accessible for inspection and replacement.
- c. The PGS shall be mounted on a rigid steel frame mounted on concrete base and isolated by means of resilient mounting.
- d. The efficiency of the resilient mounting shall be over 85%.

**26.15.12. Starting System with Batteries**

- a. Each engine shall be provided with an on-skid 24 V DC electric starting system.
- b. The electric starting system, as the minimum shall be composed of:
  - i. The electric starting motors
  - ii. Low maintenance starting batteries
  - iii. Ventilated battery housing
  - iv. Vibration-free battery rack/tray
  - v. Interconnection cables
  - vi. 240 V AC battery chargers
- c. The battery chargers shall be capable of re-charging the batteries to full potential within one hour after a cranking cycle and shall be adjustable to compensate for the battery self-discharge rate during standby periods.



- d. The starting batteries shall be lead acid, maintenance free type, minimum 9 years expected life time.
- e. The batteries and starters shall be capable of ten (10) starts per hour with minimum 5 consecutive start attempts.
- f. All battery system components shall be monitored and alarmed by the control system
- g. The control system provided shall include a cycle cranking system, which allows for user selected crank time, rest time, and number of cycles. Initial settings shall be for 3 cranking periods of 15 seconds each, with 15 second rest period between cranking periods.
- h. The control system shall include time delay start (adjustable 0~300 seconds) and time delay stop (adjustable 0 ~ 600 seconds) functions.
- i. The voltage drop at the battery terminals during the starting operation: this voltage drop shall be limited to such a value still ensuring correct operation of all alarm and control circuits.
- j. Lockable battery isolator switch shall be provided for use during maintenance and storage.

**26.15.13. Digital Diagnostic Control Panel**

- a. The Digital Diagnostic Control Panels, one for each power generator, shall be installed in the power generator room. They shall be mounted on resilient mountings and installed on a frame close to the alternators or installed on the floor near the generators.
- b. The digital Diagnostic Control Panel shall be mounted behind door equipped with key lock and porthole/ visor.
- c. The digital Diagnostic Control Panel shall be a sturdy, self-supporting, of suitably treated and painted steel sheet assuring minimum IP 23 protection according to IEC 60529: 1989/ AMD2: 2013/ COR1:2019
- d. The digital Diagnostic Control Panel shall contain as the minimum:

- i. The static battery charger
- ii. The starting procedure
- iii. The command equipment:

One 3 position switch: OFF-AUTO-MANUAL

Two push-buttons: START – STOP for use in manual position

One emergency stop push-button (see paragraph 28.49.

Emergency stop push-button)

A push button to stop the audible alarm

An alarm reset push-button

An alarm lamp test button

- iv. Communication ports:
  - Ethernet interface (RJ45)
  - 1xRS232 / 2xRS485 interface with Modbus protocol support
  - USB 2.0/3.0 interface
  - Analog / GSM / ISDN / CDMA modem communication support
  - SMS messages
  - ECU Modbus interface
  - isolated secondary RS485
- v. A Command & Control system able to show the following information as the minimum:
  - Generator load
  - Generator voltage
  - Generator current
  - DC battery voltage
  - DC battery current
  - Running time meter (engine hour counter)
  - Frequency
  - Oil pressure
  - Oil temperature
  - Coolant temperature
  - Engine speed (rpm)
  - Status indicator for the alarms
  - Audible alarm (10 dB over generator noise)
- vi. The following displayed digital information and alarms shall be reported as the minimum:
  - Coolant high temperature
  - Oil high temperature
  - Low oil pressure
  - High oil pressure
  - Missed start
  - Battery charger failure
  - Over speed
  - Under speed

Over voltage

Under voltage

Low fuel level (below 25%)

AVR alarms

PG not answering – communication lost

- vii. In case one of these alarms occurs, the following sequence shall be followed:

The corresponding alarm appears on the control panel and the audible alarm is activated

The audible alarm is stopped by means of the related push-button

After the audible alarm is stopped the visual alarm stays on

The visual alarm disappears after activation of the reset push-button

**26.15.14. Accessories and miscellaneous equipment**

- a. Each power generator shall be provided, as the minimum with the following accessories and miscellaneous equipment:
- i. At least one (1) dry powder fire extinguisher Class ABC and suitable for fires involving electronic equipment up to 1000 V, mounted in such a manner that it is easily accessible from the ground, properly sized according to the generator type and meeting requirements stipulated in following standards:
- EN 3-7:2004+A1:2007 Portable fire extinguishers. Characteristics, performance requirements and test methods
- EN 3-8:2006 Portable fire extinguishers. Additional requirements to EN 3-7 for the construction, resistance to pressure and mechanical tests for extinguishers with a maximum allowable pressure equal to or lower than 30 bar
- EN 3-10:2009 Portable fire extinguishers. Provisions for evaluating the conformity of a portable fire extinguisher to EN 3-7
- ii. One (1) maintenance tool kit
- iii. Stowage box for maintenance tool kit designed to restrict the entry of water and the tools shall be secured in place
- iv. Plate or plates (as required), located in a convenient position without creating confusion with each other, imprinted on photosensitive anodized aluminium, conforming to type H, MIL-DTL 15024G, with a matt black background with the following information printed:

Operating instructions, emergency procedures, precautionary instructions to avoid personnel injury or equipment damage, servicing instruction, electrical schematics, technical characteristics, nomenclature and serial number

Centre of gravity marking with matt black colour

## **26.16 UPS**

26.16.1. The Contractor shall provide UPS system in order to protect sensitive units from having logical and physical damages in the case of the Prime Power failures. Additionally, the UPS shall have 30% of spare capacity.

26.16.2. The UPS system shall provide protection against data loss and system damage due to power failures, voltage dips, voltage spikes, under voltage, overvoltage, switching spikes, interference voltages, frequency changes and harmonic distortion.

26.16.3. Although a main central UPS unit is preferred, the Contractor may choose, when justified by best engineering practice and improving efficiency of the system, to also provide local UPS equipment where UPS power is required away from the Equipment room/ Control Console room.

26.16.4. The UPS system shall be compliant with:

- a. IEC 62040-1:2017/COR1:2019 Corrigendum 1 - Uninterruptible power systems (UPS) - Part 1: Safety requirements or THN equivalent.
- b. IEC 62040-2:2016 Uninterruptible power systems (UPS) - Part 2: Electromagnetic compatibility (EMC) requirements or THN equivalent.
- c. IEC 62040-3:2011 Uninterruptible power systems (UPS) - Part 3: Method of specifying the performance and test requirements or THN equivalent.
- d. IEC 62040-4:2013 Uninterruptible power systems (UPS) - Part 4: Environmental aspects - Requirements and reporting or THN equivalent.

26.16.5. The UPS system shall protect all SSSB equipment except for 5Kw HF Power amplifiers.

26.16.6. The UPS shall be on line, double conversion type.

26.16.7. Input Characteristics:

- a. Voltage: 400 V 3-phases  $\pm 10\%$
- b. Frequency: 50 Hz  $\pm 5\%$
- c. Input power factor:  $> 0.9$  lagging
- d. THD:  $< 5\%$  in accordance with IEC TS 61000-3-4 or THN equivalent.
- e. Two inputs are required: one to supply the rectifier and one to supply the by-pass.

26.16.8. Output Characteristics:

- a. Rated out power: to be determined by the Contractor
  - b. Power factor: from 0.8 to 1
  - c. Nominal voltage: 3-phases 400/230 V  $\pm$  1%
  - d. Nominal frequency: 50 Hz  $\pm$  0.5%
  - e. Voltage transients:  $\pm$ 3% for load change from 0 to 100% or from 100 to 0%
  - f. System efficiency: > 90% at full load
  - g. Operating time on batteries: minimum 30 minutes under maximum designed load (including 30% of spare capacity)
- 26.16.9. The UPS shall meet the following requirements:
- a. Soft start
  - b. Zero transfer time
  - c. Surge suppressor
  - d. Static bypass for overload
  - e. Manual bypass for maintenance
  - f. Battery monitoring
  - g. Protection against deep discharge of batteries
  - h. Redundant backup management system with minimum N+2 modules
  - i. Hot-swappable modules, which means it shall be possible to replace /insert another module even when UPS is fully energized and working without interruption for the operation
  - j. The sound pressure level shall not exceed 65 dB(A) in accordance with ISO 3746:2010
  - k. Operating temperature/ Humidity: 0 to 40 ( $^{\circ}$ C) / 0 - 95% (Non-Condensing)
  - l. Thermal protection
- 26.16.10. Batteries shall meet following requirements:
- a. Replacement of the batteries shall be possible without powering down the UPS
  - b. The batteries shall be valve regulated LEAD-ACID (the type and model which does not require dedicated ventilation)
  - c. The batteries shall be compliant with:
    - i. IEC 60896-21:2004 Stationary lead-acid batteries - Part 21: Valve regulated types - Methods of test or THN equivalent.

- ii. IEC 60896-22:2004 Stationary lead-acid batteries - Part 22: Valve regulated types - Requirements or THN equivalent.
- d. Shall be located in one cabinet adjacent to the UPS cabinet
- e. Autonomy: not less than 30 minutes at full load (including 30% of spare capacity)
- f. Minimum operating life time: 10 (ten) years

26.16.11. **Command**

- a. As a minimum, the following commands shall be provided locally and remotely:
  - i. System OFF
  - ii. System on UPS
  - iii. System on Static By-pass
  - iv. System on Manual By-pass
  - v. Alarm silence switch

26.16.12. **Control**

- a. As a minimum, the following possibilities shall be provided:
- b. Measurement of:
  - i. Input current
  - ii. Input voltage
  - iii. Input power
  - iv. DC voltage
  - v. DC current
  - vi. Output voltage
  - vii. Output current
  - viii. Output frequency
  - ix. Output power
- c. A mimic display indicating different operation mode showing the status of main circuit breakers and switches.
- d. As a minimum, visual and audible alarms:
  - i. Battery at low level and low voltage
  - ii. System on by-pass
  - iii. Input supply failure
  - iv. Overload
  - v. High temperature

- vi. USP not answering – communication lost
- vii. Logging of previous minimum 200 alarms shall be possible
- viii. The UPS shall be provided with two contacts for remote alarms, one for urgent (red) alarm and one for non-urgent (yellow) alarm

- e. Automatic battery check-up

**26.16.13. Communication and remote control**

- a. In addition, the UPS shall be provided with:
  - i. Communication interface RS232/C, or Ethernet RJ45
  - ii. SNMP V. 3.x compliant
- b. The UPS shall be equipped with appropriate output protection. A short-circuit in the UPS distribution panel shall not damage the UPS.

**26.17 Lightning protection and grounding connection**

**26.17.1. Lightning protection**

- a. The Contractor shall design and provide the most suitable solution to ensure lightning protection of all provided equipment, installations and infrastructure in accordance with applicable legislations and standards in given Territorial Host Nation.
- b. The earth electrode (respective wires and penetration rods) system shall be able to handle the lightning current for dispersal into the ground.
- c. The lightning protection system shall be compliant with:
  - i. IEC 62305-1:2010 Protection against lightning - Part 1: General principles or THN equivalent.
  - ii. IEC 62305-2:2010 Protection against lightning - Part 2: Risk management or THN equivalent.
  - iii. IEC 62305-3:2010 Protection against lightning - Part 3: Physical damage to structures and life hazard or THN equivalent.
  - iv. IEC 62305-4:2010 Protection against lightning - Part 4: Electrical and electronic systems within structures or THN equivalent.
- d. The equipment shall not be damaged and the Communications and Information Systems (CIS) equipment shall continue to operate without degradation when subjected to the lightning waveforms conforming to STANAG 4370 edition 7, AECTP 250 - leaflet 254 atmospheric electricity and lightning.
- e. Appropriate Surge Protection Devices (SPD) and other lightning protection measures shall be used to provide sufficient protection for the equipment. They shall be compliant with (non-exhaustive list):

- i. IEC 61643-11:2011 Low-voltage surge protective devices - Part 11: Surge protective devices connected to low-voltage power systems - Requirements and test methods or THN equivalent.
- ii. IEC 61643-12:2020 Low-voltage surge protective devices - Part 12: Surge protective devices connected to low-voltage power systems - Selection and application principles or THN equivalent.
- iii. IEC 61643-21:2000+AMD1:2008+AMD2:2012 CSV Consolidated version
- iv. Low voltage surge protective devices - Part 21: Surge protective devices connected to telecommunications and signaling networks - Performance requirements and testing methods or THN equivalent.
- v. IEC 61643-22:2015 Low-voltage surge protective devices - Part 22: Surge protective devices connected to telecommunications and signaling networks - Selection and application principles or THN equivalent.

26.17.2. **Grounding**

- a. For all the new buildings in Greece according to Government Gazette FEK 1222/B/2006), a grounding study shall be prepared by the Contractor.
- b. Grounding study / ground resistance measurements at various locations (the new SSSB building, other indoor premises for SSSB system, antenna locations, fuel tanks, fences etc.) shall be performed by the Contractor in order to ensure good operation including lightning protection.
- c. The main grounding network shall consists of grounding rings buried under the foundations of the new SSSB building and antenna foundations.
- d. All metallic parts in the new SSSB building and of the SSSB system in all premises shall also be connected to this grounding system.
- e. The Contractor shall integrate the SSSB grounding system with existing grounding system of the site according to respective THN laws and regulations.
- f. The grounding installation shall be compliant with IEC 60364-5-54:2011 Low-voltage electrical installations - Part 5-54: Selection and erection of electrical equipment - Earthing arrangements and protective conductors or THN equivalent.

26.17.3. **External lighting**

- a. The Contractor shall design, provide, install and connect external / outdoor emergency lights.
- b. All related works shall be coordinated with the civil works site manager.



- c. The external lighting installation shall be compliant with IEC 60364-7-714:2011 Low-voltage electrical installations - Part 7-714: Requirements for special installations or locations - External lighting installations or THN equivalent.

**26.17.4. Lighting fixtures**

- a. The lighting fixtures shall meet following requirements:
  - i. The level of protection against dust and water shall be as per IEC 60529: minimum IP 66
  - ii. The resistance to mechanical impacts shall be minimum IK08 in compliance with IEC 62262:2002 Degrees of protection provided by enclosures for electrical equipment against external mechanical impacts (IK code) or THN equivalent.
  - iii. Latest generation LED technology
  - iv. Housing and cover: in die-cast aluminium, designed with small surface exposed to wind and with integrated cooling fins into the cover
  - v. Highly resistant to temperature and UV radiation
  - vi. Connection: in die-cast aluminium and with gaskets to secure frame according to designed inclinations
  - vii. Lighting diffuser: clear, tempered glass, minimum 4mm thick
  - viii. Coating: polyester resin for powder coating, resistant to corrosion and saline environments
  - ix. Equipped with automatic temperature control device so that in the event of an unexpected LED temperature rise, caused by particular weather conditions or a LED failure, the system shall reduce the luminous flux to lower the working temperature and guarantee proper operation
  - x. Equipped with a safety diode to protect against voltage peaks
  - xi. Equipped with heat dissipation system designed and made to allow the operation of the LED lights with temperatures guaranteeing excellent performance / efficiency and durability of at least 50.000 hrs in compliance with IEC 62722-2-1:2014 or THN equivalent.

## **SECTION 27 ROADS, PAVED AREAS AND LANDSCAPING**

### **27.1 General**

27.1.1. This scope shall include:

- a. The access roads to each antenna provided by the Contractor at the site of Kythira, Naval Entity 47 South (TX-RX)
- b. Parking areas at the site of Kythira, Naval Entity 47 South (TX-RX)
- c. Pavements/sidewalks and footpaths to link the new SSSB building with internal access roads/parking existing in the vicinity (see Figure 1)
- d. Temporary roads
- e. Landscaping (grass/turf sodding, planting and gardening).

27.1.2. The detailed requirements related to earthworks, foundations, collection and drainage of water are included in other sections of this SOW. Therefore this section focuses on the realization of the pavements, related works and landscaping.

27.1.3. Administrative activities, geodetic & design activities, as well as execution of the construction works, including works supervision, quality assurance, quality control and health & safety measures shall be planned, organized and executed in compliance with:

- a. THN national legislation
- b. National standards or international standards that are applicable in THN (when THN equivalent standards do not exist or are superseded by international standards applicable in THN)
- c. Best industry practices that are most relevant to the scope of work

### **27.2 Roads, parking, pavements and walk paths**

27.2.1. The requirements for antenna access roads are formulated in site specific Appendix and herein below.

27.2.2. Where required, temporary removal of fences and gates, doors etc. shall be coordinated with the THN authorities in order to allow access of the Contractors machinery, equipment and deliveries etc. It is the Contractor's responsibility to temporarily remove gates, fences, doors etc. and to reinstate them once any work is completed by the Contractor that has required temporary removal. Any damages caused by the Contractor shall be rectified by the Contractor at no cost to the Purchaser or THN.

27.2.3. Access to buildings shall be designed so as to avoid any damage to them and their surroundings during vehicle maneuvers.

27.2.4. Where pavements/sidewalks and footpaths are required to link the new SSSB building with internal roads and parking, existing in the vicinity, they shall be minimum 1.5 metres width, with flexible or semi-rigid pavement.

27.2.5. Any pathways to wider building access points (i.e. the double doors to HVAC and power generator rooms etc.) are to ensure they are at least 0.5 metres wider on each side of the pathway to allow sufficient space for machinery maneuvering.

27.2.6. Slope access ramps, with flexible or semi-rigid pavement, shall be provided for buildings accesses to accommodate any level differences.

27.2.7. The parking lot shall be designed taking into account:

- a. its sporadic use by commercial vehicles such as fuel trucks and regular use for personal vehicles and vans (maximum 3.5 T each):
- b. minimum 3 parking positions for vans (maximum 3.5 T each)
- c. it shall have similar characteristics as the antenna access roads but it shall be built with flexible or semi-rigid pavement

27.2.8. The fuel truck parking position, for refueling the buried fuel tanks, shall be designed to assure convenient and safe refueling as well as maneuvering of the fuel truck. It shall have the pavement required for refueling operations (i.e. made of non-flammable materials, sealed and washable).

27.2.9. Longitudinal slopes shall not exceed 10% and cross slopes shall be between 2% and 4%.

### **27.3 Drainage.**

27.3.1. All sections of the roads, pavements, pathways and parking shall be built with drainage works required for chosen pavement type.

27.3.2. Runoff water shall be collected by a drainage network combined with curbs, outlets, gutters, ditches, pipes and culverts. This water shall be evacuated to the public sewage network or to dispersion drains depending on the existing situation and proposed design.

### **27.4 Access roads to antennas.**

27.4.1. These roads shall be provided for all antennas as shown in the diagram (figure 2) below. The Contractor is required to choose one of the presented options or a combination of both assuring that:

- a. all antennas are accessible in an efficient and safe manner (i.e. the risk of damage to any elements of any antenna is minimized to the maximum possible extent)
- b. there is no drive through antenna fields i.e. over the areas with buried grounding screen
- c. conveniently located areas for service vehicles are provided to assure access to all antenna components (i.e. crane or lifting platform access is possible to reach the top mounted antenna components)
- d. when the access road does not form a closed loop, sufficiently large area shall be provided to enable safe and convenient turnaround of

vehicles (including cranes or lifting platforms for maintenance requirements)

27.4.2. If for the unity of road design and economy of scale it is proved efficient and economically justifiable, the Contractor can choose the same technology for the antenna access roads as for the other site roads. In such case all roads shall be built with flexible or semi-rigid pavement.

### **27.5 Temporary roads**

27.5.1. During constructing phase the Contractor may need a temporary road network to access all required areas at all sites, and a temporary parking/ storage area to execute works under this contract at any of the sites.

27.5.2. It is the Contractor's responsibility to build this temporary road network and temporary parking /storage as well as to demolish them and to restore the site to the required condition as before the Contractor's works commenced.

27.5.3. Alternatively, the Contractor can rebuilt the temporary roads into antenna access roads that shall meet requirements stipulated in this Annex and site specific Appendixes.

### **27.6 Landscaping**

27.6.1. In addition to the measures that the Contractor shall implement during the execution of the site works, at the end of the site civil works the Contractor shall complete finishing and landscaping in order to stabilize the soil and prevent erosion.

27.6.2. These works shall include sowing and planting.

27.6.3. Any works, although having an aesthetic aspect, shall in no way interfere with the existing physical security measures. Therefore, the Contractor shall take particular care during the design and execution of landscaping works to assure that the effectiveness of any of the site security measures stays intact (i.e. planting of any shrubs shall not limit monitoring of any sensitive points and areas and shall not reduce the required lighting level).

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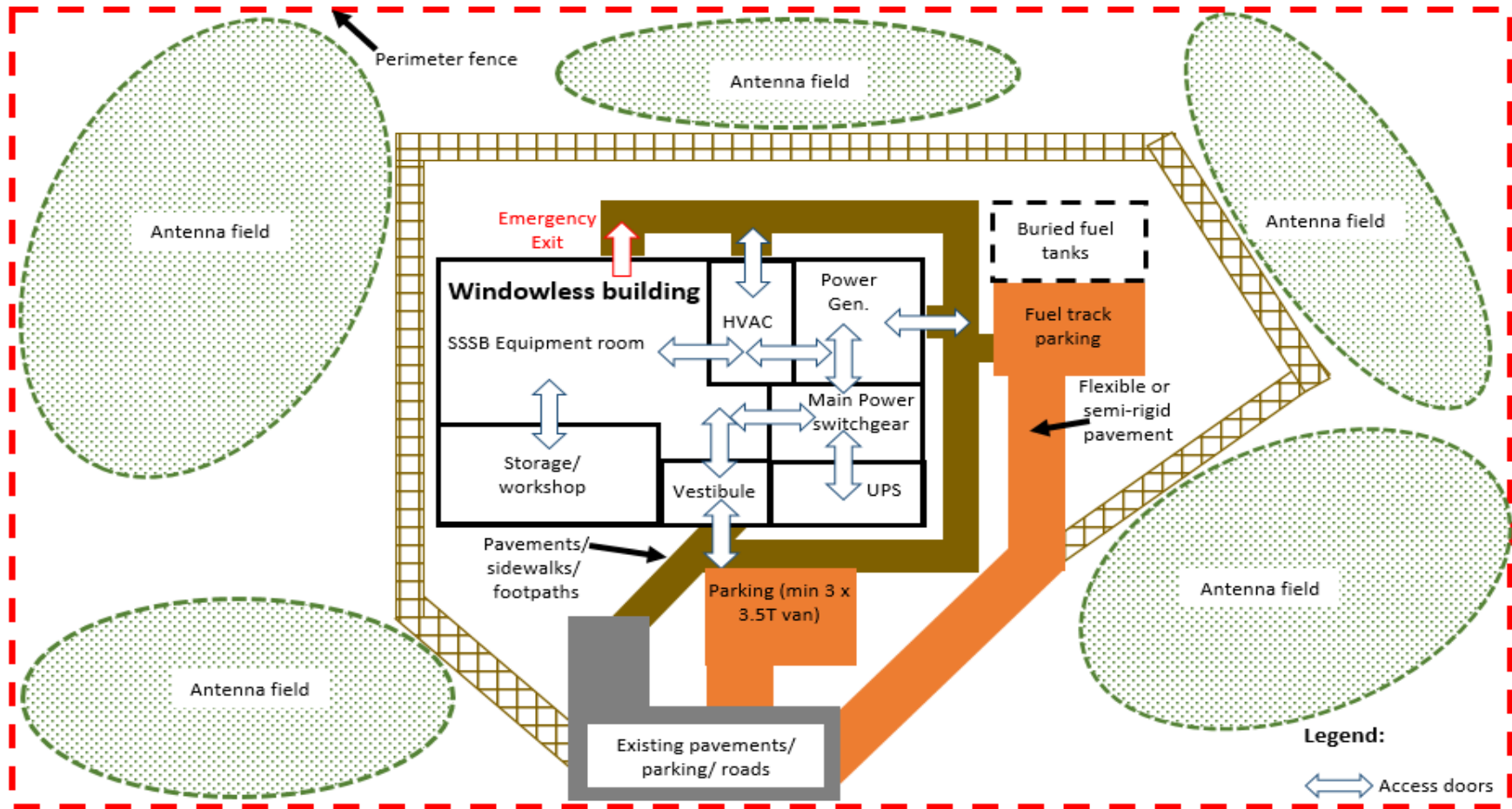


Figure 2 – Antenna Access with Closed Loop Road

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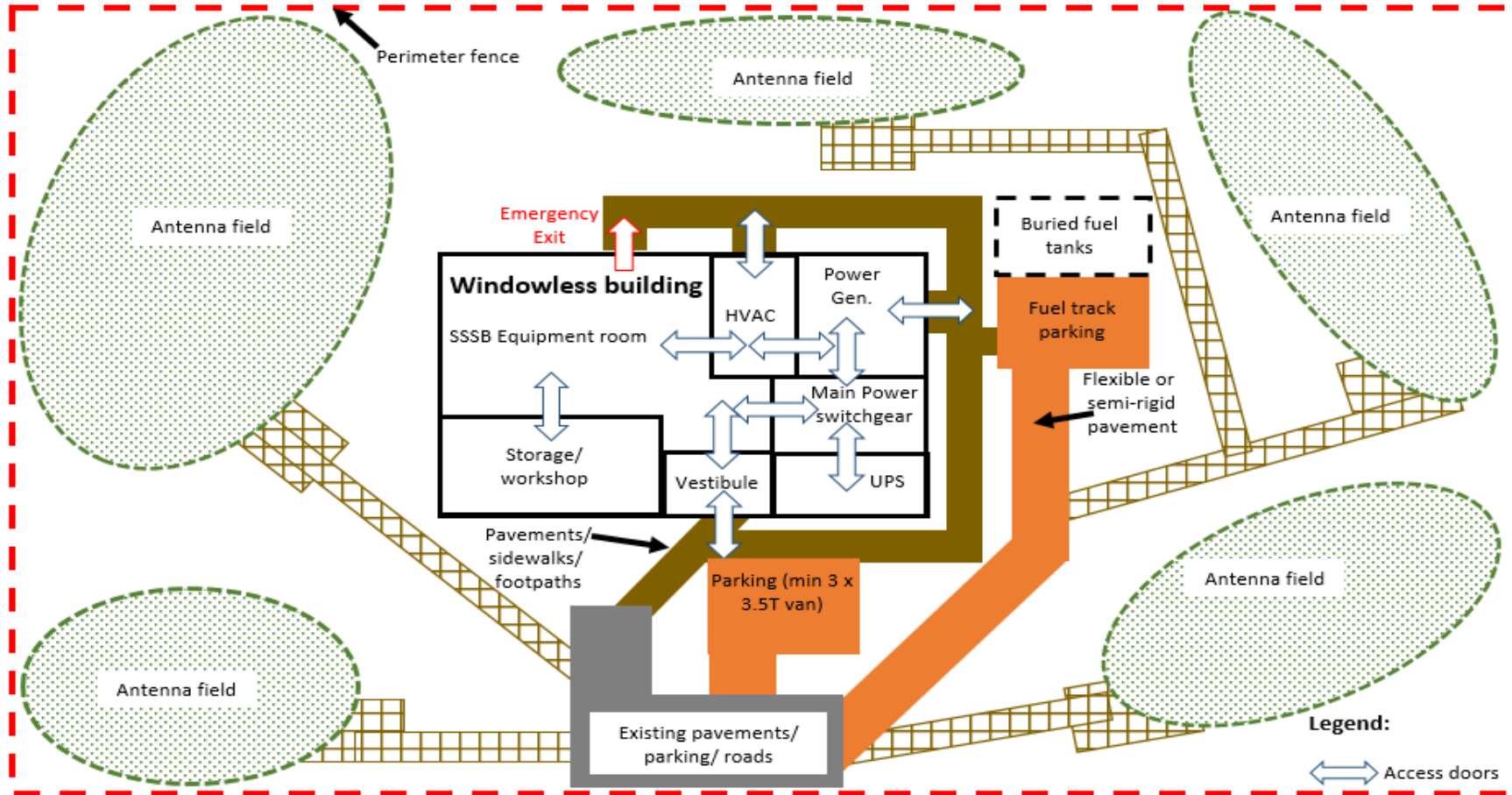


Figure 3 – Antenna Access with Vehicle Turnaround Area

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## **Appendix 1: IFB-CO-15577-SSSB-BookII-PartIV- SOW-ANNEX I-SRS-CW-GRC**

### **Civil Works at the Site Kartsinoudi, Skyros Island (HF TX), GR**

#### **1. General**

1.1. The detailed description and technical specifications of below listed works are formulated in the SOW - ANNEX I - System Requirements Specifications (Civil Works) – Greece.

#### **2. Responsibilities of the Contractor**

2.1. Provision and installation of security fence around the existing building and antenna fields:

2.1.1. The fence shall form continues line around the existing building, the antenna fields and all other infrastructure and installations provided by the Contractor, with the exception of the site perimeter section along the coastline/ waterfront. In case the fence sections built by the Contractor do not reach the coastline on the left and right side of the antenna fields, the fence shall also be built along the coastline.

2.1.2. The fence shall be built in such a distance from antennas to assure that the radiation right outside the fence line is within the limits established in respective THN legislation for publically accessible areas and the fence does not interfere with SSSB system operation.

2.1.3. The fence shall be an Anti-Intruder chain link fence complying with BS 1722-14:2017 (Fences - Specification for open mesh steel panel), Category 2: Boundary/perimeter fences or THN equivalent standard.

2.1.4. The fence mesh shall be corrosion-protected (plastic coating or galvanizing or painting or combination of the mentioned technologies) and shall extend to a height of at least 2.4m above ground level throughout.

2.1.5. The fence shall be topped with three (3) strands of barbed wire or sabre wire facing outward and upwards at an angle of forty-five (45) degrees raising the total fence height by a minimum of 0.5m throughout its entire length.

2.1.6. The under-fence gap shall not exceed fifty (50) mm and the fence shall either be buried in the ground (where it is adequately protected against corrosion), buried in concrete footings or stapled to a hard standing.

- 2.1.7. Fence posts shall be of galvanized and corrosion-protected steel positioned at centers not exceeding 3m.
- 2.1.8. Fence post shall be installed in concrete foundations.
- 2.1.9. Fence posts shall be mounted straight/vertical to accommodate the topping according to BS 1722-10:2019 (Fences - Specification for anti-intruder fences in chain link and welded mesh) or THN equivalent standard.
- 2.1.10. Both main and emergency gates shall be constructed to the same standard as the fence and shall open inwards or laterally. If opened inwards, the gates shall be double leaf gates.
- 2.1.11. The location, where to install the emergency gates, will be provided during the Contractor's site survey.
- 2.1.12. The gates shall be of minimum 3.5m width, manually operated, equipped with closing mechanism and a security padlock.
- 2.1.13. Each door leaf shall be mounted on minimum 3(three) hinges.
- 2.1.14. The closing mechanism at the gates, as the minimum shall meet following requirements:
  - 2.1.14.1. THN security approved locking mechanisms, such as a sliding locking bar that can be secured with a security approved padlock, and ground locking pins to enable it to be secured when not in use.
- 2.1.15. The security padlock at the gates, as the minimum shall meet following requirements:
  - 2.1.15.1. Body made from hardened steel
  - 2.1.15.2. Inner components made from non-corrosive materials
  - 2.1.15.3. Hardened boron steel shackle minimum 15 mm diameter
  - 2.1.15.4. Precision minimum 5-pin cylinder lock mechanism
  - 2.1.15.5. Minimum 3 keys with duplication service for code
  - 2.1.15.6. Suitable for outdoor use, weatherproof
  - 2.1.15.7. Tested against impact, drilling, cutting, lever – test certificate /CoC issued by the supplier shall be provided
  - 2.1.15.8. Minimum GRADE 3 – Medium / High Security: according to Central European Norm (CEN Grade) or EN 12320:2012 Building hardware. Padlocks and padlock fittings. Requirements and test methods



- 2.1.16. Ground surfaces under gates shall be paved with concrete and designed to bear load of wheeled vehicles with minimum 30T of the vehicle gross weight.
- 2.1.17. The fence shall be designed and installed to maximize the use of straight sections in order to permit an unobstructed field of vision.
- 2.2. If the Contractor identifies that existing fence including its foundations and/or any other not used/ not operational infrastructure, installations and equipment shall be removed to enable installation and correct O&M of SSSB system and its supporting infrastructure, it is the Contractor's responsibility to remove and dispose of the above mentioned infrastructure, installations and equipment. This activity can only be exercised after THN approval of each item scoped for removal and disposal.
- 2.3. If the Contractor decides to install new fuel tanks at the locations of currently existing fuel tanks, the Contractor shall also remove and dispose of the three existing diesel buried fuel tanks (20000 Liter each tank) for the generators:
  - 2.3.1. Removal and disposal of existing fuel tanks together with existing pipes, pumps, cathodic protection and other auxiliaries.
  - 2.3.2. Cleaning of the existing tanks with removal of sludge from its bottom, ventilation to "gas free", removal and disposal of waste o fuel
  - 2.3.3. Removal and disposal of the existing pavement cover over the existing tanks
  - 2.3.4. Inspection of the internal surface of concrete tank pits and restoration of the concrete pits with liquid injection/ ejection using suitable mortars
  - 2.3.5. Refurbishment of existing tank manholes (including their still covers/ hatches)
  - 2.3.6. Execute all necessary activities, according to requirements stipulated in respective THN laws and regulations, in case the Contractor causes or identifies fuel spill during removal of the buried fuel tanks
- 2.4. Regardless if the Contractor installs new fuel tanks in the current fuel tanks location or else, it remains the Contractor's responsibility:
  - 2.4.1. to remove and dispose of all sections of fuel pipes that are installed in the building and anywhere else on the ground surface and above the ground
  - 2.4.2. to remove and dispose of all pumps, valves and other auxiliaries related to currently existing fuel supply system, that are installed in the building and anywhere else on the ground surface and above the ground

- 2.5. Provision and installation of new buried fuel tanks with cathodic protection, piping, cabling and all ancillaries as stipulated in the SOW - ANNEX I.
- 2.6. Provision and installation of new concrete pavement over the new fuel tanks.
- 2.7. Removal and disposal of existing HVAC system:
  - 2.7.1. Removal and disposal of outdoor units including metallic fence around them
  - 2.7.2. Removal and disposal of HVAC indoor units dedicated to SSSB equipment room
  - 2.7.3. Removal and disposal of all piping, cabling, air ducting, cable trays, fixings, control panels, and other ancillaries related to the HVAC units that are scoped for disposal
- 2.8. Provision and installation of new HVAC system dedicated for SSSB system with all piping, cabling and ancillaries as stipulated in the SOW - ANNEX I:
  - 2.8.1. Provision and installation of metallic fence for outdoor HVAC unit:
    - 2.8.1.1. Specification of the fence at least equal to existing one as shown below in figure 1.



Figure 1

- 2.8.1.2. Locking mechanisms, such as a sliding locking bar that can be secured with a padlock to enable it to be secured when not in use.
- 2.8.2. The padlock, as the minimum shall meet following requirements:
  - 2.8.2.1. Body made from hardened steel
  - 2.8.2.2. Inner components made from non-corrosive materials
  - 2.8.2.3. Hardened boron steel shackle minimum 10 mm diameter
  - 2.8.2.4. Precision minimum 3-pin cylinder lock mechanism
  - 2.8.2.5. Minimum 3 keys
  - 2.8.2.6. Suitable for outdoor use, weatherproof
- 2.8.3. Outdoor HVAC unit(s) shall be installed in adequate housing for local weather conditions with impact of sea water mist

- 2.8.4. Modification and refurbishment of existing reinforced concrete foundation or removal and disposal of existing foundation and provision and installation of new reinforced concrete foundation
- 2.9. Restoration works of the roof (externally), ceiling (internally) and walls of the COMMS Kartsinoudi building, which is a reinforced concrete structure. In several areas at the roof of the building and the front facade the concrete part has been eroded and the steel reinforcement has been exposed and corroded:
  - 2.9.1. Restoration of reinforced-concrete structures as described in this appendix further below.
  - 2.9.2. Restoration of entire front facade including plastering and painting with special weather resistant coatings (painting scheme and RAL color code will be provided by the Purchaser at a later stage).
  - 2.9.3. Restoration of 5(five) existing, metallic window gratings and 1(one) existing, metallic door grating:
    - 2.9.3.1. Sandblasting of their entire structure, complete removal of corrosion, anticorrosive painting as specified further herein and in the SOW – ANNEX I;
    - 2.9.3.2. Repair and greasing of hinges;
    - 2.9.3.3. Repair of locking mechanisms for padlocks.
  - 2.9.4. Removal of old insulation for the entire roof of the building and reapplication and installation of a new one.
  - 2.9.5. Restoration of all internal walls, floors and ceiling, including plastering and painting in the room for SSSB equipment (RAL color code will be provided by the Purchaser at a later stage).
  - 2.9.6. Concrete floor painting shall meet requirements as stipulated in SOW - ANNEX I
- 2.10. Removal and disposal of eight ventilation shafts with their turrets, utilized by current HF TXs:
  - 2.10.1. In case that a number of the ventilation shafts become redundant due to the dismantling of current, redundant equipment or the cooling method / procedure for the new SSSB equipment differs from the existing ones, then appropriate closure of the openings to the roof structure shall be executed.
  - 2.10.2. If forced ventilation utilizing raised floor structures (including air ducting) is the required method for cooling / operating new SSSB

equipment, the Contractor shall also provide and install the raised floor. In such case the raised floor shall meet requirements stipulated in the SOW - ANNEX I.

- 2.11. Provision and installation of adequate number of ventilation shafts and turrets for new SSSB equipment as required.
- 2.12. Removal and disposal of RF cabling manhole covers at the entry points to the COMMS building.
- 2.13. Provision and installation of new steel RF cabling manhole covers at the entry points to the COMMS building:
  - 2.13.1. Locking mechanisms, such as a sliding locking bar that can be secured with a padlock to enable it to be secured when not in use.
  - 2.13.2. The padlock, as the minimum shall meet following requirements:
    - 2.13.2.1. Body made from hardened steel
    - 2.13.2.2. Inner components made from non-corrosive materials
    - 2.13.2.3. Hardened boron steel shackle minimum 10 mm diameter
    - 2.13.2.4. Precision, minimum 3-pin cylinder lock mechanism
    - 2.13.2.5. Minimum 3 keys
    - 2.13.2.6. Suitable for outdoor use, weatherproof
- 2.14. Refurbishment of the existing RF cabling manholes including restoration of the concrete walls with liquid injection/ ejection using suitable mortar.
- 2.15. Removal and disposal of power distribution system, both indoor and outdoor, that becomes redundant when the new SSSB system with its dedicated electrical installation (further called SSSB electrical installation) is provided and installed by the Contractor:
  - 2.15.1. The scope includes removal and disposal of redundant cabling, sockets, power panels, junction boxes, switches, cables, trays, ducts and other ancillaries.
  - 2.15.2. THN may wish to preserve some parts of the redundant electrical installation and its ancillaries. Relevant guidance will be provided to the Contractor at a later stage.
- 2.16. Provision and installation of SSSB electrical installation with associated cabling, ducting, cable trays and ancillaries as stipulated in the SOW - ANNEX I:

- 2.16.1. Complete SSSB electrical installation, both indoor and outdoor, with dedicated EPDBs (Equipment Power Distribution Boards), including surge protection devices and residual current devices (RCD), required to power all equipment provided by the Contractor for SSSB project (including HVAC, fuel supply system, fire detection and alarm, power distributed to antenna fields etc.)
- 2.16.2. Integration of the SSSB electrical installation with existing MPDB (Main Power Distribution Board) and Medium Voltage Transformer:
  - 2.16.2.1. The integration shall include installation of adequate circuit breakers, cabling provision and installation, and modification of existing power distribution system and the power boards/ panels as required to connect power cables for SSSB electrical installation
- 2.16.3. If the integration with existing MPDB is not possible, the Contractor shall:
  - 2.16.3.1. remove and dispose of the existing MPDB
  - 2.16.3.2. provide and install a new MPDB
  - 2.16.3.3. integrate SSSB electrical installation with the new MPDB
  - 2.16.3.4. integrate all remaining electrical installation of entire building with the new MPDB
- 2.17. Provision and installation of UPS system as stipulated in the SOW – ANNEX I.
- 2.18. Removal and disposal of two existing power generators together with existing piping, cabling, air intake, air outlet, louvers, control panels, grounding and all other ancillaries
- 2.19. Provision and installation of two fully redundant power generators with associated cabling, ducting, cable trays and ancillaries as stipulated in the SOW - ANNEX I:
  - 2.19.1. The PGS shall be the back-up (emergency) source of electrical power and shall be capable to provide power for entire SSSB site in case of main power failure. Hence, the Contractor shall design the system and provide equipment to meet requirements for power generators rated as Emergency Standby Power (ESP) according to ISO 8528-1:2018
  - 2.19.2. Modification and refurbishment of existing reinforced concrete foundation or removal and disposal of existing foundation and provision

and installation of new reinforced concrete foundation for both power generators.

