DETAIL TECHNICAL SPECIFICATION

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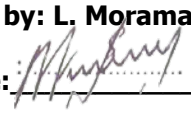
Signature: 

Date: 06 August 2024

Recommended by: D. Hlahla

Signature: 

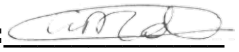
Date: 2024/08/06

Supported by: P. Matosa

Signature: 

Date: 2024/08/07

Approved by: A. Ndamase

Signature: 

Date: 2024/08/08

1. CONTRACT REQUIREMENTS AND SPECIFICATIONS FOR TENDERING

1.1 These requirements shall be read in conjunction with all the information and conditions of the contract as listed on the appropriate tender form.

1.2 Where conditions elsewhere in this specification are at variance with items contained in the tender form, the latter shall take preference.

1.3 The appropriate tender form forms part of the specification.

1.4 The requirements of parts 1 to 4 shall be read in conjunction with the rest of the specification.

1.5 "Owner" or "Client", means the TRANSNET FREIGHT RAIL, referred to as "CLIENT" or "the CLIENT" (all either fully, partially or not at all in capitals).

1.6 "Local authority" means and refers to the authority having jurisdiction over the premises involved in this contract. This authority could be one or more of the following:-

(a) ESKOM

(b) A municipality

(c) A Government department

(d) The registered owner

1.7 "Contractor" (all either fully, partially or not at all in capitals), means and refers to the Contractor, who is appointed in terms of this contract, irrespective of whether the contract is a direct contract with the client or a sub-contract with a Principal Contractor.

1.8 "Engineer" means and refers to the person (professional Engineer registered at ECSA) or company (professional consulting engineering company, registered at CESA [formally SAACE]) appointed by the Client to represent the Client from an engineering perspective, should such an appointment be deemed necessary. In the absence of such an appointment, the Client will perform these functions internally.

1.9 Failure to comply with requirements of this tender may preclude a tender from consideration.

2. CHECKING OF PAGES AND TEXT

2.1 The bidder must check the number of pages and drawings and if any are found missing or duplicated or if the figures or writing is indistinct or the schedules contain

any errors, he should apply to the CLIENT immediately for rectification of the documents or clarification as no liability whatsoever will be admitted by the CLIENT should any dispute arise subsequent to the submission of the tender in these respects.

3. SITE INSPECTIONS

3.1 Before tendering, Bidders should visit the site and acquaint themselves with all the local conditions, the accessibility of the site, the full extent and nature of the operations, the supply of and conditions affecting labour, carriage, carting, unloading, storage and safe custody of materials, workshop accommodation, the scaffolding, tackle and tools necessary for the execution of the contract generally. Claims on the ground of lack of knowledge in such respects or otherwise will not be entertained. For services where prior permission is required before Contractors may visit the site a visit will be arranged for all interested parties by the CLIENT representative.

4. SITE NAME AND LOCATION

4.1 Transnet Engineering plant in Koedoespoort.

5. FORMAL BRIEFING

5.1 A compulsory pre-proposal RFP briefing will be conducted the site, for approximately ± 2 hour, followed by a site visit to the site.
[Respondent to provide own transportation, personal protective clothing (i.e. reflector jacket and safety boots) and accommodation].

6. SCHEDULE OF INFORMATION

6.1 All particulars as set out in any schedules shall be filled in by Bidders. Failure to comply with these requirements may render the tender liable to disqualification.

7. DOCUMENTS PROPERTY OF CLIENT

7.1 Bidders are reminded that all drawings and specifications issued to them are the property of the CLIENT and must be returned to the CLIENT whether a tender is submitted or not. Designs, drawings, etc. supplied by the contractor for the provision of this service will be the property of the client, and therefore should not be reproduced nor moved to third parties.

8. TENDER PRICE

8.1 The tendered price shall be for the design, supply, delivery, installation, commissioning, configuration, integration, hand-over and guarantee of the system as specified, complete in every respect. All prices quoted shall be quoted in South African currency and shall be a fixed price.

8.2 The Tenderer is required to submit rates as per the Activity Schedule. These rates are deemed to be inclusive of costs for all elements to make the system complete and fully functional.

9. DETAIL TECHNICAL SPECIFICATION

9.1 The manufacturer will provide a certified STANDARD **5-year** warrantee on all equipment.

9.2 The system implementing Contractor must be accredited and certified by the Manufacturer as an EXPERT (or equivalent) integrator, whether as a direct or indirect Contractor.

9.3 The HDIPVS shall consist of FULL HD IP Cameras – existing Analogue cameras, if any, will be connected to the system via to Video Encoders.

10. SYSTEM DESCRIPTION

10.1 The integrated IR, 3.4 – 10.5mm f/1.6 indoor/outdoor DAY/NIGHT bullet cameras shall be at least full High Definition (HD) 2.0 Mega Pixel (MP) resolution with Wide

Dynamic Range (WDR) light catcher capability. The cameras shall be selected for suitability for internal and external Surveillance.

10.2 The integrated IR, 3.4 – 10.5mm f/1.6 Licence Plate Recognition (LPR) cameras shall be at least full High Definition (HD) 3.0 Mega Pixel (MP) resolution with Wide Dynamic Range (WDR) light catcher capability. The cameras shall be selected for suitability for internal and external Surveillance. The LPR cameras shall have the capabilities below:

10.2.1 The LPR camera shall read and process license plates on vehicles travelling up to 100km/h and 15m away from the camera when installed in in the recommended position and mounting height.

10.2.2 The LPR camera shall read and process license plates in all lighting conditions including a minimum illumination of 0 lux.

10.2.3 The LPR camera shall read and process license plates within one vehicle road lane or approximately 3m.

10.2.4 The LPR camera shall be at least 99% accurate.

10.2.5 The LPR camera shall store vehicle license plate read and processed for up to 180 days.

10.3 The IR, 2.9mm f/2.0 Mini Dome cameras shall be at least full High Definition (HD) 2.0 Mega Pixel (MP) resolution with Wide Dynamic Range (WDR) light catcher capability. The cameras shall be selected for suitability for internal and external Surveillance.

10.4 The Infra-Red (IR) PTZ camera shall be at least full High Definition (HD) pendant 4.0 Mega Pixel (MP), 36 X 150m.

10.5 Indoor cameras shall be standard vandal resistant ceiling/wall mount fixed dome and fitted with built in variable focal, dc-auto iris lenses to ensure optimal optical efficiency. Where no false ceiling is available, cameras will be mounted against wall.

10.6 Outdoor cameras shall be mounted in purpose made weatherproof housings to protect camera from dust, rain and strong winds.

10.7 All cameras shall be fitted with surge protection against possible lightning and electrical interference.

10.8 All camera signal, data and power cable will be wired to the equipment enclosure closest to its position. The video data signal cable (Cat6 UTP) will be terminated to the Security LAN Network (SLN) via a 24-way TCP/IP data switch inside the 19" equipment rack cabinet.

