



**TENDER DOCUMENT FOR SUPPLY, INSTALLATION, TESTING  
& CONFIGURATION OF IT, COMMUNICATION, ACCESS CONTROL  
& SURVEILLANCE SYSTEM**


**PROJECT NO: 120310**

**DOCUMENT NO: NPI-120310-LVS-S1-TD-01**

**REVISION NO.: 02**

**OCTOBER 2015**

**PROJECT NAME: INTEGRATED VACCINES COMPLEX**



<b>Client :</b> 	<b>TENDER DOCUMENT FOR SUPPLY, INSTALLATION, TESTING &amp; CONFIGURATION OF IT, COMMUNICATION, ACCESS CONTROL &amp; SURVEILLANCE SYSTEM</b>	<b>nne pharmaplan®</b>
<b>Project No : 120310</b>		<b>Revision : 02 Date : 2015-10-31</b>

**TENDER DOCUMENT FOR SUPPLY, INSTALLATION, TESTING AND  
CONFIGURATION OF IT, COMMUNICATION, ACCESS CONTROL & SURVEILLANCE  
SYSTEM**

**Project No:** 120310

**Project:** Integrated Vaccines Complex




Client : 	<b>TENDER DOCUMENT FOR SUPPLY, INSTALLATION, TESTING &amp; CONFIGURATION OF IT, COMMUNICATION, ACCESS CONTROL &amp; SURVEILLANCE SYSTEM</b>	
<b>Project No : 120310</b>	<b>DOCUMENT NO : NPI-120310-LVS-S1-TD-01</b>	<b>Revision : 02</b> <b>Date : 2015-10-31</b>

### INSTRUCTIONS TO BIDDERS


1. The successful bidder will have to enter into a written Contract / Agreement with the Employer, the terms and conditions of which are enclosed herewith.
2. Bidder must fill in all blank spaces in the Bill of Quantities of the tender for which quantities have been indicated in near, legible and correct entries, both in figures as well as in words. Alterations, erasures and indistinct figures should be avoided. Failure to quote against all the items could render the tender liable to rejection.
3. The tender should be signed in long hand, dated and witnessed at all places provided therein. Also all pages, drawings, corrections/alterations should be initialed / stamped.
4. Bidder must be careful to deliver a bonafide tender. Any tender which proposes any alterations to any of the conditions laid down which proposes any other conditions or any description whatsoever is liable to be rejected.
5. Intimation of tenders' quotation by a telegram/fax will not be considered.
6. Tenders must be accompanied by a certified true copy of the Power of Attorney in favour of the signatory to the tender which interalia should empower him/her to bind the firm to Arbitration Clause given in the Articles of Agreement and Contract conditions.
7. In case a blank tender is being submitted, it should be marked prominently '**BLANK**' on the envelope and signed by the authorized person.
8. In view of postal and other delays, the tenders should be posted sufficiently in advance of the last date fixed for receipt of tenders or be sent by a special messenger. Tender received late shall be liable for rejection.
9. **Tender Cost/Tender fee:** The tenderer should submit the tender fee of **Rs.5,250/- (Rupees Five Thousand Two Hundred and Fifty only) or USD 500** as on tender publishing date in the form of Demand Draft or Banker's cheque in favour of **HLL Biotech limited, payable at Chennai**. The DD/ Banker's cheque has to be enclosed along with the bid which is non-refundable. In case of cancellation of tender by HBL, the tender cost/fee shall be refunded.
10. The prices shall be quoted for all items and shall be firm. The amount shall include all plant, layout, materials, all temporary works, supervision, taxes, duties, levies, insurance for all (except supply & erection) and every incidental and contingent cost and charges whatsoever required to complete the item of work in all respects conforming to related specifications, drawings etc.
11. Prices shall be written in ink and shall be entered both in figures and words. In case of discrepancy the figure quoted in words shall be taken as accurate. In case of any discrepancy in the unit and amount, the unit rate shall be taken as accurate.
12. Prices quoted by the bidder shall be firm and valid even if the contract is split in two or more parts among different bidders.
13. The bidder shall be deemed to have been allowed in his rates and prices for the provision, maintenance and final removal of all temporary works of whatsoever nature. No specific item of any or particular temporary shed/work will be measured and paid for separately.
14. The bidder shall include the proposed quality assurance program containing overall quality management and procedural requirements to be adhered to during the execution of the contract to maintain effective quality assurance system as outlined by the recognized codes for various works in their offer, along with quality assurance manual, officials responsible for the same and their organizational approach for quality control.



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<b>Project No : 120310</b>		<b>Revision : 02</b> <b>Date : 2015-10-31</b>

15. Bidder should furnish the following details along with their offer : -

- List of technical persons available
- List of tools and tackles
- Income Tax clearance certificate
- Sales Tax clearance certificate
- List of similar work carried out by them and the work in hand
- Quality Assurance plan
- Bar chart / Project schedule

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Project No : 120310	DOCUMENT NO : NPI-120310-LVS-S1-TD-01	Revision : 02 Date : 2015-10-31

**Notice Inviting Tender (NIT)**  
**HLL Biotech Ltd.**

**INVITES TENDER FOR SUPPLY, INSTALLATION, TESTING AND CONFIGURATION OF IT, COMMUNICATION, ACCESS CONTROL & SURVEILLANCE SYSTEM AT INTEGRATED VACCINES COMPLEX, CHENGALPATTU**

Tenders are invited from vendors for Design, Supply, Installation, Testing and Commissioning of following:


S.No	System	Level	EMD	Tender fee
1	SUPPLY, INSTALLATION, TESTING AND CONFIGURATION OF IT, COMMUNICATION, ACCESS CONTROL, SECURITY & SURVEILLANCE SYSTEM	High Level Building Automation	Rs.25,00,000/-	Rs.5,250/- Inclusive of VAT@5% or USD 500

**Note: The list may vary (increase / decrease) during order finalisation.**


Details regarding important dates are as follows:

S.No.	Description	Schedule
i.	Pre Bid Meeting Date & Time	07-11-2015, at 15:00 HRS
ii.	Pre Bid Meeting Venue	<b>HLL Biotech Limited, Ticel Biopark Campus (Module no. 013-015), CSIR Road, Taramani, Chennai- 600 113</b>
iii.	Closing date & time for receipt of Tender	23-11-2015, at 11:30 Hrs
iv.	Time and date of opening of Technical Bids	23-11-2015, at 12:00 Hrs
v.	Venue of Opening of Techno Commercial Tender	<b>HLL Biotech Limited, Ticel Biopark Campus (Module no. 013-015), CSIR Road, Taramani, Chennai- 600 113</b>

Interested parties may visit [www.lifecarehll.com](http://www.lifecarehll.com) / [www.hllbiotech.com](http://www.hllbiotech.com) & <http://eprocure.gov.in/cppp> to download the Tender. Subsequent amendments/ addendum if any will be published in these websites, The parties are advised to visit the website regularly for updates. Tenders in sealed envelopes superscribing “TENDER FOR SUPPLY, INSTALLATION, TESTING AND CONFIGURATION OF IT, COMMUNICATION, ACCESS CONTROL & SURVEILLANCE OF SYSTEM AT INTEGRATED VACCINES COMPLEX, CHENGALPATTU” may be submitted to the address mentioned in Serial no. v of the table above.


Client : 	<b>TENDER DOCUMENT FOR SUPPLY, INSTALLATION, TESTING &amp; CONFIGURATION OF IT, COMMUNICATION, ACCESS CONTROL &amp; SURVEILLANCE SYSTEM</b>	<b>nne pharmaplan®</b>
Project No : 120310	DOCUMENT NO : NPI-120310-LVS-S1-TD-01	Revision : 02 Date : 2015-10-31

S.NO	CONTENTS	PAGE NO.
<b><i>Section 1- General Information</i></b>		
1.1	GENERAL INFORMATION	8
1.2	GENERAL INSTRUCTIONS TO TENDERERS	10
1.3	QUALIFICATION CRITERIA	26
<b><i>Section 2 – Technical Document</i></b>		
2.1	DESCRIPTION OF WORK	28
2.2	DESIGN BASIS	37
2.3	TECHNICAL SPECIFICATIONS	40
Annex 1	TECHNICAL SPECIFICATIONS – NETWORKING & IT SYSTEM	54
Annex 2	TECHNICAL SPECIFICATIONS – TELEPHONE SYSTEM	112
Annex 3	TECHNICAL SPECIFICATION – ACS AND SECURITY SYSTEM	128
Annex 4	TECHNICAL SPECIFICATION – SURVEILLANCE & CCTV SYSTEM	148
Annex 5	TECHNICAL SPECIFICATION – NETWORKING / DATA / COMMUNICATION / CCTV / ACS CABLING SYSTEM	162
Annex 6	DEVIATIONS	179
2.4	ERECTION & COMMISSIONING	182
2.5	TECHNICAL DATASHEETS	197
2.6	PREAMBLE SCHEDULE OF QUANTITIES	221
2.7	BILL OF QUANTITIES	223
2.8	LIST OF DRAWINGS	252
2.9	LIST OF APPROVED MAKES	254
<b><i>Section 3 – Condition Of Contract</i></b>		
3.1	GENERAL CONDITION OF CONTRACT	257
3.2	SPECIAL CONDITION OF CONTRACT	301
Annex 7 to Annex 17	INTEGRITY PACT, FORMATS & CHECK LIST	312

<b>Client :</b> 	<b>TENDER DOCUMENT FOR SUPPLY, INSTALLATION, TESTING &amp; CONFIGURATION OF IT, COMMUNICATION, ACCESS CONTROL &amp; SURVEILLANCE SYSTEM</b>	<b>nne pharmaplan®</b>
<b>Project No : 120310</b>		<b>Revision : 02 Date : 2015-10-31</b>


# CHAPTER 1

## GENERAL INFORMATION

Client : 	<b>TENDER DOCUMENT FOR SUPPLY, INSTALLATION, TESTING &amp; CONFIGURATION OF IT, COMMUNICATION, ACCESS CONTROL &amp; SURVEILLANCE SYSTEM</b>	nne pharmaplan®
Project No : 120310		Revision : 02 Date : 2015-10-31

## GENERAL INFORMATION


<b>PROJECT LOCATION</b>	: HLL Biotech Limited, Chengalpattu, Chennai.
<b>PROJECT TITLE</b>	: <b>Integrated Vaccines Complex (IVC)</b>
<b>CORPORATE OFFICE</b>	<b>HLL Biotech Limited</b> (A Govt. of India Enterprise) Ticel Biopark Ltd, Module no 13-15 CSIR Road, Taramani Chennai – 600113 Tel No: +91 44 22551868
<b>ENGINEERING CONSULTANT</b>	<b>NNE Pharmaplan India Limited</b>  <b>Bangalore Office:</b> # 9, BEL Air Drive 4 <sup>th</sup> Floor, Bellary Road, Ganganagar Bangalore - 560032 Tel.: +91 80 49056300
<b>CLIMATE</b>	Maximum Relative Humidity: 88% Maximum Temperature: 39.4°C Minimum Temperature: 18.3°C <i>Ref: ISHRAE Handbook</i>
<b>ACCESS TO SITE</b>	By Road (Chennai to Chengalpattu GST Road) : Nearest Railway Station is Chennai Nearest airport is Chennai

Client : 	<b>TENDER DOCUMENT FOR SUPPLY, INSTALLATION, TESTING &amp; CONFIGURATION OF IT, COMMUNICATION, ACCESS CONTROL &amp; SURVEILLANCE SYSTEM</b>	<b>nne pharmaplan®</b>
Project No : 120310	<b>DOCUMENT NO : NPI-120310-LVS-S1-TD-01</b>	Revision : 02 Date : 2015-10-31


## **SECTION: 1.2**

### **GENERAL INSTRUCTIONS TO TENDERERS (GIT) CONTENTS**

<b>Sl. No.</b>	<b>Topic</b>
<b>A</b>	<b>PREAMBLE</b>
1	Definitions and Abbreviations
2	Introduction
3	Language of Tender
4	Eligible Tenderers
5	Eligible Goods and Services
6	Tendering Expense and Tender Fee
<b>B</b>	<b>TENDER ENQUIRY DOCUMENT</b>
7	Contents of Tender Enquiry Document
8	Amendments to Tender Enquiry Document
9	Clarification of Tender Enquiry Document
<b>C</b>	<b>PREPARATION OF TENDERS</b>
10	Documents Comprising the Tender
11	Tender Currencies
12	Tender Prices
13	Indian Agent
14	Firm Price / Variable Price
15	Alternative Tenders
16	Documents Establishing Tenderer's Eligibility and Qualifications
17	Documents Establishing Good's Conformity to Tender Enquiry Document
18	Earnest Money Deposit (EMD)
19	Tender Validity
20	Signing and Sealing of Tender
<b>D</b>	<b>SUBMISSION OF TENDERS</b>
21	Submission of Tenders
22	Late Tender
23	Alteration and Withdrawal of Tender

Client : 	<b>TENDER DOCUMENT FOR SUPPLY, INSTALLATION, TESTING &amp; CONFIGURATION OF IT, COMMUNICATION, ACCESS CONTROL &amp; SURVEILLANCE SYSTEM</b>	<b>nne pharmaplan®</b>
Project No : 120310	<b>DOCUMENT NO : NPI-120310-LVS-S1-TD-01</b>	Revision : 02 Date : 2015-10-31

Sl. No.	Topic
<b>E</b>	<b>TENDER OPENING</b>
24	Opening of Tenders
<b>F</b>	<b>SCRUTINY AND EVALUATION OF TENDERS</b>
25	Basic Principle
26	Preliminary Scrutiny of Tenders
27	Minor Infirmary/Irregularity/Non-Conformity
28	Discrepancy in Prices
29	Discrepancy between original and copies of Tender
30	Qualification Criteria
31	Conversion of Tender Currencies to Indian Rupees
32	Schedule-wise Evaluation
33	Comparison of Tenders
34	Additional Factors and Parameters for Evaluation and Ranking of Responsive Tenders
35	Tenderer's capability to perform the contract
36	Contacting the Purchaser
<b>G</b>	<b>AWARD OF CONTRACT</b>
37	Purchaser's Right to Accept any Tender and to Reject any or All Tenders
38	Award Criteria
39	Variation of Quantities at the Time of Award
40	Notification of Award
41	Issue of Contract
42	Non-receipt of Performance Security and Contract by the Purchaser/Consignee
43	Return of EMD
44	Publication of Tender Result
45	Corrupt or Fraudulent Practices
46	Integrity Pact (IP)
47	Paying Authority

<b>Client :</b> 	<b>TENDER DOCUMENT FOR SUPPLY, INSTALLATION, TESTING &amp; CONFIGURATION OF IT, COMMUNICATION, ACCESS CONTROL &amp; SURVEILLANCE SYSTEM</b>	<b>nne pharmaplan®</b>
<b>Project No : 120310</b>	<b>DOCUMENT NO : NPI-120310-LVS-S1-TD-01</b>	<b>Revision : 02</b> <b>Date : 2015-10-31</b>

## A. PREAMBLE

### 1. Definitions and Abbreviations:

1.1 The following definitions and abbreviations, which have been used in these documents shall have the meanings as indicated below:


#### 1.2. Definitions:

- (i) “Purchaser” means the organization and / or its representatives (consultants) purchasing goods and services as incorporated in the Tender Enquiry document. Purchaser is HBL, Chennai
- (ii) “Tender” means Bids / Quotation / Tender received from a Firm / Tenderer / Bidder.
- (iii) “Tenderer” means Bidder/ the Individual or Firm submitting Bids / Quotation / Tender
- (iii) “Supplier” means the individual or the firm supplying the goods and services as incorporated in the contract.
- (iv) “Goods” means the articles, material, commodities, livestock, furniture, fixtures, raw material, spares, instruments, machinery, equipment, medical equipment, industrial plant etc. which the supplier is required to supply to the purchaser under the contract.
- (v) “Services” means services allied and incidental to the supply of goods, such as transportation, installation, commissioning, provision of technical assistance, training, after sales service, maintenance service and other such obligations of the supplier covered under the contract.
- (vi) “Earnest Money Deposit” (EMD) means Bid Security/ monetary or financial guarantee to be furnished by a tenderer along with its tender.
- (vii) “Contract” means the written agreement entered into between the purchaser and/or consignee and the supplier, together with all the documents mentioned therein and including all attachments, annexure etc. therein.
- (viii) “Performance Security” means monetary or financial guarantee to be furnished by the successful tenderer for due performance of the contract placed on it. Performance Security is also known as Security Deposit.
- (ix) “Consignee” means the organization/person to whom the goods are required to be delivered as specified in the Contract. If the goods are required to be delivered to a person as an interim consignee for the purpose of despatch to another person as provided in the Contract then that “another” person is the consignee, also known as ultimate consignee. Consignee is HBL, Chennai
- (x) “Specification” means the document/standard that prescribes the requirement with which goods or service has to conform.
- (xi) “Inspection” means activities such as measuring, examining, testing, gauging one or more characteristics of the product or service and comparing the same with the specified requirement to determine conformity.
- (xii) “Day” means calendar day.