- 2.19.3. The foundation (regardless if modification of existing foundation is executed or new foundation is provided) shall be designed and built in such a way to prevent transfer of vibrations from generators to the rest of building structure.
- 2.19.4. The existing power load of the site (without equipment that shall be provided by the Contractor) that shall be connected to the PGS is 15 kW
- 2.19.5. The Contractor shall provide the PGS with 20% of spare capacity for further load expansion
- 2.20. Removal and disposal of lightning protection and grounding system, both indoor and outdoor, that becomes redundant when the new SSSB system with its dedicated lightning protection and grounding system (further called SSSB lightning protection and grounding system) is provided and installed by the Contractor:
  - 2.20.1. The scope includes removal and disposal of redundant cabling, conductors, arresters, grounding rings (including buried, roof and mast mounted elements) grounding rods, lightning rods, trays, ducts and other ancillaries.
  - 2.20.2. THN may wish to preserve some parts of the redundant lightning protection and grounding system and its ancillaries. Relevant guidance will be provided to the Contractor at a later stage.
- 2.21. Provision and installation of SSSB lightning protection and grounding system with associated cabling, ducting, cable trays and ancillaries as stipulated in the SOW - ANNEX I:
  - 2.21.1. Complete SSSB lightning protection and grounding system, both indoor and outdoor (including surge protection devices, grounding rings (including buried, roof and mast mounted elements), grounding rods, lightning rods, trays, ducts and other ancillaries) required to protect all equipment provided by the Contractor for SSSB project (including HVAC, fuel supply system, fire detection and alarm, antennas, fences etc.)
  - 2.21.2. Integration of the SSSB lightning protection and grounding system with existing lightning protection and grounding system of the site according to respective THN laws and regulations:
    - 2.21.2.1. The integration shall include execution of necessary earth works, welding, anticorrosive protection, and necessary modification of existing lightning protection and grounding system.

- 2.22. Removal and disposal of:
- 2.22.1. three (3) ADCAB antennas and one (1) TASMO antenna;
  - 2.22.2. three (3) SSSB existing HF TX antennas;
  - 2.22.3. one (1) DLOS tower with antennas;
  - 2.22.4. all ducting, cabling, grounding, guyed lines, foundation, anchoring and other ancillaries related to the antennas that are scoped for disposal.
- 2.23. Provision and installation of required number of new antenna masts capable of supporting the SSSB system and new DLOS tower with all associated works (antenna field preparation, foundation, trenches etc.), air obstacle lights, lightning protection, grounding and other ancillaries as stipulated in the SOW - ANNEX I.
- a) The antenna masts and the DLOS tower shall be designed for minimum service life of 30 years without the need for substantial maintenance
  - b) The antenna masts and the DLOS tower shall be provided with cathodic protection system (including protection of the guy anchors) designed for minimum service life of 30 years without the need for substantial maintenance
- 2.24. Removal and disposal of the SSSB, ADCAB and TASMO equipment located in the COMMS building.
- 2.25. Provision and installation of fire detection and alarm system in SSSB equipment room and in power generator room as stipulated in the SOW - ANNEX I.
- 2.26. The fire alarm:
- 2.26.1. Shall be reported to the site duty officer (the duty officer office location will be provided during the Contractor's site survey)
  - 2.26.2. Shall be reported to the site commander (the site commander office location will be provided during the Contractor's site survey)
  - 2.26.3. Shall send notifications /alerts to the mobile phones of the site commander and the site duty officer
- 2.27. Provision and installation of fire extinguishers in SSSB equipment room and in power generator room as stipulated in the SOW - ANNEX I.



- 2.28. Provision and installation of safety marking and labelling, both indoor and outdoor, for all structures, machinery and installations provided by the Contractor, as stipulated in the SOW Main Body and in the SOW – ANNEX I.
- 2.29. All concrete works exposed to outdoor environment (regardless if buried or not) shall be executed with the utilization of concrete that meets, as the minimum, following requirements according to EN 206:2013+A2:2021 (or THN equivalent standard):
- 2.29.1. exposure class of XS1 and strength of C 32/40 for structures exposed to airborne salt but not in direct contact with sea water;
- 2.29.2. exposure class of XS3 and strength of C 33/45 for structures located at tidal and spray zones.
- 2.30. All metal works exposed to outdoor environment such as antenna masts with their ancillaries, HVAC components, cable trays and ladders, fences, gates, bolts, nuts, washers, fasteners etc. (regardless if buried or not) shall be protected against corrosion category C5M Maritime, defined according to ISO 12944-5:2019 (or THN equivalent standard).
- 2.31. The complete structural design and its execution for all structures, equipment and installations provided, installed and/or modified by the Contractor shall meet THN GRC seismic requirements. Therefore, the Contractor shall meet respective requirements as stipulated in following publications:
- 2.31.1. EN 1998-1:2004, Eurocode 8: Design of structures for earthquake resistance – Part 1: General rules, seismic actions and rules for buildings
- 2.31.2. EN 1998-3:2005 Eurocode 8: Design of structures for earthquake resistance – Part 3: Assessment and retrofitting of buildings and its implementation
- 2.31.3. EN 1998-4:2006 Eurocode 8: Design of structures for earthquake resistance – Part 4: Silos, tanks and pipelines
- 2.31.4. EN 1998-5:2004 Eurocode 8: Design of structures for earthquake resistance – Part 5: Foundations, retaining structures and geotechnical aspects
- 2.31.5. EN 1998-6:2005 Eurocode 8: Design of structures for earthquake resistance – Part 6: Towers, masts and chimneys
- 2.31.6. Ministerial Decision D17a/141/3/FN 275/1999 (Government Gazette 2184/B;/20-12-19990 Hellenic Earthquake Regulation 2000 (Approval of the Greek Earthquake Regulation))

- 2.32. The Contractor shall also consider in its design additional measures that are required to secure provided equipment against earthquake impact. Those measures include, but are not limited to, special fixing to the floors (including when installed on a raised floors) and fixing elements mounted at the rack tops to secure them to the walls.
- 2.33. When designing and erecting masts with all associated ancillaries, fences and all other outdoor installed equipment, the Contractor shall apply Eurocode EN1991-1-4 (Eurocode 1 Part 1-4: General actions Wind actions). This publication provides guidance on the determination of natural wind actions for the structural design of buildings and civil engineering works. For the calculation procedure and especially for the determination of wind actions following shall be applied:
- 2.33.1. The fundamental basic wind velocity  $v_{b,0}$  which is the 10 minute mean wind velocity with an annual risk of being exceeded of 0.02 irrespective of wind direction at a height of 10m above flat open country terrain, has a value in the National Annex  $v_{b,0,0}=33\text{m/s}$  for the Greek Islands in general.
- 2.33.2. The basic wind velocity  $v_b$ , which is the fundamental basic wind velocity modified to account the direction of the wind and the season, shall be calculated from the equation:  $v_b = C_{dir} \times C_{season} \times v_{b,0}$ . The recommended value for  $C_{dir}$  (the directional factor) and  $C_{season}$  (the season factor) is 1.
- 2.33.3. Terrain roughness: There are 5 terrain categories. For the two sites in Skyros Island (Kartsinoudi and Limnonari) as well as Site Sideros in Crete, the terrain category is No 0 (sea or coastal area exposed to the open sea). For the Site Kythira and Site Mavros in Crete the terrain category is No III (Area with regular cover of vegetation or building or with isolated obstacles with separations of maximum 20 obstacle heights (such as villages, suburban terrain, permanent forest).
- 2.34. Additionally, the Contractor shall design and execute the works in compliance with following publications respectively:
- 2.34.1. Presidential Decree 244/1980:"Cement Regulation for Concrete Works (Prestressed, Reinforced and Unarmed) (Government Gazette 69/A/1989
- 2.34.2. ELOT EN 10080, ELOT 1421-1, ELOT 1421-3 "Standards for concrete reinforcement steels". 3. Ministerial Decision D11E/0/30123/1991 (Government Gazette 1068/B/31-12-1991 "Amendment of the New Concrete Regulation for the Design and Construction of Concrete Works"

- 2.34.3. Ministerial Decision D17a/116/4/FN429/18-10-2000 (Reinforced Concrete Regulation) EKOS 2000.
- 2.34.4. Ministerial Decision D14/50504/2002 (Government Gazette 537/B;/1-5-2002) "Adaptation of the Concrete Technology Regulation to the Requirements of the Harmonized Standard" ELOT EN 197-1.
- 2.34.5. Ministerial Decision 16462/29/2001 (Government Gazette 917/B'/17.7.2001) "Cement for the Construction of Concrete Works".
- 2.34.6. Ministerial Decision D14/92330/08 (1416/B'/17.7.08) (Government Gazette 381/B'/24.3.2000) "Approval of the New Regulation of Concrete Reinforcement Steel Technology".
- 2.34.7. Ministerial Decision DIPAD/OIK. 372/2014 (Government Gazette 1457/B'/5.6.2014) "Approval of the application and use of the Eurocodes in combination with the respective National Appendices)
- 2.34.8. Government Gazette 59/D/3-2-1989 "Building Regulations".
- 2.34.9. Joint Ministerial Decision D6/B'/OIK 5825 (Government Gazette 407/B/2010) "Approval of the Energy Efficiency Regulation of Buildings (KENAK)".
- 2.34.10. Ministerial Decision F.7.5/1816/88/2004 (Government Gazette 470/B/5-3-2004) "Replacement of the current Regulation of Internal Electrical Installations with the ELOT Standards and other relevant provisions".
- 2.34.11. Manual of Standard Distribution Structures of Public Power Corporation (PPC), The Instructions Distribution of PPC SA.
- 2.34.12. Greek Technical Specifications-Government Gazette 2221/30-07-12 with mandatory application in all public works.
- 2.34.13. THN GRC Sewerage Regulation
- 2.34.14. Amendment and Supplementation of Presidential Decree 71/88 "Building Fire Protection Regulation" (Government Gazette 1316/B/31-12-1998)
- 2.34.15. Presidential Decree 41/2018 "Building Fire Protection Regulation" (Government Gazette 80/A/7-5-2018)
- 2.35. Supporting Civil Works:
  - 2.35.1. Rebuilding of pavements after pipe, cabling, ducting, air intake, air outlet, exhaust and other installation works.

- 2.35.2. Associated earthworks and backfilling, drilling for the pipes, cabling, ducting, air intake, air outlet, exhaust and other installation works.
- 2.35.3. Closing of the penetrations (with mortar, plastering, finishing/painting of affected sections in partitions) in walls, floors, roofs and ceiling after pipe, cabling, ducting, air intake, air outlet, exhaust and other installation works.
- 2.35.4. Closing of all redundant penetrations (with mortar, plastering, finishing/painting of affected sections in partitions) in walls, floors, roofs and ceiling to assure correct and efficient operation of new HVAC system provided by the Contractor
- 2.35.5. Water, sound and fire insulation as required in all areas affected by the Contractor works.
- 2.36. Restoration of reinforced-concrete structures:
  - 2.36.1. After the removal of all corroded concrete parts by using water-blasting, sandblasting the following works shall be executed according to the GRC National Regulation (Code ELOT TP 1501-14-01-04-00-2009 “Local retrofitting of concrete element damage caused by reinforcement corrosion”):
    - 2.36.1.1. Cleaning of the steel reinforcements with mechanical wire brushing and then priming after three hours with appropriate anticorrosive material in accordance with manufacturer’s recommendations.
    - 2.36.1.2. Application, in layers, anticorrosive mortar (the thickness shall be in accordance with manufacturer’s recommendations) covering the reinforcement.
    - 2.36.1.3. Once the reinforcement remediation is completed, the application of two different appropriate water-proof cement coating in layers shall be followed.
    - 2.36.1.4. Dismantling and replacement of damaged parts of networks and auxiliary works.
  - 2.36.2. In case that the reinforcing bars are corroded and have lost more than 20% of their diameter, they shall be cut and removed. In such event, removed steel bars shall be replaced with new steel bars of the same diameter. For the above procedure the following works shall be executed in accordance with GRC National Regulation (Code PETEP:14-01-11-00 “Anchoring of new steel reinforcement bars in existing concrete elements”):

- 2.36.2.1. Identification of the anchor positions of the new steel reinforcement bars.
  - 2.36.2.2. Cleaning of the concrete area in accordance with GRC National Regulation (Code PETEP:14-01-01-01 “Removal of loose or adhered material from concrete surfaces”).
  - 2.36.2.3. Roughening of the concrete surface.
  - 2.36.2.4. Boring holes in the concrete at the anchor positions (In General holes diameter=Steel bar diameter + 4mm) in accordance with GRC National Regulation (Code PETEP:14-01-03-02 “Drilling in concrete members with cut-off of encountered reinforcement”).
  - 2.36.2.5. Roughening by wire-brushing inside the hole and remove dust by air blowing, wash with clean water, removal of the water by air blowing.
  - 2.36.2.6. Insertion of sufficient amount of adhesive material.
  - 2.36.2.7. The new steel bars shall be held properly in order to remain unmovable until the coagulation of the adhesive material.
- 2.36.3. The minimum thickness of reinforcement cover of slabs, beams and columns of a construction is prescribed by National Regulation (Greek Code for Reinforced Concrete 2000 in conjunction with the Greek Antiseismic Regulation 2003). In general the minimum thickness of reinforcement cover is not allowed to be less than the diameter of the steel bar+20mm for a reinforced-concrete structure in a marine environment. Especially:
- 2.36.3.1. For a reinforcing bar in a column the minimum thickness of reinforcement cover is not allowed to be less than 40mm and not less than the diameter of the steel bar+20mm.
  - 2.36.3.2. For a reinforcing bar in a slab the minimum thickness of reinforcement cover is not allowed to be less than 35mm and not less than the diameter of the steel bar+20mm.
- 2.36.4. Once the reinforcement remediation is completed, the application of two different appropriate waterproof cement coating in layers to the external surfaces shall be followed. The restoration of the concrete area shall be completed with the works of plastering and painting.

## **Appendix 2: IFB-CO-15577-SSSB-BookII-PartIV- SOW-ANNEX I-SRS-CW-GRC**

### **Civil Works at the Site Kythira, Naval Entity 47 South (TX-RX), GR**

#### **1. General**

- 1.1. The detailed description and technical specifications of below listed works are formulated in the SOW - ANNEX I - System Requirements Specifications (Civil Works) – Greece.

#### **2. Responsibilities of the Contractor**

- 2.1. Provision and installation of security fence around the new SSSB building (that shall be built by the Contractor) and antenna fields:
  - 2.1.1. The fence shall form continues line around the building, the antenna fields and all other infrastructure and installations provided by the Contractor.
  - 2.1.2. The area planned for the new SSSB building is already fenced and included in the territory of Naval Entity 47 South. Therefore, some sections of the new fence might not be required around the new SSSB building. Additionally, removal and disposal of some sections of the existing fence, at the new SSSB building location, might be required which then shall be done by the Contractor. In such case, the new fence built around antenna fields shall be connected with existing fence at the area of new SSSB building. Relevant guidance will be provided to the Contractor at a later stage.
  - 2.1.3. The fence shall be built in such a distance from antennas to assure that the radiation right outside the fence line is within the limits established in respective THN legislation for publically accessible areas and the fence does not interfere with SSSB system operation.
  - 2.1.4. The fence shall be an Anti-Intruder chain link fence complying with BS 1722-14:2017 (Fences - Specification for open mesh steel panel), Category 2: Boundary/perimeter fences or THN equivalent standard.
  - 2.1.5. The fence mesh shall be corrosion-protected (plastic coating or galvanizing or painting or combination of the mentioned technologies) and shall extend to a height of at least 2.4m above ground level throughout.

- 2.1.6. The fence shall be topped with three (3) strands of barbed wire or sabre wire facing outward and upwards at an angle of forty-five (45) degrees raising the total fence height by a minimum of 0.5m throughout its entire length.
- 2.1.7. The under-fence gap shall not exceed fifty (50) mm and the fence shall either be buried in the ground (where it is adequately protected against corrosion), buried in concrete footings or stapled to a hard standing.
- 2.1.8. Fence posts shall be of galvanized and corrosion-protected steel positioned at centers not exceeding 3m.
- 2.1.9. Fence post shall be installed in concrete foundations.
- 2.1.10. Fence posts shall be mounted straight/vertical to accommodate the topping according to BS 1722-10:2019 (Fences - Specification for anti-intruder fences in chain link and welded mesh) or THN equivalent standard.
- 2.1.11. Both main and emergency gates shall be constructed to the same standard as the fence and shall open inwards or laterally. If opened inwards, the gates shall be double leaf gates.
- 2.1.12. The location, where to install the emergency gates, will be provided during the Contractor's site survey.
- 2.1.13. The number of gates shall be chosen by the Contractor to assure access to the new SSSB building, all antenna fields and all other infrastructure and installations provided by the Contractor.
- 2.1.14. The gates shall be of minimum 3.5m width, manually operated, equipped with closing mechanism and a security padlock.
- 2.1.15. Each door leaf shall be mounted on minimum 3(three) hinges.
- 2.1.16. The closing mechanism at the gates, as the minimum shall meet following requirements:
  - 2.1.16.1. THN security approved locking mechanisms, such as a sliding locking bar that can be secured with a security approved padlock, and ground locking pins to enable it to be secured when not in use.
- 2.1.17. The security padlock at the gates, as the minimum shall meet following requirements:
  - 2.1.17.1. Body made from hardened steel
  - 2.1.17.2. Inner components made from non-corrosive materials
  - 2.1.17.3. Hardened boron steel shackle minimum 15 mm diameter

- 2.1.17.4. Precision minimum 5-pin cylinder lock mechanism
- 2.1.17.5. Minimum 3 keys with duplication service for code
- 2.1.17.6. Suitable for outdoor use, weatherproof
- 2.1.17.7. Tested against impact, drilling, cutting, lever – test certificate /CoC issued by the supplier shall be provided
- 2.1.17.8. Minimum GRADE 3 – Medium / High Security: according to Central European Norm (CEN Grade) or EN 12320:2012 Building hardware. Padlocks and padlock fittings. Requirements and test methods
- 2.1.18. Ground surfaces under gates shall be paved with concrete and designed to bear load of wheeled vehicles with minimum of 30T of the vehicle gross weight.
- 2.1.19. The fence shall be designed and installed to maximize the use of straight sections in order to permit an unobstructed field of vision.
- 2.2. If the Contractor identifies that existing fence including its foundations and/or any other not used/ not operational infrastructure, installations and equipment shall be removed to enable installation and correct O&M of SSSB system and its supporting infrastructure, it is the Contractor's responsibility to remove and dispose of the above mentioned infrastructure, installations and equipment. This activity can only be exercised after THN approval of each item scoped for removal and disposal.
- 2.3. Provision and installation of new buried fuel tanks with cathodic protection, piping, cabling and all ancillaries as stipulated in the SOW - ANNEX I.
- 2.4. Provision and installation/ construction of new:
  - 2.4.1. fuel truck parking position (it can overlap with the parking positions for vans if THN fire prevention regulations allow that) built with flexible pavement or semi-rigid pavement
  - 2.4.2. minimum 3 (three) parking positions for vans (maximum 3.5 T each) built with flexible or semi-rigid pavement
  - 2.4.3. connection of the above mentioned pavements with existing paved road/ parking of the Naval Entity 47 South built with flexible or semi-rigid pavement
  - 2.4.4. pavements/sidewalks and footpaths as required to link the new building with new built and existing internal site roads and parking built with flexible or semi-rigid pavement



2.4.5. access roads to antennas

2.4.6. for further details on road works, parking, footpaths and pavements refer to the SOW – ANNEX I and next paragraph of this Appendix

2.5. Provision and construction of access roads to each antenna provided by the Contractor (for further details on road works refer to the SOW – ANNEX I).

2.5.1. the roads shall be designed and built as internal roads and as such they will not serve as public use roads

2.5.2. all antennas shall be accessible in an efficient and safe manner (i.e. the risk of damage to any elements of any antenna when driving vehicles on these roads is minimized to the maximum possible extent)

2.5.3. there is no drive through antenna fields i.e. over the areas with buried grounding screen

2.5.4. conveniently located areas for service vehicles shall be provided to assure access to all antenna components (i.e. crane or lifting platform access is possible to reach the top mounted antenna components)

2.5.5. when the access road does not form a closed loop, sufficiently large area shall be provided to enable safe and convenient turnaround of vehicles (including cranes or lifting platforms used for maintenance purposes)

2.5.6. designed service life: minimum 20 years

2.5.7. the antenna access roads shall be designed as a light road system made of concrete open work plates, with load bearing capacity to be designed by the Contractor, for:

2.5.7.1. occasional traffic of light transport vehicles (maximum 3.5 T each) for the maintenance and security needs

2.5.7.2. sporadic traffic of cranes or lifting platforms to assure maintenance access to the top mounted antenna components

2.5.8. one line, no sidewalks

2.5.9. in principle no curbs required

2.5.10. curbs shall only be installed at selected road sections when necessary to assure stability of the road and slopes as well as adequate drainage and protection against erosion

2.5.11. where curbs are required they shall be made of concrete as prefabricated

- 2.5.12. example of the locations that might require installation of curbs are road sections running over culverts
  - 2.5.13. when culverts are required to assure adequate drainage they shall be made of reinforced concrete as prefabricated
  - 2.5.14. any drainage and any culvert outlet shall be designed and built in such a way not to cause erosion of the adjacent terrain
  - 2.5.15. designed speed limit of the roads: 30 km/h
  - 2.5.16. the road minimum turning circle of 10,0 m
  - 2.5.17. the road lane width shall be minimum 3,0 m with possible local widening taking into account the vehicle turning circle (including paths of the front and the rear overhang)
  - 2.5.18. all sections of the roads shall be built with drainage works required for chosen pavement
  - 2.5.19. road works shall also include the slopes improvement along any section of the road whenever such improvement is required to protect the slopes and the road itself against erosion, landslides etc.
  - 2.5.20. no horizontal traffic signs required
  - 2.5.21. no vertical traffic signs required
- 2.6. Provision and installation of new HVAC system for the new SSSB building with all piping, cabling and ancillaries as stipulated in the SOW - ANNEX I:
- 2.6.1. Outdoor HVAC unit(s) shall be installed in adequate housing for local weather conditions with impact of sea water mist
  - 2.6.2. Provision and installation of new reinforced concrete foundation for outdoor HVAC unit(s)
- 2.7. Provision and installation/ construction of the new SSSB building with following characteristics:
- 2.7.1. Energy Class "A" envelope
  - 2.7.2. Windowless building to house all SSSB equipment with supporting equipment and installations provided by the Contractor
  - 2.7.3. Structured and finished as stipulated in the SOW - ANNEX I
  - 2.7.4. Provided with all equipment and installations as stipulated in the SOW - ANNEX I:

- 2.7.4.1. Internal and external doors (including emergency doors) with locks and closing mechanisms
  - 2.7.4.2. Electrical distribution system including power panels, light fixtures -indoor and outdoor, emergency lights, power sockets, switches
  - 2.7.4.3. Lightning protection and grounding
  - 2.7.4.4. Automated full volume fire suppression system
  - 2.7.4.5. Fire detection and alarm system
  - 2.7.4.6. Fire extinguishers
  - 2.7.4.7. HVAC system
  - 2.7.4.8. Weather, sound and fire insulation as required
  - 2.7.4.9. Floors and ceilings suitable for power distribution, piping, air circulation, fire prevention and other H&S measures as required for the SSSB building purpose
  - 2.7.4.10. If forced ventilation utilizing raised floor structures (including air ducting) is the required method for cooling / operating SSSB equipment, the Contractor shall also provide and install the raised floor. In such case the raised floor shall meet requirements stipulated in the SOW - ANNEX I.
  - 2.7.4.11. Drainage system
  - 2.7.4.12. Manholes, cable and pipe interface panels required for introduction into the SSSB building of all installations and assure air intake, air exhaust, power generator exhaust etc.
  - 2.7.4.13. Supplied with all equipment, installations and ancillaries required for Operation and Maintenance (O&M) of SSSB system and its supporting systems (HVAC, electrical power and distribution system, power generators, UPS, automated full volume fire suppression system fire detection and fire alarm etc.) for unmanned facility with only occasional presence of personnel for O&M purposes of the housed equipment and the building itself.
- 2.7.5. As the minimum, the building shall have following premises:
- 2.7.5.1. SSSB Equipment Room – minimum 50 m2 (Note: If the building design provides for a separate Environment Control room (HVAC) the size of SSSB Equipment room can be proportionally decreased)

- 2.7.5.2. The SSSB Equipment Room shall be built as NATO Class I area in accordance with:
  - 2.7.5.2.1. AC/35-D/2001-REV3 Directive on Physical Security, dated 25 November 2020
  - 2.7.5.2.2. AC/35-D/1030 NATO Security Committee Guidelines on Physical Security, dated 20 May 2005
- 2.7.5.3. When designing and executing the works for SSSB Equipment Room as NATO Class I area, the Contractor shall only meet requirements that pertain to:
  - 2.7.5.3.1. wall, floor, and ceiling structures
  - 2.7.5.3.2. security doors and locks
- 2.7.5.4. All other security measures, listed below, for the SSSB Equipment Room in order to meet requirements of NATO Class I area, are THN GRC responsibility and are not part of this project scope:
  - 2.7.5.4.1. an entry control system
  - 2.7.5.4.2. security barriers
  - 2.7.5.4.3. security lighting
  - 2.7.5.4.4. intrusion detection systems (IDS)
  - 2.7.5.4.5. surveillance systems (CCTV)
  - 2.7.5.4.6. access control at points of entry and an interface with the appropriate deployment of security guards or forces etc.,
- 2.7.5.5. Power Generator Room – minimum 50 m<sup>2</sup>
- 2.7.5.6. Main Power Switchgear Room
- 2.7.5.7. UPS/Battery Room
- 2.7.5.8. Environment Control Room (HVAC) if not hosed in SSSB Equipment Room
- 2.7.5.9. Supply Storage Room/ Workshop and Test facilities for electronic equipment – minimum 12 m<sup>2</sup>
- 2.7.5.10. Vestibule, of minimum 4m<sup>2</sup>, at the main entry to the SSSB building, equipped with double door that assures protection against outdoor conditions when opening the double door of the SSSB Equipment Room

- 2.8. Provision and installation of SSSB electrical installation with associated cabling, ducting, cable trays and ancillaries as stipulated in the SOW - ANNEX I:
- 2.8.1. Complete SSSB electrical installation, both indoor and outdoor, with SSSB building MPDB (Main Power Distribution Board), dedicated EPDBs (Equipment Power Distribution Boards), including surge protection devices and residual current devices (RCD), required to power all equipment provided by the Contractor for SSSB project (including HVAC, fuel supply system, automated full volume fire suppression system, fire detection and alarm, lights, power distributed to antenna fields etc.)
  - 2.8.2. Integration of the SSSB electrical installation with existing 250 kVA Medium Voltage Transformer (MVT) contractor
    - 2.8.2.1. The integration shall include installation of adequate circuit breakers at the existing Commercial Power Panel (CPP) by the MV transformer, cabling provision and installation, and any other necessary modifications to connect power cables to the MPDB installed in the new SSSB building.
    - 2.8.2.2. The existing 250 kVA MVT is located at a distance of about 200 m from the main site gate, inside the naval entity. In front of the fence at a distance of 30m before the main gate, there is a supply coming from the main transformer.
    - 2.8.2.3. Should the integration with existing 250 kVA MVT be not possible, the Contractor shall provide and install a new transformer dedicated for SSSB system.
- 2.9. Provision and installation of UPS system as stipulated in the SOW – ANNEX I.
- 2.10. Provision and installation of two fully redundant power generators with associated cabling, ducting, cable trays, reinforced concrete foundation and ancillaries as stipulated in the SOW - ANNEX I:
- 2.10.1. The PGS shall be the back-up (emergency) source of electrical power and shall be capable to provide power for entire SSSB site in case of main power failure. Hence, the Contractor shall design the system and provide equipment to meet requirements for power generators rated as Emergency Standby Power (ESP) according to ISO 8528-1:2018.
  - 2.10.2. The foundation shall be designed and built in such a way to prevent transfer of vibrations from generators to the rest of building structure.

- 2.11. Provision and installation of SSSB lightning protection and grounding system with associated cabling, ducting, cable trays and ancillaries as stipulated in the SOW - ANNEX I:
  - 2.11.1. Complete SSSB lightning protection and grounding system, both indoor and outdoor (including surge protection devices, grounding rings (including buried, roof and mast mounted elements), grounding rods, lightning rods, trays, ducts and other ancillaries) required to protect new SSSB building and all equipment provided by the Contractor for SSSB project (including HVAC, fuel supply system, automated full volume fire suppression system fire detection and alarm, antennas, fences etc.)
  - 2.11.2. Integration of the SSSB lightning protection and grounding system with existing lightning protection and grounding system of the site according to respective THN laws and regulations:
    - 2.11.2.1. The integration shall include execution of necessary earth works, welding, anticorrosive protection, and necessary modification of existing lightning protection and grounding system.
- 2.12. Provision and installation of required number of new antenna masts capable of supporting the SSSB system with all associated works (antenna field preparation, foundation, trenches etc.), air obstacle lights, lightning protection, grounding and other ancillaries as stipulated in the SOW - ANNEX I.
  - 2.12.1. The antenna masts shall be designed for minimum service life of 30 years without the need for substantial maintenance.
  - 2.12.2. The antenna masts shall be provided with cathodic protection system (including protection of the guy anchors) designed for minimum service life of 30 years without the need for substantial maintenance.
- 2.13. Provision and installation of automated full volume fire suppression system, fire detection and alarm system in the new SSSB building as stipulated in the SOW - ANNEX I.
- 2.14. The fire alarm:
  - 2.14.1. Shall be reported to the site duty officer (the duty officer office location will be provided during the Contractor's site survey)
  - 2.14.2. Shall be reported to the site commander (the site commander office location will be provided during the Contractor's site survey)
  - 2.14.3. Shall send notifications /alerts to the mobile phones of the site commander and the site duty officer

- 2.15. Provision and installation of fire extinguishers in the new SSSB building as stipulated in the SOW - ANNEX I.
- 2.16. Provision and installation of safety marking and labelling, both indoor and outdoor, for the new SSSB building, all structures, machinery and installations provided by the Contractor, as stipulated in the SOW Main Body and in the SOW – ANNEX I.
- 2.17. All concrete works exposed to outdoor environment (regardless if buried or not) shall be executed with the utilization of concrete that meets, as the minimum, following requirements according to EN 206:2013+A2:2021 (or THN equivalent standard):
- 2.17.1. exposure class of XS1 and strength of C 32/40 for structures exposed to airborne salt but not in direct contact with sea water;
- 2.17.2. exposure class of XS3 and strength of C 33/45 for structures located at tidal and spray zones.
- 2.18. All metal works exposed to outdoor environment such as antenna masts with their ancillaries, HVAC components, cable trays and ladders, fences, gates, bolts, nuts, washers, fasteners etc. (regardless if buried or not) shall be protected against corrosion category C5M Maritime, defined according to ISO 12944-5:2019 (or THN equivalent standard).
- 2.19. The complete structural design and its execution for all structures, equipment and installations provided, installed and/or modified by the Contractor shall meet THN GRC seismic requirements. Therefore, the Contractor shall meet respective requirements as stipulated in following publications:
- 2.19.1. EN 1998-1:2004, Eurocode 8: Design of structures for earthquake resistance – Part 1: General rules, seismic actions and rules for buildings
- 2.19.2. EN 1998-3:2005 Eurocode 8: Design of structures for earthquake resistance – Part 3: Assessment and retrofitting of buildings and its implementation
- 2.19.3. EN 1998-4:2006 Eurocode 8: Design of structures for earthquake resistance – Part 4: Silos, tanks and pipelines
- 2.19.4. EN 1998-5:2004 Eurocode 8: Design of structures for earthquake resistance – Part 5: Foundations, retaining structures and geotechnical aspects
- 2.19.5. EN 1998-6:2005 Eurocode 8: Design of structures for earthquake resistance – Part 6: Towers, masts and chimneys

- 2.19.6. Ministerial Decision D17a/141/3/FN 275/1999 (Government Gazette 2184/B;/20-12-19990 Hellenic Earthquake Regulation 2000 (Approval of the Greek Earthquake Regulation).
- 2.20. The Contractor shall also consider in its design additional measures that are required to secure provided equipment against earthquake impact. Those measures include, but are not limited to, special fixing to the floors (including when installed on a raised floors) and fixing elements mounted at the rack tops to secure them to the walls.
- 2.21. When designing and erecting masts with all associated ancillaries, fences and all other outdoor installed equipment, the Contractor shall apply Eurocode EN1991-1-4 (Eurocode 1 Part 1-4: General actions Wind actions). This publication provides guidance on the determination of natural wind actions for the structural design of buildings and civil engineering works. For the calculation procedure and especially for the determination of wind actions following shall be applied:
- 2.21.1. The fundamental basic wind velocity  $v_{b,0}$  which is the 10 minute mean wind velocity with an annual risk of being exceeded of 0.02 irrespective of wind direction at a height of 10m above flat open country terrain, has a value in the National Annex  $v_{b,0,0}=33\text{m/s}$  for the Greek Islands in general.
- 2.21.2. The basic wind velocity  $v_b$ , which is the fundamental basic wind velocity modified to account the direction of the wind and the season, shall be calculated from the equation:  $v_b=C_{dir} \times C_{season} \times v_{b,0}$ . The recommended value for  $C_{dir}$  (the directional factor) and  $C_{season}$  (the season factor) is 1.
- 2.21.3. Terrain roughness: There are 5 terrain categories. For the two sites in Skyros Island (Kartsinouidi and Limnonari) as well as Site Sideros in Crete, the terrain category is No 0 (sea or coastal area exposed to the open sea). For the Site Kythira and Site Mavros in Crete the terrain category is No III (Area with regular cover of vegetation or building or with isolated obstacles with separations of maximum 20 obstacle heights (such as villages, suburban terrain, permanent forest).
- 2.22. Additionally, the Contractor shall design and execute the works in compliance with following publications respectively:
- 2.22.1. Presidential Decree 244/1980:"Cement Regulation for Concrete Works (Prestressed, Reinforced and Unarmed) (Government Gazette 69/A/1989



- 2.22.2. ELOT EN 10080, ELOT 1421-1, ELOT 1421-3 "Standards for concrete reinforcement steels". 3. Ministerial Decision D11E/0/30123/1991 (Government Gazette 1068/B'/31-12-1991 "Amendment of the New Concrete Regulation for the Design and Construction of Concrete Works"
- 2.22.3. Ministerial Decision D17a/116/4/FN429/18-10-2000 (Reinforced Concrete Regulation) EKOS 2000.
- 2.22.4. Ministerial Decision D14/50504/2002 (Government Gazette 537/B;/1-5-2002) "Adaptation of the Concrete Technology Regulation to the Requirements of the Harmonized Standard" ELOT EN 197-1.
- 2.22.5. Ministerial Decision 16462/29/2001 (Government Gazette 917/B'/17.7.2001) "Cement for the Construction of Concrete Works".
- 2.22.6. Ministerial Decision D14/92330/08 (1416/B'/17.7.08) (Government Gazette 381/B'/24.3.2000) "Approval of the New Regulation of Concrete Reinforcement Steel Technology".
- 2.22.7. Ministerial Decision DIPAD/OIK. 372/2014 (Government Gazette 1457/B'/5.6.2014) "Approval of the application and use of the Eurocodes in combination with the respective National Appendices)
- 2.22.8. Government Gazette 59/D/3-2-1989 "Building Regulations".
- 2.22.9. Joint Ministerial Decision D6/B'/OIK 5825 (Government Gazette 407/B/2010) "Approval of the Energy Efficiency Regulation of Buildings (KENAK)".
- 2.22.10. Ministerial Decision F.7.5/1816/88/2004 (Government Gazette 470/B/5-3-2004) "Replacement of the current Regulation of Internal Electrical Installations with the ELOT Standards and other relevant provisions".
- 2.22.11. Manual of Standard Distribution Structures of Public Power Corporation (PPC), The Instructions Distribution of PPC SA.
- 2.22.12. Greek Technical Specifications-Government Gazette 2221/30-07-12 with mandatory application in all public works.
- 2.22.13. THN GRC Sewerage Regulation
- 2.22.14. Amendment and Supplementation of Presidential Decree 71/88 "Building Fire Protection Regulation" (Government Gazette 1316/B/31-12-1998)
- 2.22.15. Presidential Decree 41/2018 "Building Fire Protection Regulation" (Government Gazette 80/A/7-5-2018)

2.23. Supporting Civil Works:

- 2.23.1. Rebuilding of pavements after pipe, cabling, ducting, air intake, air outlet, exhaust and other installation works.
- 2.23.2. Associated earthworks and backfilling, drilling for the pipes, cabling, ducting, air intake, air outlet, exhaust and other installation works.
- 2.23.3. Closing of the penetrations (with mortar, plastering, finishing/painting of affected sections in partitions) in walls, floors, roofs and ceiling after pipe, cabling, ducting, air intake, air outlet, exhaust and other installation works.
- 2.23.4. Closing of all redundant penetrations (with mortar, plastering, finishing/painting of affected sections in partitions) in walls, floors, roofs and ceiling to assure correct and efficient operation of new HVAC system provided by the Contractor
- 2.23.5. Water, sound and fire insulation as required in all areas affected by the Contractor works.

## **Appendix 3: IFB-CO-15577-SSSB-BookII-PartIV- SOW-ANNEX I-SRS-CW-GRC**

### **Civil Works at the Site Sideros, Crete Island (HF RX), GR**

#### **1. General**

- 1.1. The detailed description and technical specifications of below listed works are formulated in the SOW - ANNEX I - System Requirements Specifications (Civil Works) – Greece.