10.9 All cameras and switches will be Power-Over-Ethernet compliant.

10.10 A suitable communication path shall be provided to ensure reliable transmission of control signals from the control equipment to any Pan/Tilt/Zoom (PTZ) camera assemblies.

10.11 The system shall incorporate as standard motion detection video analytics. All activities shall be recorded on a centralised archive storage facility.

10.12 All signal, control and power cables shall be installed inside conduit, trunking and cables racks/baskets. The Contractor shall agree with the engineer all routes. All cables shall be protected against lightning damage.

10.13 All lenses shall be of Day/Night optics type, even if the lens is build-in. The correct angles of view will be set up for each individual camera. All lenses shall be of glass type lens and not plastic.

11. MULTI-MEGAPIXEL HIGH-DEFINITION VIDEO SURVEILLANCE SYSTEM

11.1 All cameras mounted within and on the facility, buildings will be linked to and powered by a star-topology distributed network of POE switches with fibre uplinks to the Central Control Room.

11.2 An Observation Control Room with mirrored recording is essential for a completely fail-safe solution.

11.3 Remote Viewing Stations will be provided for the Management of localized cameras within the various sectors of the facility.

11.4 Perimeter cameras (Where applicable) will be installed on a fibre ring. All fibre links are to have dual redundancy.

11.5 The Network Video Management Software (NVMS), Network Video Recorder (NVR) Hardware, Network Surveillance Cameras and related components shall be installed and commissioned by authorized integrators trained and certified by the manufacturer.

11.6 Certification and training for authorized integrators shall be available from the manufacturer or his local representative.

12. MULTI-MEGAPIXEL NETWORK VIDEO RECORDERS

12.1 Each Multi-Megapixel NVR is to be provided in a space saving 2U rack-mount chassis and is to be designed to achieve the highest performance for HD video recording and playback.

12.2 The NVR must be scalable to operate seamlessly in an environment with multiple NVRs, as a single solution. Each NVR must be preloaded with Multi-Megapixel NVMS and configured for maximum performance and reliability.

12.3 The NVR is to record up to 32 MB/s of image data from up to 96 camera channels running at 30 images per second. It is to be of enterprise-class reliability with a RAID-5 hard drive configuration, and the option for redundant power supplies.

12.4 Both the hard drives and the power supplies are to be hot-swappable for online repairs. Each NVR is to have 4 gigabit Ethernet ports and an effective 96 Tera Byte (TB) of on-board recording capacity. The NVRs in the Central Control Room must incorporate an expansion card for connection to an external 15TB (effective) storage expansion unit, also configured in Raid-5.

12.5 The upgraded storage will maintain its original storage capacity and retention duration or exceed it. The security requirement is that recorded footage for all cameras be kept for 60 days or more.

13. NETWORK VIDEO MANAGEMENT SOFTWARE (NVMS)

13.1 The video management software provided is to be an Enterprise Edition and is to run seamlessly on the NVRs provided. It is to function in conjunction with the cameras installed to provide a complete solution that delivers full situation awareness and indisputable detail, leading to faster response times, reduced investigation times, compliance validation and superior overall protection.

13.2 The NVMS is to be a secure distributed-network platform with enterprise class reliability for capturing, managing, and storing HD multi-megapixel Surveillance video while efficiently managing bandwidth and storage.

13.3 The NVMS is to have the capability to manage both audio and video from a broad range of multi-megapixel IP cameras. In addition, the system must have the capability to accommodate conventional and PTZ analogue cameras and both audio and video from a broad range of 3rd party IP cameras, and encoders from leading manufacturers.

13.4 The NVMS is to be powerful, yet intuitive, with an easy-to-use interface that allows operators to efficiently evaluate and respond to events with minimal training.

As it is a requirement to integrate the NVMS into both Access Control and Intercom Control systems the NVMS is to be an open-source platform with access to the Control Centre SDK source code and technical support from the software developer.

13.5 The NVMS is to have all video and integration licenses provided as a once-off fee with unlimited client connections to all NVRs at no charge. Recurring annual license fees are not acceptable.

13.6 The NVMS shall be pre-loaded on turn-key servers running Microsoft Windows with configurable storage.

13.7 The NVMS shall be an enterprise level software solution that shall be scalable from one client, server, and camera to hundreds of clients, servers, and cameras.

13.8 The NVMS shall consist of server software applications and client software applications.

13.9 The NVMS shall be available in English.

13.10 The Network Video Management Software (NVMS) shall include the following applications: -

- 13.10.1 Server Software Applications
- 13.10.2 Control Center Server
- 13.10.3 Control Center Admin Tool
- 13.10.4 Client Software Applications
- 13.10.5 Control Center Client
- 13.10.6 Control Center Web Client
- 13.10.7 Control Center Player
- 13.10.8 Control Center Camera Installation Tool

13.11 The NVMS shall permit server and client software applications to be installed and run on both the same computer and on separate computers. The NVMS shall support edge-based storage and processing of video and audio inputs.

13.12 The NVMS shall support High Definition Stream Management (HDSM) architecture which includes:-

- 13.12.1 Support for industry standard JPEG2000, MJPEG, MPEG-4, and H.264 compression formats.
- 13.12.2 Support for reducing the required client bandwidth and processing power by only transmitting what is necessary to view the video stream at full quality (e.g. if a user is viewing a 5MP camera in a 1MP window then a 1MP representation of the 5MP image shall be transmitted).

13.13 The NVMS shall support recording and management of video and audio sources.

13.14 The NVMS shall support recording and monitoring video and audio streams from sources with bandwidth up to 90 Mbit/sec, frame rate up to 60 fps, and video resolution up to 16MP (4872x3248).

13.15 The NVMS shall support the decompression of H.264 video through the client graphics card instead of using the client processing power.

13.16 The NVMS shall require no proprietary recording hardware, no hardware multiplexer or time-division technology for video and audio recording or monitoring.

13.17 The NVMS shall not limit the storage capacity and shall allow for upgrades of recording capacity.

13.18 The NVMS shall digitally sign recorded video and audio using 256-bit encryption so video can be authenticated for evidentiary purposes.

13.19 The NVMS shall securely transmit all command-and-control data via TCP/IP using cryptographic keys based on SSL to prevent eavesdropping or tampering.

13.20 The NVMS shall also be available in turn-key NVR platforms utilizing enterprise-grade servers and workstations pre-loaded with NVMS software and tested to manufacturer specifications for deployment in enterprise applications.

13.21 The NVMS shall be available in a licensed Enterprise edition.

13.22 The NVMS shall support integration with the GE Security Facility Commander Wnx v7.x platform for Electronic Access Control and Alarm Monitoring (Access System).