#### 1.3 Abbreviations:

- (i) “T E Document” means Tender Enquiry Document
- (ii) “NIT” means Notice Inviting Tenders.
- (iii) “GIT” means General Instructions to Tenderers
- (iv) “SIT” means Special Instructions to Tenderers
- (v) “GCC” means General Conditions of Contract
- (vi) “SCC” means Special Conditions of Contract
- (vii) “DGS&D” means Directorate General of Supplies and Disposals



Client : 	<b>TENDER DOCUMENT FOR SUPPLY, INSTALLATION, TESTING &amp; CONFIGURATION OF IT, COMMUNICATION, ACCESS CONTROL &amp; SURVEILLANCE SYSTEM</b>	<b>nne pharmaplan®</b>
Project No : 120310	DOCUMENT NO : NPI-120310-LVS-S1-TD-01	Revision : 02 Date : 2015-10-31



- (viii) “NSIC” means National Small Industries Corporation
- (ix) “PSU” means Public Sector Undertaking
- (x) “CPSU” means Central Public Sector Undertaking
- (xi) “LSI” means Large Scale Industry
- (xii) “SSI” means Small Scale Industry
- (xiii) “LC” means Letter of Credit
- (xiv) “DP” means Delivery Period
- (xv) “BG” means Bank Guarantee
- (xvi) “ED” means Excise Duty
- (xvii) “CD” means Custom Duty
- (xviii) “VAT” means Value Added Tax
- (xix) “CENVAT” means Central Value Added Tax
- (xx) “CST” means Central Sales Tax
- (xxi) “RR” means Railway Receipt
- (xxii) “BL” means Bill of Lading
- (xxiii) “FOB” means Free on Board
- (xxiv) “FOR” means Free On Road
- (xxv) “DAP” means Delivered At Place
- (xxvi) “INCOTERMS” means International Commercial Terms as on the date of Tender Opening
- (xxvii) “MOH&FW” means Ministry of Health & Family Welfare, Government of India.
- (xxviii) “AMC” means Annual Maintenance Contract
- (xxix) “RT” means Re-Tender.

## 2. Introduction

- 2.1 The Purchaser has issued this TE document for purchase of goods and related services as mentioned in subsequent paragraphs which also indicates *interalia*, the required delivery schedule, terms and place of delivery.
- 2.2 This section (Section II - “General Instruction Tenderers”) provides the relevant information as well as instructions to assist the prospective tenderers in preparation and submission of tenders. It also includes the mode and procedure to be adopted by the purchaser for receipt and opening as well as scrutiny and evaluation of tenders and subsequent placement of contract.
- 2.3 The tenderers shall also read the Special Instructions to Tenderers (SIT) related to this purchase, as contained in Section III of these documents and follow the same accordingly. SWhenever there is a conflict between the GIT and SIT, the provisions contained in the SIT shall prevail over those in the GIT.
- 2.4 Before formulating the tender and submitting the same to the purchaser, the tenderer should read and examine all the terms, conditions, instructions, checklist etc. contained in the TE document. Failure to provide and/or comply with the required information, instructions etc. incorporated in these TE document may result in rejection of its tender.

## 3. Language of Tender

- 3.1 The tender submitted by the tenderer and all subsequent correspondence and documents relating to the tender exchanged between the tenderer and the purchaser, shall be written in the English language, unless otherwise specified in the Tender Enquiry. However, the language of any printed literature furnished by the tenderer in connection with its tender may be written in any other language provided the same is accompanied by an English translation and, for purposes of interpretation of the tender, the English translation shall prevail.
- 3.2 The tender submitted by the tenderer and all subsequent correspondence and documents relating to the tender exchanged between the tenderer and the purchaser, may also be written in the Hindi language, provided that the same are accompanied by English translation, in which case, for purpose of interpretation of the tender etc, the English translations shall prevail.

Client : 	<b>TENDER DOCUMENT FOR SUPPLY, INSTALLATION, TESTING &amp; CONFIGURATION OF IT, COMMUNICATION, ACCESS CONTROL &amp; SURVEILLANCE SYSTEM</b>	
Project No : 120310	DOCUMENT NO : NPI-120310-LVS-S1-TD-01	Revision : 02 Date : 2015-10-31

#### 4. Eligible Tenderers

- 4.1 This invitation for tenders is open to all suppliers who fulfil the eligibility criteria specified against clause 16 of GIT Sec. II in this document.

#### 5. Eligible Goods and Services

- 5.1 All goods and related services to be supplied under the contract shall have their origin in India or any other country with which India has not banned trade relations. The term “origin” used in this clause means the place where the goods are mined, grown, produced, or manufactured or from where the related services are arranged and supplied.

#### 6. Tendering Expense and Tender fee

- 6.1 **Tender Expense:** The tenderer shall bear all costs and expenditure incurred and/or to be incurred by it in connection with its tender including preparation, mailing and submission of its tender and for subsequent processing the same. The purchaser will, in no case be responsible or liable for any such cost, expenditure etc regardless of the conduct or outcome of the tendering process.
- 6.2 **Tender Cost/Tender fee:** The tenderer should submit the tender fee of **Rs 5,250.00 (inclusive of VAT@5%) or USD 500** as on tender publishing date in the form of Demand Draft or Banker’s cheque in favour of HLL Biotech limited, payable at Chennai. The DD/ Banker’s cheque has to be enclosed along with the technical bid which is non-refundable. In case of cancellation of tender by HBL, the tender cost/fee shall be refunded.

### B. TENDER ENQUIRY DOCUMENTS

#### 7. Content of Tender Enquiry Documents

- 7.1 deleted
- 7.2 The relevant details of the required goods and services, the terms, conditions and procedure for tendering, tender evaluation, placement of contract, the applicable contract terms and, also, the standard formats to be used for this purpose are incorporated in the above-mentioned documents. The interested tenderers are expected to examine all such details etc to proceed further.

#### 8. Amendments to Tender Enquiry documents

- 8.1 At any time prior to the deadline for submission of tenders, the purchaser may, for any reason deemed fit by it, modify the TE documents by issuing suitable amendment(s) to it.
- 8.2 Such an amendment will be notified in the website of [www.hllbiotech.com/www.lifecarehll.com](http://www.hllbiotech.com/www.lifecarehll.com) / <http://eprocure.gov.in/cppp>. The interested parties are advised to regularly visit the website for further updates.
- 8.3 In order to provide reasonable time to the prospective tenderers to take necessary action in preparing their tenders as per the amendment, the purchaser may, at its discretion extend the deadline for the submission of tenders and other allied time frames, which are linked with that deadline.



#### 9. Clarification of Tender Enquiry documents

- A
- 9.1 A Tenderer requiring any clarification or elucidation on any issue of the TE documents may take up the same during the pre bid conference. The purchaser will respond to such request by publishing the response / clarification in the official websites.

### C. PREPARATION OF TENDERS

#### 10. Documents Comprising the Tender

- 10.1 The **Two Bid System**, i.e. “Technical Bid” and “Price Bid” prepared by the tenderer shall comprise the following:

Client : 	<b>TENDER DOCUMENT FOR SUPPLY, INSTALLATION, TESTING &amp; CONFIGURATION OF IT, COMMUNICATION, ACCESS CONTROL &amp; SURVEILLANCE SYSTEM</b>	
<b>Project No : 120310</b>	<b>DOCUMENT NO : NPI-120310-LVS-S1-TD-01</b>	<b>Revision : 02</b> <b>Date : 2015-10-31</b>

**A) Technical bid (Un priced Bid)**

- i) Earnest money furnished in accordance with GIT clause 18.1 alternatively, documentary evidence as per GIT clause 18.2 for claiming exemption from payment of earnest money.
- ii) Tender Form as per annexure provided in the TED.
- iii) Documentary evidence, as necessary in terms of GIT clauses 4 and 16 establishing that the tenderer is eligible to submit the tender and, also, qualified to perform the contract if its tender is accepted.
- iv) Tenderer/Agent who quotes for goods manufactured by other manufacturer shall furnish Manufacturer's Authorisation Form.
- v) Power of attorney in favour of the signatory of the tender document.
- vi) Documents and relevant details to establish in accordance with GIT clause 17 that the goods and the allied services to be supplied by the tenderer conform to the requirement of the TE documents.
- vii) Performance Statement as per provided in the TED along with relevant copies of orders and end users' satisfaction certificate.
- viii) Certificate of country of origin by the bidder from abroad. (Chamber of commerce)
- ix) Checklist as per Annexure provided in the TED.
- x) Data Sheet and Drawings given as Annexure- I respectively duly filled up and signed and stamped

**B) Price Bid:**

The information given at clause no. 10.1 A) ii) & viii) above should be reproduced with the prices indicated.

**10.2 N.B.**

1. All pages of the Tender should be page numbered and indexed.
2. It is the responsibility of tenderer to go through the TE document to ensure furnishing all required documents in addition to above, if any.

**10.3** The tender should be signed in long hand, dated, duly stamped and witnessed at all places provided therein. Also all pages, drawings, corrections/alterations should be initialled/stamped.

**10.4** Tender, which does not fulfil any of the above requirements and/or gives evasive information/reply against any such requirement, shall be liable to be ignored and rejected.

**10.5** Tender sent by fax/telex/cable/electronically shall be ignored.

**11. Tender currencies**



**11.1** The tenderer supplying indigenous goods or already imported goods shall quote only in Indian Rupees.

**11.2** For imported goods if supplied directly from abroad, prices shall be quoted in any freely convertible currencies say US Dollar, Euro, GBP or Yen. As regards price(s) for allied services, if any required with the goods, the same shall be quoted in Indian Rupees only if such services are to be performed /undertaken in India. Commission for Indian Agent, if any and if payable shall be indicated in the space provided for in the price schedule and will be payable in Indian Rupees only. Such conversion of currencies will be done based on rate of exchange declared by the RBI as on the date of 'Price Bid' opening as already incorporated against clause 31 here after.

**11.3** Tenders, where prices are quoted in any other way shall be treated as non -responsive and rejected.

**12. Tender Prices**



**12.1** The Tenderer shall indicate on the Price Schedule provided under Section XI all the specified components of prices shown therein including the unit prices and total tender prices of the goods and services proposes to supply against the requirement. All the columns shown in the price schedule should be filled up as required. If any column does not apply to a tenderer, same should be clarified as "NA" by the tenderer.

<b>Client :</b> 	<b>TENDER DOCUMENT FOR SUPPLY, INSTALLATION, TESTING &amp; CONFIGURATION OF IT, COMMUNICATION, ACCESS CONTROL &amp; SURVEILLANCE SYSTEM</b>	
<b>Project No : 120310</b>	<b>DOCUMENT NO : NPI-120310-LVS-S1-TD-01</b>	<b>Revision : 02</b> <b>Date : 2015-10-31</b>

- 12.2 The price of the schedule complete in all respect will be evaluated and the L1 party will be identified schedule wise.
- 12.3 The quoted prices for goods offered from within India and that for goods offered from abroad are to be indicated separately in the applicable Price Schedules attached under Section XI.
- 12.4 While filling up the columns of the Price Schedule, the following aspects should be noted for compliance:
- 12.4.1 For domestic goods or goods of foreign origin located within India, the prices in the corresponding price schedule shall be entered separately in the following manner:
- The price of the goods, quoted ex-factory/ ex-showroom/ ex-warehouse/ off-the-shelf, as applicable, including all taxes and duties like sales tax, CST/ VAT, Customs Duty, Excise Duty etc. already paid or payable on the components and raw material used in the manufacture or assembly of the goods quoted ex-factory etc. or on the previously imported goods of foreign origin quoted ex-showroom etc;
  - Any sales or other taxes and any duties including excise duty, which will be payable on the goods in India if the contract is awarded;
  - Charges towards Packing & Forwarding, Inland Transportation, Loading/Unloading and other local costs incidental to delivery of the goods to their final destination as specified in the List of Requirements and Price Schedule would be borne by supplier;
  - The price of Incidental Services, as mentioned in List of Requirements and Price Schedule;
  - The price as mentioned in List of Requirements, provided in the Bill of Quantities.
- 12.4.2 For goods offered from abroad, the prices in the corresponding price schedule shall be entered separately in the following manner:
- The price of goods quoted DAP at Consignee Site basis,, as indicated in the List of Requirements and Price Schedule;
  - The price of goods quoted should be on DAP at Consignee Site basis in India as indicated in the List of Requirements, Price Schedule and Consignee List;
  - The prices of Turnkey ( if any), as mentioned in List of Requirements, Technical Specification and Price Schedule; and
  - The price of AMC (Annual Maintenance Contract), as mentioned in List of Requirements, Technical Specification and Price Schedule.
- 12.5 deleted
- 12.6 For insurance of goods to be supplied, relevant instructions as provided under GCC Clause 11 shall be followed.
- 12.7 Unless otherwise specifically indicated in the SCC, the terms FOB&DAP at consignee site basis in India. For imported goods offered from abroad, shall be governed by the rules & regulations prescribed in the current edition of INCOTERMS, published by the International Chamber of Commerce, Paris.
- 12.8 The need for indication of all such price components by the tenderers, as required in this clause (viz., GIT clause 12) is for the purpose of comparison of the tenders by the purchaser and will no way restrict the purchaser's right to award the contract on the selected tenderer on any of the terms offered.

### 13. Indian Agent

- 13.1 If a foreign tenderer has engaged an agent in India in connection with its tender, the foreign tenderer, in addition to indicating Indian agent's commission, if any, in a manner described under GIT sub clause 11.2 above, shall also furnish the following information:
- The complete name and address of the Indian Agent and its permanent income tax account number as allotted by the Indian Income Tax authority.
  - The details of the services to be rendered by the agent for the subject requirement.

Client : 	<b>TENDER DOCUMENT FOR SUPPLY, INSTALLATION, TESTING &amp; CONFIGURATION OF IT, COMMUNICATION, ACCESS CONTROL &amp; SURVEILLANCE SYSTEM</b>	
Project No : 120310	DOCUMENT NO : NPI-120310-LVS-S1-TD-01	Revision : 02 Date : 2015-10-31

- c) Details of Service outlets in India, nearest to the consignee(s), to render services during Warranty and AMC period.