#### **2. Responsibilities of the Contractor**

- 2.1. If the Contractor identifies that existing fence including its foundations and/or any other not used/ not operational infrastructure, installations and equipment shall be removed to enable installation and correct O&M of SSSB system and its supporting infrastructure, it is the Contractor's responsibility to remove and dispose of the above mentioned infrastructure, installations and equipment. This activity can only be exercised after THN approval of each item scoped for removal and disposal.
- 2.2. If the Contractor decides to install new fuel tanks at the locations of currently existing fuel tanks, the Contractor shall also remove and dispose of the three diesel buried fuel tanks (20000 Liter each tank) for the generators:
  - 2.2.1. Removal and disposal of existing fuel tanks together with existing pipes, pumps, cathodic protection and other auxiliaries.
  - 2.2.2. Cleaning of the existing tanks with removal of sludge from its bottom, ventilation to "gas free", removal and disposal of waste o fuel
  - 2.2.3. Removal and disposal of the existing pavement cover over the existing tanks
  - 2.2.4. Inspection of the internal surface of concrete tank pits and restoration of the concrete pits with liquid injection/ ejection using suitable mortars
  - 2.2.5. Refurbishment of existing tank manholes (including their still covers/ hatches)
  - 2.2.6. Execute all necessary activities, according to requirements stipulated in respective THN laws and regulations, in case the Contractor causes or identifies fuel spill during removal of the buried fuel tanks
- 2.3. Regardless if the Contractor installs new fuel tanks in the current fuel tanks location or else, it remains the Contractor's responsibility:

- 2.3.1. to remove and dispose of all sections of fuel pipes that are installed in the building and anywhere else on the ground surface and above the ground
- 2.3.2. to remove and dispose of all pumps, valves and other auxiliaries related to currently existing fuel supply system, that are installed in the building and anywhere else on the ground surface and above the ground
- 2.4. Provision and installation of new buried fuel tanks with cathodic protection, piping, cabling and all ancillaries as stipulated in the SOW - ANNEX I.
- 2.5. Provision and installation of new concrete pavement over the new fuel tanks.
- 2.6. Removal and disposal of existing HVAC system:
  - 2.6.1. Removal and disposal of outdoor units including metallic fence around them
  - 2.6.2. Removal and disposal of HVAC indoor units dedicated to SSSB equipment room
  - 2.6.3. Removal and disposal of all piping, cabling, air ducting, cable trays, fixings, control panels, and other ancillaries related to the HVAC units that are scoped for disposal
- 2.7. Provision and installation of new HVAC system dedicated for SSSB system with all piping, cabling and ancillaries as stipulated in the SOW - ANNEX I:
  - 2.7.1. Provision and installation of metallic fence for outdoor HVAC unit:

- 2.7.1.1. Specification of the fence at least equal to existing one as shown below in figure 1.



Figure 1

- 2.7.1.2. Locking mechanisms, such as a sliding locking bar that can be secured with a padlock to enable it to be secured when not in use.
- 2.7.2. The padlock, as the minimum shall meet following requirements:
- 2.7.2.1. Body made from hardened steel
  - 2.7.2.2. Inner components made from non-corrosive materials
  - 2.7.2.3. Hardened boron steel shackle minimum 10 mm diameter

- 2.7.2.4. Precision minimum 3-pin cylinder lock mechanism
- 2.7.2.5. Minimum 3 keys
- 2.7.2.6. Suitable for outdoor use, weatherproof
- 2.7.3. Outdoor HVAC unit(s) shall be installed in adequate housing for local weather conditions with impact of sea water mist
- 2.7.4. Modification and refurbishment of existing reinforced concrete foundation or removal and disposal of existing foundation and provision and installation of new reinforced concrete foundation
- 2.8. Restoration works of the roof (externally), ceiling (internally) and walls of the COMMS Sideros building, which is a reinforced concrete structure. In several areas at the roof of the building and the front facade the concrete part has been eroded and the steel reinforcement has been exposed and corroded:
  - 2.8.1. Restoration of reinforced-concrete structures as described in this appendix further below.
  - 2.8.2. Restoration of entire front facade including plastering and painting with special weather resistant coatings (painting scheme and RAL color code will be provided by the Purchaser at a later stage).
  - 2.8.3. Restoration of 4(four) existing, metallic window gratings and 1(one) existing, metallic door grating:
    - 2.8.3.1. sandblasting of their entire structure, complete removal of corrosion, anticorrosive painting as specified further herein and in the SOW – ANNEX I;
    - 2.8.3.2. repair and greasing of hinges;
    - 2.8.3.3. repair of locking mechanisms for padlocks.
  - 2.8.4. Removal of old insulation for some sections of the building roof and reapplication and installation of a new one as required.
  - 2.8.5. Restoration of all internal walls, floors and ceiling, including plastering and painting in the room for SSSB equipment (RAL color code will be provided by the Purchaser at a later stage).
  - 2.8.6. Concrete floor painting shall meet requirements as stipulated in SOW - ANNEX I.
- 2.9. Removal and disposal of 8(eight) ventilation shafts with their turrets, utilized by current HF TXs:

- 2.9.1. In case that a number of the ventilation shafts become redundant due to the dismantling of current, redundant equipment or the cooling method / procedure for the new SSSB equipment differs from the existing ones, then appropriate closure of the openings to the roof structure shall be executed.
- 2.9.2. If forced ventilation utilizing raised floor structures (including air ducting) is the required method for cooling / operating new SSSB equipment, the Contractor shall also provide and install the raised floor. In such case the raised floor shall meet requirements stipulated in the SOW - ANNEX I.
- 2.10. Provision and installation of adequate number of ventilation shafts and turrets for new SSSB equipment as required.
- 2.11. Removal and disposal of RF cabling manhole covers at the entry points to the COMMS building.
- 2.12. Provision and installation of new steel RF cabling manhole covers at the entry points to the COMMS building:
  - 2.12.1. Locking mechanisms, such as a sliding locking bar that can be secured with a padlock to enable it to be secured when not in use.
  - 2.12.2. The padlock, as the minimum shall meet following requirements:
    - 2.12.2.1. Body made from hardened steel
    - 2.12.2.2. Inner components made from non-corrosive materials
    - 2.12.2.3. Hardened boron steel shackle minimum 10 mm diameter
    - 2.12.2.4. Precision, minimum 3-pin cylinder lock mechanism
    - 2.12.2.5. Minimum 3 keys
    - 2.12.2.6. Suitable for outdoor use, weatherproof
- 2.13. Refurbishment of the existing RF cabling manholes including restoration of the concrete walls with liquid injection/ ejection using suitable mortar.
- 2.14. Removal and disposal of power distribution system, both indoor and outdoor, that becomes redundant when the new SSSB system with its dedicated electrical installation (further called SSSB electrical installation) is provided and installed by the Contractor:
  - 2.14.1. The scope includes removal and disposal of redundant cabling, sockets, power panels, junction boxes, switches, cables, trays, ducts and other ancillaries.

2.14.2. THN may wish to preserve some parts of the redundant electrical installation and its ancillaries. Relevant guidance will be provided to the Contractor at a later stage.

2.15. Provision and installation of SSSB electrical installation with associated cabling, ducting, cable trays and ancillaries as stipulated in the SOW - ANNEX I:

2.15.1. Complete SSSB electrical installation, both indoor and outdoor, with dedicated EPDBs (Equipment Power Distribution Boards), including surge protection devices and residual current devices - RCD, required to power all equipment provided by the Contractor for SSSB project (including HVAC, fuel supply system, fire detection and alarm, power distributed to antenna fields etc.)

2.15.2. Integration of the SSSB electrical installation with existing power distribution system:

2.15.2.1. The integration shall include installation of adequate circuit breakers, cabling provision and installation, and modification of existing power distribution system and the power boards/ panels as required to connect power cables for the entire site with SSSB electrical installation

2.15.2.2. Note that Conversion from a mixed Medium Voltage/ Low Voltage Installation, which includes medium voltage transformers, medium and low voltage Switching Gear/ Control Gear / Cabinets, to a pure Low Voltage Installation is required.

2.15.2.3. The reason being the reduced power requirements by the conversion of the TX site to RX site. The new transformer is going to be supplied, owned and maintained by the Local Power Utility Provider and is going to be part of the new Power Utility Connection for the installation.

2.15.2.4. The conversion to a pure Low Voltage design shall include Restoration / Replacement of Low Voltage Switch Gear / Control Gear, Cabinets, cabling etc. - to be executed by the Contractor.

2.15.3. If the integration with existing MPDB is not possible, the Contractor shall:

2.15.3.1. remove and dispose of the existing MPDB

2.15.3.2. provide and install a new MPDB

2.15.3.3. integrate SSSB electrical installation with the new MPDB



- 2.15.3.4. integrate all remaining electrical installation of entire building with the new MPDB
- 2.16. Provision and installation of UPS system as stipulated in the SOW – ANNEX I.
- 2.17. Removal and disposal of two existing power generators together with existing piping, cabling, air intake, air outlet, louvers, control panels, grounding and all other ancillaries.
- 2.18. Provision and installation of two fully redundant power generators with associated cabling, ducting, cable trays and ancillaries as stipulated in the SOW - ANNEX I:
- 2.18.1. The PGS shall be the back-up (emergency) source of electrical power and shall be capable to provide power for entire SSSB site in case of main power failure. Hence, the Contractor shall design the system and provide equipment to meet requirements for power generators rated as Emergency Standby Power (ESP) according to ISO 8528-1:2018.
- 2.18.2. Modification and refurbishment of existing reinforced concrete foundation or removal and disposal of existing foundation and provision and installation of new reinforced concrete foundation for both power generators.
- 2.18.3. The foundation (regardless if modification of existing foundation is executed or new foundation is provided) shall be designed and built in such a way to prevent transfer of vibrations from generators to the rest of building structure.
- 2.18.4. The existing power load of the site (without equipment that shall be provided by the Contractor) that shall be connected to the PGS is 15 kW
- 2.18.5. The Contractor shall provide the PGS with 20% of spare capacity for further load expansion
- 2.19. Removal and disposal of lightning protection and grounding system, both indoor and outdoor, that becomes redundant when the new SSSB system with its dedicated lightning protection and grounding system (further called SSSB lightning protection and grounding system) is provided and installed by the Contractor:
- 2.19.1. The scope includes removal and disposal of redundant cabling, conductors, arresters, grounding rings (including buried, roof and mast mounted elements) grounding rods, lightning rods, trays, ducts and other ancillaries.

- 2.19.2. THN may wish to preserve some parts of the redundant lightning protection and grounding system and its ancillaries. Relevant guidance will be provided to the Contractor at a later stage.
- 2.20. Provision and installation of SSSB lightning protection and grounding system with associated cabling, ducting, cable trays and ancillaries as stipulated in the SOW - ANNEX I:
  - 2.20.1. Complete SSSB lightning protection and grounding system, both indoor and outdoor (including surge protection devices, grounding rings (including buried, roof and mast mounted elements), grounding rods, lightning rods, trays, ducts and other ancillaries) required to protect all equipment provided by the Contractor for SSSB project (including HVAC, fuel supply system, fire detection and alarm, antennas, fences etc.)
  - 2.20.2. Integration of the SSSB lightning protection and grounding system with existing lightning protection and grounding system of the site according to respective THN laws and regulations:
  - 2.20.3. The integration shall include execution of necessary earth works, welding, anticorrosive protection, and necessary modification of existing lightning protection and grounding system.
- 2.21. Removal and disposal of:
  - 2.21.1. three (3) ADCAB antennas and one (1) TASMO antenna;
  - 2.21.2. three (3) SSSB existing HF TX antennas;
  - 2.21.3. one (1) DLOS tower with antennas;
  - 2.21.4. all ducting, cabling, grounding, guyed lines, foundation, anchoring and other ancillaries related to the antennas that are scoped for disposal.
- 2.22. Provision and installation of required number of new antenna masts capable of supporting the SSSB system and new DLOS tower with all associated works (antenna field preparation, foundation, trenches etc.), air obstacle lights, lightning protection, grounding and other ancillaries as stipulated in the SOW - ANNEX I.
  - 2.22.1. The antenna masts and the DLOS tower shall be designed for minimum service life of 30 years without the need for substantial maintenance.
  - 2.22.2. The antenna masts and the DLOS tower shall be provided with cathodic protection system (including protection of the guy anchors)

designed for minimum service life of 30 years without the need for substantial maintenance.

- 2.23. Removal and disposal of the SSSB, ADCAB and UHF equipment located in the COMMS building.
- 2.24. Provision and installation of fire detection and alarm system in SSSB equipment room and in power generator room as stipulated in the SOW - ANNEX I.
- 2.25. The fire alarm:
  - 2.25.1. Shall be reported to the site duty officer (the duty officer office location will be provided during the Contractor's site survey)
  - 2.25.2. Shall be reported to the site commander (the site commander office location will be provided during the Contractor's site survey)
  - 2.25.3. Shall send notifications /alerts to the mobile phones of the site commander and the site duty officer
- 2.26. Provision and installation of fire extinguishers in SSSB equipment room and in power generator room as stipulated in the SOW - ANNEX I.
- 2.27. Provision and installation of safety marking and labelling, both indoor and outdoor, for all structures, machinery and installations provided by the Contractor, as stipulated in the SOW Main Body and in the SOW – ANNEX I.
- 2.28. All concrete works exposed to outdoor environment (regardless if buried or not) shall be executed with the utilization of concrete that meets, as the minimum, following requirements according to EN 206:2013+A2:2021 (or THN equivalent standard):
  - 2.28.1. exposure class of XS1 and strength of C 32/40 for structures exposed to airborne salt but not in direct contact with sea water;
  - 2.28.2. exposure class of XS3 and strength of C 33/45 for structures located at tidal and spray zones.
- 2.29. All metal works exposed to outdoor environment such as antenna masts with their ancillaries, HVAC components, cable trays and ladders, fences, gates, bolts, nuts, washers, fasteners etc. (regardless if buried or not) shall be protected against corrosion category C5M Maritime, defined according to ISO 12944-5:2019 (or THN equivalent standard).
- 2.30. The complete structural design and its execution for all structures, equipment and installations provided, installed and/or modified by the Contractor shall meet THN GRC seismic requirements. Therefore, the

Contractor shall meet respective requirements as stipulated in following publications:

- 2.30.1. EN 1998-1:2004, Eurocode 8: Design of structures for earthquake resistance – Part 1: General rules, seismic actions and rules for buildings
  - 2.30.2. EN 1998-3:2005 Eurocode 8: Design of structures for earthquake resistance – Part 3: Assessment and retrofitting of buildings and its implementation
  - 2.30.3. EN 1998-4:2006 Eurocode 8: Design of structures for earthquake resistance – Part 4: Silos, tanks and pipelines
  - 2.30.4. EN 1998-5:2004 Eurocode 8: Design of structures for earthquake resistance – Part 5: Foundations, retaining structures and geotechnical aspects
  - 2.30.5. EN 1998-6:2005 Eurocode 8: Design of structures for earthquake resistance – Part 6: Towers, masts and chimneys
  - 2.30.6. Ministerial Decision D17a/141/3/FN 275/1999 (Government Gazette 2184/B;/20-12-19990 Hellenic Earthquake Regulation 2000 (Approval of the Greek Earthquake Regulation)).
- 2.31. The Contractor shall also consider in its design additional measures that are required to secure provided equipment against earthquake impact. Those measures include, but are not limited to, special fixing to the floors (including when installed on a raised floors) and fixing elements mounted at the rack tops to secure them to the walls.
- 2.32. When designing and erecting masts with all associated ancillaries, fences and all other outdoor installed equipment, the Contractor shall apply Eurocode EN1991-1-4 (Eurocode 1 Part 1-4: General actions Wind actions). This publication provides guidance on the determination of natural wind actions for the structural design of buildings and civil engineering works. For the calculation procedure and especially for the determination of wind actions following shall be applied:
- 2.32.1. The fundamental basic wind velocity  $v_{b,0}$  which is the 10 minute mean wind velocity with an annual risk of being exceeded of 0.02 irrespective of wind direction at a height of 10m above flat open country terrain, has a value in the National Annex  $v_{b,0,0}=33\text{m/s}$  for the Greek Islands in general.

- 2.32.2. The basic wind velocity  $v_b$ , which is the fundamental basic wind velocity modified to account the direction of the wind and the season, shall be calculated from the equation:  $v_b = C_{dir} \times C_{season} \times v_{b,0}$ . The recommended value for  $C_{dir}$  (the directional factor) and  $C_{season}$  (the season factor) is 1.
- 2.32.3. Terrain roughness: There are 5 terrain categories. For the two sites in Skyros Island (Kartsinouidi and Limnonari) as well as Site Sideros in Crete, the terrain category is No 0 (sea or coastal area exposed to the open sea). For the Site Kythira and Site Mavros in Crete the terrain category is No III (Area with regular cover of vegetation or building or with isolated obstacles with separations of maximum 20 obstacle heights (such as villages, suburban terrain, permanent forest).
- 2.33. Additionally, the Contractor shall design and execute the works in compliance with following publications respectively:
- 2.33.1. Presidential Decree 244/1980:"Cement Regulation for Concrete Works (Prestressed, Reinforced and Unarmed) (Government Gazette 69/A/1989
- 2.33.2. ELOT EN 10080, ELOT 1421-1, ELOT 1421-3 "Standards for concrete reinforcement steels". 3. Ministerial Decision D11E/0/30123/1991 (Government Gazette 1068/B/31-12-1991 "Amendment of the New Concrete Regulation for the Design and Construction of Concrete Works"
- 2.33.3. Ministerial Decision D17a/116/4/FN429/18-10-2000 (Reinforced Concrete Regulation) EKOS 2000.
- 2.33.4. Ministerial Decision D14/50504/2002 (Government Gazette 537/B;/1-5-2002) "Adaptation of the Concrete Technology Regulation to the Requirements of the Harmonized Standard" ELOT EN 197-1.
- 2.33.5. Ministerial Decision 16462/29/2001 (Government Gazette 917/B/17.7.2001) "Cement for the Construction of Concrete Works".
- 2.33.6. Ministerial Decision D14/92330/08 (1416/B/17.7.08) (Government Gazette 381/B/24.3.2000) "Approval of the New Regulation of Concrete Reinforcement Steel Technology".
- 2.33.7. Ministerial Decision DIPAD/OIK. 372/2014 (Government Gazette 1457/B/5.6.2014) "Approval of the application and use of the Eurocodes in combination with the respective National Appendices)
- 2.33.8. Government Gazette 59/D/3-2-1989 "Building Regulations".

- 2.33.9. Joint Ministerial Decision D6/B'/OIK 5825 (Government Gazette 407/B/2010) "Approval of the Energy Efficiency Regulation of Buildings (KENAK)".
- 2.33.10. Ministerial Decision F.7.5/1816/88/2004 (Government Gazette 470/B/5-3-2004) "Replacement of the current Regulation of Internal Electrical Installations with the ELOT Standards and other relevant provisions".
- 2.33.11. Manual of Standard Distribution Structures of Public Power Corporation (PPC), The Instructions Distribution of PPC SA.
- 2.33.12. Greek Technical Specifications-Government Gazette 2221/30-07-12 with mandatory application in all public works.
- 2.33.13. THN GRC Sewerage Regulation
- 2.33.14. Amendment and Supplementation of Presidential Decree 71/88 "Building Fire Protection Regulation" (Government Gazette 1316/B/31-12-1998)
- 2.33.15. Presidential Decree 41/2018 "Building Fire Protection Regulation" (Government Gazette 80/A/7-5-2018)
- 2.34. Supporting Civil Works:
  - 2.34.1. Rebuilding of pavements after pipe, cabling, ducting, air intake, air outlet, exhaust and other installation works.
  - 2.34.2. Associated earthworks and backfilling, drilling for the pipes, cabling, ducting, air intake, air outlet, exhaust and other installation works.
  - 2.34.3. Closing of the penetrations (with mortar, plastering, finishing/painting of affected sections in partitions) in walls, floors, roofs and ceiling after pipe, cabling, ducting, air intake, air outlet, exhaust and other installation works.
  - 2.34.4. Closing of all redundant penetrations (with mortar, plastering, finishing/painting of affected sections in partitions) in walls, floors, roofs and ceiling to assure correct and efficient operation of new HVAC system provided by the Contractor.
  - 2.34.5. Water, sound and fire insulation as required in all areas affected by the Contractor works.
- 2.35. Restoration of reinforced-concrete structures:

- 2.35.1. After the removal of all corroded concrete parts by using water-blasting, sandblasting the following works shall be executed according to the GRC National Regulation (Code ELOT TP 1501-14-01-04-00-2009 “Local retrofitting of concrete element damage caused by reinforcement corrosion”):
- 2.35.1.1. Cleaning of the steel reinforcements with mechanical wire brushing and then priming after three hours with appropriate anticorrosive material in accordance with manufacturer’s recommendations.
  - 2.35.1.2. Application, in layers, anticorrosive mortar (the thickness shall be in accordance with manufacturer’s recommendations) covering the reinforcement.
  - 2.35.1.3. Once the reinforcement remediation is completed, the application of two different appropriate water-proof cement coating in layers shall be followed.
  - 2.35.1.4. Dismantling and replacement of damaged parts of networks and auxiliary works.
- 2.35.2. In case that the reinforcing bars are corroded and have lost more than 20% of their diameter, they shall be cut and removed. In such event, removed steel bars shall be replaced with new steel bars of the same diameter. For the above procedure the following works shall be executed in accordance with GRC National Regulation (Code PETEP:14-01-11-00 “Anchoring of new steel reinforcement bars in existing concrete elements”):
- 2.35.2.1. Identification of the anchor positions of the new steel reinforcement bars.
  - 2.35.2.2. Cleaning of the concrete area in accordance with GRC National Regulation (Code PETEP:14-01-01-01 “Removal of loose or adhered material from concrete surfaces”).
  - 2.35.2.3. Roughening of the concrete surface.
  - 2.35.2.4. Boring holes in the concrete at the anchor positions (In General holes diameter=Steel bar diameter + 4mm) in accordance with GRC National Regulation (Code PETEP:14-01-03-02 “Drilling in concrete members with cut-off of encountered reinforcement”).
  - 2.35.2.5. Roughening by wire-brushing inside the hole and remove dust by air blowing, wash with clean water, removal of the water by air blowing.

- 2.35.2.6. Insertion of sufficient amount of adhesive material.
- 2.35.2.7. The new steel bars shall be held properly in order to remain unmovable until the coagulation of the adhesive material.
- 2.35.3. The minimum thickness of reinforcement cover of slabs, beams and columns of a construction is prescribed by National Regulation (Greek Code for Reinforced Concrete 2000 in conjunction with the Greek Antiseismic Regulation 2003). In general the minimum thickness of reinforcement cover is not allowed to be less than the diameter of the steel bar+20mm for a reinforced-concrete structure in a marine environment. Especially:
- 2.35.3.1. For a reinforcing bar in a column the minimum thickness of reinforcement cover is not allowed to be less than 40mm and not less than the diameter of the steel bar+20mm.
- 2.35.3.2. For a reinforcing bar in a slab the minimum thickness of reinforcement cover is not allowed to be less than 35mm and not less than the diameter of the steel bar+20mm.
- 2.35.4. Once the reinforcement remediation is completed, the application of two different appropriate waterproof cement coating in layers to the external surfaces shall be followed. The restoration of the concrete area shall be completed with the works of plastering and painting.



## **Appendix 4: IFB-CO-15577-SSSB-BookII-PartIV- SOW-ANNEX I-SRS-CW-GRC**

### **Civil Works for DLOS and Fiber Optic Interconnection to the National Defense Network, Crete Island, GR**

#### **1. General**

1.1. The detailed description and technical specifications of below listed works are formulated in the SOW - ANNEX I - System Requirements Specifications (Civil Works) – Greece.

#### **2. Responsibilities of the Contractor**

2.1. Removal and disposal of:

2.1.1. one (1) DLOS tower with antennas;

2.1.2. all ducting, cabling, grounding, foundation, anchoring and other ancillaries related to the DLOS tower with antennas that are scoped for disposal.

2.2. Provision and installation of new DLOS tower with all associated works (antenna field preparation, foundation, trenches etc.), air obstacle lights, lightning protection, grounding and other ancillaries as stipulated in the SOW - ANNEX I.

2.2.1. The DLOS tower shall be designed for minimum service life of 30 years without the need for substantial maintenance

2.2.2. The DLOS tower shall be provided with cathodic protection system designed for minimum service life of 30 years without the need for substantial maintenance

2.3. Provision and installation of Fiber Optic Interconnection to the National Defense Network with all associated ancillaries, installations and civil works:

2.3.1. The connection shall be provided to Forward Naval Base Kyriamadi NDN access point (Fiber Optic based NDN) from Palaikastro village

2.3.1.1. Starting Point in the village Palaikastro (Coordinates: 35°11' North, 26°15' East)

2.3.2. The works shall be implemented according to:

- 2.3.2.1. THN Ministerial Decision oik. 72146/2316/2008 – Government Gazette 21/B/7-1-2009: “Definition of the technical specifications of the works concerning the installations of telecommunication networks outside buildings”
- 2.3.2.2. THN Law 4463/2017 – Government Gazette 42/A/2017: “Measures to reduce the cost of installing high-speed electronic communications-Harmonization of legislation in Directive 2014/61/EU and other provisions”
- 2.3.3. The works shall include (not exhaustive list) all listed below tasks with provision and installation of all material, structures, installations and equipment:
  - 2.3.3.1. All necessary permits, administrative arrangements and surveys as stipulated in relevant THN regulations
  - 2.3.3.2. Site preparation, organization of works, road marking and traffic regulation measures as required for affected road sections
  - 2.3.3.3. Construction of a trench under the road surface of various type (asphalt, reinforced concrete, gravel and others) including crossing of road junctions
  - 2.3.3.4. The trench dimension shall be 0,10m width at its bottom, 0,50m depth
  - 2.3.3.5. Installation of one (1) High Density Poly Ethylene 40mm diameter HDPE conduit for the fiber optic
  - 2.3.3.6. The trench shall be filled with grout (cement based) of suitable composition compatible with the excavated soil
  - 2.3.3.7. Restoration of pavements, other structures and installations affected by the Contractor’s work to the same standard as before commencement of the fiber optic installation
- 2.3.4. Installation of secure manholes with manhole covers:
  - 2.3.4.1. The manhole covers shall be made of cast iron in accordance with EN-124 or THN equivalents
  - 2.3.4.2. The manholes shall be fitted approximately every 500m (indicative distance that shall be adapted by the Contractor depending on the terrain and location of required installations)
  - 2.3.4.3. Manholes shall be equipped with locking mechanism integrated on the manhole cover

- 2.3.4.4. Installation of fiber-optic cable and the corresponding outdoor optical connectors, including all necessary fiber optic splicing
- 2.3.4.5. Installation of indoor cabinets, optical patch panels, connectors and auxiliary accessories
- 2.4. If the Contractor identifies that existing not used/ not operational infrastructure, installations and equipment shall be removed to enable installation of the fiber-optic SSSB system and/ or DLOS tower will all supporting infrastructure, it is the Contractor's responsibility to remove and dispose of the above mentioned infrastructure, installations and equipment. This activity can only be exercised after THN approval of each item scoped for removal and disposal.
- 2.5. Provision and installation of safety marking and labelling, both indoor and outdoor, for all structures, machinery and installations provided by the Contractor, as stipulated in the SOW Main Body and in the SOW – ANNEX I.
- 2.6. All concrete works exposed to outdoor environment (regardless if buried or not) shall be executed with the utilization of concrete that meets, as the minimum, following requirements according to EN 206:2013+A2:2021 (or THN equivalent standard):
  - 2.6.1. exposure class of XS1 and strength of C 32/40 for structures exposed to airborne salt but not in direct contact with sea water;
  - 2.6.2. exposure class of XS3 and strength of C 33/45 for structures located at tidal and spray zones.
- 2.7. All metal works exposed to outdoor environment such as cable trays and ladders, cabinets, bolts, nuts, washers, fasteners etc. (regardless if buried or not) shall be protected against corrosion category C5I: 'Very high', defined according to ISO 12944-5:2019 (or THN equivalent standard).
- 2.8. The complete structural design and its execution for all structures, equipment and installations provided, installed and/or modified by the Contractor shall meet THN GRC seismic requirements. Therefore, the Contractor shall meet respective requirements as stipulated in following publications:
  - 2.8.1. EN 1998-1:2004, Eurocode 8: Design of structures for earthquake resistance – Part 1: General rules, seismic actions and rules for buildings
  - 2.8.2. EN 1998-3:2005 Eurocode 8: Design of structures for earthquake resistance – Part 3: Assessment and retrofitting of buildings and its implementation
  - 2.8.3. EN 1998-4:2006 Eurocode 8: Design of structures for earthquake resistance – Part 4: Silos, tanks and pipelines

- 2.8.4. EN 1998-5:2004 Eurocode 8: Design of structures for earthquake resistance – Part 5: Foundations, retaining structures and geotechnical aspects
- 2.8.5. EN 1998-6:2005 Eurocode 8: Design of structures for earthquake resistance – Part 6: Towers, masts and chimneys
- 2.8.6. Ministerial Decision D17a/141/3/FN 275/1999 (Government Gazette 2184/B;/20-12-19990 Hellenic Earthquake Regulation 2000 (Approval of the Greek Earthquake Regulation)
- 2.9. The Contractor shall also consider in its design additional measures that are required to secure provided equipment against earthquake impact. Those measures include, but are not limited to, special fixing to the floors (including when installed on a raised floors) and fixing elements mounted at the rack tops to secure them to the walls.
- 2.10. When designing and erecting the DLOS tower with all associated ancillaries, and all other outdoor installed equipment, the Contractor shall apply Eurocode EN1991-1-4 (Eurocode 1 Part 1-4: General actions Wind actions). This publication provides guidance on the determination of natural wind actions for the structural design of buildings and civil engineering works. For the calculation procedure and especially for the determination of wind actions following shall be applied:
- 2.10.1. The fundamental basic wind velocity  $v_{b,0}$  which is the 10 minute mean wind velocity with an annual risk of being exceeded of 0.02 irrespective of wind direction at a height of 10m above flat open country terrain, has a value in the National Annex  $v_{b,0,0}=33\text{m/s}$  for the Greek Islands in general.
- 2.10.2. The basic wind velocity  $v_b$ , which is the fundamental basic wind velocity modified to account the direction of the wind and the season, shall be calculated from the equation:  $v_b = C_{dir} \times C_{season} \times v_{b,0}$ . The recommended value for  $C_{dir}$  (the directional factor) and  $C_{season}$  (the season factor) is 1.
- 2.10.3. Terrain roughness: There are 5 terrain categories. For the two sites in Skyros Island (Kartsinouidi and Limnonari) as well as Site Sideros in Crete, the terrain category is No 0 (sea or coastal area exposed to the open sea). For the Site Kythira and Site Mavros in Crete the terrain category is No III (Area with regular cover of vegetation or building or with isolated obstacles with separations of maximum 20 obstacle heights (such as villages, suburban terrain, permanent forest).
- 2.11. Additionally, the Contractor shall design and execute the works in compliance with following publications respectively:

- 2.11.1. Presidential Decree 244/1980:"Cement Regulation for Concrete Works (Prestressed, Reinforced and Unarmed) (Government Gazette 69/A/1989
- 2.11.2. ELOT EN 10080, ELOT 1421-1, ELOT 1421-3 "Standards for concrete reinforcement steels". 3. Ministerial Decision D11E/0/30123/1991 (Government Gazette 1068/B/31-12-1991 "Amendment of the New Concrete Regulation for the Design and Construction of Concrete Works"
- 2.11.3. Ministerial Decision D17a/116/4/FN429/18-10-2000 (Reinforced Concrete Regulation) EKOS 2000.
- 2.11.4. Ministerial Decision D14/50504/2002 (Government Gazette 537/B;/1-5-2002) "Adaptation of the Concrete Technology Regulation to the Requirements of the Harmonized Standard" ELOT EN 197-1.
- 2.11.5. Ministerial Decision 16462/29/2001 (Government Gazette 917/B'/17.7.2001) "Cement for the Construction of Concrete Works".
- 2.11.6. Ministerial Decision D14/92330/08 (1416/B'/17.7.08) (Government Gazette 381/B'/24.3.2000) "Approval of the New Regulation of Concrete Reinforcement Steel Technology".
- 2.11.7. Ministerial Decision DIPAD/OIK. 372/2014 (Government Gazette 1457/B'/5.6.2014) "Approval of the application and use of the Eurocodes in combination with the respective National Appendices)
- 2.11.8. Government Gazette 59/D/3-2-1989 "Building Regulations".
- 2.11.9. Joint Ministerial Decision D6/B'/OIK 5825 (Government Gazette 407/B/2010) "Approval of the Energy Efficiency Regulation of Buildings (KENAK)".
- 2.11.10. Ministerial Decision F.7.5/1816/88/2004 (Government Gazette 470/B/5-3-2004) "Replacement of the current Regulation of Internal Electrical Installations with the ELOT Standards and other relevant provisions".
- 2.11.11. Manual of Standard Distribution Structures of Public Power Corporation (PPC), The Instructions Distribution of PPC SA.
- 2.11.12. Greek Technical Specifications-Government Gazette 2221/30-07-12 with mandatory application in all public works.
- 2.11.13. THN GRC Sewerage Regulation

- 2.11.14. Amendment and Supplementation of Presidential Decree 71/88 "Building Fire Protection Regulation" (Government Gazette 1316/B/31-12-1998)
- 2.11.15. Presidential Decree 41/2018 "Building Fire Protection Regulation" (Government Gazette 80/A/7-5-2018)
- 2.12. Supporting Civil Works:
  - 2.12.1. Rebuilding of pavements after pipe, cabling, ducting and other installation works.
  - 2.12.2. Associated earthworks and backfilling, drilling for the pipes, cabling, ducting and other installation works.
  - 2.12.3. Closing of the penetrations (with mortar, plastering, finishing/painting of affected sections in partitions) in walls, floors, roofs and ceiling after pipe, cabling, ducting and other installation works.
  - 2.12.4. Water, sound and fire insulation as required in all areas affected by the Contractor works.

## **Appendix 5: IFB-CO-15577-SSSB-BookII-PartIV- SOW-ANNEX I-SRS-CW-GRC**

### **Civil Works at the Site Mavros, Crete Island (HF TX), GR**

#### **1. General**

- 1.1. The detailed description and technical specifications of below listed works are formulated in the SOW - ANNEX I - System Requirements Specifications (Civil Works) – Greece.

#### **2. Responsibilities of the Contractor**

- 2.1. Provision and installation of security fence around the existing building and antenna fields:
  - 2.1.1. The fence shall form continues line around the existing building, the antenna fields and all other infrastructure and installations provided by the Contractor.
  - 2.1.2. The fence shall be built in such a distance from antennas to assure that the radiation right outside the fence line is within the limits established in respective THN legislation for publically accessible areas and the fence does not interfere with SSSB system operation.
  - 2.1.3. The fence shall be an Anti-Intruder chain link fence complying with BS 1722-14:2017 (Fences - Specification for open mesh steel panel), Category 2: Boundary/perimeter fences or THN equivalent standard.
  - 2.1.4. The fence mesh shall be corrosion-protected (plastic coating or galvanizing or painting or combination of the mentioned technologies) and shall extend to a height of at least 2.4m above ground level throughout.
  - 2.1.5. The fence shall be topped with three (3) strands of barbed wire or sabre wire facing outward and upwards at an angle of forty-five (45) degrees raising the total fence height by a minimum of 0.5m throughout its entire length.
  - 2.1.6. The under-fence gap shall not exceed fifty (50) mm and the fence shall either be buried in the ground (where it is adequately protected against corrosion), buried in concrete footings or stapled to a hard standing.
  - 2.1.7. Fence posts shall be of galvanized and corrosion-protected steel positioned at centers not exceeding 3m.

- 2.1.8. Fence post shall be installed in concrete foundations.
- 2.1.9. Fence posts shall be mounted straight/vertical to accommodate the topping according to BS 1722-10:2019 (Fences - Specification for anti-intruder fences in chain link and welded mesh) or THN equivalent standard.
- 2.1.10. Both main and emergency gates shall be constructed to the same standard as the fence and shall open inwards or laterally. If opened inwards, the gates shall be double leaf gates.
- 2.1.11. The location, where to install the emergency gates, will be provided during the Contractor's site survey.
- 2.1.12. The gates shall be of minimum 3.5m width, manually operated, equipped with closing mechanism and a security padlock.
- 2.1.13. Each door leaf shall be mounted on minimum 3(three) hinges.
- 2.1.14. The closing mechanism at the gates, as the minimum shall meet following requirements:
  - 2.1.14.1. THN security approved locking mechanisms, such as a sliding locking bar that can be secured with a security approved padlock, and ground locking pins to enable it to be secured when not in use.
- 2.1.15. The security padlock at the gates, as the minimum shall meet following requirements:
  - 2.1.15.1. Body made from hardened steel
  - 2.1.15.2. Inner components made from non-corrosive materials
  - 2.1.15.3. Hardened boron steel shackle minimum 15 mm diameter
  - 2.1.15.4. Precision minimum 5-pin cylinder lock mechanism
  - 2.1.15.5. Minimum 3 keys with duplication service for code
  - 2.1.15.6. Suitable for outdoor use, weatherproof
  - 2.1.15.7. Tested against impact, drilling, cutting, lever – test certificate /CoC issued by the supplier shall be provided
  - 2.1.15.8. Minimum GRADE 3 – Medium / High Security: according to Central European Norm (CEN Grade) or EN 12320:2012 Building hardware. Padlocks and padlock fittings. Requirements and test methods



- 2.1.16. Ground surfaces under gates shall be paved with concrete and designed to bear load of wheeled vehicles with minimum 30T of the vehicle gross weight.
- 2.1.17. The fence shall be designed and installed to maximize the use of straight sections in order to permit an unobstructed field of vision.
- 2.2. If the Contractor identifies that existing fence including its foundations and/or any other not used/ not operational infrastructure, installations and equipment shall be removed to enable installation and correct O&M of SSSB system and its supporting infrastructure, it is the Contractor's responsibility to remove and dispose of the above mentioned infrastructure, installations and equipment. This activity can only be exercised after THN approval of each item scoped for removal and disposal.
- 2.3. If the Contractor decides to install new fuel tanks at the locations of currently existing fuel tank, the Contractor shall also remove and dispose the 1 diesel buried fuel tanks (20.000 lt tank) for the generators:
  - 2.3.1. Removal and disposal of existing fuel tanks together with existing pipes, pumps, cathodic protection and other auxiliaries.
  - 2.3.2. Cleaning of the existing tanks with removal of sludge from its bottom, ventilation to "gas free", removal and disposal of waste o fuel
  - 2.3.3. Removal and disposal of the existing pavement cover over the existing tanks
  - 2.3.4. Inspection of the internal surface of concrete tank pits and restoration of the concrete pits with liquid injection/ ejection using suitable mortars
  - 2.3.5. Refurbishment of existing tank manholes (including their still covers/ hatches)
  - 2.3.6. Execute all necessary activities, according to requirements stipulated in respective THN laws and regulations, in case the Contractor causes or identifies fuel spill during removal of the buried fuel tanks
- 2.4. Regardless if the Contractor installs new fuel tanks in the current fuel tanks location or else, it remains the Contractor's responsibility:
  - 2.4.1. to remove and dispose of all sections of fuel pipes that are installed in the building and anywhere else on the ground surface and above the ground
  - 2.4.2. to remove and dispose of all pumps, valves and other auxiliaries related to currently existing fuel supply system, that are installed in the building and anywhere else on the ground surface and above the ground

- 2.5. Provision and installation of new buried fuel tanks with cathodic protection, piping, cabling and all ancillaries as stipulated in the SOW - ANNEX I.
- 2.6. Provision and installation of new concrete pavement over the new fuel tanks.
- 2.7. Removal and disposal of existing HVAC system:
  - 2.7.1. Removal and disposal of outdoor units
  - 2.7.2. Removal and disposal of HVAC indoor units dedicated to SSSB equipment room
  - 2.7.3. Removal and disposal of all piping, cabling, air ducting, cable trays, fixings, control panels, and other ancillaries related to the HVAC units that are scoped for disposal
- 2.8. Provision and installation of new HVAC system dedicated for SSSB system with all piping, cabling and ancillaries as stipulated in the SOW - ANNEX I:
  - 2.8.1. Renovation of metallic fence for outdoor HVAC unit:
    - 2.8.1.1. Sandblasting as needed, complete removal of corrosion, anticorrosive painting as specified further herein and in the SOW – ANNEX I;
    - 2.8.1.2. Repair and greasing of hinges;
    - 2.8.1.3. Repair of locking mechanisms for padlocks
  - 2.8.2. The padlock, as the minimum shall meet following requirements:
    - 2.8.2.1. Body made from hardened steel
    - 2.8.2.2. Inner components made from non-corrosive materials
    - 2.8.2.3. Hardened boron steel shackle minimum 10 mm diameter
    - 2.8.2.4. Precision minimum 3-pin cylinder lock mechanism
    - 2.8.2.5. Minimum 3 keys
    - 2.8.2.6. Suitable for outdoor use, weatherproof
  - 2.8.3. Outdoor HVAC unit(s) shall be installed in adequate housing for local weather conditions with impact of sea water mist
  - 2.8.4. Modification and refurbishment of existing reinforced concrete foundation or removal and disposal of existing foundation and provision and installation of new reinforced concrete foundation
  - 2.8.5. If currently existing fenced location is not sufficient for new outdoor HVAC unit(s) (including convenient and safe access for its O&M) new

location shall be provided / built by the Contractor, with new foundation and new fence of the specification at the minimum equal to existing one.as shown in figure 1. In such case, the Contractor shall also remove and dispose of existing fence and foundation of the existing outdoor HVAC unit.