13.23 NVMS will provide the mechanism by which individual alarm(s) from the Access system can be pre-selected and configured to be monitored and, in turn, trigger event driven video operations

13.24 The NVMS shall support software level integration (via the Wnx API) with GE Facility Commander for facilitating real-time response to monitored events processed by Wnx v7.x. Alarm events. The API integration should include:-

- 13.24.1 Bi-directional alarm event processing for monitoring and acknowledgement
- 13.24.2 Receiving card access activity events
- 13.24.3 Receiving digital input events
- 13.24.4 Receiving intrusion zone events
- 13.24.5 Occurrences for "Alarm" and "Reset" conditions for each of the pre-selected Access system alarms will be processed and managed from the NVMS system's Live View workspace that is reserved for displaying alarm notifications in the alarm list message pane or from the FCWnx alarm viewer. If the Alarm pane is hidden, the alarm can be acknowledged from the Camera display tile.

13.24.6 Once an Access system-initiated alarm occurrence is acknowledged from the NVMS system, it should be automatically acknowledged and processed in the Access System alarm monitor queue without further operator intervention.

13.25 The NVMS shall be capable of being upgraded from one version to another without having to uninstall the previous version.

13.24 The NVMS shall be capable of being upgraded from Standard edition to Enterprise edition without having to uninstall the application.

13.25 The NVMS shall automatically detect if video or audio source firmware is out of date with respect to the current installed software and upgrade it.

13.26 The NVMS shall automatically detect if client application software is out of date with respect to the current installed server software and upgrade it.

13.27 The NVMS shall run as a service configured to automatically start when the server or workstation is powered on and automatically recover from failure or attempted tampering.

13.28 The NVMS shall allow system administration, and live and recorded video and audio monitoring all from a single client application that can be located anywhere on the network.

13.29 The NVMS shall automatically discover all Control Center Server instances running on computers connected to the same network as the Control Center Client.

13.30 The NVMS shall provide a search functionality to discover Control Center Server instances running on computers connected on a different network segment than the Control Center Client by using IP addresses or hostnames.

13.31 The NVMS shall automatically discover video and audio sources that are connected to the same network as the Control Center Server.

13.32 The NVMS shall provide a search functionality to discover video and audio sources that are connected on a different network segment than the Control Center Server.

13.33 The NVMS shall provide the ability to connect a video or audio source to multiple NVRs to achieve redundant recording.

13.34 The NVMS shall provide the ability to create a failover connection for a video or audio source. If the NVR that the video or audio source is connected to goes offline then the failover NVR will take over the connection.

13.35 The NVMS shall provide administration of all system connections from a single window.

13.36 The NVMS shall support receiving Simple Network Management Protocol (SNMP) messages from servers and alert the user.

13.37 The NVMS shall detect if the video or audio signal is lost and alert the system administrator.

13.38 The NVMS shall provide the capability to rename all video and audio sources and NVRs.

13.39 The NVMS shall record video and audio streams based on a recording schedule that can be defined individually for each video source. The schedule shall be created with the following parameters:-

- 13.39.1 Recording Mode
- 13.39.2 Continuous
- 13.39.3 Motion
- 13.39.4 Digital Inputs
- 13.39.5 Alarms
- 13.39.6 POS Transactions
- 13.39.7 License Plates
- 13.39.8 Time and Date Settings
- 13.39.9 Daily
- 13.39.10 Weekly

13.40 The NVMS shall provide the ability to manually trigger recording.

13.41 The NVMS shall provide a pre-event and post-event recording option.

13.42 The NVMS shall provide a reference frame recording option in the absence of events.

13.43 The NVMS shall perform motion detection on each individual video source with adjustable sensitivity, threshold and detection zones.

13.44 The NVMS shall provide the ability to reduce the image rate of recorded video over time as a means of increasing record time. The image rate shall be able to be reduced to one half or one quarter of the original image rate. This setting can be configured separately for each video source.

13.45 The NVMS shall provide the ability to set a maximum recorded video retention time for each video source.

13.46 The NVMS shall perform dynamic bandwidth management to ensure that the total bandwidth does not overload the system.

13.47 The NVMS shall authenticate users before granting access to the system. Access rights for each user shall be able to be defined individually for each user, and shall and include:

- 13.47.1 Viewing live images
- 13.47.2 Viewing recorded images
- 13.47.3 Connect and disconnect cameras

13.47.4 Setup cameras
13.47.5 Setup servers
13.47.6 Access to individual video and audio sources

13.48 The NVMS shall provide the ability to import Windows users and use Windows credentials to authenticate users.

13.49 The NVMS shall provide the ability to create alarms.

13.50 The NVMS shall provide the ability to schedule backups of recorded video with associated events to a local folder or mapped network drive.

13.51 The NVMS shall provide the ability to email users and system administrators when an event or system health error occurs.

13.52 The NVMS shall maintain an event log for the following events:-
13.52.1 User Events
13.52.2 Device Events
13.52.3 Server Events

13.53 The NVMS shall have the capability to execute any of the following actions in response to any of the events listed above:-
13.53.1 User Notification Actions
13.53.2 Display on-screen message
13.53.3 Send an email
13.53.4 Play a sound
13.53.5 Monitoring Actions
13.53.6 Start live streaming video
13.53.7 Device Actions
13.53.8 Reboot camera
13.53.9 Trigger digital output
13.53.10 PTZ Actions
13.53.11 Go to preset
13.53.12 Run a pattern
13.53.13 Set auxiliary
13.53.14 Clear auxiliary
13.53.15 Alarm actions
13.53.16 Trigger an alarm
13.53.17 Acknowledge an alarm

13.54 The NVMS shall provide a maintenance log and audit trail of all system errors and events.

13.55 The NVMS shall provide the ability receive transaction information from point-of-sale sources.
13.56 The NVMS shall provide the ability to generate events based on point-of-sale transaction exceptions.
13.57 The NVMS shall provide the ability to define a region of an image where license plate detection is performed. Detected license plates shall be stored along with the video data.
13.58 The NVMS shall provide the ability to create a watch-list that will be used to create events when any license plate on the watch-list is detected in the images being analysed.
13.59 The NVMS shall provide the ability to enable and configure PTZ control on the RS-485 interface of a video source.
13.60 The NVMS shall support a wide range of PTZ camera protocols.
13.61 The NVMS shall provide the ability to change the network settings for a video and audio source.
13.62 The NVMS shall provide the ability to change image quality and image rate parameters for a video source without affecting the settings on the other video sources.
13.63 The NVMS shall provide the ability to enable a secondary stream for live viewing.
13.64 The NVMS shall provide the ability to change the exposure, iris, IR filter, backlight compensation, gain, priority, sharpening, saturation, focus, and white balance settings for a video source.
13.65 The NVMS shall provide the ability to change the image dimensions for a video source.
13.66 The NVMS shall provide the ability to add privacy zones to a video source to block unwanted areas in the image field of view.
13.67 The NVMS shall provide the ability to set a maximum recording duration for manually triggered recording for a video source.
13.68 The NVMS shall provide the ability to change the input and gain for an audio source.
13.69 The NVMS shall provide the ability to link any audio source to any video source.
13.70 The NVMS shall provide the ability to set a limit on the maximum bandwidth transmitted to the Control Center Client application from the Control Center Server application.
13.71 The NVMS shall provide the ability to automatically log in to an NVR.
13.72 The NVMS shall provide the ability to automatically log out of an NVR when the application is left idle.