#### 14. Firm Price

- 14.1 Unless otherwise specified in the SIT, unit prices quoted by the tenderer shall remain firm and fixed during the currency of the contract and not subject to variation on any account.

#### 15. Alternative Tenders

- 15.1 Alternative Tenders are not permitted.



#### 16. Documents Establishing Tenderers Eligibility and Qualifications

- 16.1 Pursuant to GIT clause 10, the tenderer shall furnish, as part of its tender, relevant details and documents establishing its eligibility to quote and its qualifications to perform the contract if its tender is accepted.
- 16.2 The documentary evidence needed to establish the tenderer's qualifications shall fulfil the following requirements:
- In case the tenderer offers to supply goods, which are manufactured by some other firm, the tenderer has been duly authorised by the goods manufacturer to quote for and supply the goods to the purchaser. The tenderer shall submit the manufacturer's authorization letter to this effect as per the standard form provided under Section XIV in this document.
  - The tenderer has the required financial, technical and production capability necessary to perform the contract and, further, it meets the qualification criteria incorporated in the Section IX in these documents.
  - In case the tenderer is not doing business in India, it is duly represented by an agent stationed in India fully equipped and able to carry out the required contractual functions and duties of the supplier including after sale service, maintenance & repair etc. of the goods in question, stocking of spare parts and fast moving components and other obligations, if any, specified in the conditions of contract and/or technical specifications.
  - In case the tenderer is an Indian agent/authorized representative quoting on behalf of a foreign manufacturer for the **restricted item**, the Indian agent/authorized representative is already enlisted under the Compulsory Enlistment Scheme of Ministry of Finance, Govt. of India, operated through Directorate General of Supplies & Disposals (DGS&D), New Delhi.

#### 17. Documents establishing Goods Conformity to Tender Enquiry Document

- 17.1 The tendered shall provide in its tender the required as well as the relevant documents like technical data, literature, drawings etc. to establish that the goods and services offered in the tender fully conform to the goods and services specified by the purchaser in the TE document. For this purpose the tenderer shall also provide a **clause-by-clause commentary on the technical specifications and other technical details incorporated by the purchaser in the TE Document to establish technical responsiveness of the goods and services offered in its tender.**
- 17.2 In case there is any variation and/or deviation between the goods & services prescribed by the purchaser and that offered by the tenderer, the tenderer shall list out the same in a chart form without ambiguity and provide the same along with its tender.
- 17.3 If a tenderer furnishes wrong and/or misleading data, statement(s) etc. about technical acceptability of the goods and services offered by it, its tender will be liable to be ignored and rejected in addition to other remedies available to the purchaser in this regard.

#### 18. Earnest Money Deposit (EMD)

Client : 	<b>TENDER DOCUMENT FOR SUPPLY, INSTALLATION, TESTING &amp; CONFIGURATION OF IT, COMMUNICATION, ACCESS CONTROL &amp; SURVEILLANCE SYSTEM</b>	
<b>Project No : 120310</b>	<b>DOCUMENT NO : NPI-120310-LVS-S1-TD-01</b>	<b>Revision : 02</b> <b>Date : 2015-10-31</b>

- 18.1 Pursuant to GIT clauses 7.1 and 10.1 the tenderer shall furnish along with its tender, earnest money for amount as shown in the NIT. The earnest money is required to protect the purchaser against the risk of the tenderer's unwarranted conduct as amplified under sub-clause 18.7 below.
- 18.2 The tenderers who are currently registered and, also, will continue to remain registered during the tender validity period with National Small Industries Corporation, New Delhi for the specific goods as per tender enquiry specification shall be eligible for exemption from EMD. Vague stipulations in the Registration Certificate such as "to customers' specification" etc. will not be acceptable for exemption from furnishing of earnest money. In case the tenderer falls in these categories, it should furnish copy of its valid registration details (with NSIC). The EMD should be furnished in the name of **"HLL Biotech Limited, payable at Chennai"**.
- 18.3 The earnest money shall be denominated in Indian Rupees or equivalent currencies as per GIT clause 11.2. The earnest money shall be furnished in one of the following forms:
- Account Payee Demand Draft or Bank Guarantee**
- 18.4 The demand draft shall be drawn on any commercial bank in India in favour of the **"HLL Biotech Limited"** payable at Chennai. If the EMD is in the form of bank guarantee, the same is to be provided from any scheduled commercial bank in India or in the case of foreign tenderer, the same should be routed through a Nationalized Indian Bank as per the format specified under Section XIII of this tender.
- 18.5 The earnest money shall be valid for a period of forty-five (45) days beyond the validity period of the tender. As validity period of Tender as per Clause 19 of GIT is 120 days, the EMD shall be valid for 165 days from Technical Bid opening date.
- 18.6 Unsuccessful tenderers' earnest money will be returned to them without any interest, after expiry of the tender validity period, but not later than thirty days after conclusion of the resultant contract. Successful tenderer's earnest money will be returned without any interest, after receipt of performance security from that tenderer.
- 18.7 Earnest Money is required to protect the purchaser against the risk of the Tenderer's conduct, which would warrant the forfeiture of the EMD. Earnest money of a tenderer will be forfeited, if the tenderer withdraws or amends its tender or impairs or derogates from the tender in any respect within the period of validity of its tender or if it comes to notice that the information/documents furnished in its tender is incorrect, false, misleading or forged without prejudice to other rights of the purchaser. The successful tenderer's earnest money will be forfeited without prejudice to other rights of Purchaser if it fails to furnish the required performance security within the specified period.
- 18.8 In the case of Bank Guarantee furnished from banks outside India (i.e. foreign Banks), it should be authenticated and countersigned by any nationalised bank or scheduled bank, but not cooperative banks in India by way of back-to-back counter guarantee.


## 19. Tender Validity

- 19.1 If not mentioned otherwise in the SIT, the tenders shall remain valid for acceptance for a period of 120 days (One hundred and twenty days) from the date of tender opening prescribed in the TE document. Any tender valid for a shorter period shall be treated as unresponsive and rejected.
- 19.2 In exceptional cases, the tenderers may be requested by the purchaser to extend the validity of their tenders up to a specified period. Such request(s) and responses thereto shall be conveyed by surface mail or by fax/ telex/cable followed by surface mail. The tenderers, who agree to extend the tender validity, are to extend the same without any change or modification of their original tender and they are also to extend the validity period of the EMD accordingly. A tenderer, however, may not agree to extend its tender validity without forfeiting its EMD.
- 19.3 In case the day up to which the tenders are to remain valid falls on/ subsequently declared a holiday or closed day for the purchaser, the tender validity shall automatically be extended up to the next working day.

## 20. Signing and Sealing of Tender

- 20.1 The tenderers shall submit their tenders as per the instructions contained in GIT Clause 10



Client : 	<b>TENDER DOCUMENT FOR SUPPLY, INSTALLATION, TESTING &amp; CONFIGURATION OF IT, COMMUNICATION, ACCESS CONTROL &amp; SURVEILLANCE SYSTEM</b>	nne pharmaplan®
<b>Project No : 120310</b>		<b>Revision : 02</b> <b>Date : 2015-10-31</b>

- 20.2 The tender shall either be typed or written in indelible ink and the same shall be signed by the tenderer or by a person(s) who has been duly authorized to bind the tenderer to the contract. The letter of authorization shall be by a written power of attorney, which shall also be furnished along with the tender.
- 20.3 The tender shall be duly signed at the appropriate places as indicated in the TE document and all other pages of the tender including printed literature, if any shall be initialled by the same person(s) signing the tender. The tender shall not contain any erasure or overwriting, except as necessary to correct any error made by the tenderer and, if there is any such correction; the same shall be initialled by the person(s) signing the tender.
- 20.4 The tenderer should seal the tender and write the address of the purchaser and the tender reference number on the envelope. The sentence “**NOT TO BE OPENED** before *(The tenderer is to put the date & time of tender opening)*” are to be written on these envelopes. The inner envelopes are then to be put in a bigger outer envelope, which will also be duly sealed, marked etc. as above. If the outer envelope is not sealed and marked properly as above, the purchaser will not assume any responsibility for its misplacement, premature opening, late opening etc.
- 20.5 The document seeks quotation following **Two Tender System**, in two parts. First part will be known as **‘Technical Bid’**, and the second part **‘Price Bid’** as specified in clause 10 of GIT. Tenderer shall seal **‘Technical Bid’** and **‘Price Bid’** separately and covers will be suitably super scribed. Both these sealed covers shall be put in a bigger cover and sealed and procedure prescribed in Paras 20.1 to 20.4 followed.

## SUBMISSION OF TENDERS

### 21. Submission of Tenders

- 21.1 Unless otherwise specified, the tenders are to be submitted to **The Chief Executive Officer, HLL Biotech Limited**, Tidel Biopark Campus (Module No. 013-015), CSIR Road, Taramani, Chennai- 600 113
- 21.2 The tenderers must ensure that they submit their tenders not later than the closing time and date specified for submission of tenders. It is the responsibility of the tenderer to ensure that their Tenders whether sent by post or by courier or by person, reaches the address mentioned in GIT 21.1 by the specified clearing date and time.
- 21.3 In the event the specified date for submission of tender falls on / is subsequently declared a holiday or closed day for the purchaser, the tenders will be received up to the appointed time on the next working day.

### 22. Late Tender

- 22.1 A tender, which is received after the specified date and time for receipt of tenders will be treated as “late” tender and will be ignored and not considered.



### 23. Alteration and Withdrawal of Tender

- 23.1 The tenderer, after submitting its tender, is permitted to alter / modify its tender so long as such alterations / modifications are received duly signed, sealed and marked like the original tender, within the deadline for submission of tenders. Alterations / modifications to tenders received after the prescribed deadline will not be considered.
- 23.2 No tender should be withdrawn after the deadline for submission of tender and before expiry of the tender validity period. If a tenderer withdraws the tender during this period, it will result in forfeiture of the earnest money furnished by the tenderer in its tender.

## E. TENDER OPENING

### 24. Opening of Tenders

- 24.1 The purchaser will open the tenders at the specified date and time and at the specified place as indicated in the NIT.

Client : 	<b>TENDER DOCUMENT FOR SUPPLY, INSTALLATION, TESTING &amp; CONFIGURATION OF IT, COMMUNICATION, ACCESS CONTROL &amp; SURVEILLANCE SYSTEM</b>	
Project No : 120310	DOCUMENT NO : NPI-120310-LVS-S1-TD-01	Revision : 02 Date : 2015-10-31

In case the specified date of tender opening falls on / is subsequently declared a holiday or closed day for the purchaser, the tenders will be opened at the appointed time and place on the next working day.

- 24.2 Authorized representatives of the tenderers, who have submitted tenders on time may attend the tender opening provided they bring with them letters of authority from the corresponding tenderers.

The tender opening official(s) will prepare a list of the representatives attending the tender opening. The list will contain the representatives' names & signatures and corresponding tenderers' names and addresses.

- 24.3 Two - Tender system as mentioned in para 20.5 above will be as follows. The **Technical Bid** are to be opened in the first instance, at the prescribed time and date as indicated in NIT. These Tenders shall be scrutinized and evaluated by the competent committee/ authority with reference to parameters prescribed in the TE document. During the Technical Bid opening, the tender opening official(s) will read the salient features of the tenders like brief description of the goods offered, delivery period, Earnest Money Deposit and any other special features of the tenders, as deemed fit by the tender opening official(s). Thereafter, in the second stage, the **Price Bid** of only the Technically qualified offers (**as decided in the first stage**) shall be opened for further scrutiny and evaluation on a date notified after the evaluation of the Technical Bid. The prices, special discount if any of the goods offered etc., as deemed fit by tender opening official(s) will be read out.

## F. SCRUTINY AND EVALUATION OF TENDERS



### 25. Basic Principle

- 25.1 Tenders will be evaluated on the basis of the terms & conditions already incorporated in the TE document, based on which tenders have been received and the terms, conditions etc. mentioned by the tenderers in their tenders. No new condition will be brought in while scrutinizing and evaluating the tenders.

### 26. Preliminary Scrutiny of Tenders

- 26.1 The Purchaser will examine the Tenders to determine whether they are complete, whether any computational errors have been made, whether required sureties have been furnished, whether the documents have been properly signed stamped and whether the Tenders are generally in order.
- 26.2 Prior to the detailed evaluation of Price Bid, pursuant to GIT Clause 33, the Purchaser will determine the substantial responsiveness of each Tender to the TE Document. For purposes of these clauses, a substantially responsive Tender is one, which conforms to all the terms and conditions of the TE Documents without material deviations. Deviations from, or objections or reservations to critical provisions such as those concerning Performance Security, Warranty, EMD (GIT Clause 18), Taxes & Duties, Force Majeure and Applicable law will be deemed to be a material deviation. The Purchaser's determination of a Tender's responsiveness is to be based on the contents of the tender itself without recourse to extrinsic evidence.
- 26.3 If a Tender is not substantially responsive (Non-Responsive), it will be rejected by the Purchaser and cannot subsequently be made responsive by the Tenderer by correction of the nonconformity.
- 26.4 The tenders will be scrutinized to determine whether they are complete and meet the essential and important requirements, conditions etc. as prescribed in the TE document. The tenders, which do not meet the basic requirements, are liable to be treated as non – responsive and will be summarily ignored. A non-responsive tender is one which deviates technically or commercially from any specific provision in the tender enquiry.
- 26.5 The following are some of the important aspects, for which a tender shall be declared **non – responsive** and will be summarily ignored:
- (i) Tender form as per annexure provided in the TED. (signed and stamped) not enclosed
  - (ii) Tender is unsigned.
  - (iii) Tender validity is shorter than the required period.
  - (iv) Required EMD (Amount, validity etc.) / exemption documents have not been provided.



Client : 	<b>TENDER DOCUMENT FOR SUPPLY, INSTALLATION, TESTING &amp; CONFIGURATION OF IT, COMMUNICATION, ACCESS CONTROL &amp; SURVEILLANCE SYSTEM</b>	
Project No : 120310	DOCUMENT NO : NPI-120310-LVS-S1-TD-01	Revision : 02 Date : 2015-10-31

- (v) Tenderer has quoted for goods manufactured by other manufacturer(s) without the required Manufacturer's Authorisation Form as per annexure provided in the TED..
- (vi) Tenderer has not agreed to give the required performance security.
- (vii) Goods offered are not meeting the tender enquiry specification.
- (viii) Tenderer has not agreed to other essential condition(s) specially incorporated in the tender enquiry like terms of payment, liquidated damages clause, warranty clause, dispute resolution mechanism applicable law.
- (ix) Poor/ unsatisfactory past performance.
- (x) Tenderers who stand deregistered/banned/blacklisted by any Govt. Authorities.
- (xi) Tenderer is not eligible as per GIT Clauses 4.1 & 16.1.
- (xii) Tenderer has not quoted for the entire quantity as specified in the List of Requirements in the quoted schedule.
- (xiii) The signed Integrity Pact not enclosed by the Tenderer.
- (xiv) Data Sheet and drawings given in Section- respectively not duly filled, signed and stamped.

## 27. Minor Infirmary /Irregularity/Non-Conformity

- 27.1 If during the preliminary examination, the purchaser find any minor informality and/or irregularity and/or non-conformity in a tender, the purchaser may waive the same provided it does not constitute any material deviation and financial impact and, also, does not prejudice or affect the ranking order of the tenderers. Wherever necessary, the purchaser will convey its observation on such 'minor' issues to the tenderer, asking the tenderer to respond by a specified date. If the tenderer does not reply by the specified date or gives evasive reply without clarifying the point at issue in clear terms, that tender will be liable to be ignored.