Figure 1

2.9. Renovation of two ventilation shafts with their turrets, utilized by current equipment:

2.9.1. The renovation of metallic part of the shafts and turrets shall include:

- 2.9.1.1. sandblasting of their entire structure, complete removal of corrosion, anticorrosive painting as specified further herein and in the SOW – ANNEX I
- 2.9.2. The restoration of concrete/ masonry part of the turrets shall be done according to procedure described in this appendix further below
- 2.9.3. Old insulation on the turrets and at their interface with the building roof shall be removed as required and new insulation shall be installed
- 2.9.4. In case that a number of the ventilation shafts become redundant due to the dismantling of current, redundant equipment or the cooling method/ procedure for the new SSSB equipment differs from the existing ones, then appropriate closure of the openings to the roof structure shall be executed. In such case, the Contractor shall remove and dispose redundant shafts and turrets.
- 2.9.5. If forced ventilation utilizing raised floor structures (including air ducting) is the required method for cooling / operating new SSSB equipment, the Contractor shall also provide and install the raised floor. In such case the raised floor shall meet requirements stipulated in the SOW - ANNEX I, paragraph 24.18.
- 2.10. Provision and installation of adequate number of ventilation shafts and turrets for new SSSB equipment as required.
- 2.11. Removal and disposal of RF cabling manhole covers at the entry points to the COMMS building.
- 2.12. Provision and installation of new steel RF cabling manhole covers at the entry points to the COMMS building:
  - 2.12.1. Locking mechanisms, such as a sliding locking bar that can be secured with a padlock to enable it to be secured when not in use.
  - 2.12.2. The padlock, as the minimum shall meet following requirements:
    - 2.12.2.1. Body made from hardened steel
    - 2.12.2.2. Inner components made from non-corrosive materials
    - 2.12.2.3. Hardened boron steel shackle minimum 10 mm diameter
    - 2.12.2.4. Precision, minimum 3-pin cylinder lock mechanism
    - 2.12.2.5. Minimum 3 keys
    - 2.12.2.6. Suitable for outdoor use, weatherproof

- 2.13. Refurbishment of the existing RF cabling manholes including restoration of the concrete walls with liquid injection/ ejection using suitable mortar.
- 2.14. Removal and disposal of power distribution system, both indoor and outdoor, that becomes redundant when the new SSSB system with its dedicated electrical installation (further called SSSB electrical installation) is provided and installed by the Contractor:
  - 2.14.1. The scope includes removal and disposal of redundant cabling, sockets, power panels, junction boxes, switches, cables, trays, ducts and other ancillaries.
  - 2.14.2. THN may wish to preserve some parts of the redundant electrical installation and its ancillaries. Relevant guidance will be provided to the Contractor at a later stage.
- 2.15. Provision and installation of SSSB electrical installation with associated cabling, ducting, cable trays and ancillaries as stipulated in the SOW - ANNEX I:
  - 2.15.1. Complete SSSB electrical installation, both indoor and outdoor, with dedicated EPDBs (Equipment Power Distribution Boards), including surge protection devices and residual current devices - RCD, required to power all equipment provided by the Contractor for SSSB project (including HVAC, fuel supply system, fire detection and alarm, power distributed to antenna fields etc.)
  - 2.15.2. Integration of the SSSB electrical installation with existing MPDB (Main Power Distribution Board) and Medium Voltage Transformer:
    - 2.15.2.1. The integration shall include installation of adequate circuit breakers, cabling provision and installation, and modification of existing power distribution system and the power boards/ panels as required to connect power cables for SSSB electrical installation
  - 2.15.3. If the integration with existing MPDB is not possible, the Contractor shall:
    - 2.15.3.1. remove and dispose of the existing MPDB
    - 2.15.3.2. provide and install a new MPDB
    - 2.15.3.3. integrate SSSB electrical installation with the new MPDB
    - 2.15.3.4. integrate all remaining electrical installation of entire building with the new MPDB

- 2.16. Provision and installation of UPS system as stipulated in the SOW – ANNEX I.
- 2.17. Removal and disposal of two existing power generators together with existing piping, cabling, air intake, air outlet, louvers, control panels, grounding and all other ancillaries.
- 2.18. Provision and installation of two fully redundant power generators with associated cabling, ducting, cable trays and ancillaries as stipulated in the SOW - ANNEX I:
- 2.18.1. The PGS shall be the back-up (emergency) source of electrical power and shall be capable to provide power for entire SSSB site in case of main power failure. Hence, the Contractor shall design the system and provide equipment to meet requirements for power generators rated as Emergency Standby Power (ESP) according to ISO 8528-1:2018.
- 2.18.2. Modification and refurbishment of existing reinforced concrete foundation or removal and disposal of existing foundation and provision and installation of new reinforced concrete foundation for both power generators.
- 2.18.3. The foundation (regardless if modification of existing foundation is executed or new foundation is provided) shall be designed and built in such a way to prevent transfer of vibrations from generators to the rest of building structure.
- 2.18.4. The existing power load of the site (without equipment that shall be provided by the Contractor) that shall be connected to the PGS is 15 kW
- 2.18.5. The Contractor shall provide the PGS with 20% of spare capacity for further load expansion
- 2.19. Removal and disposal of lightning protection and grounding system, both indoor and outdoor, that becomes redundant when the new SSSB system with its dedicated lightning protection and grounding system (further called SSSB lightning protection and grounding system) is provided and installed by the Contractor:
- 2.19.1. The scope includes removal and disposal of redundant cabling, conductors, arresters, grounding rings (including buried, roof and mast mounted elements) grounding rods, lightning rods, trays, ducts and other ancillaries.
- 2.19.2. THN may wish to preserve some parts of the redundant lightning protection and grounding system and its ancillaries. Relevant guidance will be provided to the Contractor at a later stage.

- 2.20. Provision and installation of SSSB lightning protection and grounding system with associated cabling, ducting, cable trays and ancillaries as stipulated in the SOW - ANNEX I:
- 2.20.1. Complete SSSB lightning protection and grounding system, both indoor and outdoor (including surge protection devices, grounding rings (including buried, roof and mast mounted elements), grounding rods, lightning rods, trays, ducts and other ancillaries) required to protect all equipment provided by the Contractor for SSSB project (including HVAC, fuel supply system, fire detection and alarm, antennas, fences etc.)
  - 2.20.2. Integration of the SSSB lightning protection and grounding system with existing lightning protection and grounding system of the site according to respective THN laws and regulations:
    - 2.20.2.1. The integration shall include execution of necessary earth works, welding, anticorrosive protection, and necessary modification of existing lightning protection and grounding system.
- 2.21. Removal and disposal of:
- 2.21.1. one (1) ADCAB antenna;
  - 2.21.2. one (1) UHF antennas;
  - 2.21.3. one (1) SSSB existing HF RX antenna;
  - 2.21.4. one (1) DLOS tower with antennas;
  - 2.21.5. all ducting, cabling, grounding, guyed lines, foundation, anchoring and other ancillaries related to the antennas that are scoped for disposal.
- 2.22. Provision and installation of required number of new antenna masts capable of supporting the SSSB system and new DLOS tower with all associated works (antenna field preparation, foundation, trenches etc.), air obstacle lights, lightning protection, grounding and other ancillaries as stipulated in the SOW - ANNEX I.
- 2.22.1. The antenna masts and the DLOS tower shall be designed for minimum service life of 30 years without the need for substantial maintenance.
  - 2.22.2. The antenna masts and the DLOS tower shall be provided with cathodic protection system (including protection of the guy anchors) designed for minimum service life of 30 years without the need for substantial maintenance.

- 2.23. Removal and disposal of the SSSB, ADCAB, UHF equipment (including Rx, matrix, communication control system etc.) located in the COMMS building.
- 2.24. Provision and installation of fire detection and alarm system in SSSB equipment room and in power generator room as stipulated in the SOW - ANNEX I.
- 2.25. The fire alarm:
- 2.25.1. Shall be reported to the site duty officer (the duty officer office location will be provided during the Contractor's site survey)
  - 2.25.2. Shall be reported to the site commander (the site commander office location will be provided during the Contractor's site survey)
  - 2.25.3. Shall send notifications /alerts to the mobile phones of the site commander and the site duty officer
- 2.26. Provision and installation of fire extinguishers in SSSB equipment room and in power generator room as stipulated in the SOW - ANNEX I.
- 2.27. Provision and installation of safety marking and labelling, both indoor and outdoor, for all structures, machinery and installations provided by the Contractor, as stipulated in the SOW Main Body and in the SOW – ANNEX I.
- 2.28. All concrete works exposed to outdoor environment (regardless if buried or not) shall be executed with the utilization of concrete that meets, as the minimum, following requirements according to EN 206:2013+A2:2021 (or THN equivalent standard):
- 2.28.1. exposure class of XS1 and strength of C 32/40 for structures exposed to airborne salt but not in direct contact with sea water;
  - 2.28.2. exposure class of XS3 and strength of C 33/45 for structures located at tidal and spray zones.
- 2.29. All metal works exposed to outdoor environment such as antenna masts with their ancillaries, HVAC components, cable trays and ladders, fences, gates, bolts, nuts, washers, fasteners etc. (regardless if buried or not) shall be protected against corrosion category C5M Maritime, defined according to ISO 12944-5:2019 (or THN equivalent standard).
- 2.30. The complete structural design and its execution for all structures, equipment and installations provided, installed and/or modified by the Contractor shall meet THN GRC seismic requirements. Therefore, the Contractor shall meet respective requirements as stipulated in following publications:



- 2.30.1. EN 1998-1:2004, Eurocode 8: Design of structures for earthquake resistance – Part 1: General rules, seismic actions and rules for buildings
- 2.30.2. EN 1998-3:2005 Eurocode 8: Design of structures for earthquake resistance – Part 3: Assessment and retrofitting of buildings and its implementation
- 2.30.3. EN 1998-4:2006 Eurocode 8: Design of structures for earthquake resistance – Part 4: Silos, tanks and pipelines
- 2.30.4. EN 1998-5:2004 Eurocode 8: Design of structures for earthquake resistance – Part 5: Foundations, retaining structures and geotechnical aspects
- 2.30.5. EN 1998-6:2005 Eurocode 8: Design of structures for earthquake resistance – Part 6: Towers, masts and chimneys
- 2.30.6. Ministerial Decision D17a/141/3/FN 275/1999 (Government Gazette 2184/B;/20-12-19990 Hellenic Earthquake Regulation 2000 (Approval of the Greek Earthquake Regulation)
- 2.31. The Contractor shall also consider in its design additional measures that are required to secure provided equipment against earthquake impact. Those measures include, but are not limited to, special fixing to the floors (including when installed on a raised floors) and fixing elements mounted at the rack tops to secure them to the walls.
- 2.32. When designing and erecting masts with all associated ancillaries, fences and all other outdoor installed equipment, the Contractor shall apply Eurocode EN1991-1-4 (Eurocode 1 Part 1-4: General actions Wind actions). This publication provides guidance on the determination of natural wind actions for the structural design of buildings and civil engineering works. For the calculation procedure and especially for the determination of wind actions following shall be applied:
- 2.32.1. The fundamental basic wind velocity  $v_{b,0}$  which is the 10 minute mean wind velocity with an annual risk of being exceeded of 0.02 irrespective of wind direction at a height of 10m above flat open country terrain, has a value in the National Annex  $v_{b,0,0}=33\text{m/s}$  for the Greek Islands in general.
- 2.32.2. The basic wind velocity  $v_b$ , which is the fundamental basic wind velocity modified to account the direction of the wind and the season, shall be calculated from the equation:  $v_b = c_{dir} \times c_{season} \times v_{b,0}$ . The recommended value for  $c_{dir}$  (the directional factor) and  $c_{season}$  (the season factor) is 1.

2.32.3. Terrain roughness: There are 5 terrain categories. For the two sites in Skyros Island (Kartsinouidi and Limnonari) as well as Site Sideros in Crete, the terrain category is No 0 (sea or coastal area exposed to the open sea). For the Site Kythira and Site Mavros in Crete the terrain category is No III (Area with regular cover of vegetation or building or with isolated obstacles with separations of maximum 20 obstacle heights (such as villages, suburban terrain, permanent forest).

2.33. Additionally, the Contractor shall design and execute the works in compliance with following publications respectively:

2.33.1. Presidential Decree 244/1980:"Cement Regulation for Concrete Works (Prestressed, Reinforced and Unarmed) (Government Gazette 69/A/1989

2.33.2. ELOT EN 10080, ELOT 1421-1, ELOT 1421-3 "Standards for concrete reinforcement steels". 3. Ministerial Decision D11E/0/30123/1991 (Government Gazette 1068/B/31-12-1991 "Amendment of the New Concrete Regulation for the Design and Construction of Concrete Works"

2.33.3. Ministerial Decision D17a/116/4/FN429/18-10-2000 (Reinforced Concrete Regulation) EKOS 2000.

2.33.4. Ministerial Decision D14/50504/2002 (Government Gazette 537/B;/1-5-2002) "Adaptation of the Concrete Technology Regulation to the Requirements of the Harmonized Standard" ELOT EN 197-1.

2.33.5. Ministerial Decision 16462/29/2001 (Government Gazette 917/B/17.7.2001) "Cement for the Construction of Concrete Works".

2.33.6. Ministerial Decision D14/92330/08 (1416/B/17.7.08) (Government Gazette 381/B/24.3.2000) "Approval of the New Regulation of Concrete Reinforcement Steel Technology".

2.33.7. Ministerial Decision DIPAD/OIK. 372/2014 (Government Gazette 1457/B/5.6.2014) "Approval of the application and use of the Eurocodes in combination with the respective National Appendices)

2.33.8. Government Gazette 59/D/3-2-1989 "Building Regulations".

2.33.9. Joint Ministerial Decision D6/B'/OIK 5825 (Government Gazette 407/B/2010) "Approval of the Energy Efficiency Regulation of Buildings (KENAK)".

2.33.10. Ministerial Decision F.7.5/1816/88/2004 (Government Gazette 470/B/5-3-2004) "Replacement of the current Regulation of Internal

Electrical Installations with the ELOT Standards and other relevant provisions".

- 2.33.11. Manual of Standard Distribution Structures of Public Power Corporation (PPC), The Instructions Distribution of PPC SA.
- 2.33.12. Greek Technical Specifications-Government Gazette 2221/30-07-12 with mandatory application in all public works.
- 2.33.13. THN GRC Sewerage Regulation
- 2.33.14. Amendment and Supplementation of Presidential Decree 71/88 "Building Fire Protection Regulation" (Government Gazette 1316/B/31-12-1998)
- 2.33.15. Presidential Decree 41/2018 "Building Fire Protection Regulation" (Government Gazette 80/A/7-5-2018)
- 2.34. Supporting Civil Works:
  - 2.34.1. Rebuilding of pavements after pipe, cabling, ducting, air intake, air outlet, exhaust and other installation works.
  - 2.34.2. Associated earthworks and backfilling, drilling for the pipes, cabling, ducting, air intake, air outlet, exhaust and other installation works.
  - 2.34.3. Closing of the penetrations (with mortar, plastering, finishing/painting of affected sections in partitions) in walls, floors, roofs and ceiling after pipe, cabling, ducting, air intake, air outlet, exhaust and other installation works.
  - 2.34.4. Closing of all redundant penetrations (with mortar, plastering, finishing/painting of affected sections in partitions) in walls, floors, roofs and ceiling to assure correct and efficient operation of new HVAC system provided by the Contractor.
  - 2.34.5. Water, sound and fire insulation as required in all areas affected by the Contractor works.
- 2.35. Restoration of reinforced-concrete structures:
  - 2.35.1. After the removal of all corroded concrete parts by using water-blasting, sandblasting the following works shall be executed according to the GRC National Regulation (Code ELOT TP 1501-14-01-04-00-2009 "Local retrofitting of concrete element damage caused by reinforcement corrosion"):

- 2.35.1.1. Cleaning of the steel reinforcements with mechanical wire brushing and then priming after three hours with appropriate anticorrosive material in accordance with manufacturer's recommendations.
- 2.35.1.2. Application, in layers, anticorrosive mortar (the thickness shall be in accordance with manufacturer's recommendations) covering the reinforcement.
- 2.35.1.3. Once the reinforcement remediation is completed, the application of two different appropriate water-proof cement coating in layers shall be followed.
- 2.35.1.4. Dismantling and replacement of damaged parts of networks and auxiliary works.
- 2.35.2. In case that the reinforcing bars are corroded and have lost more than 20% of their diameter, they shall be cut and removed. In such event, removed steel bars shall be replaced with new steel bars of the same diameter. For the above procedure the following works shall be executed in accordance with GRC National Regulation (Code PETEP:14-01-11-00 "Anchoring of new steel reinforcement bars in existing concrete elements"):
  - 2.35.2.1. Identification of the anchor positions of the new steel reinforcement bars.
  - 2.35.2.2. Cleaning of the concrete area in accordance with GRC National Regulation (Code PETEP:14-01-01-01 "Removal of loose or adhered material from concrete surfaces").
  - 2.35.2.3. Roughening of the concrete surface.
  - 2.35.2.4. Boring holes in the concrete at the anchor positions (In General holes diameter=Steel bar diameter + 4mm) in accordance with GRC National Regulation (Code PETEP:14-01-03-02 "Drilling in concrete members with cut-off of encountered reinforcement").
  - 2.35.2.5. Roughening by wire-brushing inside the hole and remove dust by air blowing, wash with clean water, removal of the water by air blowing.
  - 2.35.2.6. Insertion of sufficient amount of adhesive material.
  - 2.35.2.7. The new steel bars shall be held properly in order to remain unmovable until the coagulation of the adhesive material.

- 2.35.3. The minimum thickness of reinforcement cover of slabs, beams and columns of a construction is prescribed by National Regulation (Greek Code for Reinforced Concrete 2000 in conjunction with the Greek Antiseismic Regulation 2003). In general the minimum thickness of reinforcement cover is not allowed to be less than the diameter of the steel bar+20mm for a reinforced-concrete structure in a marine environment. Especially:
- 2.35.3.1. For a reinforcing bar in a column the minimum thickness of reinforcement cover is not allowed to be less than 40mm and not less than the diameter of the steel bar+20mm.
- 2.35.3.2. For a reinforcing bar in a slab the minimum thickness of reinforcement cover is not allowed to be less than 35mm and not less than the diameter of the steel bar+20mm.
- 2.35.4. Once the reinforcement remediation is completed, the application of two different appropriate waterproof cement coating in layers to the external surfaces shall be followed. The restoration of the concrete area shall be completed with the works of plastering and painting.

## **Appendix 6: IFB-CO-15577-SSSB-BookII-PartIV- SOW-ANNEX I-SRS-CW-GRC**

### **Civil Works at the Site Limnonari, Skyros Island (HF RX), GR**

#### **1. General**

- 1.1. The detailed description and technical specifications of below listed works are formulated in the SOW - ANNEX I - System Requirements Specifications (Civil Works) – Greece.

#### **2. Responsibilities of the Contractor**

- 2.1. Provision and installation of security fence around the existing building and antenna fields:
  - 2.1.1. The fence shall form continues line around the existing building, the antenna fields and all other infrastructure and installations provided by the Contractor, with the exception of the site perimeter section along the coastline/ waterfront. In case the fence sections built by the Contractor do not reach the coastline on the left and right side of the antenna fields, the fence shall also be built along the coastline.
  - 2.1.2. The fence shall be built in such a distance from antennas to assure that the radiation right outside the fence line is within the limits established in respective THN legislation for publically accessible areas. and the fence does not interfere with SSSB system operation.
  - 2.1.3. The fence shall be an Anti-Intruder chain link fence complying with BS 1722-14:2017 (Fences - Specification for open mesh steel panel), Category 2: Boundary/perimeter fences or THN equivalent standard.
  - 2.1.4. The fence mesh shall be corrosion-protected (plastic coating or galvanizing or painting or combination of the mentioned technologies) and shall extend to a height of at least 2.4m above ground level throughout.
  - 2.1.5. The fence shall be topped with three (3) strands of barbed wire or sabre wire facing outward and upwards at an angle of forty-five (45) degrees raising the total fence height by a minimum of 0.5m throughout its entire length.
  - 2.1.6. The under-fence gap shall not exceed fifty (50) mm and the fence shall either be buried in the ground (where it is adequately protected against corrosion), buried in concrete footings or stapled to a hard standing.

- 2.1.7. Fence posts shall be of galvanized and corrosion-protected steel positioned at centers not exceeding 3m.
- 2.1.8. Fence post shall be installed in concrete foundations.
- 2.1.9. Fence posts shall be mounted straight/vertical to accommodate the topping according to BS 1722-10:2019 (Fences - Specification for anti-intruder fences in chain link and welded mesh) or THN equivalent standard.
- 2.1.10. Both main and emergency gates shall be constructed to the same standard as the fence and shall open inwards or laterally. If opened inwards, the gates shall be double leaf gates.
- 2.1.11. The location, where to install the emergency gates, will be provided during the Contractor's site survey.
- 2.1.12. The gates shall be of minimum 3.5m width, manually operated, equipped with closing mechanism and a security padlock.
- 2.1.13. Each door leaf shall be mounted on minimum 3(three) hinges.
- 2.1.14. The closing mechanism at the gates, as the minimum shall meet following requirements:
  - 2.1.14.1. THN security approved locking mechanisms, such as a sliding locking bar that can be secured with a security approved padlock, and ground locking pins to enable it to be secured when not in use.
- 2.1.15. The security padlock at the gates, as the minimum shall meet following requirements:
  - 2.1.15.1. Body made from hardened steel
  - 2.1.15.2. Inner components made from non-corrosive materials
  - 2.1.15.3. Hardened boron steel shackle minimum 15 mm diameter
  - 2.1.15.4. Precision minimum 5-pin cylinder lock mechanism
  - 2.1.15.5. Minimum 3 keys with duplication service for code
  - 2.1.15.6. Suitable for outdoor use, weatherproof
  - 2.1.15.7. Tested against impact, drilling, cutting, lever – test certificate /CoC issued by the supplier shall be provided
  - 2.1.15.8. Minimum GRADE 3 – Medium / High Security: according to Central European Norm (CEN Grade) or EN 12320:2012 Building hardware. Padlocks and padlock fittings. Requirements and test methods

- 2.1.16. Ground surfaces under gates shall be paved with concrete and designed to bear load of wheeled vehicles with minimum 30T of the vehicle gross weight.
- 2.1.17. The fence shall be designed and installed to maximize the use of straight sections in order to permit an unobstructed field of vision.
- 2.2. If the Contractor identifies that existing fence including its foundations and/or any other not used/ not operational infrastructure, installations and equipment shall be removed to enable installation and correct O&M of SSSB system and its supporting infrastructure, it is the Contractor's responsibility to remove and dispose of the above mentioned infrastructure, installations and equipment. This activity can only be exercised after THN approval of each item scoped for removal and disposal.
- 2.3. If the Contractor decides to install new fuel tanks at the location of currently existing fuel tank, the Contractor shall also remove and dispose 1(one) diesel buried fuel tank (20000 Liter) for the generators:
  - 2.3.1. Removal and disposal of existing fuel tank together with existing pipes, pumps, cathodic protection and other auxiliaries.
  - 2.3.2. Cleaning of the existing tank with removal of sludge from its bottom, ventilation to "gas free", removal and disposal of waste o fuel
  - 2.3.3. Removal and disposal of the existing pavement cover over the existing tank
  - 2.3.4. Inspection of the internal surface of concrete tank pit and restoration of the concrete pit with liquid injection/ ejection using suitable mortars
  - 2.3.5. Refurbishment of existing tank manholes (including their still covers/ hatches)
  - 2.3.6. Execute all necessary activities, according to requirements stipulated in respective THN laws and regulations, in case the Contractor causes or identifies fuel spill during removal of the buried fuel tanks
- 2.4. Regardless if the Contractor installs new fuel tanks in the current fuel tanks location or else, it remains the Contractor's responsibility:
  - 2.4.1. to remove and dispose of all sections of fuel pipes that are installed in the building and anywhere else on the ground surface and above the ground
  - 2.4.2. to remove and dispose of all pumps, valves and other auxiliaries related to currently existing fuel supply system, that are installed in the building and anywhere else on the ground surface and above the ground



- 2.5. Provision and installation of new buried fuel tanks with cathodic protection, piping, cabling and all ancillaries as stipulated in the SOW - ANNEX I.
  - 2.5.1. The site has no main power supply. Therefore, the fuel tanks shall be sized accordingly to support entire site without the need of refueling for minimum of 15 (fifteen) days, namely:
    - 2.5.1.1. all equipment provided by the Contractor under the scope of SSSB Project
    - 2.5.1.2. all other existing installations and systems
    - 2.5.1.3. 20% for further expansion in power generator loads
- 2.6. Provision and installation of new concrete pavement over the new fuel tanks.
- 2.7. Removal and disposal of existing HVAC system:
  - 2.7.1. Removal and disposal of outdoor units including metallic fence around them
  - 2.7.2. Removal and disposal of HVAC indoor units dedicated to SSSB equipment room
  - 2.7.3. Removal and disposal of all piping, cabling, air ducting, cable trays, fixings, control panels, and other ancillaries related to the HVAC units that are scoped for disposal
- 2.8. Provision and installation of new HVAC system dedicated for SSSB system with all piping, cabling and ancillaries as stipulated in the SOW - ANNEX I:
  - 2.8.1. Provision and installation of metallic fence for outdoor HVAC unit(s):

- 2.8.1.1. Specification of the fence at least equal to existing one as shown in figure 1.



Figure 1

- 2.8.1.2. Locking mechanisms, such as a sliding locking bar that can be secured with a padlock to enable it to be secured when not in use.
- 2.8.2. The padlock, as the minimum shall meet following requirements:
- 2.8.2.1. Body made from hardened steel
  - 2.8.2.2. Inner components made from non-corrosive materials
  - 2.8.2.3. Hardened boron steel shackle minimum 10 mm diameter
  - 2.8.2.4. Precision minimum 3-pin cylinder lock mechanism
  - 2.8.2.5. Minimum 3 keys
  - 2.8.2.6. Suitable for outdoor use, weatherproof
- 2.8.3. Outdoor HVAC unit(s) shall be installed in adequate housing for local weather conditions with impact of sea water mist

- 2.8.4. Modification and refurbishment of existing reinforced concrete foundation or removal and disposal of existing foundation and provision and installation of new reinforced concrete foundation
- 2.9. Restoration works of the roof (externally), ceiling (internally) and walls of the COMMS Limnonari building, which is a reinforced concrete structure. In several areas at the roof of the building and the front facade the concrete part has been eroded and the steel reinforcement has been exposed and corroded:
  - 2.9.1. Restoration of reinforced-concrete structures as described in this appendix further below.
  - 2.9.2. Restoration of entire front facade including plastering and painting with special weather resistant coatings (painting scheme and RAL color code will be provided by the Purchaser at a later stage).
  - 2.9.3. Removal of old insulation as required at the roof sections along the front facade of the building and installation/ installation of a new one.
  - 2.9.4. Restoration of all internal walls, floors and ceiling, including plastering and painting in the room for SSSB equipment and power generator (RAL color code will be provided by the Purchaser at a later stage).
  - 2.9.5. Concrete floor painting shall meet requirements as stipulated in SOW - ANNEX I
- 2.10. Removal and disposal of two ventilation shafts, utilized by current equipment:
  - 2.10.1. In case that a number of the ventilation shafts become redundant due to the dismantling of current, redundant equipment or the cooling method / procedure for the new SSSB equipment differs from the existing ones, then appropriate closure of the openings in the building structure shall be executed.
  - 2.10.2. If forced ventilation utilizing raised floor structures (including air ducting) is the required method for cooling / operating new SSSB equipment, the Contractor shall also provide and install the raised floor. In such case the raised floor shall meet requirements stipulated in the SOW - ANNEX I.
- 2.11. Provision and installation of adequate number of ventilation shafts and turrets for new SSSB equipment as required.
- 2.12. Removal and disposal of RF cabling manhole covers at the entry points to the COMMS building.

- 2.13. Provision and installation of new steel RF cabling manhole covers at the entry points to the COMMS building:
  - 2.13.1. Locking mechanisms, such as a sliding locking bar that can be secured with a padlock to enable it to be secured when not in use.
  - 2.13.2. The padlock, as the minimum shall meet following requirements:
    - 2.13.2.1. Body made from hardened steel
    - 2.13.2.2. Inner components made from non-corrosive materials
    - 2.13.2.3. Hardened boron steel shackle minimum 10 mm diameter
    - 2.13.2.4. Precision, minimum 3-pin cylinder lock mechanism
    - 2.13.2.5. Minimum 3 keys
    - 2.13.2.6. Suitable for outdoor use, weatherproof
- 2.14. Refurbishment of the existing RF cabling manholes including restoration of the concrete walls with liquid injection/ ejection using suitable mortar.
- 2.15. Removal and disposal of power distribution system, both indoor and outdoor, that becomes redundant when the new SSSB system with its dedicated electrical installation (further called SSSB electrical installation) is provided and installed by the Contractor:
  - 2.15.1. The scope includes removal and disposal of redundant cabling, sockets, power panels, junction boxes, switches, cables, trays, ducts and other ancillaries.
  - 2.15.2. THN may wish to preserve some parts of the redundant electrical installation and its ancillaries. Relevant guidance will be provided to the Contractor at a later stage.
- 2.16. Provision and installation of SSSB electrical installation with associated cabling, ducting, cable trays and ancillaries as stipulated in the SOW - ANNEX I:
  - 2.16.1. Complete SSSB electrical installation, both indoor and outdoor, with dedicated EPDBs (Equipment Power Distribution Boards), including surge protection devices and residual current devices (RCD), required to power all equipment provided by the Contractor for SSSB project (including HVAC, fuel supply system, fire detection and alarm, power distributed to antenna fields etc.)
  - 2.16.2. Integration of the SSSB electrical installation with existing MPDB (Main Power Distribution Board):

- 2.16.2.1. The integration shall include installation of adequate circuit breakers, and modification of existing power distribution system and the power boards/ panels as required to connect power cables for SSSB electrical installation
- 2.16.3. If the integration with existing MPDB is not possible, the Contractor shall:
  - 2.16.3.1. remove and dispose of the existing MPDB
  - 2.16.3.2. provide and install a new MPDB
  - 2.16.3.3. integrate SSSB electrical installation with the new MPDB
  - 2.16.3.4. integrate all remaining electrical installation of entire building with the new MPDB
- 2.17. Provision and installation of UPS system as stipulated in the SOW – ANNEX I.
- 2.18. Removal and disposal of two existing power generators together with existing piping, cabling, air intake, air outlet, louvers, control panels, grounding and all other ancillaries
- 2.19. Provision and installation of two fully redundant power generators with associated cabling, ducting, cable trays and ancillaries as stipulated in the SOW - ANNEX I:
  - 2.19.1. The site has no main power supply. Therefore, the power generators shall be sized accordingly to support entire site, namely:
    - 2.19.1.1. all equipment provided by the Contractor under the scope of SSSB Project
    - 2.19.1.2. all other existing installations and systems of 15kW power load
    - 2.19.1.3. 20% for further expansion in power generator loads
  - 2.19.2. The PGS shall be the primary source of electrical power and shall be capable to provide power continuously for entire SSSB site. Hence, the Contractor shall design the system and provide equipment to meet requirements for power generators rated as Prime Rated Power (PRP) according to ISO 8528-1:2018
    - 2.19.2.1. Unlimited number of hours per year (8760 hr/yr less service)
    - 2.19.2.2. Variable load
    - 2.19.2.3. Not to exceed 70% average of the Prime rating during any operating period of 24 hours

- 2.19.3. Modification and refurbishment of existing reinforced concrete foundation or removal and disposal of existing foundation and provision and installation of new reinforced concrete foundation for both power generators.
- 2.19.4. The foundation (regardless if modification of existing foundation is executed or new foundation is provided) shall be designed and built in such a way to prevent transfer of vibrations from generators to the rest of building structure.
- 2.20. Removal and disposal of lightning protection and grounding system, both indoor and outdoor, that becomes redundant when the new SSSB system with its dedicated lightning protection and grounding system (further called SSSB lightning protection and grounding system) is provided and installed by the Contractor:
  - 2.20.1. The scope includes removal and disposal of redundant cabling, conductors, arresters, grounding rings (including buried, roof and mast mounted elements) grounding rods, lightning rods, trays, ducts and other ancillaries.
  - 2.20.2. THN may wish to preserve some parts of the redundant lightning protection and grounding system and its ancillaries. Relevant guidance will be provided to the Contractor at a later stage.
- 2.21. Provision and installation of SSSB lightning protection and grounding system with associated cabling, ducting, cable trays and ancillaries as stipulated in the SOW - ANNEX I:
  - 2.21.1. Complete SSSB lightning protection and grounding system, both indoor and outdoor (including surge protection devices, grounding rings (including buried, roof and mast mounted elements), grounding rods, lightning rods, trays, ducts and other ancillaries) required to protect all equipment provided by the Contractor for SSSB project (including HVAC, fuel supply system, fire detection and alarm, antennas, fences etc.)
  - 2.21.2. Integration of the SSSB lightning protection and grounding system with existing lightning protection and grounding system of the site according to respective THN laws and regulations:
    - 2.21.2.1. The integration shall include execution of necessary earth works, welding, anticorrosive protection, and necessary modification of existing lightning protection and grounding system.
- 2.22. Removal and disposal of:
  - 2.22.1. one (1) ADCAB antenna;

- 2.22.2. one (1) SSSB HF RX antenna;
- 2.22.3. one (1) UHF antennas;
- 2.22.4. all ducting, cabling, grounding, guyed lines, foundation, anchoring and other ancillaries related to the antennas that are scoped for disposal.
- 2.23. Provision and installation of required number of new antenna masts capable of supporting the SSSB system with all associated works (antenna field preparation, foundation, trenches etc.), air obstacle lights, lightning protection, grounding and other ancillaries as stipulated in the SOW - ANNEX I.
  - 2.23.1. The antenna masts shall be designed for minimum service life of 30 years without the need for substantial maintenance
  - 2.23.2. The antenna masts shall be provided with cathodic protection system (including protection of the guy anchors) designed for minimum service life of 30 years without the need for substantial maintenance
- 2.24. Removal and disposal of the SSSB, ADCAB and UHF equipment located in the COMMS building.
- 2.25. Provision and installation of fire detection and alarm system in SSSB equipment room and in power generator room as stipulated in the SOW - ANNEX I.
- 2.26. The fire alarm:
  - 2.26.1. Shall be reported to the site duty officer (the duty officer office location will be provided during the Contractor's site survey)
  - 2.26.2. Shall be reported to the site commander (the site commander office location will be provided during the Contractor's site survey)
  - 2.26.3. Shall send notifications /alerts to the mobile phones of the site commander and the site duty officer
- 2.27. Provision and installation of fire extinguishers in SSSB equipment room and in power generator room as stipulated in the SOW - ANNEX I.
- 2.28. Provision and installation of safety marking and labelling, both indoor and outdoor, for all structures, machinery and installations provided by the Contractor, as stipulated in the SOW Main Body and in the SOW – ANNEX I.
- 2.29. All concrete works exposed to outdoor environment (regardless if buried or not) shall be executed with the utilization of concrete that meets, as

the minimum, following requirements according to EN 206:2013+A2:2021 (or THN equivalent standard):

- 2.29.1. exposure class of XS1 and strength of C 32/40 for structures exposed to airborne salt but not in direct contact with sea water;
- 2.29.2. exposure class of XS3 and strength of C 33/45 for structures located at tidal and spray zones.
- 2.30. All metal works exposed to outdoor environment such as antenna masts with their ancillaries, HVAC components, cable trays and ladders, fences, gates, bolts, nuts, washers, fasteners etc. (regardless if buried or not) shall be protected against corrosion category C5M Maritime, defined according to ISO 12944-5:2019 (or THN equivalent standard).
- 2.31. The complete structural design and its execution for all structures, equipment and installations provided, installed and/or modified by the Contractor shall meet THN GRC seismic requirements. Therefore, the Contractor shall meet respective requirements as stipulated in following publications:
  - 2.31.1. EN 1998-1:2004, Eurocode 8: Design of structures for earthquake resistance – Part 1: General rules, seismic actions and rules for buildings
  - 2.31.2. EN 1998-3:2005 Eurocode 8: Design of structures for earthquake resistance – Part 3: Assessment and retrofitting of buildings and its implementation
  - 2.31.3. EN 1998-4:2006 Eurocode 8: Design of structures for earthquake resistance – Part 4: Silos, tanks and pipelines
  - 2.31.4. EN 1998-5:2004 Eurocode 8: Design of structures for earthquake resistance – Part 5: Foundations, retaining structures and geotechnical aspects
  - 2.31.5. EN 1998-6:2005 Eurocode 8: Design of structures for earthquake resistance – Part 6: Towers, masts and chimneys
  - 2.31.6. Ministerial Decision D17a/141/3/FN 275/1999 (Government Gazette 2184/B;/20-12-19990 Hellenic Earthquake Regulation 2000 (Approval of the Greek Earthquake Regulation)).
- 2.32. The Contractor shall also consider in its design additional measures that are required to secure provided equipment against earthquake impact. Those measures include, but are not limited to, special fixing to the floors (including when installed on a raised floors) and fixing elements mounted at the rack tops to secure them to the walls.