13.73 The NVMS shall provide the ability to save and restore the window layout.

13.74 The NVMS shall provide the ability to control the system using a PC keyboard or joystick.

13.75 The NVMS shall provide the ability to import and export client settings such as maps, views, and web pages.

13.76 The NVMS shall support live or recorded video monitoring of 1 to 36 video streams simultaneously on a single monitor with an unlimited array of user-defined layouts.

13.77 The NVMS shall support the ability to bias the displayed video to a higher frame rate or to a lower image resolution if the client network bandwidth or client processing power is insufficient to display the full frame rate and image resolution.

13.78 The NVMS shall support the ability to display the following list of image overlays:-

- 13.78.1 Camera Name
- 13.78.2 Camera Location
- 13.78.3 Timestamp
- 13.78.4 Record Indicator
- 13.78.5 PTZ Controls
- 13.78.6 Motion Activity
- 13.78.7 License Plate

13.79 The NVMS shall support an unlimited number of monitors for monitoring video and audio streams.

13.80 The NVMS shall support monitoring live and recorded video and audio streams simultaneously on the same monitor.

13.81 The NVMS shall support viewing the same live or recorded video stream at different zoom levels.

13.82 The NVMS shall support the creation of unlimited views with unique layouts of video streams.

13.83 The NVMS shall support the ability to full screen a view.

13.84 The NVMS shall support the ability to save views.

13.85 The NVMS shall support the ability to cycle through views (guard tour) based on a specified interval.

13.86 NVMS shall display all video sources connected to the system.

13.87 The NVMS shall support the ability to drag and drop a video source from a tree of video sources into a window for live or recorded video and audio monitoring.

13.89 The NVMS shall support the ability to drag and drop a view from a tree of views into a window for live or recorded video and audio monitoring.

13.90 The NVMS shall support the ability to configure how the tree of video sources and views is displayed.

13.91 The NVMS shall support the ability to designate one or more regions in a window for displaying video directly linked to triggered alarms and rules.

13.92 The NVMS shall support the ability to acknowledge alarms from the designated video display area.

13.93 The NVMS shall support the ability to manually trigger digital output.

13.94 The NVMS shall support the ability to create a map that represents the physical location of cameras and other devices throughout the surveillance system. Maps shall be created from images stored in JPEG, BMP, PNG, or GIF image formats. Maps shall have the ability to contain links to create a hierarchy of interlinked maps.

13.95 The NVMS shall support the ability to create a map that has a link to a section of the entire image region.

13.97 The NVMS shall support the ability to drag and drop a video source from a map into a window for live or recorded video and audio monitoring.

13.98 The NVMS shall highlight a camera on a map when an alarm linked to the camera is triggered.

13.99 The NVMS shall support the ability to save a link to a web page and view the web page in a window.

13.100 The NVMS shall support digital zooming and panning on live and recorded video streams.

13.101 The NVMS shall support controlling mechanical pan-tilt-zoom, iris, and focus as well as setting presets and patterns.

13.102 The NVMS shall support controlling mechanical pan-tilt-zoom camera on-screen display and auxiliary controls.

13.103 The NVMS shall support locking PTZ controls.

13.104 The NVMS shall support control of a mechanical pan-tilt-zoom camera with a USB joystick.

13.105 The NVMS shall support forward and reverse playback of recorded video and audio at variable speeds.

13.106 The NVMS shall synchronously playback recorded video and audio from selected video sources.

13.107 The NVMS shall support navigation of recorded video and audio via calendar, timeline, or events.

13.108 The NVMS shall support a timeline that displays all connected video sources and the corresponding motion and recording events.

13.109 The NVMS shall support a timeline that can display the entire time range down to one second of recorded video and audio.

13.110 The NVMS shall support creating bookmarks for recorded video and audio, displaying the bookmarks on the timeline, and searching for bookmarks.

13.111 The NVMS shall support protecting a bookmark so the video and audio data is never overwritten.

13.112 The NVMS shall support monitoring alarms.

13.113 The NVMS shall support the ability to assign alarms to users.

13.114 The NVMS shall support the ability to acknowledge alarms.

13.115 The NVMS shall support searching through recorded video and audio based on various search criteria including time, date, video source, and events.

13.116 The NVMS shall support searching through recorded video based on motion in user defined areas (pixel search).

- 13.116.1 Native
- 13.116.2 JPEG
- 13.116.3 PNG
- 13.116.4 TIFF
- 13.116.5 AVI
- 13.116.6 WAV
- 13.116.7 PDF
- 13.116.8 Print

13.117 The NVMS shall support the ability to export recorded audio in WAV format.

13.118 The NVMS shall support the ability to snapshot a live or recorded image and export it from the system.

13.119 The NVMS shall support the ability to export live stream of images in the following formats:

- 13.119.1 JPEG
- 13.119.2 PNG
- 13.119.3 TIFF

13.120 The NVMS shall support the ability to export video from multiple camera streams in Native format.

13.121 The NVMS shall support reviewing video and audio that was exported in the Native format.

13.122 The NVMS shall support authenticating video that was exported in the Native format to validate that it was not tampered with.

13.123 The NVMS shall support converting video that was exported in the Native format to an industry standard format.

13.124 The NVMS shall support reviewing video and audio stored in a backup.

14. REMOTE MONITORING WORKSTATION: CONTROL CENTRE AND OBSERVATION CENTER

14.1 The Control and Observation Centres require professional high performance Remote Monitoring Workstations (RMWS) specifically designed to achieve the highest performance for a client control station within a multi-megapixel HD surveillance system.

14.2 Each workstation, supplied in a desktop form factor, must have the capacity to support up to four high resolution (full-HD) monitors displaying a total 144 channels of concurrent video. The RMWSs are to be pre-loaded with Control Center Client Software and supplied with a keyboard and mouse.

14.3 The Remote Viewing stations with four high resolution monitors require professional high RMWS specifically designed to achieve the highest performance for viewing within a multi-megapixel HD Surveillance System.