## 28. Discrepancies in Prices

- 28.1 If, in the price structure quoted by a tenderer, there is discrepancy between the unit price and the total price (which is obtained by multiplying the unit price by the quantity), the unit price shall prevail and the total price corrected accordingly, unless the purchaser feels that the tenderer has made a mistake in placing the decimal point in the unit price, in which case the total price as quoted shall prevail over the unit price and the unit price corrected accordingly.
- 28.2 If there is an error in a total price, which has been worked out through addition and/or subtraction of subtotals, the subtotals shall prevail and the total shall be corrected accordingly; and
- 28.3 If there is a discrepancy between the amount expressed in words and figures, the amount in words shall prevail, subject to sub clause 28.1 and 28.2 above.
- 28.4 If, as per the judgement of the purchaser, there is any such arithmetical discrepancy in a tender, the same will be suitably conveyed to the tenderer by registered / speed post. If the tenderer does not agree to the observation of the purchaser, the tender is liable to be ignored.



## 29. Discrepancy between original and copies of Tender

- 29.1 In case any discrepancy is observed between the text etc. of the original copy and that in the other copies of the same tender set, the text etc. of the original copy shall prevail. Here also, the purchaser will convey its observation suitably to the tenderer by register / speed post and, if the tenderer does not accept the purchaser's observation, that tender will be liable to be ignored.

## 30. Qualification Criteria

- 30.1 Tenders of the tenderers, who do not meet the required Qualification Criteria prescribed in Section1.3 will be treated as non - responsive and will not be considered further.

## 31. Conversion of tender currencies to Indian Rupees

Client : 	<b>TENDER DOCUMENT FOR SUPPLY, INSTALLATION, TESTING &amp; CONFIGURATION OF IT, COMMUNICATION, ACCESS CONTROL &amp; SURVEILLANCE SYSTEM</b>	
Project No : 120310	DOCUMENT NO : NPI-120310-LVS-S1-TD-01	Revision : 02 Date : 2015-10-31

- 31.1 In case the TE document permits the tenderers to quote their prices in different currencies, all such quoted prices of the responsive tenderers will be converted to a single currency viz., Indian Rupees for the purpose of equitable comparison and evaluation, as per the exchange rates established by the Reserve Bank of India for similar transactions, as on the date of 'Price bid' opening.

### 32. Schedule/ Package -wise Evaluation

- 32.1 In case the List of Requirements contains more than one schedule/ Package, the responsive tenders will be evaluated and compared separately for each schedule/package. The tender for a schedule/ package will not be considered if the complete requirements prescribed in that schedule/ package are not included in the tender. However, as already mentioned in GIT sub clause 12.2, the tenderers have the option to quote for any one or more schedules/ package.

### 33. Comparison of Tenders

- 33.1 Unless mentioned otherwise in Section – III – Special Instructions to Tenderers and Section – VI – List of Requirements, the comparison of the responsive tenders shall be carried out on Delivery Duty Paid (DDP) consignee site basis. The quoted turnkey (if any) prices and AMC prices will also be added for comparison/ranking purpose for evaluation.

### 34. Additional Factors and Parameters for Evaluation and Ranking of Responsive Tenders

- 34.1 DELETED
- 34.2 The purchaser's evaluation of tender will also take into account the additional factors, if any, incorporated in SIT in the manner and to the extent indicated therein.
- 34.3 The Purchaser reserves the right to give the price preference to small-scale sectors etc. and purchase preference to central public sector undertakings as per the instruction in vogue while evaluating, comparing and ranking the responsive tenders.

### 35. Tenderer's capability to perform the contract



- 35.1 The purchaser, through the above process of tender scrutiny and tender evaluation will determine to its satisfaction whether the tenderer, whose tender has been determined as the lowest evaluated responsive tender is eligible, qualified and capable in all respects to perform the contract satisfactorily. If, there is more than one schedule/ package in the List of Requirements, then, such determination will be made separately for each schedule/ package.
- 35.2 The above-mentioned determination will, interalia, take into account the tenderer's financial, technical and production capabilities for satisfying all the requirements of the purchaser as incorporated in the TE document. Such determination will be based upon scrutiny and examination of all relevant data and details submitted by the tenderer in its tender as well as such other allied information as deemed appropriate by the purchaser.

### 36. Contacting the Purchaser

- 36.1 From the time of submission of tender to the time of awarding the contract, if a tenderer needs to contact the purchaser for any reason relating to this tender enquiry and / or its tender, it should do so only in writing.
- 36.2 In case a tenderer attempts to influence the purchaser in the purchaser's decision on scrutiny, comparison & evaluation of tenders and awarding the contract, the tender of the tenderer shall be liable for rejection in addition to appropriate administrative actions being taken against that tenderer, as deemed fit by the purchaser.

## G. AWARD OF CONTRACT

### 37. Purchaser's Right to accept any tender and to reject any or all tenders

Client : 	<b>TENDER DOCUMENT FOR SUPPLY, INSTALLATION, TESTING &amp; CONFIGURATION OF IT, COMMUNICATION, ACCESS CONTROL &amp; SURVEILLANCE SYSTEM</b>	
<b>Project No : 120310</b>	<b>DOCUMENT NO : NPI-120310-LVS-S1-TD-01</b>	<b>Revision : 02</b> <b>Date : 2015-10-31</b>

- 37.1 The purchaser reserves the right to accept in part or in full any tender or reject any or more tender(s) without assigning any reason or to cancel the tendering process and reject all tenders at any time prior to award of contract, without incurring any liability, whatsoever to the affected tenderer or tenderers.

#### **Award Criteria**

- 38.1 Subject to GIT clause 37 above, the contract will be awarded to the lowest evaluated responsive tenderer decided by the purchaser in terms of GIT Clause 35.

#### **38. Variation of Quantities at the Time of Award/ Currency of Contract**

- 39.1 At the time of awarding the contract, the purchaser reserves the right to increase or decrease by up to fifty (50%) per cent, the quantity of goods and services mentioned in the schedule (s) in the “List of Requirements” (rounded off to next whole number) without any change in the unit price and other terms & conditions quoted by the tenderer.
- 39.2 If the quantity has not been increased at the time of the awarding the contract, the purchaser reserves the right to increase by up to fifty (50) per cent, the quantity of goods and services mentioned in the contract (rounded off to next whole number) without any change in the unit price and other terms & conditions mentioned in the contract, during the currency of the contract after one year from the Date of Notification of Award.

#### **39. Notification of Award**

- 40.1 Before expiry of the tender validity period, the purchaser will notify the successful tenderer(s) in writing, by registered / speed post/ courier or by fax/telex/cable (to be confirmed by registered / speed post/courier) that its tender for goods & services, which have been selected by the purchaser, has been accepted, also briefly indicating therein the essential details like description, specification and quantity of the goods & services and corresponding prices accepted. The successful tenderer must furnish to the purchaser the required performance security within thirty days from the date of dispatch of this notification, failing which the EMD will be forfeited and the award will be cancelled. Relevant details about the performance security have been provided under GCC Clause 5 under Section IV.
- 40.2 The Notification of Award shall constitute the conclusion of the Contract.

#### **40. Issue of Contract**

- 41.1 Promptly after notification of award, the Purchaser/Consignee will mail the contract form duly completed and signed, in duplicate, to the successful tenderer by registered / speed post/courier.
- 41.2 Within twenty one days from the date of the contract, the successful tenderer shall return the original copy of the contract, duly signed and dated, to the Purchaser by registered / speed post/courier.
- 41.3 The Purchaser- reserves the right to issue the Notification of Award consignee wise.



#### **41. Non-receipt of Performance Security and Contract by the Purchaser/Consignee**

- 42.1 Failure of the successful tenderer in providing performance security and / or returning contract copy duly signed in terms of GIT clauses 40 and 41 above shall make the tenderer liable for forfeiture of its EMD and, also, for further actions by the Purchaser/Consignee against it as per the clause 24 of GCC – Termination of default.

#### **42. Return of EMD**

- 43.1 The earnest money of the successful tenderer and the unsuccessful tenderers will be returned to them without any interest, whatsoever, in terms of GIT Clause 18.7

#### **43. Publication of Tender Result**

Client : 	<b>TENDER DOCUMENT FOR SUPPLY, INSTALLATION, TESTING &amp; CONFIGURATION OF IT, COMMUNICATION, ACCESS CONTROL &amp; SURVEILLANCE SYSTEM</b>	
Project No : 120310	DOCUMENT NO : NPI-120310-LVS-S1-TD-01	Revision : 02 Date : 2015-10-31

- 44.1 The name and address of the successful tenderer(s) receiving the contract(s) will be mentioned in the notice board/bulletin/web site of the purchaser.

#### 44. Corrupt or Fraudulent Practices

- 45.1 It is required by all concerned namely the Consignee/Tenderers/Suppliers etc to observe the highest standard of ethics during the procurement and execution of such contracts. In pursuance of this policy, the Purchaser: -

- (a) defines, for the purposes of this provision, the terms set forth below as follows:
- (i) “corrupt practice” means the offering, giving, receiving or soliciting of anything of value to influence the action of a public official in the procurement process or in contract execution; and
  - (ii) “fraudulent practice” means a misrepresentation of facts in order to influence a procurement process or the execution of a contract to the detriment of the Purchaser, and includes collusive practice among Tenderers (prior to or after Tender submission) designed to establish Tender prices at artificial non-competitive levels and to deprive the Purchaser of the benefits of free and open competition;
- (b) will reject a proposal for award if it determines that the Tenderer recommended for award has engaged in corrupt or fraudulent practices in competing for the contract in question;
- (c) will declare a firm ineligible, either indefinitely or for a stated period of time, to be awarded a contract by the purchaser if it at any time determines that the firm has engaged in corrupt or fraudulent practices in competing for, or in executing the contract.

#### 45. Integrity Pact (IP)

The Integrity Pact (IP) will be one of the conditions in this tender enquiry. It will be considered to be a material deviation resulting into ignoring and rejecting the tender if the tenderers do not agree to accept it. The detailed terms of the IP are given below:


##### **The Public Authority commits that:**

- No official will demand or accept any illicit gratification to give any of the parties an advantage at any stage of the project.
- All necessary and appropriate technical, legal and administrative information related to the contract will be made public
- None of the officials will make available confidential information to a bidder/contractor to give unfair advantage in the contract
- Declaration by all concerned officials any conflict of interest and disclosure of own and family assets
- Officials will report to appropriate government authority about any breach/attempt to breach a commitment.

##### **The Bidder commits that:**

- they will not offer any illicit gratification to obtain unfair advantage
- they will not collude with other parties to impair transparency and fairness
- they will not accept any advantage in exchange for unprofessional behaviour
- will disclose all payments made to agents and intermediaries
- it will demonstrate existence of organization-wide code of conduct forbidding unethical practices

##### **Penalties:**



Client : 	<b>TENDER DOCUMENT FOR SUPPLY, INSTALLATION, TESTING &amp; CONFIGURATION OF IT, COMMUNICATION, ACCESS CONTROL &amp; SURVEILLANCE SYSTEM</b>	<b>nne pharmaplan®</b>
Project No : 120310	<b>DOCUMENT NO : NPI-120310-LVS-S1-TD-01</b>	Revision : 02 Date : 2015-10-31

For failure to implement IP officials will be subject to penal action and bidders will face cancellation of contract, forfeiture of bond, liquidated damages and blacklisting. Action will not require criminal conviction but be based on “no-contest” after the evidence is made available or there can be no material doubts. Disputes in IP implementation would be resolved by arbitration detailed in IP.

**Integrity Pact has to be signed and submitted by the Tenderer along with the filled up Tenders, failing which the Tender is liable to be rejected. Integrity Pact enclosed in Annexure**

**46. Paying Authority:**

- 47.1 The payment for the supplies of stores / goods / equipments which including agency commission, turnkey (if any), installation and commissioning and any other payment mentioned in the tender enquiry will be made by “**HLL Biotech Limited**”.

Client : 	<b>TENDER DOCUMENT FOR SUPPLY, INSTALLATION, TESTING &amp; CONFIGURATION OF IT, COMMUNICATION, ACCESS CONTROL &amp; SURVEILLANCE SYSTEM</b>	
Project No : 120310	DOCUMENT NO : NPI-120310-LVS-S1-TD-01	Revision : 02 Date : 2015-10-31

### SECTION -1.3

## QUALIFICATION CRITERIA

1. The Bidder shall be either of the following:

- Manufacturer of the tendered items
- Authorized Dealer/Distributor/Agent/Re-seller of the tendered items
- Authorized channel partner of the manufacturer/s of the tendered items

(Copy of manufacturer authorization certificate shall be provided as per Annexure-10 in TED)

2. The bidder should have proven and demonstrable experience in the supply, installation and configuring of Systems for IT , Networking , Access Control /Surveillance, continuously during last 5 years ending 31/10/2015.

*(Purchase Orders and Job Completion Certificates in the Client(s) Letterhead for all last five years has to be enclosed).*

The bidder should have successfully supplied and installed during the last five years ending 31/10/2015, the following: *(Copy of purchase orders and completion certificates in client(s) letterhead to be attached).*

a) One similar work costing not less than **Rs.300 Lakhs (Rupees Three Hundred Lakhs Only)**

(or)

b) Two similar works each costing not less than **Rs.250 Lakhs (Rupees Two Hundred and Fifty Lakhs Only)**

(Or)



c) Three similar works each costing not less than **Rs.200 Lakhs (Rupees Two Hundred Lakhs Only)**

(Or)

d) Four similar works each costing not less than **Rs.150 Lakhs (Rupees One Hundred and Fifty Lakhs Only)**

(Or)


e) Six similar works each costing not less than **Rs.100 Lakhs (Rupees One Hundred Lakhs Only)**

Client : 	<b>TENDER DOCUMENT FOR SUPPLY, INSTALLATION, TESTING &amp; CONFIGURATION OF IT, COMMUNICATION, ACCESS CONTROL &amp; SURVEILLANCE SYSTEM</b>	
<b>Project No : 120310</b>	<b>DOCUMENT NO : NPI-120310-LVS-S1-TD-01</b>	<b>Revision : 02</b> <b>Date : 2015-10-31</b>

3. The average annual turnover for last three financial years (i.e., 2012-2013, 2013-2014, 2014-2015) should not be less than **Rs.500 Lakhs**.
4. The Bidder should have a **positive net worth in last three financial years** i.e, 2012-2013, 2013-2014, 2014-2015. Notarized copies of the Chartered Accountant certified balance sheet statements should be enclosed.

**Note:**



- In support of above, the Tenderer shall furnish sufficient details.
- The manufacturer as well as the Tenderer/ Indian Agent shall furnish Satisfactory Performance cum Installation Certificate/purchase orders/bill of entry in respect of above, duly translated in English and duly notarized in the country of origin, along with the tender.
- The Tenderer shall furnish a brief write-up, packed with adequate data explaining and establishing his available capacity/capability (both technical and financial) to perform the Contract (if awarded) within the stipulated time period, after meeting all its current/present commitments. The Tenderer shall also furnish details of Equipment and Quality Control in the enclosed Section below.
- The Annual Report (Balance Sheet and Profit & Loss Account) for last three years prior to the date of Tender opening certified by a Chartered Accountant should be submitted as part of the tender
- Notwithstanding anything stated above, the Purchaser reserves the right to assess the Tenderer's capability and capacity to perform the contract satisfactorily before deciding on award of Contract, should circumstances warrant such an assessment in the overall interest of the Purchaser. The Purchaser reserves the right to ask for a free demonstration of the quoted equipment to similar/identical specification at a pre-determined place acceptable to the purchaser for determining technical responsiveness, before the opening of the Price Bid.
- The Purchaser also reserves the right to assess the Tenderer's capability and capacity to perform the contract satisfactorily by inspecting their facility such Assessment shall be done before opening of the Price Bid and the assessment report shall form part of TCTR.