- 2.33. When designing and erecting masts with all associated ancillaries, fences and all other outdoor installed equipment, the Contractor shall apply Eurocode EN1991-1-4 (Eurocode 1 Part 1-4: General actions Wind actions). This publication provides guidance on the determination of natural wind actions for the structural design of buildings and civil engineering works. For the calculation procedure and especially for the determination of wind actions following shall be applied:
- 2.33.1. The fundamental basic wind velocity  $v_{b,0}$  which is the 10 minute mean wind velocity with an annual risk of being exceeded of 0.02 irrespective of wind direction at a height of 10m above flat open country terrain, has a value in the National Annex  $v_{b,0,0}=33\text{m/s}$  for the Greek Islands in general.
- 2.33.2. The basic wind velocity  $v_b$ , which is the fundamental basic wind velocity modified to account the direction of the wind and the season, shall be calculated from the equation:  $v_b = C_{dir} \times C_{season} \times v_{b,0}$ . The recommended value for  $C_{dir}$  (the directional factor) and  $C_{season}$  (the season factor) is 1.
- 2.33.3. Terrain roughness: There are 5 terrain categories. For the two sites in Skyros Island (Kartsinouli and Limnonari) as well as Site Sideros in Crete, the terrain category is No 0 (sea or coastal area exposed to the open sea). For the Site Kythira and Site Mavros in Crete the terrain category is No III (Area with regular cover of vegetation or building or with isolated obstacles with separations of maximum 20 obstacle heights (such as villages, suburban terrain, permanent forest).
- 2.34. Additionally, the Contractor shall design and execute the works in compliance with following publications respectively:
- 2.34.1. Presidential Decree 244/1980:"Cement Regulation for Concrete Works (Prestressed, Reinforced and Unarmed) (Government Gazette 69/A/1989
- 2.34.2. ELOT EN 10080, ELOT 1421-1, ELOT 1421-3 "Standards for concrete reinforcement steels". 3. Ministerial Decision D11E/0/30123/1991 (Government Gazette 1068/B/31-12-1991 "Amendment of the New Concrete Regulation for the Design and Construction of Concrete Works"
- 2.34.3. Ministerial Decision D17a/116/4/FN429/18-10-2000 (Reinforced Concrete Regulation) EKOS 2000.
- 2.34.4. Ministerial Decision D14/50504/2002 (Government Gazette 537/B;/1-5-2002) "Adaptation of the Concrete Technology Regulation to the Requirements of the Harmonized Standard" ELOT EN 197-1.

- 2.34.5. Ministerial Decision 16462/29/2001 (Government Gazette 917/B/17.7.2001) "Cement for the Construction of Concrete Works".
- 2.34.6. Ministerial Decision D14/92330/08 (1416/B/17.7.08) (Government Gazette 381/B/24.3.2000) "Approval of the New Regulation of Concrete Reinforcement Steel Technology".
- 2.34.7. Ministerial Decision DIPAD/OIK. 372/2014 (Government Gazette 1457/B/5.6.2014) "Approval of the application and use of the Eurocodes in combination with the respective National Appendices)
- 2.34.8. Government Gazette 59/D/3-2-1989 "Building Regulations".
- 2.34.9. Joint Ministerial Decision D6/B/OIK 5825 (Government Gazette 407/B/2010) "Approval of the Energy Efficiency Regulation of Buildings (KENAK)".
- 2.34.10. Ministerial Decision F.7.5/1816/88/2004 (Government Gazette 470/B/5-3-2004) "Replacement of the current Regulation of Internal Electrical Installations with the ELOT Standards and other relevant provisions".
- 2.34.11. Manual of Standard Distribution Structures of Public Power Corporation (PPC), The Instructions Distribution of PPC SA.
- 2.34.12. Greek Technical Specifications-Government Gazette 2221/30-07-12 with mandatory application in all public works.
- 2.34.13. THN GRC Sewerage Regulation
- 2.34.14. Amendment and Supplementation of Presidential Decree 71/88 "Building Fire Protection Regulation" (Government Gazette 1316/B/31-12-1998)
- 2.34.15. Presidential Decree 41/2018 "Building Fire Protection Regulation" (Government Gazette 80/A/7-5-2018)
- 2.35. Supporting Civil Works:
  - 2.35.1. Rebuilding of pavements after pipe, cabling, ducting, air intake, air outlet, exhaust and other installation works.
  - 2.35.2. Associated earthworks and backfilling, drilling for the pipes, cabling, ducting, air intake, air outlet, exhaust and other installation works.
  - 2.35.3. Closing of the penetrations (with mortar, plastering, finishing/painting of affected sections in partitions) in walls, floors, roofs

and ceiling after pipe, cabling, ducting, air intake, air outlet, exhaust and other installation works.

2.35.4. Closing of all redundant penetrations (with mortar, plastering, finishing/painting of affected sections in partitions) in walls, floors, roofs and ceiling to assure correct and efficient operation of new HVAC system provided by the Contractor

2.35.5. Water, sound and fire insulation as required in all areas affected by the Contractor works.

2.36. Restoration of reinforced-concrete structures:

2.36.1. After the removal of all corroded concrete parts by using water-blasting, sandblasting the following works shall be executed according to the GRC National Regulation (Code ELOT TP 1501-14-01-04-00-2009 "Local retrofitting of concrete element damage caused by reinforcement corrosion"):

2.36.1.1. Cleaning of the steel reinforcements with mechanical wire brushing and then priming after three hours with appropriate anticorrosive material in accordance with manufacturer's recommendations.

2.36.1.2. Application, in layers, anticorrosive mortar (the thickness shall be in accordance with manufacturer's recommendations) covering the reinforcement.

2.36.1.3. Once the reinforcement remediation is completed, the application of two different appropriate water-proof cement coating in layers shall be followed.

2.36.1.4. Dismantling and replacement of damaged parts of networks and auxiliary works.

2.36.2. In case that the reinforcing bars are corroded and have lost more than 20% of their diameter, they shall be cut and removed. In such event, removed steel bars shall be replaced with new steel bars of the same diameter. For the above procedure the following works shall be executed in accordance with GRC National Regulation (Code PETEP:14-01-11-00 "Anchoring of new steel reinforcement bars in existing concrete elements"):

2.36.2.1. Identification of the anchor positions of the new steel reinforcement bars.

- 2.36.2.2. Cleaning of the concrete area in accordance with GRC National Regulation (Code PETEP:14-01-01-01 “Removal of loose or adhered material from concrete surfaces”).
- 2.36.2.3. Roughening of the concrete surface.
- 2.36.2.4. Boring holes in the concrete at the anchor positions (In General holes diameter=Steel bar diameter + 4mm) in accordance with GRC National Regulation (Code PETEP:14-01-03-02 “Drilling in concrete members with cut-off of encountered reinforcement”).
- 2.36.2.5. Roughening by wire-brushing inside the hole and remove dust by air blowing, wash with clean water, removal of the water by air blowing.
- 2.36.2.6. Insertion of sufficient amount of adhesive material.
- 2.36.2.7. The new steel bars shall be held properly in order to remain unmovable until the coagulation of the adhesive material.
- 2.36.3. The minimum thickness of reinforcement cover of slabs, beams and columns of a construction is prescribed by National Regulation (Greek Code for Reinforced Concrete 2000 in conjunction with the Greek Antiseismic Regulation 2003). In general the minimum thickness of reinforcement cover is not allowed to be less than the diameter of the steel bar+20mm for a reinforced-concrete structure in a marine environment. Especially:
  - 2.36.3.1. For a reinforcing bar in a column the minimum thickness of reinforcement cover is not allowed to be less than 40mm and not less than the diameter of the steel bar+20mm.
  - 2.36.3.2. For a reinforcing bar in a slab the minimum thickness of reinforcement cover is not allowed to be less than 35mm and not less than the diameter of the steel bar+20mm.
- 2.36.4. Once the reinforcement remediation is completed, the application of two different appropriate waterproof cement coating in layers to the external surfaces shall be followed. The restoration of the concrete area shall be completed with the works of plastering and painting.

## **Appendix 7: IFB-CO-15577-SSSB-BookII-PartIV- SOW-ANNEX I-SRS-CW-GRC**

### **Civil Works at the Site 7<sup>th</sup> Air Force Radar Station, Skyros Island (HF TX), GR**

#### **1. General**

- 1.1. The detailed description and technical specifications of below listed works are formulated in the SOW - ANNEX I - System Requirements Specifications (Civil Works) – Greece.

#### **2. Responsibilities of the Contractor**

- 2.1. If the Contractor identifies that existing fence including its foundations and/or any other not used/ not operational infrastructure, installations and equipment shall be removed to enable installation and correct O&M of SSSB system and its supporting infrastructure, it is the Contractor's responsibility to remove and dispose of the above mentioned infrastructure, installations and equipment. This activity can only be exercised after THN approval of each item scoped for removal and disposal.
- 2.2. Provision and installation of new HVAC system, based on split units and heat recovery ventilator as required, with sufficient capacity for SSSB system and existing equipment in the equipment room with all piping, cabling and ancillaries as stipulated in the SOW - ANNEX I.
  - 2.2.1. The existing equipment generates heat load of 3 kW
  - 2.2.2. There is operational HVAC unit in the room (9000 BTU) whose capacity shall be considered by the Contractor when designing and installing a new HVAC system
- 2.3. Restoration works in the equipment room:
  - 2.3.1. Restoration of all internal walls and ceiling, including plastering and painting in the room for SSSB equipment (RAL color code will be provided by the Purchaser at a later stage).
  - 2.3.2. The two pre-existing openings of the room (one door leading to outside of the building and one window) shall be walled and the built in mortar/ concrete/ masonry shall be finished with plastering and painting on both sides.

- 2.3.3. Removal and disposal of the current access door to the equipment room and the door between equipment room and the adjacent room (location for the new power generator) with their doorframes.
- 2.3.4. Provision and installation of new doors with door frames, locks and other ancillaries as stipulated in the SOW – ANNEX I:
- 2.3.5. this new doors shall be of solid wood or steel plated, free of abrasions to detect attempts of surreptitious entry
- 2.3.6. the frame and fixing of the doors shall be at least as strong as the doors itself
- 2.3.7. no glass shall be used
- 2.3.8. the doors equipped with a Group B lock as per ACE Security directives and drill resistant (group B lock is one which a NATO Member has certified as suitable for the protection of material classified up to NATO S\*CR\*T)
- 2.3.9. keys or other required device for changing the combination shall be provided with the locks
- 2.3.10. hardened steel installed between the lock case and the door itself
- 2.3.11. the doors dimensions suitable for easy access of personnel and equipment/ rack to the premises interior (at least a clear opening of 2000 (H) × 900 (W) mm)
- 2.4. Removal and disposal of power distribution system, both indoor and outdoor, that becomes redundant when the new SSSB system with its dedicated electrical installation (further called SSSB electrical installation) is provided and installed by the Contractor:
  - 2.4.1. The scope includes removal and disposal of redundant cabling, sockets, power panels, junction boxes, switches, cables, trays, ducts and other ancillaries.
  - 2.4.2. THN may wish to preserve some parts of the redundant electrical installation and its ancillaries. Relevant guidance will be provided to the Contractor at a later stage.
  - 2.4.3. Removal and disposal of light fixtures in the SSSB room
- 2.5. Provision and installation of SSSB electrical installation with associated cabling, ducting, cable trays and ancillaries as stipulated in the SOW - ANNEX I:

- 2.5.1. Complete SSSB electrical installation, both indoor and outdoor, with dedicated EPDBs (Equipment Power Distribution Boards), including surge protection devices and residual current devices (RCD), required to power all equipment provided by the Contractor for SSSB project (including HVAC, fuel supply system, fire detection and alarm, power distributed to antenna fields etc.) and the existing THN electronic equipment in the SSSB room, as well as internal lighting of the room
- 2.5.2. Provision and installation of light fixtures (including emergency lights) in the SSSB room as stipulated in the SOW – Annex I.
- 2.5.3. Integration of the SSSB electrical installation with existing MPDB (Main Power Distribution Board) and Medium Voltage Transformer:
- 2.5.4. The integration shall include installation of adequate circuit breakers, cabling provision and installation, and modification of existing power distribution system and the power boards/ panels as required to connect power cables for SSSB electrical installation
- 2.6. Provision and installation of UPS system as stipulated in the SOW – ANNEX I.
- 2.7. Provision and installation of 1(one) power generator with integrated daily fuel tank (no other fuel tanks required) with associated cabling, ducting, cable trays and ancillaries as stipulated in the SOW - ANNEX I:
  - 2.7.1. The PG shall be the back-up (emergency) source of electrical power and shall be capable to provide power for all equipment in the SSSB room in case of main power failure. Hence, the Contractor shall design the system and provide equipment to meet requirements for power generators rated as Emergency Standby Power (ESP) according to ISO 8528-1:2018
  - 2.7.2. The existing power load (without equipment that shall be provided by the Contractor) that shall be connected to the PG is 10 kW
  - 2.7.3. The power generator shall be installed in such a way to prevent transfer of vibrations from the generator to the rest of building structure.
  - 2.7.4. The daily fuel tank of the power generator shall be sized adequately to assure continues operation under full load for minimum of 5 (five) hours
  - 2.7.5. The daily fuel tank shall be reinforced with non-cutting edge bulkheads.
  - 2.7.6. External fuel inlet with warning light for full tank shall be provided with lockable cap (with lock).

- 2.7.7. Refilling by hand from jerry cans or locally from a mobile tank with electric pump shall be possible during operation of the PG.
- 2.8. Removal and disposal of lightning protection and grounding system, both indoor and outdoor, that becomes redundant when the new SSSB system with its dedicated lightning protection and grounding system (further called SSSB lightning protection and grounding system) is provided and installed by the Contractor:
- 2.8.1. The scope includes removal and disposal of redundant cabling, conductors, arresters, grounding rings (including buried, roof and mast mounted elements) grounding rods, lightning rods, trays, ducts and other ancillaries.
- 2.8.2. THN may wish to preserve some parts of the redundant lightning protection and grounding system and its ancillaries. Relevant guidance will be provided to the Contractor at a later stage.
- 2.9. Provision and installation of SSSB lightning protection and grounding system with associated cabling, ducting, cable trays and ancillaries as stipulated in the SOW - ANNEX I:
- 2.9.1. Complete SSSB lightning protection and grounding system, both indoor and outdoor (including surge protection devices, grounding rings (including buried, roof and mast mounted elements), grounding rods, lightning rods, trays, ducts and other ancillaries) required to protect all equipment provided by the Contractor for SSSB project (including HVAC, fuel supply system, fire detection and alarm, antennas, etc.)
- 2.9.2. Integration of the SSSB lightning protection and grounding system with existing lightning protection and grounding system of the site according to respective THN laws and regulations:
- 2.9.2.1. The integration shall include execution of necessary earth works, welding, anticorrosive protection, and necessary modification of existing lightning protection and grounding system.
- 2.10. Provision and installation of required number of new antenna masts capable of supporting the SSSB system with all associated works (antenna field preparation, foundation, trenches etc.), air obstacle lights, lightning protection, grounding and other ancillaries as stipulated in the SOW - ANNEX I.
- 2.10.1. The antenna masts shall be designed for minimum service life of 30 years without the need for substantial maintenance



- 2.10.2. The antenna masts shall be provided with cathodic protection system (including protection of the guy anchors) designed for minimum service life of 30 years without the need for substantial maintenance
- 2.11. Provision and installation of fire detection and alarm system in SSSB equipment room and in power generator room as stipulated in the SOW - ANNEX I.
  - 2.11.1. The fire alarm (both visual (beacon) and audio (siren)) shall be transferred to the location within approximately 40m distance from SSSB equipment and power generator room. Detailed guidance will be provided to the Contractor at a later stage.
- 2.12. Provision and installation of fire extinguishers in SSSB equipment room and in power generator room as stipulated in the SOW - ANNEX I.
- 2.13. Provision and installation of safety marking and labelling, both indoor and outdoor, for all structures, machinery and installations provided by the Contractor, as stipulated in the SOW Main Body and in the SOW – ANNEX I.
- 2.14. All concrete works exposed to outdoor environment (regardless if buried or not) shall be executed with the utilization of concrete that meets, as the minimum, following requirements according to EN 206:2013+A2:2021 (or THN equivalent standard):
  - 2.14.1. exposure class of XS1 and strength of C 32/40 for structures exposed to airborne salt but not in direct contact with sea water;
  - 2.14.2. exposure class of XS3 and strength of C 33/45 for structures located at tidal and spray zones.
- 2.15. All metal works exposed to outdoor environment such as antenna masts with their ancillaries, HVAC components, cable trays and ladders, fences, gates, bolts, nuts, washers, fasteners etc. (regardless if buried or not) shall be protected against corrosion category C5M Maritime, defined according to ISO 12944-5:2019 (or THN equivalent standard).
- 2.16. The complete structural design and its execution for all structures, equipment and installations provided, installed and/or modified by the Contractor shall meet THN GRC seismic requirements. Therefore, the Contractor shall meet respective requirements as stipulated in following publications:
  - 2.16.1. EN 1998-1:2004, Eurocode 8: Design of structures for earthquake resistance – Part 1: General rules, seismic actions and rules for buildings

- 2.16.2. EN 1998-3:2005 Eurocode 8: Design of structures for earthquake resistance – Part 3: Assessment and retrofitting of buildings and its implementation
- 2.16.3. EN 1998-4:2006 Eurocode 8: Design of structures for earthquake resistance – Part 4: Silos, tanks and pipelines
- 2.16.4. EN 1998-5:2004 Eurocode 8: Design of structures for earthquake resistance – Part 5: Foundations, retaining structures and geotechnical aspects
- 2.16.5. EN 1998-6:2005 Eurocode 8: Design of structures for earthquake resistance – Part 6: Towers, masts and chimneys
- 2.16.6. Ministerial Decision D17a/141/3/FN 275/1999 (Government Gazette 2184/B;/20-12-19990 Hellenic Earthquake Regulation 2000 (Approval of the Greek Earthquake Regulation)
- 2.17. The Contractor shall also consider in its design additional measures that are required to secure provided equipment against earthquake impact. Those measures include, but are not limited to, special fixing to the floors (including when installed on a raised floors) and fixing elements mounted at the rack tops to secure them to the walls.
- 2.18. When designing and erecting masts with all associated ancillaries, fences and all other outdoor installed equipment, the Contractor shall apply Eurocode EN1991-1-4 (Eurocode 1 Part 1-4: General actions Wind actions). This publication provides guidance on the determination of natural wind actions for the structural design of buildings and civil engineering works. For the calculation procedure and especially for the determination of wind actions following shall be applied:
- 2.18.1. The fundamental basic wind velocity  $v_{b,0}$  which is the 10 minute mean wind velocity with an annual risk of being exceeded of 0.02 irrespective of wind direction at a height of 10m above flat open country terrain, has a value in the National Annex  $v_{b,0,0}=33\text{m/s}$  for the Greek Islands in general.
- 2.18.2. The basic wind velocity  $v_b$ , which is the fundamental basic wind velocity modified to account the direction of the wind and the season, shall be calculated from the equation:  $v_b = C_{dir} \times C_{season} \times v_{b,0}$ . The recommended value for  $C_{dir}$  (the directional factor) and  $C_{season}$  (the season factor) is 1.
- 2.18.3. Terrain roughness: There are 5 terrain categories. For the two sites in Skyros Island (Kartsinouidi and Limnonari) as well as Site Sideros in Crete, the terrain category is No 0 (sea or coastal area exposed to the

open sea). For the Site Kythira and Site Mavros in Crete the terrain category is No III (Area with regular cover of vegetation or building or with isolated obstacles with separations of maximum 20 obstacle heights (such as villages, suburban terrain, permanent forest).

- 2.19. Additionally, the Contractor shall design and execute the works in compliance with following publications respectively:
- 2.19.1. Presidential Decree 244/1980:"Cement Regulation for Concrete Works (Prestressed, Reinforced and Unarmed) (Government Gazette 69/A/1989
  - 2.19.2. ELOT EN 10080, ELOT 1421-1, ELOT 1421-3 "Standards for concrete reinforcement steels". 3. Ministerial Decision D11E/0/30123/1991 (Government Gazette 1068/B/31-12-1991 "Amendment of the New Concrete Regulation for the Design and Construction of Concrete Works"
  - 2.19.3. Ministerial Decision D17a/116/4/FN429/18-10-2000 (Reinforced Concrete Regulation) EKOS 2000.
  - 2.19.4. Ministerial Decision D14/50504/2002 (Government Gazette 537/B;/1-5-2002) "Adaptation of the Concrete Technology Regulation to the Requirements of the Harmonized Standard" ELOT EN 197-1.
  - 2.19.5. Ministerial Decision 16462/29/2001 (Government Gazette 917/B/17.7.2001) "Cement for the Construction of Concrete Works".
  - 2.19.6. Ministerial Decision D14/92330/08 (1416/B/17.7.08) (Government Gazette 381/B/24.3.2000) "Approval of the New Regulation of Concrete Reinforcement Steel Technology".
  - 2.19.7. Ministerial Decision DIPAD/OIK. 372/2014 (Government Gazette 1457/B/5.6.2014) "Approval of the application and use of the Eurocodes in combination with the respective National Appendices)
  - 2.19.8. Government Gazette 59/D/3-2-1989 "Building Regulations".
  - 2.19.9. Joint Ministerial Decision D6/B'/OIK 5825 (Government Gazette 407/B/2010) "Approval of the Energy Efficiency Regulation of Buildings (KENAK)".
  - 2.19.10. Ministerial Decision F.7.5/1816/88/2004 (Government Gazette 470/B/5-3-2004) "Replacement of the current Regulation of Internal Electrical Installations with the ELOT Standards and other relevant provisions".

- 2.19.11. Manual of Standard Distribution Structures of Public Power Corporation (PPC), The Instructions Distribution of PPC SA.
- 2.19.12. Greek Technical Specifications-Government Gazette 2221/30-07-12 with mandatory application in all public works.
- 2.19.13. THN GRC Sewerage Regulation
- 2.19.14. Amendment and Supplementation of Presidential Decree 71/88 "Building Fire Protection Regulation" (Government Gazette 1316/B/31-12-1998)
- 2.19.15. Presidential Decree 41/2018 "Building Fire Protection Regulation" (Government Gazette 80/A/7-5-2018)
- 2.20. Supporting Civil Works:
  - 2.20.1. Rebuilding of pavements after pipe, cabling, ducting, air intake, air outlet, exhaust and other installation works.
  - 2.20.2. Associated earthworks and backfilling, drilling for the pipes, cabling, ducting, air intake, air outlet, exhaust and other installation works.
  - 2.20.3. Closing of the penetrations (with mortar, plastering, finishing/painting of affected sections in partitions) in walls, floors, roofs and ceiling after pipe, cabling, ducting, air intake, air outlet, exhaust and other installation works.
  - 2.20.4. Closing of all redundant penetrations (with mortar, plastering, finishing/painting of affected sections in partitions) in walls, floors, roofs and ceiling to assure correct and efficient operation of new HVAC system provided by the Contractor
  - 2.20.5. Water, sound and fire insulation as required in all areas affected by the Contractor works.

## **Appendix 8: IFB-CO-15577-SSSB-BookII-PartIV- SOW-ANNEX I-SRS-CW-GRC**

### **Civil Works for DLOS antenna replacement, 5 (five) locations, GR**

#### **1. General**

- 1.1. The detailed description and technical specifications of below listed works are formulated in the SOW - ANNEX I - System Requirements Specifications (Civil Works) – Greece.
- 1.2. All of the works described hereafter shall be executed at five different sites:
  - 1.2.1. Skopelos DLOS radio-relays station
  - 1.2.2. Agios Efstratios DLOS radio-relays station
  - 1.2.3. Pelion DLOS radio-relays station
  - 1.2.4. ARS Larissa DLOS radio-relays station
  - 1.2.5. Pagia DLOS radio-relays station

#### **2. Responsibilities of the Contractor**

- 2.1. Removal and disposal of:
  - 2.1.1. 16 DLOS antennas and their interconnection coaxial cables;
  - 2.1.2. 2 at ARS Larissa DLOS radio-relays station
  - 2.1.3. 4 at Pelion DLOS radio-relays station
  - 2.1.4. 4 at Skopelos DLOS radio-relays station
  - 2.1.5. 4 at Pagia (SKYROS ISLAND) DLOS radio-relays station
  - 2.1.6. 2 at Agios Efstratios DLOS radio-relays station
- 2.2. all ducting, cabling and other ancillaries related to the DLOS antennas with coaxial cables that are scoped for disposal.
- 2.3. Provision and installation of new DLOS antennas with their interconnection coaxial cables as stipulated in the SOW and associated ANNEXES.
- 2.4. If the Contractor identifies that existing not used/ not operational infrastructure, installations and equipment shall be removed to enable installation of the DLOS antennas with their coaxial cables, it is the Contractor's responsibility to remove and dispose of the above mentioned infrastructure, installations and equipment. This activity can only be exercised after THN approval of each item scoped for removal and disposal.

- 2.5. Provision and installation of safety marking and labelling, both indoor and outdoor, for installations provided by the Contractor, as stipulated in the SOW Main Body and in the SOW – ANNEX I.
- 2.6. All concrete works exposed to outdoor environment (regardless if buried or not) shall be executed with the utilization of concrete that meets, as the minimum, following requirements according to EN 206:2013+A2:2021 (or THN equivalent standard):
  - 2.6.1. exposure class of XS1 and strength of C 32/40 for structures exposed to airborne salt but not in direct contact with sea water;
  - 2.6.2. exposure class of XS3 and strength of C 33/45 for structures located at tidal and spray zones.
- 2.7. All metal works exposed to outdoor environment such as cable trays and ladders, cabinets, bolts, nuts, washers, fasteners etc. (regardless if buried or not) shall be protected against corrosion category C5I: 'Very high', defined according to ISO 12944-5:2019 (or THN equivalent standard).
- 2.8. The complete structural design and its execution for all equipment and installations provided, installed and/or modified by the Contractor shall meet THN GRC seismic requirements. Therefore, the Contractor shall meet respective requirements as stipulated in following publications:
  - 2.8.1. EN 1998-1:2004, Eurocode 8: Design of structures for earthquake resistance – Part 1: General rules, seismic actions and rules for buildings
  - 2.8.2. EN 1998-3:2005 Eurocode 8: Design of structures for earthquake resistance – Part 3: Assessment and retrofitting of buildings and its implementation
  - 2.8.3. EN 1998-4:2006 Eurocode 8: Design of structures for earthquake resistance – Part 4: Silos, tanks and pipelines
  - 2.8.4. EN 1998-5:2004 Eurocode 8: Design of structures for earthquake resistance – Part 5: Foundations, retaining structures and geotechnical aspects
  - 2.8.5. EN 1998-6:2005 Eurocode 8: Design of structures for earthquake resistance – Part 6: Towers, masts and chimneys
  - 2.8.6. Ministerial Decision D17a/141/3/FN 275/1999 (Government Gazette 2184/B;/20-12-19990 Hellenic Earthquake Regulation 2000 (Approval of the Greek Earthquake Regulation)
- 2.9. When designing and installing the DLOS antennas with all associated ancillaries, the Contractor shall apply Eurocode EN1991-1-4 (Eurocode 1

Part 1-4: General actions Wind actions). This publication provides guidance on the determination of natural wind actions for the structural design of buildings and civil engineering works. For the calculation procedure and especially for the determination of wind actions following shall be applied:

- 2.9.1. The fundamental basic wind velocity  $v_{b,0}$  which is the 10 minute mean wind velocity with an annual risk of being exceeded of 0.02 irrespective of wind direction at a height of 10m above flat open country terrain, has a value in the National Annex  $v_{b,0}=33\text{m/s}$  for the Greek Islands in general.
  - 2.9.2. The basic wind velocity  $v_b$ , which is the fundamental basic wind velocity modified to account the direction of the wind and the season, shall be calculated from the equation:  $v_b = C_{dir} \times C_{season} \times v_{b,0}$ . The recommended value for  $C_{dir}$  (the directional factor) and  $C_{season}$  (the season factor) is 1.
  - 2.9.3. Terrain roughness: There are 5 terrain categories. For the two sites in Skyros Island (Kartsinouli and Limnonari) as well as Site Sideros in Crete, the terrain category is No 0 (sea or coastal area exposed to the open sea). For the Site Kythira and Site Mavros in Crete the terrain category is No III (Area with regular cover of vegetation or building or with isolated obstacles with separations of maximum 20 obstacle heights (such as villages, suburban terrain, permanent forest).
- 2.10. Additionally, the Contractor shall design and execute the works in compliance with following publications respectively:
- 2.10.1. Presidential Decree 244/1980: "Cement Regulation for Concrete Works (Prestressed, Reinforced and Unarmed) (Government Gazette 69/A/1989
  - 2.10.2. Ministerial Decision D14/50504/2002 (Government Gazette 537/B;/1-5-2002) "Adaptation of the Concrete Technology Regulation to the Requirements of the Harmonized Standard" ELOT EN 197-1.
  - 2.10.3. Ministerial Decision 16462/29/2001 (Government Gazette 917/B'/17.7.2001) "Cement for the Construction of Concrete Works".
  - 2.10.4. Ministerial Decision DIPAD/OIK. 372/2014 (Government Gazette 1457/B'/5.6.2014) "Approval of the application and use of the Eurocodes in combination with the respective National Appendices)
  - 2.10.5. Government Gazette 59/D/3-2-1989 "Building Regulations".
  - 2.10.6. Ministerial Decision F.7.5/1816/88/2004 (Government Gazette 470/B/5-3-2004) "Replacement of the current Regulation of Internal Electrical Installations with the ELOT Standards and other relevant provisions".

- 2.10.7. Manual of Standard Distribution Structures of Public Power Corporation (PPC), The Instructions Distribution of PPC SA.
- 2.10.8. Greek Technical Specifications-Government Gazette 2221/30-07-12 with mandatory application in all public works.
- 2.10.9. Amendment and Supplementation of Presidential Decree 71/88 "Building Fire Protection Regulation" (Government Gazette 1316/B/31-12-1998)
- 2.10.10. Presidential Decree 41/2018 "Building Fire Protection Regulation" (Government Gazette 80/A/7-5-2018)
- 2.11. Supporting Civil Works:
  - 2.11.1. Rebuilding of pavements after cabling, ducting and other installation works.
  - 2.11.2. Associated earthworks and backfilling, drilling for the cabling, ducting and other installation works.
  - 2.11.3. Closing of the penetrations (with mortar, plastering, finishing/painting of affected sections in partitions) in walls, floors, roofs and ceiling after cabling, ducting and other installation works.

Water, sound and fire insulation as required in all areas affected



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IFB-CO-15577-SSSB

Book 2, Part 4, SOW, Annex J

**IFB-CO-15577-SSSB**



NATO Communications and Information Agency  
Agence OTAN d'information et de communication

**BOOK II**

**PART IV – STATEMENT OF WORK**

**SOW - ANNEX J**

**SYSTEM SECURITY REQUIREMENTS  
(SSR)**

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**1. INTRODUCTION**

**1.1 Purpose**

- (1) This document contains the CIS Security Requirements for the Contract CO-15577-SSSB-UK-GR-NL and is issued pursuant to C-M (2002)49-REV1 (Reference [A]) published by the NATO Security Committee and its supporting directives as described in Reference [B].
- (2) It describes the Contractor's obligations to design, implement and deliver a secure CIS, addressing the minimum CIS Security requirements as derived from NATO Security Risk Management (Reference [C])

**1.2 References**

- (1) The references for these PSIs are listed in

<b>Reference</b>	<b>Document Title</b>	<b>Number / Edition Revision</b>	<b>Date</b>
[A]	NATO Security Policy	C-M(2002)49-REV1	20-Nov-20
[B]	"Roadmap" to NATO Security Policy, Supporting Directives, Supporting Documents and Guidance Documents	Version 3.0	26-Jan-21
[C]	NATO PILAR	Version 2021.1	13-Jan-21

- (2) Table 1 below:

<b>Reference</b>	<b>Document Title</b>	<b>Number / Edition Revision</b>	<b>Date</b>
[A]	NATO Security Policy	C-M(2002)49-REV1	20-Nov-20
[B]	"Roadmap" to NATO Security Policy, Supporting Directives, Supporting Documents and Guidance Documents	Version 3.0	26-Jan-21
[C]	NATO PILAR	Version 2021.1	13-Jan-21

**Table 1 - References**

## **2. CIS Security Requirements**

### **2.1 IA - Identification and authentication**

(1) IA.3 User identification

The system shall implement user identification compliant with:

- a. Unique identification for every user
- b. User identification does not indicate function or privilege level
- c. Guest accounts are renamed and disabled or deleted.
- d. People acting as users are identified
- e. Software processes acting as users are identified

(2) IA.5 Special accounts (administration)

The system shall implement special accounts (administration) compliant with:

- a. There are separate accounts for system administration
- b. There are separate accounts for security administration

(3) IAM4 Password based Authentication

The system shall implement password based authentication compliant with:

- a. The password composition policy requires users to choose a password at least 12 characters long while using a minimum of 3 of the 4 types of keyboard characters
- b. Commonly used passwords and substrings (e.g. "1234" or keyboard patterns) are banned by using password blacklists.
- c. Passwords are valid for 2 years.
- d. Password reuse is prohibited for 10 generations (i.e. users cannot re-use their last 10 passwords on a system).
- e. Users have the ability to change their passwords in compliance with the requirements of this paragraph.
- f. The CIS stores only cryptographically protected passwords. Hashed passwords are salted with a unique and unpredictable salt per password.
- g. Default passwords on CIS are changed (e.g. devices, service accounts, applications).
- h. CIS components are not procured nor used with unchangeable passwords.

### **2.2 AC - Logical access control**

(1) AC.2 Access control enforcement

The system shall implement access control enforcement compliant with:

- a. Restricted access
  - i. System cannot be accessed without prior identification and authentication of the user or process
  - ii. System cannot be accessed without prior verification of access rights

- iii. Establishment of specific menus to control access to the applications' functions
- iv. User privileges are under control (read, write, modify, delete, execute)
- v. The privileges granted to other applications are under control
- b. Access to system configuration is restricted
  - i. Changes to the system configuration are logged
- c. Access to system security configuration is restricted
  - i. Only authorised security administrators may access
  - ii. Changes to system security configuration are logged
- d. Explicit manual elevation of privileges, including supervisor overrides, shall be required for all operations that require elevated privileges
- e. Monitoring
  - i. All the activities of the people who access are logged
  - ii. All the activities of the software processes that access are logged
- f. Access control model
  - i. Role-Based Access Control (RBAC)
    - 1. There is a centralized catalogue of roles defined in the system
    - 2. A certain action can only be performed if the user is associated with a certain role
    - 3. Prior authorisation is required for a user to be associated with a certain role
- g. Logon on terminals
  - i. Users and user groups are limited to certain stations
  - ii. After one failed attempt, there is a delay until the next attempt is enabled
  - iii. The account is locked after a determined number of failed attempts
  - iv. Authorisation is required to restore a blocked account
  - v. Set a maximum time to perform logon
  - vi. Only the minimum information required during logon is displayed
  - vii. Only the minimum information required for login is requested
  - viii. No help is available during logon
  - ix. No system information is shown until logon succeeds
  - x. Connection information is only validated when all the data entries have been completed
  - xi. It is displayed a message indicating the proper use of the system (see security configuration)
  - xii. After connection, display the date and time of the previous successful connection
  - xiii. After connection, the failed attempts are shown
  - xiv. Passwords cannot be saved in any automatic process (macros, function keys, etc.)
- h. Connection time is limited
  - i. Mechanisms to limit the amount of time in which each type of connection can

- be established
  - ii. Systems access restriction at specific scheduled work times
  - iii. Re-authentication is requested for certain activities classified as critical
  - i. Session management
    - i. Invalid session IDs are not accepted
    - ii. Unique session identifiers are used
    - iii. Session IDs are unpredictable
    - iv. Session IDs are disabled at the end of the session
    - v. Cannot reuse session IDs
    - vi. There is a limit on the number of concurrent sessions by one user
  - j. Automatic terminal disconnection
    - i. Automatic activation of the screen saver with password after an idle period
    - ii. Automatic disconnection of sessions or high risk inactive terminals
- (2) H.ST Segregation of tasks
- The system shall implement segregation of tasks with Administration and operation responsibilities are separated

- (3) AC.6 Protection of remote diagnosis ports
- The system shall implement protection of remote diagnosis ports in accordance with:
- a. Encryption
  - b. User authentication
  - c. Privileges are restricted to a minimum
  - d. Actions during diagnosis are logged

### **2.3 D - Protection of Data / Information**

- (1) D.C Encryption of information
- The system shall implement confidentiality protection for data in accordance with:
- a. Encryption mechanism (options)
    - i. Shared secret (symmetric encryption) - AES-192 (192 bits) or higher
    - ii. Public key cryptography RSA (+ session key) - RSA-2048 + AES-128 or higher
    - iii. Based on public key cryptography ECC (+session key) - ECC-256 + AES-128 or higher
  - b. Certified / accredited algorithms are used
- (2) D.backup Backup copies of the data
- The system shall implement backup copied of data:
- a. Management of backup copies

- i. Making copies of decryption keys
  - ii. Making copies of the signature verification information
- b. Backup mechanism
  - i. Media
- c. Protection of backup copies
  - i. Backups are encrypted

## **2.4 K - Protecting cryptographic keys**

### **(1) K.comms Protecting communications keys**

The system shall implement protection of communication keys:

- a. Operation
  - i. Keys are regularly replaced
  - ii. Compromised keys are replaced
  - iii. Keys under suspicion are replaced
  - iv. Out-of-service keys are destroyed
  - v. Signature certificates are revoked when they are no longer valid
- b. Key generation
  - i. Software application
- c. Key storage
  - i. Software container with access control
- d. Copies of keys are retained
  - i. Storage media
  - ii. Access to keys is controlled
  - iii. Copies of encryption keys are retained
  - iv. Copies of decryption keys are retained
  - v. Copies of key certificates are retained

### **(2) K.509 Certificate management**

The system shall implement certificate management:

- a. Certificates are revoked when compromised, or there is suspicion of it
- b. Certificates have a limited validity period and are regularly renewed

## **2.5 S - Protection of Services**

### **(1) S.SC Secure configuration baseline is applied**

The system shall implement secure configuration baseline:

- a. Reduction of service options to the minimum required (services)
- b. User accounts included by default in the products are removed or modified

- c. Administrator accounts included by default in the products are removed or modified
- d. Only authorised security administrators can modify the configuration
- e. Enabled services are subject to a secure configuration
- f. The rule of 'secure by default' is applied

(2) S.dir            Directory protection

The system shall implement directory protection

- a. X.500 or LDAP V3 Standard
- b. Administrator authentication
- c. Administration activities are logged
- d. Integrity of stored data
- e. User authentication
- f. Intrusion detection
- g. Directory monitoring and diagnosis

(3) S.dns            DNS service protection

The system shall implement DNS service protection

- a. Internal name / address resolution services is from authoritative sources
- b. Authentication is required to modify data
- c. Data modifications are logged
- d. DNS poisoning - Preventive measures
- e. Response authentication
- f. Response integrity guarantee
- g. Architecture - Internal server does not respond to external queries
- h. The DNS service is not run as a privileged account
- i. Implement DNSSEC (Domain Name Security Extensions)
- j. DNS-Zones re-signed with DNSSEC
- k. DNS resolvers validates DNSSEC if used.