15. HIGH-DEFINITION VIDEO SURVEILLANCE MONITOR

15.1 Technical Specifications

15.1.1 Diagonal Screen Size 40”
15.1.2 Type 120Hz LED BLU
15.1.3 Resolution 1920 x 1080p
15.1.4 Aspect Ratio 16:9
15.1.5 Pixel Pitch 0.461(H) x 0.153(V)
15.1.6 Brightness 450 cd/m²
15.1.7 Contrast Ratio 6000:1
15.1.8 Response Time 6ms
15.1.9 Input Display Port / DVI to suite RMWS
15.1.10 Mounting Wall-Mount VESA 400 x 400mm

15.2 **GIGABIT POWER-OVER-ETHERNET NETWORK SWITCHES**

15.2.1 To provide adequate support for bandwidth intensive applications, such as multi-megapixel IP cameras as intended to be used here, the contractor shall provide managed gigabit speed, power-over-ethernet (POE) network switches with fibre uplink ports, together will all patch-cables, cabinets, mounting brackets and accessories to ensure a full and complete installation, with the following specifications:-

15.2.1.1 Core Distribution Switch with 48 Port Fiber Ports and 24 Ports UTP/RJ45 Blades on the ETC.

15.2.1.2 Four Small Form-Factor Pluggable (SFP) slots (shared with four copper ports) for fiber Gigabit Ethernet uplink.

15.2.1.3 IEEE 802.3af PoE delivered over any of the twenty-four 10/100/1000 RJ-45 copper ports

15.2.1.4 Up to 15.4W available on the copper ports for powering POE-enabled IP-cameras, with a maximum per-device POE delivery of 185W available for all ports

15.2.1.5 Dual images for resilient firmware upgrades

15.2.1.6 48-Gbps, non-blocking, store-and-forward switching capacity

15.2.1.7 Simplified QoS management using 802.1p, Differentiated Services (DiffServ), or type of service (ToS) traffic prioritization specifications

15.2.1.8 Fully resilient stacking for optimized growth with simplified management

15.2.1.9 ACLs for granular security and QoS implementation

15.2.1.10 Can be configured and monitored from a standard web browser

15.2.1.11 Secure remote management of the switch via Secure Shell (SSH) and SSL encryption

15.2.1.12 802.1Q-based VLANs enable segmentation of networks for improved performance and security

15.2.1.13 Private VLAN Edge (PVE) for simplified network isolation of guest connections or autonomous networks

15.2.1.14 Automatic configuration of VLANs across multiple switches through Generic VLAN Registration Protocol

15.2.1.15 (GVRP) and Generic Attribute Registration Protocol (GARP)

15.2.1.16 User/network port-level security via 802.1X authentication and MAC-based filtering

15.2.1.17 Increased bandwidth and added link redundancy with Link Aggregation Control Protocol (LACP)
15.2.1.18 Enhanced rate-limiting capabilities, including back pressure and multicast and broadcast flood control
15.2.1.19 Port mirroring for non-invasive monitoring of switch traffic
15.2.1.20 Jumbo frame support up to 10KB
15.2.1.21 Simple Network Management Protocol (SNMP) versions 1, 2c, and 3 and Remote Monitoring (RMON) support
15.2.1.22 Fully rack mountable including rack-mounting hardware

16. CAMERA MOUNTING POLE (Where required)

16.1 The masts for dome and stand-alone static outdoor and PTZ cameras shall be 9m hollow spun concrete Rocla or similar and shall be planted in 32Mpa concrete basis of 1.2 x 1.2 x 1.2m.
16.2 A 1,5m x 15mm steel rod with molecularly bonded copper cladding shall be mounted to the apex of the mast. This shall serve as the air termination of a lightning conduction system which will further consist of a 50mm2 stranded bare copper down conductor running inside the mast to four 1,5m copper clad earth rods driven into the ground at the extremities of the excavation for the base of the mast before the concrete is cast.
16.3 The tops of the earth rods will be interconnected with the continuous 50mm² down conductor.
16.4 All connections in this down conduction path shall be hard soldered or fusion welded ('Cadweld').

17. POE SURGE PROTECTION

17.1 All perimeter and externally mounted cameras supplied by the contractor are to be protected against power surges with suitable inline 100 BaseT single POE protection devices which shall meet or exceed the following design and performance specifications:-
17.1.1 Cable CAT6

17.1.2 Clamping Voltage <70 V
17.1.3 Max Discharge Current 4.5kA (coarse protection)
17.1.4 Max Discharge Current 300A (fine protection)
17.1.5 Pairs Protected 1-2, 3-6, 4-5, 7-8
17.1.6 Standards Compliance Fast Ethernet 802.3u; IEC 11801; IEEE 802.3
17.1.7 Insertion Loss in dB <0.10@20Mhz, <0.10@62.5Mhz, <0.30@100Mhz
17.1.8 Next (As per IEC 11801) >43@20Mhz, >32.4@62.5Mhz, >33.6@100Mhz
17.1.9 Return Loss (IEC 11801) >27.8@20Mhz, >31.4@62.5Mhz, >22.8@100Mhz
17.1.10 Data Rate >200 Mbps
17.1.11 Bandwidth (3dB) per pair >350 Mhz

18. PREVIOUS INSTALLATIONS

18.1 The sensor system shall be well proven in the field and have been installed and operating in similar configurations for at least three years. References shall be provided for a minimum of three operational sites.

19. OPERATOR MENUS

19.1 The operator shall be able to log on and log off the system, view site maps with different views and zooms, acknowledge alarms and include comments and notes, Manually point the cameras to their pre-sets for the zone or take full control of, each camera through an optional matrix switcher and keyboard, Bring up a panel to show what the different colours of the alarmed segments mean, Click on a zone to bring up zone details, Isolate a zone, In the event of an alarm, the system shall display a pre-defined Standard operating procedure (SOP) for this specific alarm.

20. SUPERVISOR MENUS

20.1 In addition to the Operator functions, the Supervisor shall be able to exit the system and shut the system down, read the System Log, Communications Log, and Alarm Log and archived Logs, Isolate a zone.

21. ENGINEER MENUS

21.1 In addition to the Supervisor functions, the Engineer shall be able to create users, allocate user levels, edit user details, and delete users off the system

21.2 Configure the system including selection of site maps and databases; add the Customer logo, date format, and system units (metric or imperial).

22. DATA DETAILS

22.1 The system event logs shall include Date, Time, Location, Event type, Time acknowledged, Who acknowledged the event, Action taken to attend to the alarm, Other commends.

23. SYSTEM INSTALLATION AND COMMISSIONING

23.1 The system shall be installed and commissioned in accordance with the Original Equipment Manufacturer (OEM) recommended procedures as defined in the product's installation manual and commissioning documents.

23.2 The installation shall be comprehensibly commissioned and configured as individual and integrated systems as may be required by the configuration after the works are substantially complete.

23.3 The Contractor shall provide adequate and competent personnel for commissioning and configuration of every installation and for the full duration of the commissioning process.