<b>Client :</b> 	<b>TENDER DOCUMENT FOR SUPPLY, INSTALLATION, TESTING &amp; CONFIGURATION OF IT, COMMUNICATION, ACCESS CONTROL &amp; SURVEILLANCE SYSTEM</b>	<b>nne pharmaplan®</b>
<b>Project No : 120310</b>		<b>Revision : 02 Date : 2015-10-31</b>

## CHAPTER– 2.1

### DESCRIPTION/SCOPE OF WORK



Client : 	<b>TENDER DOCUMENT FOR SUPPLY, INSTALLATION, TESTING &amp; CONFIGURATION OF IT, COMMUNICATION, ACCESS CONTROL &amp; SURVEILLANCE SYSTEM</b>	
<b>Project No : 120310</b>	<b>DOCUMENT NO : NPI-120310-LVS-S1-TD-01</b>	<b>Revision : 02</b> <b>Date : 2015-10-31</b>

## 2.1 DESCRIPTION

### 2.1.1 SYSTEM DESCRIPTION

HLL Biotech Limited (HBL), a subsidiary of HLL Lifecare Limited, (a CPSU under Ministry of Health & Family Welfare, Government of India, is implementing "an **Integrated Vaccines Complex (IVC)** - a **project of national importance**" at Chengalpattu, near Chennai.. The proposed complex is a state of the art facility with cGMP compliance for manufacturing vaccines required for the immunization programme of Government of India.

For this purpose, HBL has decided to invite bids for appointment of IT, Communication, Access Control, Security and Surveillance System Contractors to build this state-of-the-art facility as per the scope of services, Technical specifications and BOQ defined in chapter 2.2 & 2.7 respectively.

NNE Pharmaplan India Limited, hereinafter called as "NPI" has been appointed as "Project Consultants". NPI shall design and engineer this facility, incorporating the latest GMP Standards and best practices. This facility shall be built as per the latest International trends and upon completion, shall be in compliance with Indian FDA (Schedule M), USFDA, EUGMP & MHRA.

One amongst the several other jobs is to plan, supply, execute & commission above said system as per enclosed, specifications, Bill of Quantities (BOQ) and drawings.



Hence, bids are invited from technically pre-qualified parties having experience in this type of Building Automation & IT work

The scope of work involved is detailed in the subsequent paragraphs and is precise to the extent possible. However, in order to ascertain the actual site conditions, it is requested to all Contractors to visit the site and get well versed with the actual site conditions or discuss with Consultants Purchaser about the type and quantum of works involved.

### 2.1.2 Over all Scope of Works

A. Following are the scope of Supply, unloading, shifting and installation, testing and commissioning of Electrical Contractor :

- a. Networking & IT Systems
- b. Communication (Telephone System)
- c. Access Control and Security System
- d. Surveillance (CCTV) System
- e. Consumable Items
  - Conduits
  - Socket outlets, Modular switches & socket outlets, conducting and cabling / wiring etc.
  - Cable trays (wherever applicable)
  - Earthing (Contractor shall consider earthing system for supplied Items from the available earth pit at site)
  - Cable glands
  - OFC/Data/Telephone and Control Cabling
  - Safety items.
  - Consoles for supplied Equipment.
  - Network Racks, MS Bracket, Cubicle & Installation Accessories
  - Structural steels (Minor works – to complete installation)
  - All consumable hardware

Client : 	<b>TENDER DOCUMENT FOR SUPPLY, INSTALLATION, TESTING &amp; CONFIGURATION OF IT, COMMUNICATION, ACCESS CONTROL &amp; SURVEILLANCE SYSTEM</b>	
<b>Project No : 120310</b>	<b>DOCUMENT NO : NPI-120310-LVS-S1-TD-01</b>	<b>Revision : 02</b> <b>Date : 2015-10-31</b>

f. Any other items specified in Schedule of Quantities

Supply of various equipment, transporting , unloading, receiving, inspection, storing, transportation to work site, handling, assembling, cleaning, mechanical erection, chipping of foundations(if required), installation, alignment, testing and commissioning and handing over in working condition of all items covered below but not limited to it. However, OFC 12 Core cable will be supplied and laid by other Contractor, only splicing, jointing and termination of end devices is included in the scope of this Contractor.

- B. All Civil works related to laying of Cables, Mounting of Panels, Tripods, Boom Barriers, etc such as punching holes, and openings in concrete floors, slabs, chasing of brick walls / ceiling and after chasing brick walls/ceiling.
- C. Excavation & back filling as applicable.
- D. The extent of work services under the contract include all items shown on the drawings, indicated in companion with specifications, notwithstanding the fact that such items have been omitted from the price schedule. All equipment and services, which are required to complete the intent of the contract, shall also be deemed to be within the scope of the contract.
- E. After receiving / inspections of not only the materials supplied by Contractors but also those supplied by the Purchaser, shall be reported to the Purchaser/Consultant with Contractors comments.
- F. Preparation of as built-in- drawings. Consultant will provide Cable Route and System disposition drawing during execution. Contractor has to develop drawing further up to the equipment termination with Technical Data and relevant Manuals & submit the same for approval.
- G. Co-ordination with other service contractors with respect to the installation activity without affecting the project schedule is in this Contractor's scope.

### 2.1.3 Scope of Work in Detail



Supply, Testing at works, delivery, erection, testing at site and CONFIGURATION/Networking, Communication System, Access Control / Security and Surveillance System as per the specification.

Main Server Room, Sub-Server Room, Networking Room, Meeting Rooms(Smart Boards, etc), cable tray(Minor Works), cable rack (as required) , underground cable routing (for FO/Data/Control Cable) etc of the complex is described in layouts and Site Master Plan in subsequent chapter.


#### ✓ Networking & IT System

##### **Refer Networking & IT Architecture Drawing – (DWG NO. NPI/120310/LVS/DET/S1/001)**



- a) There shall be Rack Server(s) in Main Server Room. The PCs, Printers, Smart Boards, interalia from various area shall be connected to the Core Switches and to the Servers Located in the Admin building as shown in the drawings.
- b) The following Servers shall be provided to meet the requirement along with Functional / Application and Operating Software shall be provided:-
  - SERVER 1 - Active directory services – 150 Users
  - SERVER 2 - SAP Business One – 75 Concurrent Users
  - SERVER 3(VM) – Antivirus, Visitor Management – MS SQL Database\ Oracle
  - SERVER 4 – Surveillance + Access Control System – MS SQL Database\ Oracle
  - SERVER 5 - Backup Server – DR Backup
  - SERVER 6 – Terminal Server 1 – MS RDS – File Server
  - SERVER 7– Terminal Server 2 - MS RDS - File Server
  - SERVER 8 – MAIL SERVER 1 – MS Exchange or Zimbra

<b>Client :</b> 	<b>TENDER DOCUMENT FOR SUPPLY, INSTALLATION, TESTING &amp; CONFIGURATION OF IT, COMMUNICATION, ACCESS CONTROL &amp; SURVEILLANCE SYSTEM</b>	
<b>Project No : 120310</b>	<b>DOCUMENT NO : NPI-120310-LVS-S1-TD-01</b>	<b>Revision : 02</b> <b>Date : 2015-10-31</b>

- SERVER 9 – MAIL SERVER 2 – MS Exchange or Zimbra
  - Storage Controller for SAN Access 40 TB.
  - Tape Backup Media rugged, removable disk backup for servers or desktops with a simple USB port connection.
  - Backup Software as applicable.
  - Link proof and Server Load Balancer
  - Thin Clients
- c) The data flow in Ground Floor PCs & Printer Systems will be from Edge/Distribution switches located in Ground Floor Network rack, however connection between these Switches and Core Switches located at Main Server Room shall be on OFC Cable which shall be on Redundant Communication Link to ensure the data and networking connectivity is available at all time.
- d) The Networking/data flow in Second and Third Floor PC & Printer Systems in the Admin Block will be through distribution switches located in Main Server Room Network rack at Third Floor, however Contractor can use Network Server Room located at Second Floor for Local Distribution to the respective area if the copper cable exceed 80 mtrs to the end devices from the third floor distribution switches. In this case, the connection between the distribution Switches at Second Floor and Main Network Rack located at Main Server Room shall be on OFC Cable. Communication link shall be Redundant as mentioned above.
- e) For Data/IT Connectivity between Core Switch and Distribution Switches (at BMS/UPS/IT Room) / PC / Printers Located at F1 Block (Factory of Viral Vaccines/Viral Vaccines Formulation (VVF) Block) shall be on redundant FO cable (Multi-Mode). The number of core shall be 12 in each FO Cable.
- f) Further to the internal distribution in the VVF Block shall be done from Network Rack/Switches located at first floor of VVF block. From BMS Room, the Networking to G-9 Block (Security gate Office-3) to be provided on Redundant 6 core Multi Mode fiber Optic Cable, and shall be connected to Network Rack/Network Switches at G-9 Block for PC/Printer System. Also for networking between G3 Block (security Gate Office-1) and Main Server Room shall be through F1 Block Distribution Switches located in BMS Room. The Redundancy in end connection shall be provided.
- g) For Data/IT Connectivity between Core Switches and Distribution Switches/PC/Printers Located at W1 Block (Vaccines Warehouse Block) shall be on redundant FO cable (Multi-Mode). The number of core shall be 12 in each FO Cable.
- h) Further to the internal distribution in the VVF Block shall be done from Network Rack/Switches located at first floor of VVF block in the Office Room.
- i) For Data/IT Connectivity between Core Switches and Distribution Switches/PC/Printers Located at P1 Block (Secondary Packaging Block)-BMS/IT Room shall be on redundant FO cable (Multi-Mode).
- j) Further to the internal distribution in the Secondary Packaging Block shall be done from Network Rack/Switches located at first floor of P1 Block in BMS/IT Room. In addition, the data connectivity from P1 block to U3 block shall be on Redundant FO cable from Network Switches at P1 block to network Switches' U3 Block.
- k) For Data/IT Connectivity between Core and Distribution Switches/PC/Printers Located at U1 Block (Utility Block) shall be on redundant FO cable (Multi-Mode).
- l) Further to the internal distribution in the U1 Block shall be done from Network Rack/Switches located at Office Room in the Utility Block.
- m) For Data/IT Connectivity between Core and Distribution Switches/PC/Printers Located at F2 Block (Bacterial Vaccine Block) shall be on redundant FO cable (Multi-Mode).

<b>Client :</b> 	<b>TENDER DOCUMENT FOR SUPPLY, INSTALLATION, TESTING &amp; CONFIGURATION OF IT, COMMUNICATION, ACCESS CONTROL &amp; SURVEILLANCE SYSTEM</b>	<b>nne pharmaplan®</b>
<b>Project No : 120310</b>	<b>DOCUMENT NO : NPI-120310-LVS-S1-TD-01</b>	<b>Revision : 02</b> <b>Date : 2015-10-31</b>

- n) Further to the internal distribution in the F2 Block shall be done from Network Rack/Switches located at Office Room 2 in the F2 Block. From Ground Floor Office Room 2, the Networking to G-4 Block (Security gate Office-2) to be provided on Redundant 12 core Multi Mode fiber Optic Cable, and shall be connected to Network Rack/Network Switches at G-4 Block for PC/Printer System
- o) For Data/IT Connectivity between Sub-Server 2 and Network Switches/PC/Printers Located at G12 Block (Central Laundry and Change Rooms) shall be on redundant FO cable (Multi-Mode). The number of core shall be 12 in each FO Cable.
- p) Further to the internal distribution in the G12 Block shall be done from Network Rack/Switches located at Office Room in the G12 Block-Ground Floor.
- q) For Data/IT Connectivity between Sub-Server 2 and Network Switches/PC/Printers Located at B1 Block (Multiple Bacterial Block) in the BMS/UPS&IT Room at first floor and shall be on redundant FO cable (Multi-Mode). The number of core shall be 12 in each FO Cable.
- r) Further to the internal distribution in the B1 Block, First Floor IT System shall be networked from the Network Switches located at BMS Room and then to Network Switches in Ground Floor Office area for networking facility in the Ground Floor PC/Printer System.
- s) For Data/IT Connectivity between Sub-Server 2 and Network Switches/PC/Printers Located at B4 Block (Factory of Bacterial Vaccine/Bacterial Rabbits Block) in the BMS/UPS&IT Room at first floor and shall be on redundant FO cable (Multi-Mode). The number of core shall be 12 in each FO Cable.
- t) Further to the internal distribution in the B4 Block, First Floor IT System shall be networked from the Network Switches located at BMS Room and then to Network Switches in Ground Floor Office Room for networking facility in the Ground Floor PC/Printer System. In the Ground Floor Office area, the Networking to G-11 Block (Worker/Staff Guest House) to be provided on Redundant 6 core Multi Mode fibre Optic Cable, and shall be connected to Network Rack/Network Switches at G-11 Block. Again from the G-11 Block the Networking shall be provided to G-10 Block (Security/Time office) PC System. It shall be on redundant FO cable as specified above.
- u) For Data/IT Connectivity between Sub-Server 2 and Network Switches/PC/Printers Located at F4 Block (Factory of BCG Bulk & Form/BCG Block) in the BMS/UPS&IT Room at first floor and shall be on redundant FO cable (Multi-Mode). The number of core shall be 12 in each FO Cable.
- v) Further to the internal distribution in the F4 Block, First Floor IT System shall be networked from the Network Switches located at BMS Room and then to Network Switches in Ground Floor Control Room for networking facility in the Ground Floor PC/Printer System, However, Control Network Shall not be in the scope of this Contractor connecting between Equipment and Central Control System of BCG.
- w) For Data/IT Connectivity between Sub-Server 2 and Network Switches/PC/Printers Located at G1 Block (Vaccine Testing of Animals/Animal Block) in the BMS/UPS&IT Room at first floor and shall be on redundant FO cable (Multi-Mode). The number of core shall be 12 in each FO Cable.
- x) Further to the internal distribution in the G1 Block, First Floor IT System shall be networked from the Network Switches located at BMS Room and then to Network Switches in Ground Floor Office Room for networking facility in the Ground Floor PC/Printer System,
- y) For Data/IT Connectivity between Sub-Server 2 and Network Switches/PC/Printers Located at G5 Block (ETP/STP) in the BMS/UPS&IT Room at first floor and shall be on redundant FO cable (Multi-Mode). The number of core shall be 12 in each FO Cable.
- z) Further to the internal distribution in the G1 Block, First Floor IT System shall be networked from the Network Switches located at BMS Room and then to Network Switches in Ground Floor Office Room for networking facility in the Ground Floor PC/Printer System,

Client : 	<b>TENDER DOCUMENT FOR SUPPLY, INSTALLATION, TESTING &amp; CONFIGURATION OF IT, COMMUNICATION, ACCESS CONTROL &amp; SURVEILLANCE SYSTEM</b>	
Project No : 120310	DOCUMENT NO : NPI-120310-LVS-S1-TD-01	Revision : 02 Date : 2015-10-31

✓ **Telephone VoIP Communication System**

**Refer Communication System Architecture Drawing – (DWG NO. NPI/120310/LVS/DET/S1/002)**

- a) Telephone System shall be similar to IT System, it shall have IPPBX network to meet the requirement of the facility connecting every area as specified. The Main IPPBX shall be placed in Main Server Room and shall be communicating on IP Network as shown in Communication System Architecture Drawing.
- b) For Admin (QA&QC) Block the networking shall be provided and all the telephone Units, Fax Machine, Voice Conference Facility shall be through Edge Switches. Further to the Distribution switches to Main master console, FO cable connectivity shall be provided.
- c) To minimize the cable run it has been envisaged that distribution switches shall be considered for each building and further cabling shall be made to each end devices (Telephone Unit). Connectivity between Master Unit and distribution switches shall be on FO cable (Multi-Mode) to suit the Vendor requirement.
- d) Further to the internal distribution of telephone system in each Block shall be in the similar fashion as explained in the Networking and IT System and the same has been detailed in the respective Drawings, Contractor shall refer all the Drawings called in the specification to understand the complete scope of supply and shall provide the system to meet the complete requirement of the Plants.
- e) Clean Room Telephone to be considered in the Clean room areas, as indicated in the drawings. The dimension shall be provided early to the Client or Clean Room Panel Manufacturer to provide appropriate cut out to suite the requirement.