(4) VoIP            Voice over IP

The system shall implement Voice over IP:

- a. VoIP usage monitoring
- b. IP phones and VoIP servers are separated onto different networks from other CIS devices
- c. VoIP Devices authenticate to a VoIP server
- d. IP Phones are secured like other network devices
- e. VoIP protocols are protected between VoIP endpoints and servers.
- f. Interconnection between VoIP VLAN and mixed data VLAN is through a BPS.

- g. VoIP traffic leaving the security domain uses approved network encryption for confidentiality
  - i. Cryptographic protection - Encryption mechanism
    - 1. Shared secret (symmetric encryption) - AES-128 (128 bits) or higher
    - 2. Public key cryptography RSA (+ session key) - RSA-2048 + AES-128 or higher
    - 3. Based on public key cryptography ECC (+session key) - ECC-224 + AES-128 or higher
  - ii. Cryptographic protection - Certified / accredited algorithms are used

## **2.6 SW - Protection of Software**

- (1) SW.SC Secure configuration baseline is applied

The system shall implement secure configuration baseline:

- a. Reduction of application options to the minimum required (SW)
- b. User accounts included by default in the products are removed or modified
- c. Administrator accounts included by default in the products are removed or modified
  - i. Only authorised security administrators can modify the configuration
  - ii. Enabled functions are subject to a secure configuration
  - iii. The rule of 'secure by default' is applied
  - iv. Logging of application use is enabled

- (2) SW.op Operation

The system shall implement the following in relation to software operation:

- a. Production systems have no development tool
- b. Security of applications
  - i. Input data validation – Error Control
    - 1. Verification of the range of values
    - 2. Verification of the type of input data
    - 3. Verification of the completeness of input data
    - 4. Verification of data volume
    - 5. Verification of unauthorised or inconsistent data
- c. Application data files security
  - i. Confidentiality
  - ii. Integrity
  - iii. Backup copies
- d. Security of configuration files
  - i. Integrity
  - ii. Backup copies

- iii. Confidentiality
- e. Security of system files
  - i. Backup copies
  - ii. Integrity is assured
  - iii. Confidentiality is assured
- f. Mobile Code. execution is controlled (e.g. Java, JavaScript, ActiveX, PDF, Postscript, Shockwave, Flash, VBScript, ...)
  - i. Code origin is verified
  - ii. Code integrity is verified
  - iii. Code is analysed looking for malicious Req. ID.
  - iv. Mobile Code output is controlled
  - v. The use of mobile Code is monitored
  - vi. The download or automatic execution of unauthorized mobile code is blocked.

## **2.7 HW Protection of Hardware**

- (1) HW.SC Secure configuration baseline is applied

The system shall implement secure configuration baseline:

- a. Only authorised security administrators can modify the configuration
- b. Reduction of options to the minimum required (HW)
- c. Enabled functions are subject to a secure configuration
- d. Reduce of devices to the minimum required
- e. Enabled devices are subject to a secure configuration
- f. The rule of 'secure by default' is applied
- g. Removal of unused components
- h. Activity logs are enabled

- (2) HW.4 Secure configuration of BIOS / UEFI

The system shall implement secure configuration of BIOS / EEFI:

- a. The activated functions are limited to the minimum necessary
- b. Secure boot capability is activated
- c. Enabled functions are subject to a secure configuration
- d. BIOS / UEFI is protected with password
- e. Only authorised security administrators can modify the configuration

- (3) HW.12 Protection of network devices

The system shall implement protection of network devices:

- a. Identification of all the terminals connected (MAC address, static IP address, etc.)
- f. Terminal identification cannot be modified by the user



- g. Devices are identified and authenticated before connecting to the IS
- h. Disabling of all services and utilities which are not used
- i. Access to administration consoles is controlled
- j. Automatic disconnection of inactive sessions
- k. Removal or modification of preconfigured accounts and passwords
- l. Ban on groups of shared administrator accounts
- m. Remote administration
  - i. Remote administration is restricted
    - 1. Secure protocols are used for remote administration
    - 2. Strong authentication used for remote administration

## **2.8 COM - Protection of Communications**

- (1) COM.SC Secure configuration baseline is applied

The system shall implement secure configuration baseline:

- a. Communication options are reduced to the minimum required
- b. User accounts included by default in the products are removed or modified
- c. Administrator accounts included by default in the products are removed or modified
- d. Only authorised security administrators can modify the configuration
- e. Enabled services are configured securely
- f. The rule of 'secure by default' is applied
- g. Activity logs are enabled

- (1) COM.cont Availability guarantees

The system shall implement availability guarantees:

- a. Links and network devices are monitored
- b. There are backup copies of configuration information
- c. There are backup copies of authentication keys
- d. There are backup copies of decryption keys

- (2) COM.aut Channel authentication

The system shall implement channel authentication:

- a. Authentication of the origin of the connection
- b. Authentication mechanism
  - i. Something you know - passwords
    - 1. Passwords are handled as classified information at a level equal to or greater than the system they protect
    - 2. It is the user who chooses his own password
    - 3. Passwords are easy to remember but hard to guess

- a) Passwords have a minimum length (12 characters)
- b) They contain alphanumeric characters, in upper and lower case
- c) They have no relation to the user identification, i.e. names or date of birth
- d) The same characters do not appear consecutively
- e) They are not easily vulnerable to dictionary attacks
- 4. Users guarantee password confidentiality
  - a) Are not stored in files (unless encrypted)
  - b) Are not included in automatic connection processes (SW code, web pages, etc.)
- 5. Previous passwords are not re-cycled
- 6. Passwords have a maximum usage period
  - a) less than 1 year
- 7. Initial passwords
  - a) have a limited validity period
  - b) The user has to change the password after the first usage
- 8. Verification information is protected
  - a) is stored separately from application system data
  - b) passwords cannot be decrypted (e.g. a hash value is used)
  - c) do not enable dictionary attacks
- ii. Software certificates (public-key cryptography)
  - 1. Usage is password-protected
  - 2. Certificate management
    - a) Certificates have a limited validity period and are regularly renewed
  - 3. Certified or accredited products are used

(3) COM.I Protection of the integrity of the data in the channel

The system shall implement protection of the integrity of the data in the channel using one of the following options:

- a. MAC-based mechanism (Message Authentication Code)
  - i. Certified / accredited algorithms are used
- b. HMAC-based mechanism according to FIPS 140-2
  - i. Certified / accredited algorithms are used
- c. Hash Mechanism - SHA-224 (224 bits) or higher
  - i. Certified / accredited algorithms are used

(4) COM.C The confidentiality of the data is cryptographically protected in the channel

The system shall implement measures to cryptographically protect data confidentiality in the

channel

- a. Implementation of algorithms
  - i. Logical device
- b. Shared secret (symmetric encryption)
  - i. AES-128 (128 bits) or higher
- c. Certified / accredited algorithms are used
- d. A certified or accredited product is used

(5) COM.13 Network access control

The system shall implement network access control

- a. Control of connection to networks
  - i. Traffic control and filtering
    - 1. By type
    - 2. By flow direction
    - 3. By origin / destination
- b. Authentication of network nodes
  - i. Unique identification of each node (address, name, etc.)
  - ii. Authentication mechanism
    - 1. Passwords
    - 2. By means of CHAP protocol (Challenge Handshake Authentication Protocol)
    - 3. Cryptographic methods (e.g. PKI)
- c. Routing control
  - i. Based on permitted information flows
  - ii. Checks on origin and destination addresses

(6) COM.DS Segregation of networks into domains

The system shall implement segregation of networks into domains:

- a. Access control
  - i. The point of interconnection is monitored
- b. Network segregation into domains
  - i. Logic separation by means of virtual networks (VLAN)

**2.9 M - Protection of Media**

(1) M.3 Connection of removable devices is under control

The system shall implement control on the connection of removable devices:

- a. The connection is logged
- b. Autorun is not executed when connecting the device

- c. Disconnection is logged
- d. It is analysed existence of malicious code. in the data transferred

## **2.10 Tools - Security tools**

### **(1) tools.AV Tool against harmful code (malware)**

The system shall implement a tool against harmful code (malware) – Application Control & Antivirus:

- a. There are protection measures for harmful code.
- b. Up-to-date software maintenance
- c. Virus database is continuously updated
- d. Software, data, and critical systems are regularly reviewed
- e. Non-authorized software and files are regularly reviewed
- f. Programs and services are reviewed during boot
- g. Virus scan when system is started up and in each application
- h. Virus scan on web pages
- i. Scanning of downloaded files
- j. Scanning of files received on removable computer storage media
- k. Removable media are analysed when connected to the information system
- l. Virus scan carried out from various points on the network
- m. Certified or accredited products are used

### **(2) tools.FIM FIM: File Integrity Monitoring**

The system shall implement file integrity monitoring:

- a. It is possible to manage the tool, installed in a specific system or in a certain subnet, from a centralized management system
- b. It is possible to generate reports in various formats (.html, .txt) and according to different criteria (depending on the system, the network, the production signature)
- c. Real time alarms
- d. Certified or accredited products are used

### **(3) tools.SFV Security functions verification**

The system shall implement security functions verification:

- a. on start-up
- b. upon command by authorised administrator

## **2.11 A - Logging and audit**

### **(1) A.2 Tools**

The system shall implement connection to security logging and audit tool

- a. Centralized registry, On premises or Remote
- b. Clock synchronisation
  - i. Automatic synchronisation
    - 1. Automatic synchronisation with a centralised proprietary clock
  - ii. Users cannot change the clocks on their stations

(2) A.3 Information

The system shall implement setting in order to produce security log information:

- a. The logged events and the information about these events is configurable
  - i. Information
    - 1. User identification
    - 2. Terminal identification
    - 3. Process identification
    - 4. Date and time
    - 5. Type of event
    - 6. Result of the event (fault or success)
  - ii. Events
    - 1. System start up and shutdown
    - 2. User logon and logoff
    - 3. Logon attempts
    - 4. Accepted and denied access attempts to data and other resources
    - 5. Export (e.g. upload) and import (e.g. download) events
    - 6. Operations with privileges are logged
      - a) Changes in user and group authorisation and privileges
      - b) Changes in the information relevant to the management of system security (including audit functions)
      - c) Start-up and shutdown of the audit functions (services)
      - d) Access to system security information
      - e) Changes in the system date and time
- a. Protection of audit information
  - i. Audit information is protected against unauthorised read access
- b. Logs are time stamped
- c. Audit information is retained for the established period

(3) A.4 Activities

The system shall implement security log activities in the case of:

- a. Audit processing failure
  - i. There is a mechanism to detect the depletion of space for logging
  - ii. There is a mechanism to detect the failure of monitoring processes

- iii. There is an alarm and reporting mechanism

**2.12 NEW Acquisition / development**

- (1) NEW.C Certified / accredited products are used

The system shall implement certified / accredited products:

- a. The fitness of the product for the task is verified in advance
  - i. Expected threats were considered in the certification process
  - ii. Availability is assured
  - iii. Integrity is assured
  - iv. Confidentiality is assured
  - v. Authenticity is assured
  - vi. Accountability is assured
  - vii. The product is certified to resist to the expected attack potential
- b. The certificate or accreditation is currently valid
- c. Assumptions on the environment are met by the product

**2.13 TEMPEST - Emanation protection (TEMPEST)**

- (1) TEMPEST.3 Equipment installation & cabling (power / data)

The system shall following equipment installation & cabling (power / data) according to standard SDIP-29 (current version).

# **NATO Communications and Information Agency**

CO-15577-SSSB

## **Common Documents Project Security Instructions**

### **BOOK II PART IV – STATEMENT OF WORK SOW - ANNEX K**



Rev: - (18 Jan 2021)

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**1. INTRODUCTION**

**1.1 Purpose**

- (1) This document contains the Project Security Instructions (PSIs) for the Contract CO-15577-SSSB and is issued pursuant to C-M (2002)49-COR12 (Reference [A]) published by the NATO Security Committee and its supporting directives as described in Reference [B] and in particular the directive of Reference [C] and of Reference [D].
- (2) It describes the Contractor's obligations to protect NATO classified information against related security threats (i.e. espionage, compromise, or unauthorised disclosure) and provides specific security rules, regulations and procedures, which shall be applied by the Contractor addressing the minimum security requirements for the protection of NATO classified information received or produced under the Contract.
- (3) This document forms part of the Contract and provides direction to ensure compliance by Contractor on the protection of NATO classified information.
- (4) This document describes the security requirements for Article 11 of General Provision of the Contract and Article 12 of Special Provisions of the Contract.
- (5) The PSIs are to be reviewed regularly and amended as necessary in consultation with the contract NSAs/DSAs so that any sensitivities relating to the Contract are identified and managed to ensure that the most appropriate degree of security is afforded throughout the Contract.
- (6) The NSAs/DSAs/SAsAs are responsible for the implementation and oversight of security for NATO classified information entrusted to their Contractors.

**1.2 References**

- (1) The references for these PSIs are listed in

<b>Reference</b>	<b>Document Title</b>	<b>Number / Edition Revision</b>	<b>Date</b>
[A]	NATO Security Policy	C-M(2002)49-REV1	20-Nov-20
[B]	"Roadmap" to NATO Security Policy, Supporting Directives, Supporting Documents and Guidance Documents	Version 3.0	26-Jan-21
[C]	Directive on Classified Project and Industrial Security	AC/35-D/2003-REV5	13-May-15
[D]	Technical and Implementation Directive on Supply Chain Security for COTS CIS Security Enforcing Products	AC/322-D(2017)0016 (INV)	30-Mar-17
[F]	Air Command & Control (AirC2) Security Accreditation Board (ASAB) Security Accreditation Strategy (ASAS)	NCIA/AIRC2POS/2017/0070 4, Version 1.0	10-May-17
[G]	Directive on the Security of Information	AC/35-D/2002-REV5	25-Nov-20
[H]	Directive on Personnel Security	AC/35-D/2000-REV8	25-Nov-20
[I]	INFOSEC Technical & Implementation Directive for the Interconnection of Communication and Information Systems (CIS)	AC/322-D/0030-REV5	23-Feb-11

<b>Reference</b>	<b>Document Title</b>	<b>Number / Edition Revision</b>	<b>Date</b>
[K]	Supporting Document on the Interconnection of NATO RESTRICTED CIS to the Internet	AC/322-D(2010)0058	21-Dec-10
[L]	INFOSEC Technical & Implementation Directive for CIS Security	AC/322-D/0048-REV3	09-Dec-19
[M]	Security Operating Procedures (SecOPs) for End-users of NATO RESTRICTED Automated Information System (NR AIS)	NCIA/SDel/RD/0046	08-Dec-14

(2) Table 1 below:

<b>Reference</b>	<b>Document Title</b>	<b>Number / Edition Revision</b>	<b>Date</b>
[A]	NATO Security Policy	C-M(2002)49-REV1	20-Nov-20
[B]	"Roadmap" to NATO Security Policy, Supporting Directives, Supporting Documents and Guidance Documents	Version 3.0	26-Jan-21
[C]	Directive on Classified Project and Industrial Security	AC/35-D/2003-REV5	13-May-15
[D]	Technical and Implementation Directive on Supply Chain Security for COTS CIS Security Enforcing Products	AC/322-D(2017)0016 (INV)	30-Mar-17
[F]	Air Command & Control (AirC2) Security Accreditation Board (ASAB) Security Accreditation Strategy (ASAS)	NCIA/AIRC2POS/2017/0070 4, Version 1.0	10-May-17
[G]	Directive on the Security of Information	AC/35-D/2002-REV5	25-Nov-20
[H]	Directive on Personnel Security	AC/35-D/2000-REV8	25-Nov-20
[I]	INFOSEC Technical & Implementation Directive for the Interconnection of Communication and Information Systems (CIS)	AC/322-D/0030-REV5	23-Feb-11
[K]	Supporting Document on the Interconnection of NATO RESTRICTED CIS to the Internet	AC/322-D(2010)0058	21-Dec-10
[L]	INFOSEC Technical & Implementation Directive for CIS Security	AC/322-D/0048-REV3	09-Dec-19
[M]	Security Operating Procedures (SecOPs) for End-users of NATO RESTRICTED Automated Information System (NR AIS)	NCIA/SDel/RD/0046	08-Dec-14

**Table 1 - References**



**1.3 Authority**

- (1) Requests for clarification or recommended changes or revisions to this PSI shall be directed to Purchaser Security Officer (Purchaser SO), who will co-ordinate as appropriate with the relevant authorities. Changes will not be made without notification and approval of the Purchaser Security Officer.

**1.4 Definitions**

- (1) The applicable abbreviations and definitions of frequently used terms are listed in Table 2:

Access	The ability and opportunity to obtain knowledge of classified information
Purchaser SO	A nominated Security Officer from the Purchaser responsible for the overall security activities for the Project.
AIS	Automatic Information System
AfT	Approval for Testing
Attestation of Personnel Security Clearance (APSC)	An approved format to confirm the security clearance level of an individual in the context of a contract involving NATO classified information.
Breach of Security	An act or omission, deliberate or accidental, contrary to NATO Security Policy and supporting directives, that results in the actual or possible compromise of NATO classified information or supporting services and resources (including, for example, classified information lost while being transported; classified information left in an unsecured area, where persons without an appropriate PSC have unescorted access; an accountable document cannot be found; classified information has been subjected to unauthorised modification; destroyed in an unauthorised manner or, for CIS, there is a denial of service).
CIS	Communication Information System. An assembly of computer hardware, software, and firmware configured for the purpose of automating the functions of calculating, computing, sequencing, storing, retrieving, displaying, communicating, or otherwise manipulating data, information, and textual material.
CIS Security	The application of security measures for the protection of communication, information and other electronic systems, and the information that is stored, processed or transmitted in these systems with respect to confidentiality, integrity, availability, authentication and non-repudiation.
Classified Information	Any information (namely, knowledge that can be communicated in any form) or material determined to require protection against unauthorised disclosure and which has been so designated by a security classification.
Classified Meeting	A conference, seminar, symposium, exhibition, convention, or other gathering that is conducted by a participant or by a cleared Contractor during which classified information is disclosed.
Commercial Courier Company	Commercial company that offers a service where a consignment is moved under a trace and tracking scheme.
Compromise	Compromise denotes a situation when - due to a breach of security or adverse activity (such as espionage, acts of terrorism, sabotage or theft) - NATO classified information has lost its confidentiality, integrity or availability, or supporting services and resources have lost their integrity or availability. This includes loss, disclosure to unauthorised individuals (e.g. through espionage or to the media) unauthorised modification, destruction in an unauthorised manner, or denial of service.
Confidentiality	The property that information is not made available or disclosed to unauthorised individuals or entities.
Contract	A legally enforceable agreement to provide goods or services.

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Contractor	An industrial, commercial or other entity that seeks or agrees to provide goods or services.
Courier	A person officially assigned to hand-carry material.
Document	Any recorded information regardless of its physical form or characteristics, including, without limitation, written or printed matter, data processing cards and tapes, maps, charts, photographs, paintings, drawings, engravings, sketches, working notes and papers, carbon copies or ink ribbons, or reproductions by any means or process, and sound, voice, magnetic or electronic or optical or video recordings in any form, and portable IT equipment with resident computer storage media, and removable computer storage media.
Facility Security Clearance (FSC)	An FSC is an administrative determination by which an NSA/DSA formally recognises the capacity and reliability of Contractor's facilities to manage generate and have access to NATO classified information up to a certain level.
Infraction	A security infraction is an act or omission, deliberate or accidental; contrary to NATO Security Policy and supporting directives that does not result in the actual or possible compromise of NATO classified information. (E.g. classified information left unsecured inside a secure facility where all persons are appropriately cleared, failure to double wrap classified information, etc.).
Information	Any information provided to, generated in, or used in the Contract. This information may be of any form or type. (I. e including scientific, technical, business, or financial data, and includes photographs, reports, manuals, threat data, experimental data, test data, designs, computer software, specifications, processes, techniques, inventions, drawings, technical writings, sound recordings, pictorial representations, and other graphic presentations). Data also includes magnetic tape, computer memory, or any other forms and whether or not subject to copyright, patent, or other legal protection.
IVCP	International Visit Control Procedures
NATO Classified Information	Means information or material determined by or on behalf of NATO to require protection against unauthorised disclosure which has been so designated by a security classification NR or above.
NATO RAP	NATO Recognised Air Picture
Need-to-know	The principle according to which a positive determination is made that a prospective recipient has a requirement for access to, knowledge of, or possession of information in order to perform official tasks or services .
National Security Authority (NSA)	An authority of a NATO nation which is responsible for the maintenance of security of NATO classified information in national agencies and elements, military or civil, at home or abroad.
Personnel Security Clearance (PSC)	A determination that an individual is eligible to have access to classified information.
Personnel Security Clearance Certificate (PSCC)	An approved format used by NSAs/DSAs to confirm the level and validity of a PSC.
Project Security Classification Guide (PSCG)	Part of the program (project) security instructions (PSI) which identifies the elements of the program that are classified, specifying the security classification levels. The security classification guide may be expanded throughout the program life cycle, and the elements of information may be re-classified or downgraded.
Risk	The likelihood of a vulnerability being successfully exploited by a threat, leading to a compromise of confidentiality, integrity and/or availability and damage being sustained.

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Subcontractor	Any agreement, contract, subcontract or purchase order made by the Contractor with any other party in order to fulfil any part of this Contract. A contractor to whom a prime Contractor lets a sub-contract.
Threat	The potential for compromise, loss or theft of NATO classified information or supporting services and resources. A threat may be defined by its source, motivation or result, it may be deliberate or accidental, violent or surreptitious, external or internal.
Vulnerability	A weakness, an attribute, or lack of control that would allow or facilitate a threat actuation against NATO classified information or supporting services and resources.

**Table 2 - Definitions**

**2. SECURITY INSTRUCTIONS**

**2.1 Records of Employees**

- (1) The Contractor shall maintain a record of his employees taking the project and who have been cleared for access to NATO classified information. This record must show the period of validity and the level of the clearances.

**2.2 Security Classifications and Markings**

- (1) Security classifications used for the Contract shall indicate the sensitivity of NATO information and are applied in order to alert recipient to the need to ensure protection, in accordance with Reference [G], in proportion to the degree of the damage that would occur from unauthorised access or disclosure. The security classifications shall be applied only to those aspects of a contract that must be protected, and the level of such classifications must be strictly related to the degree of protection required.
- (2) The word “NATO” is a qualifying marking which signifies that the document is the property of NATO even if the containing information remains the property of the owner (see Part 2, Article 21 for the rights granted to the Purchaser on background/foreground information delivered under this Contract). The originator of the information is responsible for determining the security classification and initial dissemination of information (see Appendix 3). The classification level of NATO information shall not be changed, downgraded or declassified without the consent of the NCI Agency as the Contracting Authority.
- (3) The following principles apply to the marking of NATO information for the Contract:
- a. NATO SECRET (NS) – where unauthorised disclosure would result in grave damage to NATO;
  - b. NATO CONFIDENTIAL (NC) – where unauthorised disclosure would be damaging to NATO;
  - c. NATO RESTRICTED (NR) – where unauthorised disclosure would be detrimental to the interests or effectiveness of NATO.
  - d. NATO UNCLASSIFIED (NU) – where unauthorised access would be undesirable and shall be granted only based a “need-to-know” principle (e.g. internal used only) but does not required specific security protection. NU information is no considered as NATO classified information.
- (4) The classification of a compilation of information from more than one source shall be co-ordinated among the sources to determine the appropriate NATO security classification.
- (5) The Contractor shall not change any level of security classification or de-classification of documentation or material, which may be carried out unless written authority in this respect is obtained from the Purchaser.
- (6) The initial assessment that information should be classified, which was not previously identified for classification in a contract, may be made by the Contractor. In such case, the Contractor shall recommend to take appropriate classification action. However, the decision to classify information ultimately is the responsibility of the Contracting Authority or other designated classification authority.
- (7) In the absence of clearly defined classification guidance, the Contractor may forward a classification proposal to the Purchaser SO regarding interim classification, which when reviewed and approved may update the Contract Project Security Classification Guide (PSCG).

**2.3 Personnel Security Clearances (PSCs)**

- (1) All Contractor/Subcontractor personnel handling NATO classified (e.g. NC/NS) information shall possess a valid Personnel Security Clearance (PSC) at the appropriate level defined based on the Reference [A], Reference [C], Reference [H] and defined in Reference [J], have a “need-to-know” and shall be briefed on security procedures and their responsibilities by the nominated

Facility Security Officer acknowledging in writing that they fully understand their security responsibilities and the potential consequences if information passes into unauthorised hands either by intent or through negligence. A record of the acknowledgement of responsibilities by Contractor's employees shall be retained by the Contractor Security Officer.

- (1) The Contractor shall deny access to NATO classified information to any persons other than those authorised to have access with appropriate PSC and determined by the "need-to-know" requirement.

#### **2.4 Protection of NATO classified information**

- (1) All NATO classified information generated, held, used, or exchanged in connection with the Contract shall be stored, handled, safeguarded and transmitted in accordance with the NATO Security Policy as stated in C-M(2002)49 (Reference [A]) and all its supporting directives and guidelines, contract requirements and applicable national laws and regulations.
- (2) The Contractor shall apply appropriate security mechanism and protection level for NATO information up to including NATO SECRET.

##### **2.4.1 Storage**

- (1) Storage of NATO classified Contract information and material is only permitted at sites for which an appropriate facility clearance in proportion to the security classification of such information and material has been issued by the responsible NSA/DSA.
- (2) NATO SECRET and NATO CONFIDENTIAL Information shall not be left unattended or handled in a manner that could result in unauthorised access. It shall be stored in an approved safe or steel file cabinet that has an automatic locking mechanism and is afforded supplemental protection (NSA/DSA approved Intrusion Detection Systems or NSA/DSA approved Security Guard services) during non-working hours. When NATO SECRET and NATO CONFIDENTIAL information is not secured in a NSA/DSA approved container it may only be worked on in a restricted or closed area that prevents unauthorised personnel access to the information or material.
- (3) NATO RESTRICTED information shall not be left unattended or handled in a manner that could result in unauthorised accesses. It may be stored in locked desks, cabinets, or similar containers to which access is restricted. It may also be secured in the open in locked rooms, provided access to the room is restricted to persons who are authorised access to the information. During travel, the information must remain in the personal custody of the carrier or be secured at all times. It may not be left unattended in hotel rooms or vehicles. It may not be read in public.
- (4) Unless specifically mandated by NSA/DSA or Contracting Authority, NR information is not required to be individually recorded or processed through a Registry System

##### **2.4.2 Access**

- (5) Access to NATO UNCLASSIFIED Information shall be limited to individuals having a need-to-know. NATO UNCLASSIFIED Information does not require security protection. NATO UNCLASSIFIED Information may only be released to the general public (non-NATO nations, organisations, and individuals) when such release would not be against the interest of NATO.
- (6) Access to NATO classified information applicable for the Contract (e.g. NR and above up to including NS) shall be provided only to facilities or persons whose access is necessary in connection with their involvement in the Contract. All persons who are to be given access to the information shall be informed of and acknowledge their responsibilities for protecting the information.

##### **2.4.3 Destruction**

- (1) Destruction of NATO UNCLASSIFIED information is individual responsibility and shall be destroyed in a manner that it cannot be easily reconstructed in full or in part (e.g. paper copies shall be shredded before being thrown into a bin; computer disks shall be erased with NATO approved tools).

- (2) The Contractor shall destroy or return any classified information provided or generated under the Contract unless the contracting authority has given written approval. Documents or other media containing NATO classified information shall be destroyed by any method approved for the destruction of classified information. The Contractor/Subcontractor shall keep a record of destruction for NATO information classified NATO CONFIDENTIAL/ NATO SECRET.

#### **2.4.4 Unauthorised Disclosure**

- (1) The unauthorised disclosure of NU information shall be processed through an administrative process, and appropriate action shall be taken against those responsible. The unauthorised disclosure shall be reported to the Contractor security office.

### **3. NATIONAL / NATO / INDUSTRY OFFICIALS ROLES AND RESPONSIBILITIES**

#### **3.1 National Security Authority/ Designated Security Authority**

- (1) The NSA/DSA is responsible for the implementation and oversight of security for NATO classified information entrusted to their contractors. The NSAs/DSAs/SAsAs shall ensure that they have the means to make their security requirements upon the Contractor and that they have the right to inspect and approve the measures taken by the Contractor in compliance with Reference [A] for the protection of NATO classified information.
- (2) The NSA/DSA of the contractor nation is responsible for ensuring that contractor's facility under its jurisdiction has adopted the protective security measures necessary to qualify for a Facility Security Clearance (FSC) and to issue security accreditation statements for the CIS that are storing, processing or transmitting classified information.
- (3) In granting a FSC, the NSA/DSA shall ensure that they have the means to be advised of any circumstances that could have a bearing upon the viability of the clearance granted. This may include: a transfer or the controlling interests in the facility, a realignment of the business associations, the replacement of any of its directors, a change in its physical location, an alteration to the premises it occupies or a variation in security procedures.

#### **3.2 Contractor and Subcontractor(s)**

- (4) The prime Contractor and any Subcontractor(s) are required comply with NATO security regulations as implemented by the NSA/DSA of the nation in which the work is performed, in particular, with all security requirements laid down in this Contract for handling, storing and/or transmitting NATO classified information in this PSI.
- (5) The Contractor is responsible for the safeguarding of classified information, documentation, material and equipment entrusted to him or generated by him in connection with the performance of the Contract.
- (6) The Contractor shall submit in due time to the NSA/DSA the personal particulars of the person the Contractor wishes to employ on the project with a view to obtaining PSCs at the required level where NC and above is involve.
- (7) The Contractor shall maintain, preferably through this officer responsible for security measures, a continuing relationship with the NSA/DSA and / or the Contracting Authority in order to ensure that all NATO classified information involved in the bid, contract or subcontract is properly safeguarded.
- (8) The Contractor, with the signature of the Contract, acknowledges receipt of these PSIs, confirms that it understands and complies with the security aspects defined within this document.

##### **3.2.1 Facility Security Officer (FSO)**

- (1) A FSO shall be in place for a Contractor/Subcontractor to be granted an FSC. The FSO shall be responsible for the overall protection of NATO classified information and obliged to ensure the effective implementation of security requirements and procedures within the facility involved in any contract/subcontract requiring access to NATO classified information.

- (2) The FSO shall, in accordance with national laws and regulations, serve as the main point of contact between the Contractor/Subcontractor and the Contracting Authority or relevant NSA/DSA for all security related aspects. When appointing the FSO, the following requirements apply:
- e. The FSO shall be:
    - i. A citizen of the nation where the facility is located, or a citizen of a NATO nation;
    - ii. An employee of the Contractor/Subcontractor;
    - iii. Granted a PSC at the appropriate level;
    - iv. A part of the facility's management, or reporting directly to one of the members of the management in order to exercise security authority;
  - f. The FSO shall undertake appropriate briefing and/or training regarding protective security and threat awareness;
  - g. The responsible NSA/DSA should endeavour to create and maintain a close cooperation with the FSO.
- (3) The FSO is responsible for the following tasks:
- a. Establishing and maintaining a system of procedures and measures for the protection of NATO classified information. These measures must ensure that all security requirements specified for personnel security, physical security, security of information and CIS security (CISS) are adhered to and are in place throughout the lifetime of the classified project/contract;
  - b. Reporting to the responsible NSA/DSA any circumstances that may have an impact on the status of the FSC (e.g. changes in the ownership or key management personnel, changes in personnel who are involved in the classified project, changes to physical security, security of information and CISS, etc.), or PSCs (e.g. changes to or other circumstances which necessitate revalidation or which may adversely affect the individual's loyalty, reliability and trustworthiness, etc.);
  - c. Reporting to the responsible NSA/DSA any suspected espionage, sabotage or subversive activities at the facility, including any indication of loss, compromise or suspected compromise of NATO classified information and any other security risks concerning NATO classified information;
  - d. Providing initial security briefings to new employees, and to all cleared persons before they are given access to NATO classified information. Providing periodic security training and security awareness programs for all personnel as required and conduct debriefings with individuals who are terminating employment on their continuing responsibilities concerning the safeguarding of NATO classified information they have accessed;
  - e. Conducting periodic security spot-checks or inventories as required of their facility;
  - f. Initiating a preliminary enquiry to ascertain the circumstances of any security violation, submit an initial investigation report of the security incident and final report including the corrective actions taken to the responsible NSA/DSA;
  - g. Cooperating in security inspections and investigations undertaken by the responsible NSA/DSA for assessing the protection of NATO classified information and assist in personnel security investigations of current or former employees; complying with any procedure that is, or may be, established by the NSA/DSA regarding the safeguarding and release of NATO classified information related to the contract/subcontract.

### **3.2.2 Facility Security Clearance**

- (1) The Contractor shall obtain and maintain a Facility Security Clearance (FSC) for managing, generating or having access to NATO Classified information up to and including NATO SECRET. The FSC of the Contractor's facility shall be verified through the relevant NSA/DSA. No NATO classified material are to be provided prior to this event.

**3.3 Purchaser / Contracting Authority**

- (1) NCI Agency acts as the relevant Purchaser and Contracting Authority for this Contract.
- (2) The Purchaser shall notify, via Purchaser SO, the NSA/DSA of the nation with jurisdiction over the Contractor about the Contract, which involves classified information at the level NS, to include details on the nature of services or work to be performed by the Contractor, the security classification, the nature and volume of classified information to be generated and handled by the Contractor as well as any other relevant security aspects.
- (3) The Contracting Authority shall obtain the respective assurance from the responsible NSA/DSA by using the Facility Security Clearance Information Sheet (FSCIS) defined in Appendix 5 in accordance with Reference [C].



**3.3.1 Personnel Security Clearances**

- (1) Personnel security clearances are required for access to information classified NATO CONFIDENTIAL and above. The Contractor facilities that require access to NATO CONFIDENTIAL information and above, shall be security cleared.

**3.3.2 Reproduction**

- (1) Reproduction of documents or information classified NR may be reproduced by individuals authorised for access to the information and on equipment with controlled access.

**3.3.3 Dissemination**

- (1) The Contractor shall limit the dissemination of NATO classified information to the smallest number of persons as is consistent with the proper execution of the Contract or Subcontract(s).

**3.4 Security Incidents**

- (1) Actual or possible loss or compromise of classified information shall be reported to the relevant FSO. The FSO will report the incident to the applicable NSA/DSA and Purchaser SO, as applicable, in addition to reporting procedures prescribed by national / NATO regulations.
- (2) The FSO of the facility where a violation or compromise may have occurred will investigate all such occurrences and inform their NSA/DSA of the results. NSA/DSA will promptly and fully inform other NSAs/DSAs and AirC2 Security Accreditation Board (ASAB) via the ASAB Chairman of the known details of any such occurrences, provide updates and final results on the investigation the corrective actions taken to preclude recurrences.
- (3) Reports on the loss or compromise, or possible compromise, shall include as a minimum the following details:
  - a. A description of the circumstances.
  - b. The date or the period of the occurrence.
  - c. The date and place of discovery and location of the occurrence. The security classification and markings of the information involved in the incident.
  - d. Specific identification of the information or material, to include originator, subjects, reference, date, copy number, and language.
  - e. Assessments of the likelihood of compromise (i.e., "certain," "probable," "possible," or "unlikely").
  - f. A statement on whether the originator has been informed.
  - g. Actions taken to secure the material and limit further damage.
  - h. A list of the information that has been compromised or material that is unaccounted for.
  - i. Responsible person(s) and reasons for loss or compromise or possible loss/compromise.
- (4) The above reporting requirements are in addition to any other reporting requirements of the Contracting parties, required by national regulations.
- (5) Reports of investigations involving NATO CONFIDENTIAL information and above shall be provided to the NSA/DSA and the Purchaser SCIO who will report to the NATO International Staff (IS) NATO Office of Security (NOS), if appropriate.

**3.5 Termination Contract Security Procedures**

- (1) In the event of termination or expiration of the Contract, the Contract parties' respective rights and responsibilities with regard to Contract information shall be determined. Retained Contract information must be safeguarded in accordance with this PSI and References [A], [B] and [I].

- (2) Contract information and deliverables shall be protected accordingly to identified and categorised security classification levels and shall not use that information for other purposes without the prior written consent of the originating Contract parties.
- (3) All NATO classified information related to the Contract shall be returned to the PURCHASER SO on completion or termination of their Contract unless the information has been declassified or removed from control, destroyed, or authorised for retention by the PURCHASER SO.
- (4) In the event that a NFSC is terminated, the Contractor shall return all classified information to the PURCHASER SO or dispose of such information in accordance with instructions from the PURCHASER SO.

### **3.6 Security Education**

- (1) Contractor employees who will have access to classified and unclassified Information for the purpose of this Contract shall be briefed on or otherwise informed of, and acknowledge their understanding of their responsibilities for protecting the information. This may be accomplished by briefings, the use of written material, or by electronic means.
- (2) The briefings and acknowledgements including initial, recurring, and termination actions shall be recorded in the personnel security file. The responsibilities to be presented in the briefings shall include:
  - a. The pertinent aspects of applicable laws and regulations;
  - b. The perceived threat;
  - c. Procedures for handling the information during use, transmission, visits, travel, and meetings;
  - d. How to handle possible losses or compromises and security violations ;
  - e. Any special security requirements that are unique to the Contract; and,
  - f. Penalties that may be imposed for violating the security requirements of the Contract and this PSI.

**4. RELEASE OF INFORMATION**

- (1) The release of Contract information (classified or non-classified) to authorities or persons outside of the Contract (non-participants) without prior approval is strictly prohibited.
- (2) Reference [C] addresses the specific procedures and arrangements for authorising the release of NATO classified information and the release authority conditions.
- (3) Unless specifically authorised by the Purchaser, the Contractor shall not release any NATO information pertaining to this Contract to any third parties to whom a request to supply goods or services has been submitted.

**4.1 Unilateral Release**

- (1) The unilateral release of classified Contract information or material to other than the Contract parties is prohibited without the specific written approval of the PURCHASER SO. Release of Contract classified information is restricted to the Contract parties and their (sub) contractors expressly identified and approved in writing by the PURCHASER SO. Contractor must ensure that subcontractors follow the same procedures.
- (2) Requests for release shall be submitted to the PURCHASER SO in order to obtain approval from the responsible authority. Release of classified information shall be restricted to those individuals who have a need-to-know for purposes of performance on the Contract.
- (3) Public release of Contract information shall receive the PURCHASER SO approval since it is NATO property that must be protected from unauthorised disclosure. Approval for release may also include limits, restrictions, and imposition of reasonable measures that should be taken to protect the secrecy of inventions. Although not subject to the same restrictions, handling, and transmission constraints imposed on NATO classified information, NATO unclassified information is also the property of NATO. As such, release of official information is restricted to NATO member nations only, unless written permission is received from the PURCHASER SO. Detailed requests for permission to release Contract information, shall be submitted to the PURCHASER SO before the proposed date of release.