23.4 The commissioning and configuration shall include interaction between other services and contractors where interdependence of installations are encountered.

23.5 The commissioning and configuration process shall after all testing has been completed be the final proving ground of the systems and during this procedure the installations shall be subjected to all possible inputs and actions which way be encountered under operational conditions. The Contractor shall prove the full operation, working and compliance of the installation in accordance with the specifications.

23.6 A programme of the planned commissioning and configuration procedures shall be submitted to the CLIENT at least 7 days before commissioning and configuration commences.

24. COMPLIANCE TO SPECIFICATION

24.1 The Contractor shall comply with all the requirements as per this specification. Proposed deviations shall only be considered after the awarding of the contract.

24.2 Proposed deviations shall only be accepted if it meets with all the following criteria:

24.2.1 The proposed deviation offers a substantial improvement to the final product offered.

24.2.2 The proposed deviation has been proven in other applications.

24.3 Any deviations from the specifications can only be implemented with prior approval from the various representatives from both the Client and the Engineer.

25. GENERAL ELECTRICAL WORKS

25.1 The following shall form part of the contractors' responsibility, unless otherwise specified:

25.1.1 Allocation of most suitable supply distribution board

25.1.2 Supply and installation of switchgear and circuit wiring to equipment positions as per SANS 100124

25.1.3 Circuit labelling

25.1.4 Conduit or wire way installation

25.1.5 Labelling of switchgear and update legend cards

25.1.6 Issue Certificate of Compliance (COC) for each Distribution Board termination

25.1.7 No underground trenching in and around the substation or relay room will be allowed.

25.2 All circuits shall be wired from fresh unused coils of red, white, blue and black conductors. The colours of conductors shall correspond to the phase from which that circuit is fed. The use of insulation tape for colour coding will not be accepted.

25.3 Wiring shall not be drawn into conduit until the conduit installation has been completed, fitted with bushes and all moisture and debris has been removed.

25.4 Joints of any kind will not be permitted in wiring.

25.5 Suitable cable markers indicating the circuit (Acc Con 10 or P10 on both line and neutral
conductors shall mark all conductors).

25.5 Circuit wiring shall be taped together by means of PVC insulated tape at intervals not exceeding 1000 mm.

25.7 Isolators shall be installed at each point where 231 V AC power is required for controllers, terminals, power supply units, booms, booths, turnstiles, etc. The units shall be of the 16Amp 2 pole type complete with metal enclosure.

25.8 Socket outlets shall be installed at each point where 231V AC power is required for computers, printers, sublimation printers, cameras etc.

25.9 Dedicated SSO's shall consist of a red shaved pin 16A switch socket outlet complete with red cover plate similar or equal to Lumex or Crabtree manufacture suitable for surface mounting.

25.10 Normal SSO's shall consist of a 16A-switch socket outlet complete with white cover plate similar or equal to Lumex or Cabtyer manufacture suitable for surface mounting.

26. CONTRACT SPECIFICATION FOR ELECTRONIC SECURITY INSTALLATIONS

26.1 The Detail Technical Specifications cover the general technical requirements w.r.t. materials, installation, testing, commissioning and guarantee of electrical and/or mechanical installations for the CLIENT. These specifications shall be read in conjunction with the rest of this contract in its entirety. If the conditions and/or specifications contained herein are at variance with anything contained in the detail specification, the latter shall take preference; otherwise, the Detail Technical Specifications shall apply as if duly included.

26.2 The conditions and/or specifications in this document shall be regarded as the absolute minimum requirement. More stringent similar conditions and/or specifications stated in the detail specification shall take preference to those in these Standard Technical Specifications.

26.3 Tender prices for articles and equipment described by means of trade names or catalogue references must refer to the type and manufacture specified. If it is desired to use substitutes, the onus shall be on the contractor to prove that such substitutes are similar and equivalent to the articles specified and meet with the approval of the

engineer. The decision as to whether to use the specified or alternative articles shall rest solely with the CLIENT.

26.4 Once installation has commenced with the appropriate approvals for using any type and make of article or equipment, the same type and make of article or equipment shall be used throughout the project for that specific application unless otherwise specified.

26.5 The workmanship under this contract shall be of a high standard and to the satisfaction of the CLIENT.

26.6 All materials and equipment supplied and/or installed under this contract shall be new and the best of their respective kinds and shall comply with the requirements laid down in the latest editions of the relevant SABS or BS and their amendments and with the requirements of this specification.

26.7 At all times for the duration of the contract, the work shall be carried out under the direct supervision of a qualified, skilled and competent tradesman and representative of the contractor. Also refer to the conditions of contract.

26.8 The CLIENT reserves the right to instruct the contractor to carry out variations to the contract in accordance with the conditions of contract.

26.9 Except where otherwise specified the works must be completed in working order concurrent with the completion of the building project.

26.10 In the case of a direct contract with the CLIENT the works must be completed in the time as tendered on the form of tender.

26.11 The successful Bidder shall supply, on request, two (2) extra copies of his completed tender, contract documents and drawings.

26.12 Four (4) copies of all workshop drawings as approved and signed by the contractor shall, within six (6) weeks after appointment of the successful Bidder, be submitted to the CLIENT for approval prior to manufacture. Workshop drawings shall be prepared for wiring diagrams, schematic diagrams, general arrangements and construction details of all distribution boards and mechanical systems. These drawings shall indicate all electrical and mechanical information as well as the make and type of equipment, dimensions, ratings and other relevant technical information. The CLIENT's approval of shop drawings shall not relieve the contractor of responsibility for any deviation from the requirements of this contract unless the contractor has informed the CLIENT in writing of such deviation at the time of submission of shop drawings or samples and the CLIENT has given written approval for the specific deviation, nor shall the CLIENTs approval relieve the contractor of responsibility for errors or omissions in the workshop drawings or samples.

26.13 One set of paper drawings applicable to this contract will be issued to the contractor for installation purposes. Any further copies required shall be purchased from the CLIENT. The contractor shall always during the duration of the contract make available a complete set of up-to-date design and workshop drawings as well as a copy of the contract at no cost for use on site by the CLIENT, architect, engineers and contractors authorised on site.

26.14 The contractor shall supply to the CLIENT a complete set of drawings and detail specification in both hard and soft copies of the works as actually carried out (as built) within two months of the first delivery date of the completed contract. If the representative of the CLIENT is either a consulting architect or engineer these items, in the form of marked-up paper prints shall be supplied to the representative, who will then compile final as-built sepia drawings as well as an as-built detail specification for the account of the contractor for handing over to the CLIENT. Retention moneys will be withheld until such items are handed to and approved by the CLIENT.