✓ **Access Control and Security System**



**Refer Access Control & Security System Architecture Drawing – (DWG NO. NPI/120310/LVS/DET/S1/003)**

- a) The System shall prevent unauthorized entry in to the facilities and keep track of the occupancy of the building all the time.
- b) Access Control System shall be based on Smart Card Technology/Biometric Sensor System and shall be integrated with CCTV Main Server located at Main Server Room in Admin Block (Third Floor).
- c) Security Gates shall have one PC station, Printer for ID card Printing, along with Web camera and shall be provided for issue of visitors ID photo along with smart card.
- d) The Card should be programmed based on the flow of visitor to respective wings in the building
- e) An access card given to each person configured to specific access shall be used as identity card, attendance instrument, and access key, however in some area Biometric Sensor shall be placed with RFID card reader to ensure high level of security control and the same shall be highlighted in the above drawing.
- f) It shall also be integrated with FAS (Fire Alarm System to de-activate all Electro Magnetic Doors Locks, Flap Barriers, Door-Interlock System, etc.)
- g) The system shall provide multiple levels of access restriction as described in the following sections

✓ **Surveillance or CCTV System**

**Refer CCTV System Architecture Drawing – (DWG NO. NPI/120310/LVS/DET/S1/004)**





<b>Client :</b> 	<b>TENDER DOCUMENT FOR SUPPLY, INSTALLATION, TESTING &amp; CONFIGURATION OF IT, COMMUNICATION, ACCESS CONTROL &amp; SURVEILLANCE SYSTEM</b>	
<b>Project No : 120310</b>	<b>DOCUMENT NO : NPI-120310-LVS-S1-TD-01</b>	<b>Revision : 02</b> <b>Date : 2015-10-31</b>

- a) The System shall be designed such as to cover the strategic location and sensitive areas as marked in the Layout Drawings and System Architecture Diagram.
- b) System shall be integrated with Access Control System Master Unit located at Main Server.
- c) System shall be programmed such that operator's intervention if required shall be minimal and the system should provide features like guard tours, preset positions and the preset positions shall be linked to perimeter protection system/intrusion system in future.
- d) Products with necessary certificates to be produced
- e) CCTV Software must have Video Analytic Capability. Various Critical Scenarios should be built into this project allowing users to gain intelligent functions from the CCTV Platform. The CCTV Platform through analytics should also allow People Counting, Vehicle Counting etc. allowing Customer to customize these features.

#### 2.1.4 Others:

- a) Furnishing of all labour ( skilled and unskilled ) Engineers and administrative personnel, safety person, erection tools and tackles, testing equipment, implements, supplies, consumables like welding rods and gas, oil and grease, cleaning fluids, insulating tape, anti-corrosive paints, jute cotton waste etc. and hardware for timely and efficient execution of the erection work.
- b) Transport vehicles necessary for efficient transportation of equipment from employer's stores to site of erection and excess materials back to employer's stores.
- c) Complete assembly, erection and connection, testing and commissioning, putting into successful and satisfactory operations of above said equipment.
- d) All spare parts required for the commissioning of the equipment / system covered under this specifications.
- e) Special tools and tackles, as required, for operation and maintenance, inspection and repair of the equipment / system shall be offered.
- f) All equipment covered under this scope shall be in accordance with International standards.
- g) All materials supplied under this contract shall be new and unused.
- h) Spares of supplied Items shall be easily available in the market for another period of 10 years.
- i) The items of work to be performed on all equipment and materials shall include but not be limited to the following:
  - i) Supply, Transportation, Receiving, unloading and transportation at site. (to Purchaser / contractor's stores and from there up to actual place of erection).
  - ii) Opening, inspecting and reporting all damages & short supply items.
  - iii) Arranging to repair and/or re-order all damaged and short supply items.
  - iv) Inspection of all equipment, which are not inspected at manufacturer's works by employer regarding compliance with technical specifications and submission of report of the same to site in charge.
  - v) Storing at site with suitable all weather protection.
  - vi) Assemblies, erection and complete Installation.
  - vii) Necessary coordination between works done by other contractors.
  - viii) Final check-up, testing and commissioning in presence of employer's representative.
- ix) Trial run for Sixty (60) days, rectification of defects, if any and adjustments as necessary.
- x) Obtaining employer's written acceptance of satisfactory performance.

Client : 	<b>TENDER DOCUMENT FOR SUPPLY, INSTALLATION, TESTING &amp; CONFIGURATION OF IT, COMMUNICATION, ACCESS CONTROL &amp; SURVEILLANCE SYSTEM</b>	
<b>Project No : 120310</b>	<b>DOCUMENT NO : NPI-120310-LVS-S1-TD-01</b>	<b>Revision : 02</b> <b>Date : 2015-10-31</b>

- j) Excavation, Backfilling, Minor Civil work for installation of Boom Barriers, Tripod, Access Control Card Readers, Door Magnetic Locks, Pushbuttons, wall mounting network racks, and other supplied equipment, etc.

### 2.1.5 Completeness

- a) It is not the intent to specify completely herein all details of the equipment. Nevertheless, the equipment shall be complete and operative in all aspects.
- b) Any material or accessories which may not have been specifically mentioned but which is necessary usual for satisfactory and trouble free operation and maintenance of the equipment, shall be furnished by the contractor without any extra charge to the Employer.

### 2.1.6 Civil work

Civil work as required to complete the Installation and Erection work of Equipment supplied in the scope of the Contractor including excavation/backfilling, etc.

### 2.1.7 Information Required From Vendor :-


The contractor shall furnish following information:-

- a. Along with the offer
  - i. Technical particulars of various equipment as format (Annexure) enclosed with this specification.
  - ii. G.A/I.G.A. drawing of all Equipment.
- b. After award of work (For approval)
  - i. Bill of Materials
  - ii. Architecture diagram.
  - iii. Disposition Drawing of Each System located in Various Blocks.
  - iv. Installation Guide
  - v. Interfacing and Integration Diagram between IT and ACS/Security System and between ACS and FAS System respectively.
  - vi. Test certificates of equipment.
  - vii. Four copies of final drawings with one auto cad CD, operation, installation and maintenance manual shall be supplied well in advance before inspection.

### 2.1.8 Completeness :-

- i. It is not the intent to specify completely herein all details of the equipment. Nevertheless, the equipment shall be complete and operative in all aspects.
- ii. Any material or accessories which may not have been specifically mentioned but which is necessary usual for satisfactory and trouble free operation and maintenance of the equipment, shall be furnished by the contractor without any extra charge to the Employer.


### 2.1.9 Notes to Bidder:-

<b>Client :</b> 	<b>TENDER DOCUMENT FOR SUPPLY, INSTALLATION, TESTING &amp; CONFIGURATION OF IT, COMMUNICATION, ACCESS CONTROL &amp; SURVEILLANCE SYSTEM</b>	<b>nne pharmaplan®</b>
<b>Project No : 120310</b>		<b>Revision : 02</b> <b>Date : 2015-10-31</b>

It is necessary to follow the following points while submitting the offer:



- i. The equipment should conform in all respects to the relating standards and shall be manufactured to the highest quality of Engineering, design and workmanship. The equipment manufactured shall ensure satisfactory and reliable performance throughout the service life.
- ii. The equipments offered shall be complete in all respects. Any material / component / accessories not specifically stated in this specification but which is otherwise necessary for trouble free operation of the equipment specified in this specification shall be deemed to be included unless excluded expressly. All such components/ accessories shall be supplied at no extra cost.
- iii. The design and manufacturing shall be such that the equipment / components/ accessories of the same type and of identical rating shall be interchangeable. Likewise similar or corresponding parts/ components or accessories thereof shall also be interchangeable.
- iv. Wherever and whenever a material or article or component is specified or described by the name of a particular brand or manufacturer or vendor, the specific item mentioned shall be understood as establishing type, function and quality and not as limiting competition. However, suppliers are invited to offer other similar equipment/components/accessories provided they meet with the required standards, design, duties, and performance.
- v. All equipments offered shall confirm to type tests and shall also be subjected to acceptance and routine tests in accordance with the requirements stipulated herein. The Purchaser/consultant reserves the right for conducting any or all of the type tests in accordance with the relevant standards. Such type tests shall be done free of cost. Where type tests have already been conducted, the Supplier shall submit copies of the same along with tender. The type tests certificates should however be not older than five years as on the date of bid opening. Any extra cost for repeating the type tests shall be indicated in the relevant price schedules.
- vi. All equipment shall meet the requirement of this specification. Deviations (if any) with respect to this specifications shall clearly be indicated in the offer in Annexure under “Deviations” with page no. & clause no. of specification.
- vii. Quantities of equipment indicated herein are subject to change.
- viii. All technical particulars and other details as asked for shall be furnished in the specification only. Additional information, if desired by the bidder, can also be furnished separately.



<b>Client :</b> 	<b>TENDER DOCUMENT FOR SUPPLY, INSTALLATION, TESTING &amp; CONFIGURATION OF IT, COMMUNICATION, ACCESS CONTROL &amp; SURVEILLANCE SYSTEM</b>	<b>nne pharmaplan®</b>
<b>Project No : 120310</b>		<b>Revision : 02 Date : 2015-10-31</b>

## CHAPTER – 2.2

### DESIGN BASIS

<b>Client :</b> 	<b>TENDER DOCUMENT FOR SUPPLY, INSTALLATION, TESTING &amp; CONFIGURATION OF IT, COMMUNICATION, ACCESS CONTROL &amp; SURVEILLANCE SYSTEM</b>	
<b>Project No : 120310</b>	<b>DOCUMENT NO : NPI-120310-LVS-S1-TD-01</b>	<b>Revision : 02</b> <b>Date : 2015-10-31</b>

### 2.2.1 DESIGN BASIS

All equipment and materials specified herein or not, shall be designed, manufactured and tested with the latest applicable International Standards & Bureau of Indian Standards (wherever applicable).

All electrical equipment shall also conform to the latest Electricity rules as regards safety and other essential provisions.

All electrical systems design and installation work shall be carried to in accordance with Indian codes and standard , in particular;

- IEC Code
- Indian Standards (IS)
- ISO (International Organization for Standardization)
- IEEE Code
- All relevant IS codes of practice.
- Telecom Regulatory Authority of India.

These Codes and Standards shall be supplemented by International Electrical Commission (IEC) where no Indian Standard exists or, where the IEC provides a design that is safe, modern and more cost effective.

- 1) Electrical/Electronic Components/equipment and materials manufacturing standards shall be in accordance with IEC standards, with the option for Indian manufacturers to offer equipment and materials manufactured to equivalent Indian Standards (IS).
- 2) Certification of equipment and materials for duty, rating, hazardous area use, etc. shall be obtained from recognized National or International testing authorities. Evidence of the appropriate certification shall be obtained prior to commitment to purchase.

### 2.2.2 Basic Condition

- 1) The selection of supply equipment shall be governed by fitness for purpose, safety, reliability, maintainability of spares and service, compatibility with specified future expansion, design margins, suitability for environment, economic considerations, and past service history.
- 2) The SI system of units shall be used.
- 3) English language shall be used for all drawings, texts and communications.

### 2.2.3 Service Condition


All electrical equipment, materials and installation shall be designed for suitable for operation under site conditions

- Temperature

Season	DBT (Dry bulb temperature) ° C	WBT (Wet bulb temperature) ° . C
Summer	39.4°C	27.8°C
Monsoon	28.3°C	26.7°C
Winter	18.3°C	13.9°C

- Connectivity

❖ Nearest Airport – Chennai

<b>Client :</b> 	<b>TENDER DOCUMENT FOR SUPPLY, INSTALLATION, TESTING &amp; CONFIGURATION OF IT, COMMUNICATION, ACCESS CONTROL &amp; SURVEILLANCE SYSTEM</b>	<b>nne pharmaplan®</b>
<b>Project No : 120310</b>	<b>DOCUMENT NO : NPI-120310-LVS-S1-TD-01</b>	<b>Revision : 02</b> <b>Date : 2015-10-31</b>

- ❖ Nearest Railway station – Chengalpattu
- ❖ Nearest Bus stand – Chengalpattu


- Altitude :- 36 Mtr. from MSL
- Average Rain :- 374 mm

1. Electrical equipment intended for outdoor installation shall have minimum protection to IP55.
2. Electrical equipment intended Panel room installation shall have minimum protection to IP42.
3. The design ambient temperature is :
  - + 35°C for Equipment Located Indoors
  - + 45°C for Equipment Located Outdoors.
4. All equipment and materials shall be suitable for operation in service conditions typical dry environment in the tropics. The atmosphere is to be considered dusty. The possibility of condensation exists, as experienced during large temperature variations in a humid environment.

2.2.4 All equipment shall be suitable of continuous operation satisfactorily under the following conditions:


- a) Nominal System Voltage : 215V (RMS)
  - b) Highest System Voltage : 440 V (RMS)
  - c) System Grounding : Solidly Earthed
  - d) No of Phases : 2 phase 3 wire system
  - e) Frequency : 50 Hz
  - f) Supply System variation
    - System Voltage variation : ± 10%
    - Frequency variation : ± 3%
- Two extremes of voltage and frequency variations are not to be considered to coincide.

2.2.5 Control/Data cable shall have PVC insulated Single/Multi stranded copper conductor to suite the requirement.

<b>Client :</b> 	<b>TENDER DOCUMENT FOR SUPPLY, INSTALLATION, TESTING &amp; CONFIGURATION OF IT, COMMUNICATION, ACCESS CONTROL &amp; SURVEILLANCE SYSTEM</b>	<b>nne pharmaplan®</b>
<b>Project No : 120310</b>		<b>Revision : 02 Date : 2015-10-31</b>

## CHAPTER - 2.3

### TECHNICAL SPECIFICATIONS

Client : 	<b>TENDER DOCUMENT FOR SUPPLY, INSTALLATION, TESTING &amp; CONFIGURATION OF IT, COMMUNICATION, ACCESS CONTROL &amp; SURVEILLANCE SYSTEM</b>	<b>nne pharmaplan®</b>
Project No : 120310	<b>DOCUMENT NO : NPI-120310-LVS-S1-TD-01</b>	<b>Revision : 02 Date : 2015-10-31</b>


### 2.3.1 TECHNICAL SPECIFICATIONS

This chapter covers the detailed Technical specifications and scope for the materials intended to be used in the said.