**4.2 Release of Information and Material to Third Parties**

- (1) No Contract information, except that which has been approved for public release may be released without the prior written approval of the PURCHASER SO.

**4.3 Release of Contract Information at Symposia, Seminars and Conferences**

- (1) In accordance with Contract Part 3 Clause 12 the following shall apply:
  - a. Speeches and presentations by Contract parties at symposia, seminars, etc., regarding Contract must be approved in advance by the NSA/DSA, and the PURCHASER SO;
  - b. The Contractor shall submit the particulars of the meeting in advance, with sufficient time to allow NSA/DSA and the PURCHASER SO to ascertain the extent of the classified information access and disclosures, and determine the organisation and composition of the proposed audience;
  - c. Detailed requests for permission to release Contract information shall be submitted to the PURCHASER SO, a minimum of 45 days before the proposed date of release. Requests shall include the name of the requesting individual, date of presentation, nationality of representatives and the countries represented title of the symposium or seminar, and other information which may be required by national regulations.

**4.4 Public Release of Classified Contract Information**

- (1) Written approval for public release of classified Contract information, including papers, advertising, brochures, displays, web pages, and other publicity material, shall be sought in writing through the PURCHASER SO.

- (2) Contractor shall ensure that its Subcontractors follow the same procedures. The PURCHASER SO may reject such proposals without further recourse. Release authorisation will be made following consultation with the NSA/DSA or delegated responsible authorities.
- (3) All proposals that the PURCHASER SO endorses will be submitted to the appropriate NSA/DSA or other NSA/DSA specified authorities. The NSA/DSA will then grant or deny release in accordance with national regulations. A minimum of 45 days should be allowed for review of the proposal.
- (4) It is incumbent upon government organisations to screen all information submitted to them for public release to ensure that: (1) it is NATO UNCLASSIFIED, (2) it is technically accurate, and (3) release will not be detrimental to NATO or national security.

#### **4.5 Exhibition Authorisation**

- (1) The Contractor when displaying Contract information and material at exhibitions shall have available at each exhibition a copy of the document that provides authorisation for the display. The Contractor shall ensure that all information on public display (e.g., at Air Shows, International Exhibitions, etc.) is displayed in the form in which it was officially authorised for release.
- (2) The Contractor shall seek the prior written approval of the Purchaser before publishing any press release or disclosing any other information, orally or in writing, in relation to the Contract. The approval of the Purchaser shall be required for both the opportunity and the content of the information. This provision shall remain in effect after the termination of the Contract and shall cease to apply to any particular piece of information once that information becomes public knowledge other than through an act, default or omission of the Contractor or its Subcontractors.
- (3) No Contract information, except that which has been approved for public release may be released without the prior written approval of the PURCHASER SO to third parties.

**5. CHANGE PROCEDURES**

- (1) No changes to this document shall be made by the Contractor.
- (2) The Contractor may submit, by a written order to the Purchaser, proposals for applicable changes to the relevant security instructions included in this document or changes to the Project Security Classification Guide (PSCG).

**6. INTERNATIONAL HAND CARRIAGE OF NATO CLASSIFIED DOCUMENTS**

**6.1 Security Arrangements and Procedures**

- (1) Transmission of NATO UNCLASSIFIED information may be conducted through a normal mail channels or by hand carrying without formal courier orders. The information display and processing should avoided in a public places (i.e. airport, train station) and protection against potential overlooking should be satisfied.
- (2) Documents or other media containing NATO classified information up to NATO RESTRICTED may be transmitted by a national mail system via registered mail, authorised messenger service or courier. Double envelopes or wrappings shall be used. The envelope or wrapping shall be opaque and shall not reveal that the package contains NATO classified information.
- (3) The international transmission of material classified NATO CONFIDENTIAL and NATO SECRET shall be satisfied by an approved courier service or personal carriage. Receipts are required for the international transmission of NATO classified information.
- (4) To meet an urgent need to transfer classified Contract documents and material between the Purchaser and Contractor and his subcontractors, the responsible NSA/DSA may approve special arrangements for hand carriage, or delivery by a national mail system or by cleared commercial delivery services.
- (5) Hand carriage may be used on a case-by-case basis when government channels are not reasonably available, or transmission through government channels would result in an unacceptable delay that will adversely affect performance on the Contract, and it is verified that the information is not available at the intended destination.
- (6) Classified information and material being hand carried must be sealed while in transit, may not be opened a route, and requires direct delivery from the secure facility originating point to the secure facility at the destination. During travel NATO classified information must remain in the personal custody of the carrier and be secured. It may not be left unattended in hotel rooms or vehicles and NATO classified information may not be read in public.
- (7) When hand carriage of NATO classified material is permitted, the following minimum procedure shall apply:
  - a. The courier shall carry a Courier Certificate based on (Appendix 7), authorising him to carry the package as identified. The Courier Certificate shall be stamped and signed by the consignor's NSA/DSA and by the consignor's FSO;
  - b. A copy of the "Instructions for the Courier" (Appendix 7) shall be attached to the certificate;
  - c. The Courier Certificate shall be returned to the issuing NSA/DSA through the consignor's Facility Security Officer (FSO) immediately after completion of the journey(s) or be kept available at the company for monitoring purposes if permitted by the issuing NSA/DSA national laws and regulations. Any circumstances that occurred during the trip which raise security concerns shall be reported by the courier on the certificate.
- (8) The consignor's FSO is responsible for instructing the courier in all of his/her duties and of the provisions of the "Instructions for the Courier" (Appendix 7) and a Security Acknowledgement (Appendix F) has to be signed.
- (9) If customs authorities (of the NATO nation or of a non-NATO nation with a Security Agreement with NATO) request to examine the consignment and inspection is unavoidable, the procedures detailed in Reference [C] shall be followed. Customs authorities will be permitted to observe sufficient parts of the consignment to determine that it does not contain material other than that which is declared.

**6.2 Handling of Classified Material as Freight**

- (1) The transmission of classified material as freight within a country shall be in accordance with approved national procedures providing a degree of protection not less stringent than NATO Security Policy.

## **7. INTERNATIONAL VISIT CONTROL PROCEDURES**

### **7.1 Visit Types**

- (1) There are three types of international visits that will be used in the Contract:
- a. A One-time visit is a single visit for a specific purpose and to a specific site or sites, which is not anticipated to be repeated within the same calendar year. The duration of the visit will never be longer than the validity of the personnel security clearance of the visitor(s);
  - b. Recurring visit is for intermittent visits over a specified period of time to a specific site or sites and for a specific purpose;
  - c. Emergency visit is for a one-time visit that must take place as a matter of urgency and importance and as such that the normally required lead time identified cannot be met.
  - d. Amendment is an extended, long-term visit for a specified period of time, subject to annual review and validation.

### **7.2 Recurring Visit**

- (1) Recurring visit covers normally the duration of a contract that requires participating personnel to make intermittent (recurring) visits to Purchaser premises.
- (2) Visits covering a period of more than one year may be subject to annual review. The duration of the visit will never be longer than the validity of the personnel security clearance of the visitor(s).
- (3) When a Contractor personnel is required to work the Purchaser premises during defined time period, the advance Purchaser authorisation is required. Contractor shall coordinate arrival of its personnel with the designated and authorised NCI Agency Contract Manager (Appendix 1).
- (4) The Contractor shall performed appropriate in-processing process defined by the Purchaser Human Resource policy.
- (5) The PURCHASER SO shall initiate an annual review to update the lists of personnel that are authorised to make recurring visits. Information concerning individuals derived from one time or emergency requests shall be added, if they are to be authorised to make recurring visits. Employees that are no longer involved in the Contract shall be deleted.

### **7.3 Emergency Visits**

- (1) An emergency visit is for a one-time visit that must take place as a matter of urgency and importance and as such that the normally required lead time identified cannot be met.
- (2) Such unplanned or emergency visits should be arranged only in exceptional circumstances. To qualify as an emergency visit at least one of the following conditions must be met.
- (3) To qualify as an emergency visit, the visit must relate to the Contract and failure to make the visit could reasonably be expected to seriously jeopardise performance on the Contract.
- (4) Emergency visit requests shall be critically reviewed, fully justified and documented by the Security Officer of the requesting organisation.
- (5) Emergency visit requests should be submitted no less than three working days prior to the visit. Emergency visits shall be approved only as a single, one-time visit. If subsequent visits may be necessary, the requester should submit a follow-up request for a recurring visit authorisation.
- (6) The requester should co-ordinate the emergency visit in advance with the person to be visited. The requestor shall ensure that contact information is provided for both the person to be visited and a knowledgeable government point-of contact. This contact data includes the complete name, grade or position, address, and telephone number of the person to be visited and a knowledgeable government point of contact. Provide this information in the visit request, along with the identification of the Contract and the justification for submission of the emergency visit request.

- (7) Under extraordinary circumstances, an emergency visit request may be submitted with less than the required lead-time; however emergency RFVs will not be accepted less than two working days prior to the start of the proposed visit.

**7.4 Amendment**

- (1) When an already approved or pending RFV needs to be changed regarding dates, visitors and/or locations, an amendment referring to the original RFV must be submitted.
- (2) Amendments to approved or pending one-time and recurring visits are authorised, provided that the amendments are limited to:
  - a. Change of dates of visit;
  - b. Addition and/or deletion of visitors; and
  - c. Change of location.
- (3) For amendments, the standard RFV Form should be used. The type of visit cannot be changed via the amendment procedure. Amendments should refer to the original request that is still pending or already approved.

**7.5 Request for Visit**

- (1) Visit the Purchaser facility by Contractor personnel required advance authorisation. The completed Request for Visit (RfV) format (Appendix 4) and instructions shall be used to request visit authorisation. Reference to the Contract shall be included in all visit requests. All RFVs shall be submitted through NCI Agency sponsor.
- (2) For all types of visit, the standard RfV Form (see Appendix 4) should be used.
- (3) This RFV Form has been designed for automated as well as manual use. However, the use of an electronic form and the transmission via e-mail are strongly encouraged.
- (4) The completed RFV should be considered as an unclassified document.



**8. SUBCONTRACTING**

- (1) Subcontracts shall not be let without the prior approval of the Contracting Authority.
- (2) Subcontractor(s) are contractually obliged to comply with all the provisions of this document and any other additional security requirements issued by Contracting Authority. The Contractor shall ensure that subcontractors follow and comply with the same security procedures.
- (3) Subcontractors under the jurisdiction of a NATO Nation requiring by their national laws and regulations notification of contracts involving NR shall notify their NSA/DSA about any such contracts they have been awarded.
- (4) The Subcontractor(s)' responsibilities include but are not limited to:
  - a. Obtaining NFSCs from the cognisant NSA/DSA.
  - b. Dissemination of information solely on the basis of the need-to-know. No person is entitled to have access to NATO classified information based on rank, status, or clearance. The individual must have a clearly demonstrated need-to-know.

**9. INTERNATIONAL TRANSPORTATION**

**9.1 Transportation of NATO Classified Material NC or NS as Freight**

- (1) The consignor and the consignee of a consignment of NATO classified material to be transported as freight internationally shall jointly organise the transport arrangements. The consignor shall submit a written transportation plan to its NSA/DSA who, after consultation with the NSA/DSA of the consignee, will advise the consignor whether the transportation plan is acceptable and/or of any changes that are required.
- (2) The transportation of classified material as freight within a country shall be in accordance with approved national procedures providing a degree of protection not less stringent than current NATO Security Policy.
- (3) Commercial carriers can be used for transportation if it is in the opinion of the NSA/DSA concerned, in this case the following procedure shall be applied:
  - a. The commercial carrier shall hold an FSC if required by national laws and regulations or if it is to store NC or above at its premises;
  - b. The commercial carrier shall deploy personnel that have been granted a PSC at a minimum level to the material being transported;
  - c. Prior to any international transmission by commercial carrier, the NSAs/DSAs of the consignor and of the consignee must agree on an International Transportation Plan as described in Appendix 10 or in Reference [C]; and
  - d. When an International Transportation Plan is developed that will involve more than one international shipment of classified material, a Notice of Classified Consignment (Attachment 11 or from Reference [C]) shall be used to identify each shipment and provide details to the recipient, transportation personnel and any other personnel who will be involved in ensuring the security of the shipment.

**9.2 Transportation of NATO Classified Material NC or NS as Freight by Road**

- (1) The following minimum criteria shall be applied when consignments of NATO classified material NC or NS are transported by road:
  - a. When storage of classified consignments is required at the carrier's facility, the carrier shall hold an FSC at the appropriate level issued by the respective NSA/DSA;
  - b. Classified material shall be secured in vehicles or containers by a lock or padlock of a type currently approved by the NSA/DSA concerned. Closed vans and cars that may be sealed should be used since they offer maximum security. If this is not physically possible, the consignment should be encased to protect the classified aspects and prevent unauthorised persons from gaining access;
  - c. The transport shall be accompanied by at least two individuals who could be the driver, co-driver or additionally deployed security escorts or guards, and who both shall hold a PSC at the level commensurate with the classification level of the material. At least one individual shall carry a "Courier Certificate" based on (Appendix 7) and assume responsibilities of a "Courier" as described above.
  - d. In cases where stops must be made, arrangements shall be made in advance to use storage provided by government establishments or facilities having an appropriate FSC and the necessary cleared personnel and capabilities to ensure security of consignment. In the event such arrangements cannot be made or an emergency situation arises due to accident or breakdown of the vehicle, at least one of the security cleared individuals accompanying the material shall be responsible for keeping the consignment under constant control, and
  - e. Communication checks along the road shall be pre-arranged to ensure security of the consignment.

**9.3 Transportation of NATO Classified Material NC or NS as Freight by Rail**

- (1) The following minimum criteria shall apply when consignments of NC and NS material are transported by rail:
  - a. Passenger accommodation shall be made available for appropriately cleared security guards or escorts who shall carry a Courier Certificate (Appendix 7 or Reference [C]) and assume responsibilities of a "Courier" as described above.; and
  - b. During stops, the security guards/escorts shall remain with the consignment.
- (2) Depending on the volume of the consignment, priority shall be given to rail cars or containers that can be closed and sealed, giving maximum security.

**9.4 Transportation of NATO Classified Material NC or NS as Freight by Sea**

- (1) The following minimum standards shall be applied when consignments of NATO material classified NC or NS are sent by sea:
  - a. Where possible consignments should be carried in ships sailing under the flag of a NATO nation. Ships sailing under the flag of a non-NATO nation, which represents a special security risk (as defined in the Directive on the Security of Information, "International Transmission") shall not be used. Where practicable, a guard or escort holding an appropriate PSC shall accompany the consignment;
  - b. Material shall be secured in locked containers approved by the NSA/DSA of the consignor. However, when this is not possible, blocked-off stowage may be approved by the NSA/DSA of the consignor. Use of security tapes or seals on the openings shall be considered. Blocked-off stowage is stowage in the hold of a ship where the material is covered and surrounded by other cargo consigned to the same destination in such a way that access to the material is physically impracticable. Where it is not possible or impracticable to carry a consignment in the hold, it may be carried as deck cargo, provided it is secured in a locked container and packaged so it is not evident that it contains classified material;
  - c. Stops at or entering the territorial waters of countries presenting special security risks shall normally be avoided but if unavoidable the security risk shall be assessed by the NSAs/DSAs concerned in the light of the political environment, when they receive the transportation plan drawn up by the consignor and the consignee. Unless the ship is in an emergency situation, it shall not enter the territorial waters of any of these countries;
  - d. Stops at any other country shall not be permitted unless the prior approval of the consignor's NSA/DSA has been obtained;
  - e. In all cases, loading and unloading shall be under security control; and
  - f. Deliveries to the port of embarkation and collection from the port of disembarkation must be so timed to prevent, as far as possible, a consignment being held in port warehouses unless the warehouse has been granted an FSC by the consignor's or consignees NSA/DSA, as applicable. Where this is not possible, sufficient security guards must be provided to keep the consignment under adequate and permanent supervision until collection is achieved.

**9.5 Transportation of NATO Classified Material NC or NS as Freight by Aircraft**

- (1) Preference shall be given to the use of military aircraft of a NATO nation to transport NC or NS material. If utilisation of a military aircraft of a NATO nation is not feasible, an NSA/DSA approved commercial air carrier may be used, provided it is registered in or chartered by a NATO nation. Exceptionally, airlines from non-NATO nations may also be used provided the security of the consignment can be assured by the appropriate measures taken by NSA/DSA. Scandinavian Airlines System aircraft also may be used. The following minimum standards shall be observed:
  - a. Every effort shall be made to deliver the consignment straight to the aircraft rather than permitting it to be stored in warehouses, etc., at airports and airfields. When a consignment cannot be loaded straight away, it shall either be stored in a NSA/DSA cleared storage

- facility, or kept under guard. A sufficient number of security guards must be provided to keep the consignment under adequate and continuous supervision;
- b. Every effort shall be made for the aircraft to be met on landing and the consignment to be removed at its final destination. When this is not feasible, the consignment shall be kept at the airport and a sufficient number of security guards must be provided to keep the consignment under adequate and continuous supervision;
  - c. Direct flights shall be used wherever possible;
  - d. Intermediate routine stops of short duration may be permitted, provided the consignment shall remain in the aircraft. However, if the cargo compartment is to be opened, every effort shall be made to ensure that the courier or other personnel holding an appropriate PSC are available to ensure the protection of the classified material;
  - e. In the event the aircraft is delayed at an intermediate stop or has to make an emergency landing, the security guard, or the person fulfilling the duties of the security guard, shall take all measures considered necessary for the protection of the consignment and if necessary seeking the assistance of his Diplomatic mission in the country concerned;
  - f. Transportation over countries presenting special security risks, as defined in the "Directive on the Security of Information, International Transmission" should be avoided; and
  - g. Stops in a non-NATO nation having a valid security agreement with NATO, may be allowed by the NSA/DSA of the consignor. Stops at airfields in non-NATO nations not having a Security Agreement with NATO, except in an emergency, shall not be permitted;
- (2) When the conditions outlined below are met and if permitted by national laws and regulations, the requirements for a commercial air carrier to hold an FSC do not apply:
- a. The commercial air carrier agrees to be responsible for the consignment while it is in the hold of the air plane, and will be cognisant of, and agrees to comply with the security requirements, particularly the emergency procedures specified by the NSA/DSA;
  - b. Consignments shall be transmitted point-to-point, the service provided by the commercial air carrier cannot be subcontracted, and the intermediate stops are not permitted;
  - c. A written transportation plan approved by the participating NSA/DSA shall be in place before the consignment is released to the cargo handling service or to the commercial air carrier;
  - d. Sufficient physical protection shall be provided to the consignment as agreed by the NSA/DSA.
- (3) Companies that provide cargo handling services (such as freight forwarders) for NC and NS consignments shall have an FSC and approved protection capability if the consignment is to be stored at the facility.

**10. COMMUNICATION AND INFORMATION SYSTEMS (CIS)**

**10.1 CIS Security Accreditation Strategy**

- (1) The Contractor shall use only appropriately security accredited CIS (including standalone work stations), which are used for the storing, processing or transmitting (called hereafter "handling") of NATO classified information up to and including NATO RESTRICTED and up to including NATO SECRET. The Security Accreditation shall be provided by the respective national Security Accreditation Authorities or their delegated SAAs. No CIS may be used for processing classified information without prior accreditation by the responsible authorities.
- (2) The Contractor shall notify their NSA/DSA for the intended use of CIS for handling of classified information from this Contract. The Purchaser will be notified by the NSA/DSA through the FSCS in such case which will be required to be accompanied from the respective accreditation statement per Contractor's CIS.

**10.2 Handling of NATO RESTRICTED Information on Information and Communication Systems (CIS)**

**10.2.1 Requirement on Security Accreditation**

- (1) Security accreditation shall be performed for all contractors' CIS that are used to handle (store, process or transmit) NATO RESTRICTED (NR) information.
- (2) This contract security clause contains the rules and regulations that shall be applied by the Contractor's FSO or other appropriate officer to address and satisfy the minimum security requirements for the protection of NR information received or produced by the Contractor as a result of the Contract. This clause includes specific provisions to be satisfied by the Contractor under delegation from the Contracting Authority for the accreditation of the Contractor's CIS handling NR information. Under this delegated authority the Contractor shall provide the Contracting Authority with a written statement of compliance confirming that its CIS has been accredited in compliance with the minimum requirements specified below. This written statement may be included in the Contractor's response in acknowledgement of the receipt and requirements of this PSI.
- (3) It is the responsibility of the Contractor to implement these minimum security requirements when handling NR on its CIS.
- (4) The Contractor FSO shall assess and verify the compliance of the CIS over its entire life-cycle, in order to ensure that it continues to be consistent with the requirements of this document.
- (5) The following describes the minimum security requirements for handling NR information on contractors' CIS that shall be met:
  - a. Identification and Authentication
    - i. An up-to-date list of authorised users shall be maintained by security management staff;
    - ii. Credentials shall be established and maintained to identify authorised users;
    - iii. Users shall themselves authenticate to, and be authenticated by, the system before any access to the CIS will be granted;
    - iv. Passwords shall be a minimum of 9 characters long and shall include numeric and "special" characters (if permitted by the system) as well as alphabetic characters;
    - v. Passwords shall be changed at least every 180 days. Passwords shall be changed as soon as possible if they have, or are suspected to have been compromised or disclosed to an unauthorised person;
    - vi. The re-use of a number of previous passwords shall be denied;
    - vii. The system shall provide only limited feedback information to the user during the authentication process;

- viii. Accounts that are no longer required shall be locked or deleted;
  - ix. When the authentication of the person is not enforced by physical security measures surrounding the location where the system is installed (e.g. perimeter/building security) or by non-technical security measures surrounding the office areas where components of system are located (e.g. server rooms, user workstation areas), two-factor authentication shall be used.
- b. Access Control
- i. The identification and authentication data shall be used by the system to determine user privileges, in accordance with the access control requirements set out in the security-related documentation;
  - ii. From the user account only, it shall be possible for the security management staff to identify the specific user and/or roles;
  - iii. Mechanisms shall be implemented to restrict access to only that information to support a given project or contract, taking into account the need-to-know principle;
  - iv. Access to security and system information shall be restricted to only authorised security and system administrators;
  - v. Access privileges shall be implemented to restrict the type of access that a user may be permitted (e.g., read, write, modify, and delete);
  - vi. The system (e.g. Operating System) shall lock an interactive session after a specified period of user inactivity by clearing or overwriting display devices, making the current contents unreadable and by disabling any user's data access/display devices other than unlocking the activity of the session;
  - vii. The system shall allow user-initiated locking of the user's own interactive session by clearing or overwriting display devices, making the current contents unreadable and by disabling any user's data access/display devices other than unlocking the activity of the session;
  - viii. Security mechanisms and/or procedures to regulate the introduction or connection of removable computer storage media (for example USB, mass storage devices, CD-RWs) to user workstations/portable computing devices shall be implemented.
- c. Security Audit
- i. An audit log shall be generated and maintained. System Level, Application Level and User Level events shall be included in the log, as required by the relevant Security Authority as a result of a Risk Assessment. For each of the auditable events, it shall associate individual user identities to those events, and shall include date and time of the event, type of event, user identity, and the outcome (success or failure) of the event. The following events shall always be recorded:
    - all log on attempts whether successful or failed;
    - log off (including time out where applicable);
    - the creation, deletion or alteration of access rights and privileges;
    - the creation, deletion or alteration of passwords.
  - ii. The audit trail and associated archive shall be protected from unauthorised deletion and/or modification; it shall be presented in human readable format either directly (e.g., storing the audit trail in human-readable format) or indirectly (e.g., using audit reduction tools) or both;
  - iii. Access to audit information shall be controlled; access permissions shall be established to permit access only by the appropriate security management staffs;
  - iv. The audit data shall be retained for a period agreed by the Contracting Authority, based, where appropriate, on the requirements established by the NSA or DSA.

- v. A means shall be available to analyse and review system activity and audit data, looking for possible or real security violations (analysis may work in support of intrusion detection/ automatic response to an imminent security violation).
- d. Protection against Malicious Software
  - i. Virus/malicious code detection software shall be installed on all servers, portable computing devices and workstations dependent upon the vulnerability of the underlying operating system environment. It shall be configured to automatically check on the introduction of removable media (e.g., CDs, USB mass storage devices, flash memory);
  - ii. The virus/malicious code detection software shall be regularly updated.
- e. Mobile Code
  - i. The source of the mobile code shall be appropriately verified;
  - ii. The integrity of the mobile code shall be appropriately verified;
  - iii. All mobile code shall be verified as being free from malicious software;
  - iv. Available technical measures shall be enabled to ensure the use of mobile code is appropriately managed. For example, Microsoft Office applications and Internet Browser applications shall be configured to control import/acceptance of mobile code as well as use and creation of mobile code.
- f. Availability
  - i. Security measures ensuring availability of NR information shall be implemented when required by the Contracting Authority.
- g. Import/Export of Data
  - i. Data transfers between machines, virtual or physical, in different security domains shall be controlled and managed to prevent the introduction of NR data to a system not accredited to handle NR data.
  - ii. All data imported to or exported from the CIS shall be checked for malware.
- h. Configuration Management
  - i. A detailed hardware and software configuration control system shall be available and regularly maintained;
  - ii. Configuration baselines shall be established for servers, LAN Components, Portable Computing Devices and workstations;
  - iii. Configuration checks shall be made by appropriate Security Management staff on hardware and software to ensure that unauthorised hardware and software has not been introduced;
  - iv. An inventory of hardware and software should be maintained, with equipment and cabling labelled as part of the inventory;
  - v. The configuration of the security enforcing and security relevant functions of the operating system shall only be subject to change by a limited number of authorised system and security administrators;
  - vi. The security configuration of the operating system shall be maintained with the implementation of the appropriate security patches and updates. Regression Aspects;
  - vii. i.e. any potential adverse affects of the modification on existing security measures, shall be considered and appropriate action taken;

- viii. The installation and configuration of application software with security relevant or security-enforcing functions shall be subject to a limited number of authorised system and security administrators;
- ix. The configuration of the operating system shall be subject to periodic checks to ensure its security compliance;
- x. Changes to the system or network configuration shall be assessed for their security implications/impacts;
- xi. The Basic Input/Output System (BIOS) or similar firmware shall be password protected in order to protect access to the system's password data
- i. Security Management
  - i. Mechanisms shall be implemented which manage security data and functions; only defined authorised users (or roles) may perform security functions and access security relevant data.
  - ii. The compromise or suspected compromise of NR information shall be immediately reported for inspection and investigation purposes, through the SO, to the Contracting Authority and, if required by national laws and regulations, to the relevant NSA or DSA.
- j. Approved products
  - i. An approved product is one that has been approved for the protection of NR information either by NATO or by the National CIS Security Authority (NCSA) of a NATO Nation or in accordance with national laws and regulations.
  - ii. The relevant NSA, NCSA or DSA shall be consulted, through the Contracting Authority, to determine, whether approved products shall be used, unless already defined by the NATO policies or equivalent national laws and regulations.
- k. Security Testing
  - i. The system shall be subject to initial and periodic security testing to verify that security measures work as expected.
- l. Transmission Security
  - i. NR information transmitted over a CIS not accredited to handle NR information (e.g. Internet) shall be encrypted using approved cryptographic products.
- a. Wireless LAN
  - ii. The range of Access Points shall be set to minimise exposure to external attacks, special attention shall be given to the selection of antennae, their location, power and signal propagation.
  - iii. NR information transmitted over a wireless connection shall be encrypted using an approved cryptographic product.
- b. Virtualisation
  - i. When existing systems are combined using a virtualisation product, the accreditation of each of the systems shall be reviewed to ensure that any mitigations and assumptions previously made are still appropriate.
  - ii. A deployed virtualisation product itself shall be treated as at least the highest Protective Marking of any of its virtual machines (i.e. NR).
  - iii. Virtual Machines shall be appropriately configured and managed. System patching, administration of accounts, and maintenance of anti-virus software, shall all be performed as if the machine were a physical machine. The host-operating machine shall also be correctly configured and maintained.



- iv. Network routing provided internally by the virtualisation product to connect virtual machines shall not be considered as a security measure. For example, a firewall shall not be virtualised.
- v. The administrative interface for the hypervisor, shall only be used for administration of the hypervisor, and shall not be used for the normal administration of services provided by the virtual machines.
- vi. Access to the hypervisor functions shall be appropriately controlled.
- vii. The ability to “cut-and-paste” between virtual machines shall be appropriately configured and controlled.
- viii. The ability to create virtual machines shall be appropriately configured and controlled.
- ix. Virtual Machines shall be suitably de-commissioned after use.
- x. Software based virtual networks created between virtual machines shall be appropriately configured, controlled and monitored.
- xi. Virtual Servers and Virtual Workstations shall not be located on the same physical host.
- xii. Virtual machines operating in different areas of the system architecture shall not be located on the same physical host, for example, virtual machines operating in a De-Militarised Zone (DMZ) shall not be located on the same physical host as those operating in the LAN.
- xiii. The management of the Virtualisation infrastructure shall be appropriately controlled. Only Virtual Management, patch management, anti-malware and Active Directory communication mode shall be allowed.
- xiv. Management of the Virtualisation infrastructure shall be performed via a dedicated Administrative account.
- xv. The Storage Area Network (SAN) used for Virtualisation shall be isolated and only accessible by the physical host.
- xvi. The SAN used to host Virtualisation operating at different security classifications shall be isolated onto separate Logical Unit Numbers.
- xvii. Modifications to the ‘Master Copy/Version’ of a Virtual Machine shall be appropriately controlled.
- xviii. Network cards shall not be shared across Virtual Machines that are operating in different Security Domains.

**10.2.2 Interconnections to a CIS not accredited to handle NR information**

- (1) Security requirements, specific to interconnection scenarios, are listed in Reference [I] and Reference [K]. These Directives may be obtained from the Contracting Authority.
- (2) Interconnection to another CIS, especially the internet, will significantly increase the threat to a Contractor’s CIS and therefore the risk to the security of the NR information handled by the Contractor’s CIS. A security risk assessment shall be performed to identify the additional security requirements that need to be implemented as part of the security accreditation process.

**10.2.3 Disposal of IT Storage Media**

- (1) For IT storage media that has at any time held NR information the following sanitisation shall be performed to the entire storage media prior to disposal:
  - a. EEPROM and Flash Memory (e.g. USB sticks, SD cards, solid state drives, hybrid hard drives): overwrite with random data at least three times, then verify storage content matches the random data;

- b. Magnetic Media (e.g. hard disks): overwrite or degauss;
- c. Optical Media (e.g., CDs and DVDs): shred or disintegrate into pieces of 10mm<sup>2</sup> or less;
- d. Other storage media: seek security requirements from the Security Accreditation Authority.

**10.2.4 Portable Computing Devices (laptops, tablets, etc)**

- (1) Portable computing devices not using approved encryption shall only be used or stored in an appropriately secure location. Portable computing devices and drives containing NR information that do not use approved encryption shall not be taken outside the Contractor's premises unless held under personal custody. The term "drives" includes all removable media. Any authentication token and/or password(s) associated with the encryption product shall be kept separate from portable computing devices whenever it is not in use, left unattended or in transit.

**10.2.5 Physical Security of CIS Handling NR information**

- (1) Areas in which CIS are installed to display, store, process, or transmit NR information shall be established, as a minimum, as Administrative Zones. For mobile solutions (e.g. laptop) used outside of Administrative Zones, the user shall ensure that the displayed content is protected in a way that NR information is not exposed to unauthorised individuals.
- (2) CIS areas housing servers, network management system, network controllers and communications controllers should be established as separate and controlled areas with an appropriate access control system. Access to these CIS areas should be limited to only specifically authorised persons.

**10.2.6 Security of NR Removable Computer Storage Media**

- (1) Removable computer storage media containing NR information are required to be labelled with that classification marking. Measures shall be in place to prevent unauthorised access to NR removable computer storage media in order to maintain the need-to-know principle

**10.2.7 Use of CIS Equipment Privately Owned by Contractor's Personnel**

- (1) The use of privately-owned equipment of Contractor's personnel (hardware and software) for processing NR information shall not be permitted

**10.2.8 CIS Users' responsibilities**

- (1) CIS users (e.g. end users, administrators) involved in the handling of NR information within the CIS shall be made aware of their responsibilities and the procedures to be followed. The responsibilities and the procedures to be followed shall be documented and acknowledged by CIS users in writing.

**10.2.9 Advice**

- (1) Advice or clarification of the provisions of this contract security clause shall be obtained from the Contracting Authority.

**10.2.10 Audit/inspection**

At the request of the contracting authority or relevant NSA/DSA/SAA, the Contractor shall provide evidence of compliance with this Contract Security Clause and permit an audit of inspection of the Contractor's processes and facilities by representatives of the contracting authority or the contractors NSA/DSA or relevant NATO security authorities to ensure compliance with these requirements.

**10.3 Handling Of NATO SECRET Information on Information and Communication Systems (CIS)**

- (1) All Contractor's CIS storing and processing NATO CONFIDENTIAL and higher information shall be subject of a formal security accreditation process in accordance with Section 10.1.1.

- (2) The requirements listed in Section 10.1.1.1 are applicable to the all NS CIS. Additional requirements shall be adhere to as specified by the respective NSA/DSA and in accordance with the security requirements found in the Reference [L].

**10.4 Electronic Transmission of NATO Information**

- (1) Electronic transmission of NATO UNCLASSIFIED information may be conducted over Internet under condition that only recognised business e-mail addresses are used for a distribution (e.g. sender and addressee - e.g. @ncia.nato.int, @thalesgroup.com).
- (2) Storing NATO UNCLASSIFIED or higher information on portals accessible through the internet is strictly forbidden.
- (3) Electronic transmission of NATO RESTRICTED information may be performed over accredited CIS or interconnecting CIS, which for this Contract is the NR AIS and the AIDES. Transmission of classified information NATO CONFIDENTIAL and above is strictly forbidden over NR AIS system.
- (4) Electronic transmission of NATO CONFIDENTIAL information may be performed over accredited CIS or interconnecting CIS, which for this Contract is the AIDES.
- (5) Request for NR AIS laptops, accounts and iron-keys should be directed in writing to the Purchaser Project Manager or through a NCI Agency Customer Request Form (CRF). Before NR AIS account creation, the involved user shall read the related NR AIS Security Operating Procedures (SecOPs) and acknowledge in writing the required adherence and compliance (Reference [M]).
- (6) Standard telephone or facsimile system shall be used to exchange only NATO UNCLASSIFIED information.

**11. SECURITY CLASSIFICATION GUIDE**

- (1) The Security Classification Guide (SCG) (Appendix 2) to this PSI, and changes thereto, are the basis for classification, re-grading, or declassification of Contract Information and/or material. It constitutes the authority that shall be cited as the basis for initial classification, re-grading, or declassification of Contract Information or material concerning the Contract. Security classification must be determined by considering all applicable information and references.
- (2) If the appropriate classification is unclear, the matter shall be referred to the PURCHASER SO. Questions concerning the content and interpretation as well as proposed changes to the classification guide will be co-ordinated by the PURCHASER SO. Until the matter is resolved, the classification level assigned should be the highest anticipated.

**Appendix 1. CONTACT INFORMATION**

(1) Contracting Authority (Purchaser)

Name	Katharina Schwarz
Function	Senior Contracting Officer
Telephone	+32 2 707 8591
Address	NCI Agency, Contracting Office, Boulevard Leopold III, B-1110 Brussels, Belgium
E-mail	<a href="mailto:katharina.schwarz@ncia.nato.int">katharina.schwarz@ncia.nato.int</a>

(2) Purchaser Security Officer

Name	Dr Kevin MEPHAM
Function	Head CIS Security Section (NCIA AMDC2)
Telephone	+31 70 374 3226
Address	NCI Agency, Oude Waalsdorperweg 61, 2597 AK, The Hague, Netherlands
E-mail	<a href="mailto:kevin.mepham@ncia.nato.int">kevin.mepham@ncia.nato.int</a>

(3) Purchaser (NCI Agency) Project Manager

Name	
Function	SSSB Project Manager (NCIA AMDC2)
Telephone	+31 70 374
Address	NCI Agency, Oude Waalsdorperweg 61, 2597 AK, The Hague, Netherlands
E-mail	

(4) Contractor Contract Manager

Name	
Function	
Telephone	
Address	
E-mail	

(5) Contractor Security Officer

Name	
Function	
Telephone	
Address	
E-mail	

(6) Contractor CIS Security Officer

Name	
Function	
Telephone	
Address	
E-mail	

(7) National Security Agency

Name	
Telephone	
Address	
E-mail	

(8) Delegated Security Agency

Name	
Telephone	
Address	
Name	
Telephone	
Address	

**Appendix 2. SECURITY CLASSIFICATION GUIDE**

**1. Purpose**

- (1) The purpose of this Security Classification Guide (SCG) is to provide instructions and direction for classification of information and material pertaining to the Contract Information classified pursuant to this SCG shall be safeguarded in accordance with the PSI.

**2. Authority**

- (1) This guide is issued under Contract CO-15577-SSSB. This guide constitutes authority and may be cited as the basis for classification, re-grading, or declassification of information and material generated under the Contract.

**3. Classification Guidelines**

- (1) If the security classification guidance imposed herein is impractical, justified change recommendations should be made to the PURCHASER SO. Progress attained in the state-of-the-art of this effort, and other contributory factors may indicate a need for changes in this guide. Pending final decision, the items of information involved shall be considered and protected at the higher of the current classification or the recommended level.

**4. Downgrading/Declassification Instructions**

- (1) Contract Information will be downgraded or declassified only after receiving written approval from the Contracting Authority.
- (2) The classification levels assigned in this SCG are described at **Error! Reference source not found.** and **Error! Reference source not found.** and reflect specific data item.
- (3) Reports, publications, drawings, schematics, photographs, mock-ups, training aids, test data, hardware, and similar items, will be assigned a security classification commensurate with the information classified by this guide and other applicable security classification guides.

**Appendix 3. MARKING NATO INFORMATION**

- (1) Each document (electronic or physical) shall be conspicuously marked or stamped at the top and bottom of the front cover and all pages and the back side of the last page and back side of the back cover with the security classification (e.g., "NATO RESTRICTED").
- (2) "Classified by", "Downgrade to", or "Declassify on" markings together with the agreed dates for the action, shall be annotated on the front lower left cover of documents.
- (3) The overall classification of each page shall be reflected at the top and bottom of each page. The classification marking shall reflect the highest level of classified information on that page. The level of classification of information in the paragraphs or portion of information on each page shall be adequately identified in accordance with the paragraph and portion-marking requirement outlined below.
- (4) Paragraph or portion markings of information in NATO classified documents shall be as follows:
  - a. (NU) for NATO UNCLASSIFIED
  - b. (NR) for NATO RESTRICTED
  - c. (NC) for NATO CONFIDENTIAL
  - d. (NS) for NATO SECRET
- (5) **Error! Reference source not found.** represents the Contract specific guidance for the exact security classification level of specific data items and information that may be used within contractual deliverable.