26.15 A complete diagram showing the relevant connections and the schematic layout of the installations together with maintenance and operating manuals shall be provided by the contractor. The diagram and instructions shall be on stiff paper (minimum 1 mm thickness) that shall be placed in an approved metal frame with hard perspex cover and neatly fixed in an approved position for each installation and/or distribution board. The installation will not be taken over until this clause has been complied with.

26.16 The contractor is warned to place all orders for materials or special articles as early as possible as he will be held solely responsible for any delay in the delivery of such goods, unless such delay has been declared to the CLIENT in writing, who may not unreasonably withhold acceptance of such delay and its resultant effects.

26.17 The contractor shall furnish, without delay, such samples for testing or other purposes as called for or may be called for by the CLIENT, who may reject all materials or workmanship not corresponding with the approved sample. Notwithstanding that samples and approved brands of materials etc. are exhibited or included in classified lists at the offices of the CLIENT, the CLIENT may retest any samples, brands of materials, etc. included in the contract and reject articles and materials, etc. that do not strictly comply with the specification.

26.18 The responsibility for and cost of holes, recessed, chases, ducts, manholes, etc. and also the builders work as per the Provisional Bill of Quantities will form part of this contract, the extents which may be remeasured on completion and paid for in terms

of the conditions contained herein. Where no builder or main/principal contractor is concerned, cutting away and making good shall be carried out by and at the expense of the contractor except where otherwise specified.

26.19 The contractor will be held responsible for the sizes and positions of the holes, chases, recesses, ducts, manholes, etc. required. Any alterations to these after they have been provided (as specified by the contractor) by the main/principal contractor or by the CLIENT will be for the contractor's account if his default.

26.20 Any damage done to the building by the contractor, or his staff shall be made good by the contractor himself at his own expense.

26.21 The contractor shall ensure that any telecommunications, computer or other valuable equipment of the CLIENT is sufficiently protected against work or dust means of temporary coverings or sealed-off partitions.

26.22 The contractor shall provide all tools and instruments required for inspections, testing and commissioning of the works.

26.23 Once the contractor has completed the total installation, written notice shall be given to the representative in order that a mutually acceptable date may be arranged for a joint inspection. During the inspection the CLIENT will compile a list of items (if any) requiring further attention. These items shall be identified by checking each clause in the contract (all specifications and drawings) in relation to the offered installation. A copy of this list of outstanding items will be provided to the following:

(a) Contractor - for action via the main/principal contractor, unless the contractor is directly appointed by the CLIENT, then for action directly by the contractor.

(b) Head Office of the CLIENT - for information

26.24 The contractor shall then similarly provide written notice that he is ready for an inspection of the remedial work done on the offending items. If the installation is accepted as completed at this stage by both the CLIENT representative, the representative may certify the works as completed. If at this stage there are still outstanding items requiring attention irrespective of whether these items were identified during prior inspections or not, the procedure will continue until the entire installation has been correctly completed to the satisfaction of the CLIENT.

26.25 In addition to the above, the contractor shall have the complete installation tested and the correct operation of all plant demonstrated to –

(a) the Technical representatives of the CLIENT, if applicable.

26.26 Subsequent to the above testing and approval, the contractor, in the presence of the representative, shall test all circuits with respect to (whichever is applicable) -

(a) phase balance

(b) insulation level
(c) polarity
(d) quality of signals
(d) function and performance of signals

26.27 Where applicable, upon completion of the installation, and within 6 months of the first delivery date, the contractor shall provide and make available a recording voltmeter and power factor meter to record both the voltage and power factor on all phases simultaneously at three locations in the complex over a period of 48 hours. These locations shall be nominated by the CLIENT.

26.28 First delivery (see conditions of contract) may only be proceeded with after final acceptance and testing have been completed successfully.

26.29 Any additional expenditure by the CLIENT due to ill performance or default on the part of the contractor will be considered fruitless fees and shall be for the account of the contractor.

26.30 If applicable, the contractor shall assist the CLIENT to apply for and complete all the formalities necessary for obtaining electricity supply. He shall also make himself available for all supply authority inspections to complete all the formalities and tests.

26.31 With first delivery the contractor shall accept in writing the responsibility for the total Installation as installed by him by certifying the correctness of the installation in accordance with and on the certificates of compliance of electrical works.

26.32 Except where otherwise stated the painting of plant shall be carried out by the contractor as specified.

27. TRAINING

27.1 The supplier will provide technical and operational training to that number of Client's personnel as specified by the client, but subject to a Maximum of 60 employee of the client, on a train the trainer basis, in the use and operation of the Security Site System. The level of training will be equal to that of the contractor's personnel with regards to the technology deployed. Training syllabus shall be similar to the one provided by the manufacturer.

Training shall be carried out by experienced personnel of the contractor who are proficient in the English language and have the requisite experience and expertise to provide training in all aspects and areas of the Site Security System so as to enable

the relevant personnel to properly use and operate the Site Security System. The contractor shall provide all relevant documentation required for training of the designated number of employees. In this regard the Contractor warrants that the training will be of such quality and standards as to ensure that the Client's personnel will have skills required to use and operate the system properly.

The amount payable for training shall be included as part of the Service to be provided by the contractor and no additional payment shall be made by the Client for any such training.

28. DELIVERY, RISK AND OWNERSHIP

28.1 Ownership in hardware and software shall vest in the Client immediately upon the expiry of the Contract Period, subject to the Client having paid the contractor fully in respect of the Site Security System. Upon this event, the Client shall not be liable for any further payments to the Contractor in terms of this Agreement. For the sake of clarity, no residual amount shall be payable to the Contractor upon the expiry of the contract period.

28.2 The Contractor shall during the Contract period remain being the owner of the Hardware

28.3 The Contractor shall be liable for and shall, at its own cost and expense, provide maintenance services and replace, repair and make good any damage howsoever to the Hardware and/or Software (Excluding any theft or damage caused by third parties) during the Contract period to ensure that the Site Security System is at all times in good working order and meet the Required Functionality.

28.4 The Contractor shall carry all the risks in the Hardware and Software during the Contract Period. The Risk in the Hardware and Software shall only pass to the Client upon the Client becoming the owner of the Hardware.

28.5 The Contractor shall ensure that the latest released versions of the Software (if applicable) are supplied and installed in the Systems for the Contract period.

28.6 The Contractor acknowledges that the Client is as a material term of this contract, relying on its skills, expertise and experience in the commissioning of similar systems to attain the required functionality. The Contractor shall advise the Client of the appropriateness of the design thereof and with respect to suitable back-up power

supply and making recommendations to the client to ensure the minimum disruption due to power surges, and/or power failures, and/or power disruptions and/or lightning, etc…

28.7 The Contractor shall install and configure the Software and the Hardware. The Contractor shall provide the Client with an electronic copy of all required Documentation including without limitation the Software manual and hard copy thereof for each user of the Software at no additional cost to the client.