### 2.3.2 ABBREVIATIONS

The following abbreviations used in the bill of quantities, specifications and drawings represent:-


MS	Mail Server
TCP/IP	Communication Protocol
PC	Work Stations
VM	Virtual Machine Server
CMS	Central Monitoring Station
SS	Sub-Server
FO	Fiber Optic Cable
CPU	Central Processing Unit
HTTP	Hypertext Transfer Protocol
IPv6	Internet Protocol Version 6
IT	Information Technology
JNLP	Java Networking Launch Protocol
LAN	Local Area Network
WAN	Wide Area Network
LCT	Logic Connector Tool
LON	Logic Operating Network
MECVT	Master-Slave Token Passing (MS/TP) to Ethernet Converter
MTBF	Mean Time between Failure
NAT	Network Address Translation
NIC	Network Interface Card
NTP	Network Time Protocol
POE	Power Over Ethernet
R/S	Routing and Switching
SCT	System Configuration Tool
SMART net	Core Support Package, which provides software updates and upgrades, 24 Hrs global telephone support from expert technicians and advanced hardware replacements
SNMP	Simple Network Management Protocol
SNTP	Simple Network Time Protocol
SONA	Service Oriented Network Architecture
STP	Spanning Tree Protocol
VLAN	Virtual Local Area Network
WAN	Wide Area Network
WAP	Wireless Access Point
WIFI	Wireless Fidelity
XML	Extensible Markup Language

Client : 	<b>TENDER DOCUMENT FOR SUPPLY, INSTALLATION, TESTING &amp; CONFIGURATION OF IT, COMMUNICATION, ACCESS CONTROL &amp; SURVEILLANCE SYSTEM</b>	nne pharmaplan®
Project No : 120310		Revision : 02 Date : 2015-10-31

EPBAX	Electronic Private Automatic Branch Exchange
M-EPBAX	Master Electronic Private Automatic Branch Exchange
S-EPBAX	Slave Electronic Private Automatic Branch Exchange
MDP	Main Distribution Panel
ASCII	American Standards Code for Information Interchange
BIOS	Basic Input Output System
DCL	Data Communication Links
CCTV	Closed Circuit Television
PAL	Phase Alternating Lines
NTSC	National Television Standard Committee
DVR	Digital Video Recorder
NVR	Network Video Recorder
FC	Focal Length
JPEG	Joint Photographic Experts Group
LUX	Light Illuminance
PTZ	Pan Tilt Zoom
ACS	Access Control System
EML	Electro Magnetic Lock
RFID	Radio Frequency Identification
ZSL	Zone Signing Key
AVI	Advanced Vehicle Identification
CSIG	Signaling Information Flows at the C reference Point
IPC	Inter-PINX Connection
IPL	Inter-PINX Link
IVN	Inter Vening Network
MP	Mapping (Functional Grouping)
PICS	Protocol Implementation Services Network
PISN	Private Integrated Services Network
PINX	Private Integrated Services network eXchange
Q	Q reference point
QSIG	Signaling information flows at the Q reference point
SM	Scenario Management (functional grouping)
UDP	User Datagram Protocol

### 2.3.3 GENERAL REQUIRMENT:

- The suppliers shall submit the technical requirements, data and information as per the technical data sheets provided in the documents.
- The suppliers shall furnish catalogues, engineering data, technical information, design documents, drawings etc., fully in conformity with the technical specification.
- Unless brought out clearly, the Supplier shall be deemed to confirm to this specification scrupulously. All deviations from the specification shall be clearly brought out in the respective schedule of deviations. Any discrepancy between the specification and the catalogues or the bid, if not clearly brought out in the specific requisite schedule, will not be considered as valid deviation.


<b>Client :</b> 	<b>TENDER DOCUMENT FOR SUPPLY, INSTALLATION, TESTING &amp; CONFIGURATION OF IT, COMMUNICATION, ACCESS CONTROL &amp; SURVEILLANCE SYSTEM</b>	<b>nne pharmaplan®</b>
<b>Project No : 120310</b>	<b>DOCUMENT NO : NPI-120310-LVS-S1-TD-01</b>	<b>Revision : 02</b> <b>Date : 2015-10-31</b>

- d. Equipments furnished shall be complete in every respect with all mountings, fittings, fixtures and standard accessories normally provided with such equipment and / or needed for erection, completion and safe operation of the equipment as required by applicable codes though they may not have been specifically detailed in the Technical Specification unless included in the list of exclusions.
- e. Materials and components not specifically stated in the specification but which are necessary for commissioning and satisfactory operation of the IT/ACS/CCTV/COMM. System unless specifically excluded shall be deemed to be included in the scope of the specification and shall be supplied without any extra cost. All similar standard components/parts of similar standard equipment provided, shall be inter-changeable with one another.

#### 2.3.4 CODE, REGULATIONS AND STANDARDS


- a. The works covered by the specification shall be designed, engineered, manufactured, built, tested and commissioned in accordance with the Act, Rules, Laws and Regulations in India.
- b. The Supply & Installation shall confirm in all respects to latest revision with all amendments of Indian Standard Code of Practice and IEC Standards in India for supply of material for IT/Comm./ACS/CCTV system. It shall also be in conformity with the current GMP (Good Manufacturing Practice) and the requirements of Local Regulation Authority.
- c. Wherever this specification calls for a higher standard of materials and/or workmanship then those required by any of the above regulations, this specification shall take precedence over the said regulations and standards.
- d. In general, the materials, equipment and workmanship not covered by the above shall conform to the latest revision with all amendments of following Indian / International Standards (latest), unless specifically mentioned in specification, unless otherwise called for. Nothing in the enclosed specification shall be construed to relieve the contractor of this responsibility.
- e. The supplier shall note that standards mentioned in the specification are not mutually exclusive or complete in themselves, but intended as a basic reference.
- f. When the specific requirement stipulated in the specifications exceed or differ than those required by the applicable standards, the stipulation of the specification shall take precedence.

Semiconductor devices – integrated circuits	IEC 60748
Functional safety of electrical/electronic/programmable electronic safety-related systems	IEC 61508
Network Security Overview and Concepts	ISO/IEC 27011-1:2001
Information technology- Security technique-Application security	ISO/IEC 27034:2011
Information technology equipment –Safety	IEC 60950-1:2005
Protection against electric shock – Common aspects for installation and equipment	IEC 61140
Industrial Systems, installations and equipment	IEC 81346-1:2009
Connectors Inlet / Outlet	IEC 6063-7-7
Connectors for electronics Equipments	IEC 61076-3-104



<b>Client :</b> 	<b>TENDER DOCUMENT FOR SUPPLY, INSTALLATION, TESTING &amp; CONFIGURATION OF IT, COMMUNICATION, ACCESS CONTROL &amp; SURVEILLANCE SYSTEM</b>	<b>nne pharmaplan®</b>
<b>Project No : 120310</b>		<b>Revision : 02</b> <b>Date : 2015-10-31</b>

Low Voltage electrical Installation	IEC 60364-7-704
Managed Ethernet Layer 3 rack mount Switches	IEC 61850-3-28
LAN Cables - Solid	IEC 61156-5
LAN Cables - Flexible	IEC 61156-6
Unshielded Connecting Hardware	IEC 60603-7-41
Shielded Connecting Hardware	IEC 60603-7-51
Cat 6A connecting Hardware	IEC 60512-27-100
Parallel Redundancy Protocol	IEC 62439-3
Optical Fibers	IEC 60793
Optical Fiber Cables	IEC 60794
Fiber Optic Attenuators	IEC 60869
Fiber Connectors	IEC 60874
Fiber Optic Branching Devices	IEC 60875
Fiber Optic Spatial Switches	IEC 60876
Splices for optical fibers and cables	IEC 61073
Fiber Optic Isolators	IEC 61202
Fiber optic adaptors	IEC 61274
Fiber optic communication subsystem basic test procedures	IEC 61280
Fiber optic communication system design guides	IEC 61282
Optical Amplifiers test methods	IEC 61290
Optical amplifiers	IEC 61291
Optical Amplifiers Technical reports	IEC 61292
Test and measurement	IEC 61300
Fiber optic passive components	IEC 61313
Fiber Optic fan outs	IEC 61314
Laser Modules used for telecommunication	IEC 61751
Fiber optic interconnecting devices and passive components performance standard	IEC 61753
Fiber optic connector interfaces	IEC 61754
Fiber optic connector optical interface	IEC 61755
Fiber Management System	IEC61756
Fiber Optic sensor	IEC 61757



<b>Client :</b> 	<b>TENDER DOCUMENT FOR SUPPLY, INSTALLATION, TESTING &amp; CONFIGURATION OF IT, COMMUNICATION, ACCESS CONTROL &amp; SURVEILLANCE SYSTEM</b>	<b>nne pharmaplan®</b>
<b>Project No : 120310</b>		<b>Revision : 02 Date : 2015-10-31</b>



Fiber optic filter	IEC 61977
Fiber Optic passive dispersion compensators	IEC 61978
Reliability	IEC 62005
Semiconductor Optoelectronic devices	IEC 62007
Fiber optic WDM devices	IEC 62074
Fiber Optic circulators	IEC 62077
Fiber optic wavelength switches	IEC 62099
Fiber optic enclosures	IEC 62134
Fiber optic active components and devices – Package and interface standards	IEC 62148
Fiber Optic active components and devices – Performance standards	IEC 62149
Fiber optic active components and devices – Test and measurement procedures	IEC 62150
Dynamic Modules	IEC 62343
Video System Requirements	IEC 62676-1-1
Video Transmission General requirements	IEC 62676-1-2
Video transmission protocols – General	IEC 62676-2-1
Video transmission = IP interop	IEC 62676-2-2
Video transmission = IP web services	IEC 62676-2-3
Analogue and Digital Interfaces	IEC 62676-3
Application Guidelines	IEC 62676-4
Alarm and Electronic Security System	IEC 60839-11-1
Size and Physical characteristics of RFID card	IEC 1443-1:2000
RF Power and signal interface	IEC 1443-2:2000
Initialization and anti-collision protocols	IEC 14443-3:2001
High-level data transmission protocols	IEC 14443-4:2001
Guidelines for organizational information security standards and information security management practices	IEC 27002:2013
Fundamental construction requirements for photovoltaic modules	IEC 61730-1
Biometric data records and data structures	IEC 19794-1:2011
Finger Image Data	IEC 19794-4

<b>Client :</b> 	<b>TENDER DOCUMENT FOR SUPPLY, INSTALLATION, TESTING &amp; CONFIGURATION OF IT, COMMUNICATION, ACCESS CONTROL &amp; SURVEILLANCE SYSTEM</b>	
<b>Project No : 120310</b>		<b>Revision : 02</b> <b>Date : 2015-10-31</b>

Iris Image Data	IEC 19794-6:2011
Signature /Sign Times Series Data	IEC 19794-7
DNA Data	IEC 19794-14
Palm Line Image Data	IEC 19794-15
Framework for XML Encoding	IEC 19794-1:2011
Finger minutiae data	IEC 29109-1:2009
Liveness Detection	IEC 30107
Electrical and electronic installations in ships - Electromagnetic compatibility	IEC 60533
Maritime navigation and radio communication equipment and systems - General requirements - Methods of testing and required test results	IEC 60945
Electromagnetic compatibility (EMC) - Part 4: Testing and measurement techniques - Section2: Electrostatic discharge immunity test. Basic EMC Publication	IEC 61000-4-2
Electromagnetic compatibility (EMC) - Part 4: Testing and measurement techniques – Section 3: Radiated, radio- frequency, electromagnetic field immunity test	IEC 61000-4-3
Electromagnetic compatibility (EMC) - Part 4: Testing and measurement techniques – Section 4: Electrical fast transient/burst immunity test. Basic EMC Publication	IEC 61000-4-4
Electromagnetic compatibility (EMC) - Part 4:nTesting and measurement techniques – Section 5: Surge immunity test	IEC 61000-4-5
Electromagnetic compatibility (EMC) - Part 4: Testing and measurement techniques – Section 6: Immunity to conducted disturbances, induced by radio-frequency fields	IEC 61000-4-6

### 2.3.5 SERVICES TO BE PERFORMED BY THE EQUIPMENT BEING FURNISHED:

- The equipment furnished under this specification shall perform all its functions and operate satisfactory without showing undue strain, re-strike etc under such over voltage conditions.
- All equipments shall also perform satisfactorily under various other electrical, electromechanical, and meteorological conditions of the site of installation.
- The equipment shall be able to withstand all external and internal mechanical, thermal and electromechanical forces due to various factors like wind load, temperature variation, short circuit etc for the equipment.
- The supplier shall supply terminal connectors of the equipment taking into account various technical requirements specified.
- The software shall be upgraded to latest revision and shall be compatible to upcoming standards.
- It shall be user friendly and shall be customized as per Client's requirement.
- Accessing database and admin shall be User friendly.
- It shall have facility for future integration of the Network/IT, VoIP Comm., CCTV and ACS System.

Client : 	<b>TENDER DOCUMENT FOR SUPPLY, INSTALLATION, TESTING &amp; CONFIGURATION OF IT, COMMUNICATION, ACCESS CONTROL &amp; SURVEILLANCE SYSTEM</b>	
Project No : 120310	DOCUMENT NO : NPI-120310-LVS-S1-TD-01	Revision : 02 Date : 2015-10-31

### 2.3.6 ENGINEERING DATA AND DRAWINGS

The engineering data shall be furnished by the supplier in accordance with the Schedule for each set of equipment as specified in the Technical Specifications. The list of drawings/Documents that are to be submitted to the Purchaser/Consultant shall be discussed and finalized by the Purchaser/Consultant at the time of award.

The drawings, specification technical data sheet, required softwares, Operating Systems and bill of quantities shall be considered as a part of this contract and any work or materials shown on the drawings and not called for in the specifications or vice-versa, shall be executed as if specifically called for in both

#### ➤ At Enquiry Stage

- 1) Descriptive literature of the various equipment offered with equipment, if any.
- 2) Guaranteed technical particulars of the equipment.
- 3) Approximate dimensions and weight and preliminary GA drawings as follows.
- 4) General arrangement showing plan, elevation, and typical section views particularly typical cross sections to illustrate cable connections.
- 5) Foundation plan showing location of fixing channels, floor openings etc.
- 6) Schematic wiring diagram.
- 7) System Architecture Drawing for IT System and Layout Drawing
- 8) Telecommunication System Architecture Drawing and Layout Drawing
- 9) CCTV System architecture Drawing and Layout Drawing
- 10) Security and Access Control System Drawing and Layout Drawing

#### ➤ At Order Stage


Within two week of order, contractor shall submit 4 sets of following documents for Purchaser/Consultant's approval

- a) All drawings submitted by the contractor shall be in sufficient detail to indicate the type, size, arrangement, materials description, Bill of Materials, Weight of each component, configuration methodology, Operating Methodology, Modification methodology, add-on systems methodology, break-up for packing and shipment, dimensions, internal & the external connections, fixing arrangement required and any other information specifically requested in the specification
- b) Each drawing submitted shall be clearly marked with the name of the Purchaser/Consultant, the specifications title, the specification number and the name of the project as per the format to be given by Purchaser/consultant. If standard catalogue pages are submitted, the applicable items shall be indicated therein.
- c) All manufacturing, customizing the required software to meet the functional requirement as specified in the document and fabrication work in connection with the equipment prior to the approval of the drawings shall be at the contractor's risk. The Contractor may make any changes in the design which are necessary to make the equipment/system conform to the provisions and intent of the Contract and such changes will again be subject to approval by the Purchaser/Consultant. Approval of Contractor's drawing or work by the Purchaser shall not relieve the contractor of any of his responsibilities and liabilities under the contract.

All engineering data submitted by the contractor after final process including review and approval by the Purchaser/consultant shall form part of the contract document and the entire works performed under these specifications shall be in strict conformity, unless otherwise expressly requested by the Purchaser in writing.

#### ➤ Approval Procedure

The scheduled dates for the submission of the drawings by contractor or any data/information to be furnished by the Purchaser would be discussed and finalized at the time of award.