Title	Security Classification Level
<b>DATA ITEMS &amp; INFORMATION</b>	
Location of the Site (name)	NU
Geographical Location in degrees/min/sec	NC
Geographical Location in degrees	NU
Manning Requirements	NU
Site Description	NU
Name of Site and Function	NR
Site Number and Name of Site	NC
Surveillance Functions	NR
Air Mission Control	NR
Air Traffic Control	NR
Support Function	NR
RAP Dissemination	NC
Logistics	NU
Training	NU
IETM	NR
System Security Settings	NR
System Security Settings including Credentials	NS
Credentials of NU devices	NU
Link 11 Live Data (Unencrypted)	NS
Link 11 Live Data (Encrypted)	NU
Documents with IP Addresses	NR





**Appendix 4. INSTRUCTIONS FOR USE AND COMPLETION OF A REQUEST FOR VISIT**

**1. General Instruction**

- (1) The Request for Visit (RFV) must be completed without misstatement or omission. Failure to provide all requested information will delay the processing and possibly lead to the denial of the request.
- (2) This RFV should be typed. Electronic processing and transmitting of the RFV is encouraged. The completed RFV is normally an unclassified document. The completion of the RFV Form should be in either one of the official NATO languages.
- (3) RFV must be in the possession of the receiving host NSA/DSA in accordance with the RFV lead times detailed in Appendix 4, Paragraph 3.
- (4) The completed RFV has to be submitted to the Security Officer of the requesting agency, organisation or facility. After completion by the Security Officer of the requesting agency, organisation or facility, the RFV should be sent to the following national agency's address that will process the request (to be inserted by issuing NSA/DSA):

Name of Agency	
Address:	
Fax no:	
E-mail address:	

**2. Detailed Instructions for Completion of Request for Visit**

- (1) These detailed instructions are guidance for the visitors and the Security Officers who complete the RFV.

HEADER	Insert full country or international organisation name (e.g. NATO CI Agency, NATO International Military Staff, SHAPE, etc) of the host
1. TYPE OF VISIT REQUEST	Select the appropriate checkbox for the type of visit request. If the Emergency checkbox is selected, complete the remarks portion in item 15 of the RFV Form to explain the reasons behind the emergency RFV. If the Amendment checkbox is selected, mark the appropriate checkbox for the type of amendments and insert the reference number provided by the NSA/DSA of the original RFV that the amendment is made to. Depending on the laws/regulations of the countries involved, a one-time visit request which is issued for the posting of personnel may require additional information/documents to be included with the RFV Form.
2. TYPE OF INFORMATION/MATERIAL OR SITE ACCESS	Select the appropriate checkbox for the type of information/material or site access. The first box covers direct access to information/material classified NC or above. The second box shall be checked when unescorted access to Security Areas (e.g. Class I/II) is required but no direct access to information/material classified NC or above is anticipated.
3. SUMMARY	Insert the number of sites to be visited and the number of visitors.
4. ADMINISTRATIVE DATA	<b><u>DO NOT FILL IN - LEAVE BLANK</u></b> <i>To be completed by requesting NSA/DSA if required</i>
5. REQUESTING GOVERNMENT AGENCY, ORGANISATION OR INDUSTRIAL FACILITY	Select the appropriate checkbox (only one box) for the entity of the requesting government agency, organisation or industrial facility. Insert the full name, full postal address (include city, province/state, and postal zone), e-mail address, facsimile number and telephone number.

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6. GOVERNMENT AGENCY(IES), ORGANISATION(S) OR INDUSTRIAL FACILITY(IES) TO BE VISITED	Complete Annex 1 to the RFV Form to include information on all of the sites to be visited.
7. DATE OF VISIT	Insert the period of the visit by using numeral "day/month/year" (dd/mm/yyyy).
8. TYPE OF INITIATIVE	Select one item from each column as indicated
9. IS THE VISIT PERTINENT TO	Select the appropriate checkbox and specify the full name of the government project/programme. Foreign Military Sales case, etc., or request for proposal or tender offer. Abbreviations should be avoided.
10.SUBJECT TO BE DISCUSSED/ JUSTIFICATION/ PURPOSE	Give a brief description of the subject(s) motivating the visit. If known, include the details of the host Government/Project Authority and solicitation/ contract number. Abbreviations should be avoided. <u>Remarks:</u> In case of a recurring visit, this item of the RFV Form should state "Recurring Visits" as the first words in the data element (e.g. Recurring Visits to discuss...). It is strongly advised to repeat the subject to be discussed and/or the justification of the visit in the language of the receiving country. Make sure to describe the subject to be discussed in a way that it does not reveal any classified information since the completed RFV is considered to be an UNCLASSIFIED document.
11.ANTICIPATED HIGHEST LEVEL OF INFORMATION/ MATERIAL OR UNESCORTED ACCESS TO SECURITY AREAS	Select the appropriate checkbox for the anticipated highest level of information/material or unescorted access to security areas. If the box "Other" is checked, it shall be specified.
12.PARTICULARS OF VISITOR(S)	Complete Annex 2 to the RFV Form to include information on all of the visitors. When there is more than one visitor, enter the visitors' surnames in alphabetic order if possible
13.THE SECURITY OFFICER OF THE REQUESTING AGENCY, ORGANISATION OR INDUSTRIAL FACILITY	This item requires the name, telephone number, e-mail address, and signature of the requesting Security Officer.
14. CERTIFICATION OF SECURITY CLEARANCE LEVEL	<u>DO NOT FILL IN - LEAVE BLANK</u> To be completed by government/NATO certifying authority only. In accordance with the laws/regulations of the countries involved, government certifying authority must also complete this item for RESTRICTED. <u>Note for the certifying authority:</u> Insert name, address, telephone number, and e-mail address. Date and signature. If the certifying authority corresponds with the requesting National Security Authority, insert in this item: "See item 14 of the RFV Form". <u>Remark:</u> Items 13 and 14 of the RFV Form may be completed by the appropriate official of the Embassy of the requesting country as per national legislations, policies or directives.

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15.REQUESTING SECURITY AUTHORITY	<p><b><u>DO NOT FILL IN - LEAVE BLANK</u></b></p> <p>To be completed by the requesting NSA/DSA or responsible NATO security office only as per below instructions.</p> <p>Insert name, address, telephone number, and e-mail address.</p> <p>Date and signature.</p>
16.REMARKS	<p>In case of an emergency visit, it is mandatory to give the reasons for the emergency visit in this field of the RFV Form. The particulars of the knowledgeable person, see Paragraph 7.4, should also be identified in this field of the RFV Form.</p> <p>This item can be used for certain administrative requirements (e.g. proposed itinerary, request for hotel, and/or transportation, etc.).</p> <p>This space is also available for the receiving NSA/DSA for processing (e.g., "no security objections", etc.).</p> <p>In case a special briefing is required, the type of briefing and the date that the briefing was given should be stated.</p>

<b>ANNEX 1 TO RFV FORM</b>	
<p><b>GOVERNMENT AGENCY(IES), ORGANISATION(S) OR INDUSTRIAL FACILITY(IES) TO BE VISITED</b></p>	<p>Select the appropriate checkbox (only one box) for the government agency, organisation or industrial facility to be visited. Repeat for every site to be visited.</p> <p>Insert the full name, full physical address (include city, province/state, and postal zone), telephone number and facsimile number. Insert the name, e-mail and telephone number of the main point of contact or the person with whom the appointment for the visit was made. Insert the name, e-mail and telephone number of the Security Officer or the secondary point of contact.</p> <p><u>Remarks:</u></p> <p>For visits to the United States, one RFV Form with Annexes for each agency/organisation/facility to be visited should be filled in.</p> <p>For visits to military sites in the United States, it is mandatory to specify which military unit will be visited (e.g. Army, Air Force, Navy, Marine Corps or Defence Intelligence Agency).</p>

<b>ANNEX 2 TO RFV FORM</b>	
<p><b>PARTICULARS OF VISITOR(S)</b></p>	<p>Select the appropriate checkbox (only one box) for the type of employment of the visitor (e.g. military, defence public servant, government, industry/embedded Contractor, international organisation employee (e.g. NATO, EU, etc.)). Repeat for every visitors.</p> <p><u>Surname:</u> Family name.</p> <p><u>Forenames:</u> As per passport.</p> <p><u>Rank:</u> Insert the rank of the visitor if applicable.</p> <p><u>DOB:</u> Insert date of birth by using numeral "day/month/year" (dd/mm/yyyy).</p> <p><u>POB:</u> Place of birth (city-province/state-country).</p> <p><u>Nationality:</u> Insert nationality as per passport.</p> <p><u>Security clearance level:</u> Actual security clearance status (e.g. TS, S, C). Indicate NATO clearance (CTS, NS, NC) if the visit is related to NATO business.</p> <p><u>PP/ID Number:</u> Enter the passport number or identification card number, as required by host government.</p> <p><u>Position:</u> Insert the position the visitor holds in the organisation (e.g., director, product manager, etc.)</p> <p><u>Company/Agency:</u> Insert the name of the government agency, organisation, or industrial facility that the visitor represents.</p>

**Visit Notification Form**

All fields must be completed.

<b>REQUEST FOR VISIT</b>		
<b>TO: _____</b> <b>(Country/NATO body)</b>		
1. TYPE OF VISIT REQUEST	2. TYPE OF INFORMATION/ MATERIAL OR SITE ACCESS	3. SUMMARY
<input type="checkbox"/> One-time <input type="checkbox"/> Recurring <input type="checkbox"/> Emergency <input type="checkbox"/> Amendment <input type="checkbox"/> Dates <input type="checkbox"/> Visitors <input type="checkbox"/> Agency/Facility  For an amendment, insert the NSA/DSA original RFV Reference No. _____	<input type="checkbox"/> NATO CONFIDENTIAL or above, or <input type="checkbox"/> access to security areas.	No. of sites: _____  No. of visitors: _____
4. ADMINISTRATIVE DATA:		
Requestor:  To:	NSA/DSA RFV Reference No. _____  Date (dd/mm/yyyy): ____/____/____	
5. REQUESTING GOVERNMENT AGENCY, ORGANISATION OR INDUSTRIAL FACILITY:		
<input type="checkbox"/> Military <input type="checkbox"/> Government <input type="checkbox"/> Industry <input type="checkbox"/> NATO <input type="checkbox"/> Other: _____		
NAME:  POSTAL ADDRESS: E-MAIL ADDRESS:  FAX NO:                      TELEPHONE NO:		
6. GOVERNMENT AGENCY(IES) , ORGANISATION(S) OR INDUSTRIAL FACILITY(IES) TO BE VISITED - (Annex 1 to be completed)		
<b>7. DATE OF VISIT (dd/mm/yyyy):</b> FROM ____/____/____ TO ____/____/____		
8. TYPE OF INITIATIVE (Select one from each column):		
<input type="checkbox"/> Government initiative <input type="checkbox"/> Commercial initiative	<input type="checkbox"/> Initiated by requesting agency or facility <input type="checkbox"/> By invitation of the facility to be visited	

**9. IS THE VISIT PERTINENT TO:**

- Specific equipment or weapon system
- Foreign military sales or export licence
- A programme or agreement
- A defence acquisition process
- Other

Specification **of the selected subject:**

**10. SUBJECT TO BE DISCUSSED/JUSTIFICATION/PURPOSE** *(To include details of host Government/Project Authority and solicitation/contract number if known and any other relevant information. Abbreviations should be avoided):*

**11. ANTICIPATED HIGHEST LEVEL OF INFORMATION/MATERIAL OR UNESCORTED ACCESS TO SECURITY AREAS**

- NATO CONFIDENTIAL     NATO SECRET
- COSMIC TOP SECRET     Other

If other, specify: \_\_\_\_\_

**12. PARTICULARS OF VISITOR(S) - (Annex 2 to be completed)**

**13. THE SECURITY OFFICER OF THE REQUESTING GOVERNMENT AGENCY, ORGANISATION OR INDUSTRIAL FACILITY:**

NAME:

TELEPHONE NO:

E-MAIL ADDRESS:

SIGNATURE:

**14. CERTIFICATION OF SECURITY CLEARANCE LEVEL:**

NAME:

ADDRESS:

TELEPHONE NO:

E-MAIL ADDRESS:

SIGNATURE:                      DATE (*dd/mm/yyyy*): \_\_\_\_/\_\_\_\_/\_\_\_\_

**15. REQUESTING NATIONAL SECURITY AUTHORITY/DESIGNATED SECURITY AUTHORITY/*NATO security office*:**

NAME:

ADDRESS:

TELEPHONE NO:

E-MAIL ADDRESS:

SIGNATURE: DATE (*dd/mm/yyyy*): \_/\_\_\_\_/\_\_\_\_

**16. REMARKS (Mandatory justification required in case of an emergency visit):**



1. **ANNEX 1 to RFV FORM**

<b>GOVERNMENT AGENCY(IES), ORGANISATION(S) OR INDUSTRIAL FACILITY(IES) TO BE VISITED</b>	
1.	<input type="checkbox"/> Military <input type="checkbox"/> Government <input type="checkbox"/> Industry <input type="checkbox"/> NATO <input type="checkbox"/> Other: _____
	NAME: ADDRESS: TELEPHONE NO: FAX NO:  NAME OF POINT OF CONTACT: E-MAIL: TELEPHONE NO:  NAME OF SECURITY OFFICER OR SECONDARY POINT OF CONTACT: E-MAIL: TELEPHONE NO:
2.	<input type="checkbox"/> Military <input type="checkbox"/> Government <input type="checkbox"/> Industry <input type="checkbox"/> NATO <input type="checkbox"/> Other: _____
	NAME: ADDRESS: TELEPHONE NO: FAX NO:  NAME OF POINT OF CONTACT: E-MAIL: TELEPHONE NO:  NAME OF SECURITY OFFICER OR SECONDARY POINT OF CONTACT: E-MAIL: TELEPHONE NO:

**GOVERNMENT AGENCY(IES), ORGANISATION(S) OR INDUSTRIAL FACILITY(IES)  
TO BE VISITED**

3.  Military  Government  Industry  NATO  Other: \_\_\_\_\_

NAME: ADDRESS:

TELEPHONE NO:

FAX NO:

NAME OF POINT OF CONTACT:

E-MAIL:

TELEPHONE NO:

NAME OF SECURITY OFFICER OR  
SECONDARY POINT OF CONTACT:

E-MAIL:

TELEPHONE NO:

4.  Military  Government  Industry  NATO  Other:

NAME: ADDRESS:

TELEPHONE NO:

FAX NO:

NAME OF POINT OF CONTACT:

E-MAIL:

TELEPHONE NO:

NAME OF SECURITY OFFICER OR  
SECONDARY POINT OF CONTACT:

E-MAIL:

TELEPHONE NO:

***(Continue as required)***

**2. ANNEX 2 to RFV FORM**

<b>PARTICULARS OF VISITOR(S)</b>	
<p>1. <input type="checkbox"/> Military <span style="float: right;"><input type="checkbox"/> Government</span> <input type="checkbox"/> Contractor's Personnel <input type="checkbox"/> NATO <input type="checkbox"/> Other IO (Specify: _____)</p> <p>SURNAME: FORENAMES (<i>as per passport</i>): RANK (<i>if applicable</i>): DATE OF BIRTH (<i>dd/mm/yyyy</i>): ____/____/____ PLACE OF BIRTH: NATIONALITY: SECURITY CLEARANCE LEVEL: PP/ID NUMBER: POSITION: COMPANY/AGENCY:</p>	
<p>2. <input type="checkbox"/> Military <span style="float: right;"><input type="checkbox"/> Government</span> <input type="checkbox"/> Contractor's Personnel <input type="checkbox"/> NATO <input type="checkbox"/> Other IO (Specify: _____)</p> <p>SURNAME: FORENAMES (<i>as per passport</i>): RANK (<i>if applicable</i>): DATE OF BIRTH (<i>dd/mm/yyyy</i>): ____/____/____ PLACE OF BIRTH: NATIONALITY: SECURITY CLEARANCE LEVEL: PP/ID NUMBER: POSITION: COMPANY/AGENCY:</p>	

<b>PARTICULARS OF VISITOR(S)</b>	
3.	<input type="checkbox"/> Military <span style="float: right;"><input type="checkbox"/> Government</span> <input type="checkbox"/> Contractor's Personnel <input type="checkbox"/> NATO <input type="checkbox"/> Other IO (Specify: _____)
SURNAME: FORENAMES ( <i>as per passport</i> ): RANK ( <i>if applicable</i> ): DATE OF BIRTH ( <i>dd/mm/yyyy</i> ): ____/____/____ PLACE OF BIRTH: NATIONALITY: SECURITY CLEARANCE LEVEL: PP/ID NUMBER: POSITION: COMPANY/AGENCY:	
4.	<input type="checkbox"/> Military <span style="float: right;"><input type="checkbox"/> Government</span> <input type="checkbox"/> Contractor's Personnel <input type="checkbox"/> NATO <input type="checkbox"/> Other IO (Specify: _____)
SURNAME: FORENAMES ( <i>as per passport</i> ): RANK ( <i>if applicable</i> ): DATE OF BIRTH ( <i>dd/mm/yyyy</i> ): ____/____/____ PLACE OF BIRTH: NATIONALITY: SECURITY CLEARANCE LEVEL: PP/ID NUMBER: POSITION: COMPANY/AGENCY:	
<b>(Continue as required)</b>	

**3. International Visits Processing Times/Lead Times and NU or NR Notification Requirements**

- (1) The national requirements for RFV for NU or NR notification shall not put additional obligations on other NATO nations or Contractors under their jurisdiction.
- a. The following table depicts the number of working days prior to the date of the one-time visit or the date of the first recurring visit that the request should be in the possession of the receiving host NSA/DSA.
  - b. Visits involving NR information will be arranged directly between the SO responsible for the visitor and the SO of the facility to be visited without formal requirements. The SO of the facility to be visited should be asked if a request for visit is required to be provided to its NSA/DSA and if so, the SO of the facility to be visited should submit a visit request to its NSA/DSA on behalf of the visitor. However, visitors are not required to hold a PSC.

COUNTRY	RFV REQUIRED		NUMBER OF WORKING DAYS	
	Unclassified Visits	Restricted Visits	Request	Amendment/Change
Albania	No	Yes	20	10
Belgium	No	No	20	09
Bulgaria	No	Yes	20	No deadline
Canada	Yes 1. May be required for governmental facilities 2. Required for military facilities	Yes 1. May be required for governmental facilities 2. Required for military facilities	20	10
Croatia	No	No	20	7
Czech Republic	No	Yes	20	10
Denmark	No	No	07	05
Estonia	No	Yes	20	05
France	No	No	15	05
Germany	No	No	20	10
Greece	Yes 1. May be required for governmental facilities 2. Required for military facilities	Yes 1. May be required for governmental facilities 2. Required for military facilities	20	10
Hungary	No	No	20	10
Iceland	-	-	-	-
Italy	No	Yes	20	07
Latvia	No	No	20	05
Lithuania	No	Yes	20	10
Luxembourg	No	Yes	20	09
Netherlands	No	Yes required for military facilities only	10	05
Norway	No	Yes	10	05
Poland	No	No	25	10
Portugal	No	No	21	07

<b>COUNTRY</b>	<b>RFV REQUIRED</b>		<b>NUMBER OF WORKING DAYS</b>	
	<b>Unclassified Visits</b>	<b>Restricted Visits</b>	<b>Request</b>	<b>Amendment/ Change</b>
Romania	No	No	25	10
Slovakia	No	No	20	10
Slovenia	No	Yes	21	07
Spain	No	No	20	08
Turkey	Yes For military facilities only	Yes For military facilities only	21	10
United Kingdom	No	No	20	05
United States	No	Yes	21	05

**4. List of Authorities concerned with IVCPs**

<b>COUNTRY</b>	<b>OFFICE</b>	<b>E-mail</b>
Albania	NSA	E-mail: Sektretaria.nsa@mod.gov.al Tel: +335 4 224 5995
Belgium		
Bulgaria	State Commission on Information Security (NSA)	E-mail: dksi@government.bg
Canada	Industrial Security Sector, Public Works and Government Services Canada, Designated Security Authority (DSA).	E-mail: ssivisites.issvisits@pwgsc.gc.ca
Croatia	NSA/DSA, Office of the National Security Council	E-mail: ivcp@uvns.hr
Czech Republic	NSA	E-mail: posta@nbu.cz
Denmark	Danish Defence Intelligence Service (NSA for the Military Sphere)	E-mail: fe4222@fe-ddis.dk
Estonia	NSA	E-mail: nsa@mod.gov.ee
France	MOD acting as DSA	E-mail: <u>In:</u> Bagneux.sdi-sii@dga.defense.gouv.fr <u>Out:</u> bagneux.sdi-visit@dga.defense.gouv.fr
Germany	<u>RFV's relating to military projects:</u> Federal Office of Bundeswehr Equipment, Information Technology and In-Service Support Division Z1.3  <u>RFV's relating to civil projects:</u> Federal Ministry for Economic Affairs and Energy (DSA) Division - ZB2	E-mail: baainbwZ1.3-bkv@bundeswehr.org Tel.: +49.261.400.13190/13192 Fax: +49.261.400.13189 E-mail: zb2-international@bmwi.bund.de Tel.: +49 228 99615 3621/3605 Fax: +49 228 99615 2603

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<b>COUNTRY</b>	<b>OFFICE</b>	<b>E-mail</b>
Greece	Hellenic National Defence General Staff F' Division Security Directorate - Industrial Security Office	E-mail: daa.industrial@hndgs.mil.gr Tel: 00 30 210 6572022 Fax: 0030 210 6527612
Hungary	NSA	E-mail: nbf@nbf.hu Tel.: +36.17.95.23.03 Fax: +36.17.95.03.44
Iceland		
Italy	Dipartimento delle Informazioni per la Sicurezza – Ufficio Centrale per la Segretezza	E-mail: mg3437.a03@alfa.gov.it
Latvia	The Constitution Protection Bureau (SAB)	E-mail : ndi@sab.gov.lv
Lithuania	Commission for Secrets Protection Co-ordination	E-mail: nsa@vsd.lt Tel.: +370 706 66701(03) +370 706 66708 Fax: +370 706 66700
Luxembourg	Autorité nationale de Sécurité 207, route d'Esch L-1471 Luxembourg	E-mail: ans@me.etat.lu Tel.: +352.24.78.2210 Fax.: +352.24.78.2243
Netherlands	NSA/DSA	E-mail: NSA: NIVCO@minbzk.nl DSA: indussecc@mindef.nl*
Norway	The Norwegian Defence Security Agency	E-mail: fsa.kontakt@mil.no
Poland	NSA	E-mail: nsa@abw.gov.pl
Portugal	NSA/GNS –Rua da Junqueira, 69, 1300-342 Lisboa	E-mail: geral@gns.gov.pt
Romania	National Registry Office for Classified Information (ORNISS)	E-mail: relatii publice@orniss.ro
Slovakia	NSA	E-mail: podatelna@nbusr.sk
Slovenia	NSA	E-mail: <a href="mailto:gp.uvtp@gov.si">gp.uvtp@gov.si</a>

**NATO UNCLASSIFIED**



COUNTRY	OFFICE	E-mail
Spain	NSA	E-mail: <a href="mailto:sp-ivtco@areatec.com">sp-ivtco@areatec.com</a>
Turkey		
United Kingdom	Defence Equipment and Support PSyA, Ministry of Defence, International Visits Control Office, Poplar-1 # 2004, Abbey Wood, Bristol, England, BS34 8JH, UK	Email: <a href="mailto:Desinfra-ivco@mod.uk">Desinfra-ivco@mod.uk</a> Tel.: + 44 117 91 33840 Fax.: + 44 117 91 34924
United States	For Department of Defense: Mr. Mario Rubio International Security Directorate Office of the Under Secretary of Defense (Policy) Defense Technology Security Administration 4800 Mark Center Drive Suite 07E12 Alexandria, VA 22350	E-mail: <a href="mailto:Mario.rubio@dtsa.mil">Mario.rubio@dtsa.mil</a> Tel.: +1.571.372.2561 Fax.: +1 571.372.2559



3.  does not hold an FSC.

4. has the capability to protect classified information/material:  
 yes, level: .....  no

5. has Accredited CIS:  
 yes, level: .....  no

6. This FSC assurance expires on ..... (dd/mm/yyyy), or as advised otherwise by the NSA/DSA.  
In case of an earlier invalidation or in case of any changes of the information listed above you will be informed.

7. Remarks:  
.....  
.....

Issuing NSA/DSA:  
Name: ..... Date: (dd/mm/yyyy).....

**Appendix 6. INSTRUCTIONS FOR THE COURIER**

**Annex to the "Courier Certificate", No. ....  
for the International Hand Carriage of Classified Material**

**INSTRUCTIONS FOR THE COURIER**

- (1) You have been appointed to carry/escort a classified consignment. Your "COURIER CERTIFICATE"/"MULTI-TRAVEL COURIER CERTIFICATE" has been provided. Before starting the journey, you will be briefed on the security regulations governing the hand carriage of the classified consignments and on your security obligations during the specific journey (behaviour, itinerary, schedule, etc.). You will also be requested to sign a declaration that you have read and understood and will comply with prescribed security regulations.
- (2) The following general points are brought to your attention:
- a. You will be held liable and responsible for the consignment described in the Certificate;
  - b. Throughout the journey, the classified consignment must stay under your personal control;
  - c. The consignment will not be opened a route except in the circumstances described in sub-paragraph (j) below;
  - d. The classified consignment is not to be discussed or disclosed in any public place;
  - e. The classified consignment is not, under any circumstances, to be left unattended. During overnight stops, military facilities or industrial companies having appropriate security clearance may be utilised. You are to be instructed on this matter by your facility Security Officer;
  - f. While hand carrying a classified consignment, you are forbidden to deviate from the travel schedule provided;
  - g. In cases of emergency, you must take such measures as you consider necessary to protect the consignment, but on no account will you allow the consignment out of your direct personal control; to this end, your instructions include details on how to contact the security authorities of the countries you will transit as listed in sub-paragraph (l) below. If you have not received these details, ask for them from your facility Security Officer;
  - h. You and the facility Security Officer are responsible for ensuring that your personal expatriation and travel documentation (passport, currency and medical documents, etc.) are complete, valid and current;
  - i. If unforeseen circumstances make it necessary to transfer the consignment to other than the designated representatives of the company or government you are to visit, you will give it only to authorised employees of one of the points of contact listed in sub-paragraph (l);
  - j. There is no assurance of immunity from search by the Customs, Police, and/or Immigration Officials of the various countries whose borders you will be crossing; therefore, should such officials enquire into the contents of the consignment, show them your Certificate and this note and insist on showing them to the actual senior Customs, Police, and/or Immigration Official; this action should normally suffice to pass the consignment through unopened. However, if the senior Customs, Police, and/or Immigration Official demands to see the actual contents of the consignments you may open it in his presence, but this should be done in an area out of sight of the general public;

You should take precautions to show officials only as much of the contents as will satisfy them that the consignment does not contain any other item and ask the official to repack or assist in repacking it immediately upon completion of the examination. You should request the senior Customs, Police, and/or Immigration Official to provide evidence of the opening and inspection of the packages by signing and sealing them when closed and confirming in the shipping documents (if any) that the consignment has been opened.

If you have been required to open the consignment under such circumstances as the foregoing, you must notify the receiving facility Security Officer and the dispatching facility

Security Officer, who should be requested to inform the NSA/DSA of their respective government.

- k. Upon your return, you must produce a bona fide receipt for the consignment signed by the Security Officer of the facility or agency receiving the consignment or by an NSA/DSA of the receiving government;

- l. Along the route you may contact the following officials to request assistance:

.....  
.....  
.....  
.....  
.....  
.....

**Appendix 7. COURIER CERTIFICATE**

[LETTERHEAD] COURIER

**CERTIFICATE PROGRAMME**

**TITLE (optional)**

**COURIER CERTIFICATE NO. .... (\*)**

**FOR THE INTERNATIONAL HAND CARRIAGE OF CLASSIFIED DOCUMENTS, EQUIPMENT AND/OR COMPONENTS**

This is to certify that the bearer: Mr./Ms. (name/title):

born on: (day/month/ year), in (country): a national of (country):

holder of passport/identity card no.: (number) issued by: (issuing authority)

on: (day/month/year)

employed with: (company or organisation)

is authorised to carry on the journey detailed below the following consignment:

*(Number and particulars of the consignment in detail, i.e., No. of packages, weight and dimensions of each package and other identification data as in shipping documents)*

.....  
.....

\* May also be used by security guards.

The attention of Customs, Police, and/or Immigration Officials is drawn to the following:

- The material comprising this assignment is classified in the interests of the security of:

(NATO, the country of origin of the shipment and that of the destination shall be indicated. The country(ies) to be transited also may be indicated).

- It is requested that the consignment will not be inspected by other than properly-authorized persons or those having special permission.

- If an inspection is deemed necessary, it is requested that it be carried out in an area out of sight of persons who do not belong to the service and, in the presence of the courier.

- It is requested that the package, if opened for inspection, be marked after re-closing, to show evidence of the opening by sealing and signing it and by annotating the shipping documents (if any) that the consignment has been opened.
  
- Customs, Police, and/or Immigration Officials of countries to be transited, entered or exited are requested to give assistance, if necessary, to ensure successful and secure delivery of the consignment.

**Appendix 8. MULTI-TRAVELS COURIER CERTIFICATE**

[LETTERHEAD]

PROGRAMME TITLE (optional)

MULTI-TRAVELS COURIER CERTIFICATE N° .....

FOR INTERNATIONAL HAND CARRIAGE OF CLASSIFIED DOCUMENTS,

EQUIPMENTS AND/OR COMPONENTS

This is to certify that the bearer

**Mr/Ms** (name/title)

**born on** (day/month/year) ..... in (country) .....,

**a national of** (country) .....

**holder of passport or identity card n°** .....

**issued by** (issuing authority): .....

**on** (day/month/year):.....

**employed with** (facility): .....

is authorised to carry the classified documents, equipments and/or components between the following countries:.....

The bearer above is authorised to use the present certificate as many times as necessary, for classified shipments between the countries here above until (day / month / year): .....

Each sending is attached with the shipment description.

The attention of Customs, Police and/or Immigration Officials is drawn to the following:

- The material comprising each consignment is classified in the interest of the security of:  
  
(NATO, the country of origin of the shipment and that of the destination shall be indicated. The country (ies) to be transited also may be indicated).
- It is requested that the consignment will not be inspected by other than properly authorised persons or those having special permission.
- If an inspection is deemed necessary, it is requested that it be carried out in an area out of sight of persons who do not belong to the service and, in the presence of the courier.

It is requested that the package, if opened for inspection, be marked after re-closing, to show evidence of the opening by sealing and signing it and by annotating the shipping documents (if any) that the consignment has been opened.



Customs, Police and/or Immigration Officials of countries to be transited, entered or exited are requested to give assistance, if necessary, to ensure successful and secure delivery of the consignment.

Instructions for the Courier (Appendix 7) are also applicable.

Attachment to multi-travels courier certificate No:.....

Description of consignment nr: .....

Transport from (**day/month/year**): ..... to (**day/month/year**):

..... Bearer (name): .....

Itinerary: from (originating country) ..... to (destination country)

..... through (crossed countries) .....

authorised stops (list of locations):

..... References of receipt or

inventory list:

Description of the consignment (number of package, dimensions and, if needed, weight of each package):

Officials you may contact to request assistance

Signature of the consignor's security officer .....	Signature of the NSA/DSA .....
Facility stamp .....	Official stamp or NSA/DSA's seal .....

Note to be signed on completion of each journey:

I declare in good faith that, during the journey covered by this "shipment consignment", I am not aware of any occurrence or action, by myself or by others, that could have resulted in the compromise of the consignment.

Courier's signature: .....

Witnessed by (name and signature of consignor's security officer):

..... Date of return of the "shipment consignment"

(day/month/year): .....

**Appendix 9. SECURITY ACKNOWLEDGEMENT (IN CASE OF HAND CARRIAGE)**

[LETTERHEAD]

**SECURITY ACKNOWLEDGEMENT**

**DECLARATION**

(name, forename)

(name of company)

(position in company)

I have been briefed on and provided with instructions concerning the handling and custody of classified documents/equipment to be carried by me. I have read and understood their contents.

I shall always retain en route the classified documents/equipment and shall not open the package unless required by the Customs Authorities.

Upon arrival, I shall hand over the classified documents/equipment intended for the receiving company/organisation, against receipt, to the designated consignee.

(Place and date)

(Signature of courier)

Witnessed by:

(Security Officer's signature)

**Appendix 10. INTERNATIONAL TRANSPORTATION PLAN  
INTERNATIONAL TRANSPORTATION PLAN**

*[LETTERHEAD]*

**TRANSPORTATION PLAN  
FOR THE MOVEMENT OF CLASSIFIED CONSIGNMENTS  
(INSERT NAME OF PROGRAMME OR PROJECT)**

**1. INTRODUCTION**

This transportation plan lists the procedures for the movement of classified (*insert Programme /Project / Contract name*) consignments between (*insert Programme Participants*).

**2. DESCRIPTION OF CLASSIFIED CONSIGNMENT**

Provide a general description of the consignment to be moved. If necessary, a detailed, descriptive listing of items to be moved under this plan, including military nomenclature, may be appended to this plan as an annex. Include in this section a brief description as to where and under what circumstances transfer of custody will occur.

**3. IDENTIFICATION OF AUTHORISED PARTICIPATING GOVERNMENT REPRESENTATIVES**

This Section should identify by name, title and organisation, the authorised representatives of each Programme/Project participant who will receipt for and assume security responsibility for the classified consignment. Mailing addresses, telephone numbers, fax numbers and network addresses should be listed for each country's representatives.

**4. DELIVERY POINTS**

- (a) Identify the delivery points for each participant (e.g., ports, railheads, airports, etc.) and how transfer is to be effected;
- (b) describe the security arrangements that are required while the consignment is located at the delivery points; and
- (c) specify any additional security arrangements, which may be required due to the unique nature of the movement or of a delivery point (e.g., an airport freight terminal or port receiving station).

**5. IDENTIFICATION OF CARRIERS**

Identify the commercial carriers, freight forwarders and transportation agents, where appropriate, that might be involved to include the level of security clearance and storage capability.

**6. STORAGE/PROCESSING FACILITIES AND TRANSFER POINTS**

- (a) List, by participants, the storage or processing facilities and transfer points that will be used; and
- (b) describe specific security arrangements necessary to ensure the protection of the classified consignment while it is located at the storage / processing facility or transfer point.

**7. ROUTES**

Specify in this section the routes for movements of the classified consignments under the plan. This should include each segment of the route from the initial point of movement to the ultimate destination including all border crossing. Routes should be detailed for each participant in the logical sequence of the shipment from point to point. If overnight stops are required, security arrangements for each stopping point should be specified. Contingency stop-over locations should also be identified as necessary.

## **8. PORT SECURITY AND CUSTOMS OFFICIALS**

In this section, identify arrangements for dealing with customs and port security officials of each participant. The facility must verify that the courier has been provided with the necessary documentation and is aware of the rules necessary to comply with customs and security requirements. Prior co-ordination with customs and port security agencies may be required so that the Project/Programme movements will be recognised.

Procedures for handling custom searches and points of contact for verification of movements at the initial despatch points should also be included here.

## **9. COURIERS**

When couriers are to be used, relevant provisions specified in Appendix 7 and 8 apply.

## **10. RECIPIENT RESPONSIBILITIES**

Describe the responsibilities of each recipient to inventory the movement and to examine all documentation upon receipt of the movement and:

- (a) notify the dispatcher of any deviation in routes or methods prescribed by this plan;
- (b) notify the dispatcher of any discrepancies in the documentation or shortages in the shipment; and
- (c) clearly state the requirement for recipients to promptly advise the NSA/DSA of the dispatcher of any known or suspected compromise of classified consignment or any other exigencies which may place the movement in jeopardy.

## **11. DETAILS OF CLASSIFIED MOVEMENTS**

This section should include the following items:

- (a) identification of dispatch assembly points;
- (b) packaging requirements that conform to the national security rules of the Project/Programme participants. The requirements for dispatch documents seals, receipts, and storage and security containers should be explained. Any unique requirement of the Projects/Programme participants should also be stated; documentation required for the dispatch points;
- (c) courier authorisation documentation and travel arrangements;
- (d) procedures for locking, sealing, verifying and loading consignments. Describe procedures at the loading points, to include tally records, surveillance responsibilities and witnessing of the counting and loading arrangements;
- (e) procedures for accessibility by courier to the shipment en route;

- (f) procedures for unloading at destination, to include identification of recipients and procedures for change of custody, and receipt arrangements;
- (g) emergency communication procedures. List appropriate telephone numbers and points of contact for notification in the event of emergency; and
- (h) procedures for identifying each consignment and for providing details of each consignment (see Attachments); the notification should be transmitted no less than six working days prior to the movement of the classified consignment.

**12. RETURN OF CLASSIFIED MATERIAL**

This section should identify requirements for return of classified material to the manufacturer or sending country (e.g., warranty, repair, test and evaluation, etc.).

- (a) Samples of these forms should be included, as appropriate, as enclosures to the plan as necessary.
  - (1) packing list;
  - (2) classified material receipts;
  - (3) bills of lading;
  - (4) export declaration;
  - (5) waybills;
  - (6) other nationally-required forms.
- (b) NSAs/DSAs reserve their right to add additional measures in the course of establishing the Transportation Plan if required.

**Appendix 11. NOTICE OF CLASSIFIED CONSIGNMENT**

**NOTICE OF CLASSIFIED CONSIGNMENT**

**NOTICE OF (INSERT PROGRAMME/PROJECT NAME)**

**CONSIGNMENT APPROVED TRANSPORTATION PLAN REFERENCE No.  
(INSERT REFERENCE)**

**REPLY BEFORE:** *(insert date)*

1. Consignor / consignee: *(include the name, telephone number and address of the person(s) responsible for the consignment at both locations).*
2. Government Designated Personnel: *(include name, telephone number and address of releasing and receiving authorised representatives, as applicable).*
3. Description of consignment:
  - (a) contract or Tender Number;
  - (b) export licence or other applicable export authorisation citation;
  - (c) consignment description: *(describe items to be shipped and their classification);*
  - (d) package description:
    - type of package (wood, cardboard, metal, etc.);
    - number of packages;
    - number of enclosed classified items in each package;
    - package dimensions/weight: *(include length, width, height and weight);*
  - (e) indicate if package contains any hazardous material.
4. Routing of consignment:
  - (a) date / time of departure;
  - (b) date / estimated time of arrival;
  - (c) routes to be used between point of origin, point of export, point of import and ultimate destination: *(identify specific transfer points; use codes that appear in transportation plan, if applicable);*
  - (d) method of transport for each portion of the shipment: *(include names and addresses of all carriers and flight, rail or ship numbers, as applicable);*
  - (e) freight forwarder s /transportation agents to be used: *(include name, telephone number, address of companies if not specified in transportation plan); (Note: Consignor must re-verify clearance and safeguarding capability of these entities prior to releasing shipments);*

- (f) customs or port security contacts: *(list names and telephone numbers, if different from approved transportation plan procedures)*.
5. Name(s) and identification of authorised courier.