29. GRANT OF LICENCE

29.1 The Contractor hereby grants to the client, who hereby accepts, a perpetual, non-exclusive licence to use the Software for the System and (if applicable) the Client's own integrated security system.

29.2 The Client shall pay to the contractor the once off licence fees per system. No further licence fees shall be payable by the Client to the contractor for the use of the Software.

30. LIGHTNING AND SURGE PROTECTION SPECIFICATION

30.1 The Contractor shall provide and install all the necessary Surge Protection devices, for the protection of the electrical/electronic control equipment, communication and data lines. Surge Protection devices shall protect all AC and DC circuits from the effect of lightning induced over voltages, internally generated transients and utility switching transients.

30.2 Surge protection will be required on the incoming power supply to the security equipment and shall be done at the single point where the supply enters the building. Lightning protection shall be installed from Live to Earth (L-E), Neutral to Earth (N-E) and from Live to Neutral (L-N) on a single-phase supply. If a 3-phase supply is used lightning protection shall be required on each phase individually (L1-E, L2-E, L3-E & N-E). If the same supply is reticulated to another building additional lightning protection shall be required where it enters the next building. The protection shall be as described above.

30.3 The bidder must allow for additional surge suppression and voltage stabilisation equipment if this is required to protect his equipment or to guarantee its correct operation.

30.4 Equipment which is connected to signal lines of any type which run for any distance outside a building, shall, if technically possible, be surge protected to survive twenty 8/20 microsecond current impulses with maximum amplitude of 10 kA when applied in common mode between the signal lines connected and earth. Ten of the test pulses shall be applied as positive pulses with respect to earth and the other ten as negative pulses.

30.5 In addition, the protected equipment shall be able to survive 20 8/20 microsecond current impulses with maximum amplitude of 2 kA when applied in differential mode. Ten of the test pulses shall be applied with any polarity and the other ten with the polarity reversed.

30.6 The test pulses shall be applied at intervals of not less than one minute.

30.7 The surge protection equipment may be built into the equipment being protected. If the provided internal protection is inadequate to meet this specification, then additional external protection must be provided.

30.8 There shall be an earth bar in the lower corner of each enclosure and shall be sized to accept a 16mm square BCW. The Bare Copper Wire shall be terminated to the nearest earth mat.

30.9 AC protection devices can be in the equipment cabinet and must be installed prior to any distribution (i.e. multi-outlets).

30.10 Equipment which is connected to signal lines of any type of which the entire length of the run is within the same building and for which the signal cable is longer than 30 m, shall be protected as in 1.5.1.4, except that the maximum amplitude for the common mode test shall be 2 kA and the maximum amplitude for the differential mode test shall be 500 A.

30.11 Surge protection devices shall be chosen in such a way that the protected circuit shall still function to specification despite the introduction of series and/or shunt impedances by the protecting devices.

30.12 The above test specifications are based on recommendations of CSIR report No Ek/85/6/1.

31. DEFECTS LIABILITY

31.1 Full Security Installation Maintenance during Defects Liability

31.1.1 The bidder shall note that a one-year full maintenance period shall be applicable on all aspects of the work done under this contract effective from the date of practical completion.

31.1.2 Without additional charge, renew any Works implemented to meet the requirements of this contract which prove to be faulty from workmanship or materials, and 'fully maintain and service' the whole installation during the defect's liability period.

31.1.3 "Fully maintain and service" shall include: -

31.1.3.1 Monthly inspection and test of the system to verify continued operation of the system in accordance with the performance parameters specified in the Sub-contract.

31.1.3.2 Assessment of system reports to ensure continued performance reliability of the system and associated devices

31.1.3.3 The contractor shall record all works carried out during each visit and forward copies of all records to Engineer / Client within 7 days of the conduct of the monthly visit.

31.1.4 The Contractor shall deliver a proposed maintenance program to the Engineer, for approval, 5 working days prior to final handover.

31.1.4.1 This shall include a full back-up service for all the equipment and cabling installed as well as all software installed by the successful bidder under this contract.

31.1.5 The bidder shall fully include in his tender price the monthly charge for the above inclusive of his additional rate for labour for any afterhours work required.

31.2 Call Outs during Defects Liability Period

31.2.1 The Contractor shall attend on site within four (4) hours of notification of a failure of the equipment and associated systems.

31.2.2 The call out during the defect liabilities period requirement shall apply on a 24-hour day, 7 day a week basis.

31.2.3 The Contractor shall forward details of contact staff, suppliers, agents and/or representatives to be used to provide afterhours call out service to the Engineer / Client, for approval.

31.2.4 The provided details shall indicate staffing levels, roster of after hour's on-call personnel, spare parts holdings, systems experience and qualifications.

31.2.5 Failure to attend on site within the specified period shall allow the client to recover costs from the Contractor. Recovery costs may include, but are not limited to:

31.2.5.1 Additional labour costs, including penalty rates, occurring because of the failure of the security services.

31.2.5.2 Costs associated with the provision of alternate equipment used to provide temporary resolution of a fault condition. This may include supply, transport, installation and decommissioning costs associated with the provision of temporary facilities.

31.2.6 The Contractor shall adhere to the Engineer's defined security procedures for access to and during site attendance over the defect liability period.

31.2.7 The Electronic Security and Related Systems and subsystems described in the general specification for the integrated security system and in the Schedule of Quantities shall form part of the maintenance scope of work, and may include in the scope of works for this tender project:

31.2.7.1 Mechanical and Electro-Mechanical Hardware items

31.2.7.2 Electronic Hardware devices45

31.2.7.3 Application Software

31.2.7.4 Databases

31.2.7.5 Software Drivers, Interfaces and any other Specialist Function software

31.2.7.6 Computer devices like Workstations, Servers, Clients, etc.

31.2.7.7 Auxiliary devices, like Printers, Scanners, etc.

31.2.7.8 Operating Systems

31.2.7.9 Specialist Software Utilities, like Anti-Virus packages.

32. POST CONTRACT MAINTENANCE AGREEMENT

32.1 If the Client requires it, the Contractors shall be able and willing to maintain their installed equipment for a period agreed after completion of the contract. This will be arranged through a maintenance contract, which will be negotiated during the free maintenance period.

32.2 Such maintenance contract may be either of the following general types:

32.2.1 Extended guarantee maintenance contract. Under this type of maintenance agreement the Contractor undertakes to maintain the installation in a good working condition for a fixed price which is independent of the number of maintenance visits which he must make. Preventative maintenance visits at agreed intervals are included in the price. (The cost of replacement parts may or may not be included in the fixed price.)

32.2.2 Preventative plus breakdown service maintenance. Under this type of maintenance agreement, the Contractor undertakes to do preventative maintenance visits at agreed intervals for a fixed fee. Further callouts will be

on breakdown only and are charged at hourly and km rates. The cost of replacement parts is extra.