<b>Client :</b> 	<b>TENDER DOCUMENT FOR SUPPLY, INSTALLATION, TESTING &amp; CONFIGURATION OF IT, COMMUNICATION, ACCESS CONTROL &amp; SURVEILLANCE SYSTEM</b>	<b>nne pharmaplan®</b>
<b>Project No : 120310</b>		<b>Revision : 02 Date : 2015-10-31</b>

The following schedule shall be followed generally for approval of drawings/ documents and for providing final documentation.

1.	Approval / comments / by Purchaser / consultant on initial submission	As per agreed schedule
2.	Resubmission (Whenever Required)	Maximum 8 Days
3.	Approval / comments / by Purchaser / consultant on re-submission	Maximum 4 Days
4.	Furnishing of distribution copies in bound volume	1 weeks from the date of final approval as per inspections.
5.	Furnishing of distribution copies of test reports	1 weeks from the date of approval final
6.	Routine Test Reports	1 weeks from the date of approval final
7.	Furnishing of instruction / operation	As per agreed schedule
8.	As built drawings	On commissioning of equipment

1. The Contractor may please note that all resubmissions must incorporate all comments given in the earlier submission by the purchaser
2. All major drawings should be submitted in Auto Cad format.
3. The instruction Manuals shall contain full details of drawings/Operation of System as per the requirement/Interfacing details/FO cable splicing/Configuration of Switches/Configuration of ACS and Security System/Configuration of Surveillance System/Configuration of Telephone System being supplied under this contract, their exploded diagrams with complete instructions for storage, handling, erection, commissioning, testing, operation, trouble shooting, servicing and overhauling procedures.
4. The drawings / documents that are to be submitted but shall not be limited to are as follows:



- GA Drawings & Schematics :-

The contractor shall develop his own general arrangement and schematic drawing adding Necessary Auxiliary devices, accessories, components particular to supplied equipments etc. which are required for safe, convenient, efficient, and proper operation of the equipment.

Contractor shall submit for Purchaser/ consultant's approval the System Architecture diagrams, general arrangement drawings and their wiring, flooring and mounting detail drawings and schematic diagrams with dead load and impact load, plan, sections and foundation details.

Drawing and data sheet for each component with design calculation, indicating type, power rating of all components used including colour and mounting details.

- Type Test reports
- Guaranteed Technical Particulars
- Quality assurance plan
- Equipment catalogue
- Equipment O & M manual

Client : 	<b>TENDER DOCUMENT FOR SUPPLY, INSTALLATION, TESTING &amp; CONFIGURATION OF IT, COMMUNICATION, ACCESS CONTROL &amp; SURVEILLANCE SYSTEM</b>	
<b>Project No : 120310</b>	<b>DOCUMENT NO : NPI-120310-LVS-S1-TD-01</b>	<b>Revision : 02</b> <b>Date : 2015-10-31</b>

- d) The employer / consultant's approval as the manufacturer's drawings shall not relieve the manufacturer of his responsibility for supplying equipment conforming with the relevant specifications and standards or for any other mistakes, errors or omissions in drawings for proper and correctness of functioning/operation of the system

➤ **At Final Order Execution Stage**

The following shall be submitted after inspection but before dispatch of the equipment

1. Contractor shall submit four sets of As built drawings with soft copy
2. Routine test certificate ( including all brought out components) in 4 sets
3. Detail operation manuals in 4 sets
4. Detailed erection, testing and commissioning manuals in 4 sets

### 2.3.7 MATERIALS / WORKMANSHIP

➤ **General Requirement**



- a. The materials listed under "PERFORMANCE and APPROVED MAKE" only shall be used. Materials, equipments, fittings, etc. used in the installation shall conform to the latest relevant IS/IEC Standard. In case of materials for which standard specifications do not exist, the material shall be got approved by the Consultants before start of work.
- b. It is essential that all the material must be new, be of the highest preferably industrial grade and be of the best quality of their kind, conforming to best engineering practice.
- c. Any machinery, equipment, materials and components supplied, installed or used without such approval shall run the risk of subsequent rejection, the cost as well as the time delay associated with the rejection shall be borne by the contractor.
- d. Whenever possible, all similar part of the equipment shall be made to gauge and shall also be made interchangeable with similar parts. All spare parts shall also be interchangeable and shall be made of the same materials and workmanship as the corresponding parts of the equipment supplied under the specification. All equipment of the same type and rating shall be interchangeable.
- e. All materials and equipment shall be installed in strict accordance with the manufacturer's supervision. It shall include unpacking, cleaning and lifting into position, grouting, leveling, aligning, coupling, of or bolting down to equipment bases/foundations, performing the alignment check and final adjustment prior to initial operation, testing and commissioning in accordance with the manufacturer's tolerances, instructions and the specification.
- f. Corona and radio-interference voltage test and seismic withstand test results shall be approved by Purchaser/consultant.

➤ **Provisions for Exposure to Hot and Humid climate**

Outdoor equipment supplied under the specification shall be suitable for service and storage under tropical conditions of high temperature, high humidity, heavy rainfall, and environment favorable to the growth of fungi and mildew.

- **Space Heaters**

The anti-condensation heaters (with provision of thermostat) shall be suitable for continuous operation at 240V as supply voltage. On-off switch and fuse shall be provided (wherever necessary).

Client : 	<b>TENDER DOCUMENT FOR SUPPLY, INSTALLATION, TESTING &amp; CONFIGURATION OF IT, COMMUNICATION, ACCESS CONTROL &amp; SURVEILLANCE SYSTEM</b>	
Project No : 120310	DOCUMENT NO : NPI-120310-LVS-S1-TD-01	Revision : 02 Date : 2015-10-31

- **Ventilation opening**

Wherever ventilation is provided, the compartments shall have ventilation openings with fine wire mesh of brass to prevent the entry of insects and to reduce to a minimum the entry of dirt and dust.

Outdoor compartment openings shall be provided with shutter type blinds and suitable provision shall be made so as to avoid any communication of air/dust with any part in the enclosures of the Control cabinets, Junction boxes and Marshalling Boxes, panels etc.

- **Degree of Protection**

The enclosures of the Control Cabinets, Junction boxes, Terminal box etc. to be installed shall provide degree of protection as detailed here under:

a) Outdoor Installation Minimum IP-55

The degree of protection shall be in accordance with IEC-947 & IEC 529.

Type test report for degree of protection test, on each type of the box shall be submitted for approval.

➤ **Rating Plates, Name Plates and Labels**

**Name Plate:-**

Each Supplied Equipment is to have permanently attached to it in a conspicuous position a rating plate of non-corrosive material. The rating plate of each equipment shall be according to IEC requirement.



a. Each equipment cubicles/consoles and components shall be identified by labels. Cubicle and compartment label designations (located at front and rear side of the equipment) shall be in accordance with the Drawing and documents.

1) A main label shall be affixed in a prominent/ conspicuous position on each equipments giving the following information in bold letter:

- Manufacturers name and type
- Equipment Tag Number
- System Description
- Serial No. of Equipment
- Year of manufacture
- Purchaser Name
- Loading condition
- Diagram plate as may be required by Purchaser
- Order Item No
- Characters shall be 12 mm high.

2) A separate name plate giving components details shall be provided for each module giving the following information:

- Equipment tag number and equipment designation
- Equipment rating

Client : 	<b>TENDER DOCUMENT FOR SUPPLY, INSTALLATION, TESTING &amp; CONFIGURATION OF IT, COMMUNICATION, ACCESS CONTROL &amp; SURVEILLANCE SYSTEM</b>	
Project No : 120310	DOCUMENT NO : NPI-120310-LVS-S1-TD-01	Revision : 02 Date : 2015-10-31

- Characters shall be 5 mm high.
- 3) Labels shall be fitted on front and back of panels/panels/consoles/cubicles. When the programming or configuration and operating sequence of the equipment is not evident, e.g. programming RFID Card, Access Cards, Managed Switches, Firewall Configuration , Configuration of all servers, CCTV System, IP based Telephone system configuration, etc. setting up through manual functional keys and instruction labels shall be provided.
  - 4) Labels shall be affixed by means of self-tapping screws or rivets at the top of the cubicles. Use of adhesives shall not be accepted.
  - 5) Labels shall be made out from anodized aluminum and shall have black characters on a white background.
  - 6) Engraved name plates shall preferably be of 3 ply, (red-white-red or black - white -black) lamicold sheet. However black engraved perplex sheet nameplates shall also be applicable. Engraving shall be done with square groove cutters.
  - 7) Inside the consoles/panels /cubicle compartment, the semiconductor component, equipments, accessories like switches, electronics exchange, motors, flap or boom barriers, magnetic locks relays etc. shall suitably be identified by providing stickers.

### 2.3.8 DESIGN IMPROVEMENTS/CO-ORDINATION



- a. The Contractor will be called upon to attend progress and design review meetings with the Purchaser/consultant and other suppliers
- b. The supplier shall attend such meetings as and when required and fully cooperate with such persons/agencies involved in discussion for Customization of the requirement to meet the functionality of the plant.

### 2.3.9 QUALITY ASSURANCE PROGRAMME:

- a. Contractor shall ensure that the equipment/components/system and services under the scope of this Contract whether manufactured or performed within the Contractor's Works or at his Sub-supplier's premises or at the Purchaser's site or at any other place of Work are in accordance with the specifications, the Contractor shall adopt suitable quality assurance programme to control such activities at all points necessary before award of contract. The detailed programme shall be submitted after the award of LOI. The Programme shall generally cover the following:
- b. Contractor organization structure for the management and implementation of the proposed quality assurance programme:
- c. Documentation control System;
- d. Qualification data for supplier's key personnel;
- e. The procedure for purchases of materials, parts components, and selection of sub-contractor's services including vendor analysis, source inspection, incoming raw material inspection, verification of material purchases etc.
- f. System for shop manufacturing and site erection controls including process, controls, software development and fabrication and assembly control;
- g. Control of non-conforming items and system for corrective actions;
- h. Inspection and test procedure both for manufacture and field activities.
- i. Control of calibration and testing of measuring instruments and field activities;
- j. System for indication and appraisal of inspection status;
- k. System for quality audits;
- l. A quality plan stating the specific quality control measures and procedures adopted for controlling the quality characteristics relevant to equipment supplied.

The Contractor would be required to submit all the Quality Assurance Documents as stipulated in the Quality Plan to Purchaser/consultant at time of inspection of particular equipment/material/system



Client : 	<b>TENDER DOCUMENT FOR SUPPLY, INSTALLATION, TESTING &amp; CONFIGURATION OF IT, COMMUNICATION, ACCESS CONTROL &amp; SURVEILLANCE SYSTEM</b>	
Project No : 120310	DOCUMENT NO : NPI-120310-LVS-S1-TD-01	Revision : 02 Date : 2015-10-31

### 2.3.10 TESTING AND INSPECTION

All routine tests for individual equipments shall be covered in specification of individual equipment and contractor has to carried out as per specification

#### Pre-commissioning Tests (if applicable)

On completion of erection of the equipment and before putting in to work, each item of the equipment shall be thoroughly cleaned and then inspected jointly by the Purchaser and contractor for correctness and completeness of installation and acceptability for charging, leading to initial pre-commissioning tests at Site.

#### Commissioning Tests.

The testing equipments required for testing and commissioning shall be arranged by the contractor

### 2.3.11 PACKAGING & PROTECTION:

- a. All the equipments shall be suitably protected, coated, covered or boxed and crated to prevent damage or deterioration during transit, handling and storage at site till time of erection.
- b. The Contractor shall also submit packing details/associated drawing for any equipment/material under his scope of supply.
- c. The Contractor shall be responsible for any loss or damage during transportation, handling and storage due to improper packing. Any demurrage, wharf age and other such charges claimed by the transporters, railways etc. shall be to the account of the Contractor.



### 2.3.12 FINISHING OF METAL SURFACES

- a. All metal surfaces shall be subjected to treatment for anti-corrosion protection. All ferrous surfaces for external use unless otherwise stated elsewhere in the specification or specifically agreed, shall be hot-dip galvanized after fabrication. High tensile steel nuts & bolts and spring washers shall be electro galvanized as per IS standard.

#### b. Hot Dip Galvanizing

- a. The minimum weight of zinc coating shall be 610 gm/sq. m and minimum thickness of coating shall be 75 to 85 microns for all items thicker than 6mm. For items lower than 6mm thickness requirement of coating thickness shall be as per relevant ASTM. For surface, which shall be embedded in concrete, the zinc coating shall be 610 gm/sq. m minimum.
- b. The galvanized surfaces shall consist of a continuous and uniform thick coating of zinc, firmly adhering to the surface of steel. The finished surface shall be clean and smooth and shall be free from defects like dis-coloured patches, bare spots, unevenness of coating, spelter which is loosely attached to the steel globules, spiky deposits, blistered surface, flaking or peeling off, etc. The presence of any of these defects noticed on visual or microscopic inspection shall render the material liable to rejection.
- c. After galvanizing no drilling or welding shall be performed on the galvanized parts of the equipment. Sodium dichromate treatment shall be provided to avoid formation of white rust after hot dip galvanization.
- d. The galvanized steel shall be subjected to six one minute dips in copper sulphate solution as per IS-2633.

#### c. Painting

Client : 	<b>TENDER DOCUMENT FOR SUPPLY, INSTALLATION, TESTING &amp; CONFIGURATION OF IT, COMMUNICATION, ACCESS CONTROL &amp; SURVEILLANCE SYSTEM</b>	
<b>Project No : 120310</b>		<b>Revision : 02</b> <b>Date : 2015-10-31</b>

All steel work used in the construction of the panel should have undergone rigorous metal treatment process like phosphate in accordance with the IS: 6005 “Code of practice for phosphating iron and steel” and shall be stated in particular equipment’s specification

### 2.3.13 TOOLS AND TACKLES

The Contractor shall furnish with the equipment a complete list of all special tools and tackles for the erection, assembly, dis-assembly, and maintenance of the equipment. The prices for the same shall be indicated separately.


### 2.3.14 SAMPLES

The Contractor shall submit two sets of samples of accessories and apparatus proposed to be used in the installation to the Project Manager / Consultant along with execution for approval. Drawings of samples as required shall be submitted by the contractor and this specification shall not be departed from without the written instructions from the Project Manager / Consultant. The verbal approval given by the Consultant to any drawings or samples submitted by the contractor shall in no way exonerate the contractor from their liability to carry out the work in accordance with the forms of contract.

### 2.3.15 SPECIFICATIONS:



This document defines the Specification of the Proposed System as follows:-

1. Networking & IT System (**Refer Annex 1**)
2. Telephone Communication System (**Refer Annex 2**)
3. ACS & Security System (**Refer Annex 3**)
4. Surveillance / CCTV System (**Refer Annex 4**)
5. Consumable Items (**Refer Annex 5**)
  - a. Conduits and Modular switches and socket outlets
  - b. Cable trays (wherever neccessary)
  - c. Earthing System
  - d. Cable Glands & Lugs
6. Data, Telephone and OFC cable & UPS System (**Refer Annex 6**)
7. Deviation (**Refer Annex 7**)

<b>Client :</b> 	<b>TENDER DOCUMENT FOR SUPPLY, INSTALLATION, TESTING &amp; CONFIGURATION OF IT, COMMUNICATION, ACCESS CONTROL &amp; SURVEILLANCE SYSTEM</b>	<b>nne pharmaplan®</b>
<b>Project No : 120310</b>		<b>Revision : 02 Date : 2015-10-31</b>

## ANNEX 1

# TECHNICAL SPECIFICATION NETWORKING & IT SYSTEM

Client : 	<b>TENDER DOCUMENT FOR SUPPLY, INSTALLATION, TESTING &amp; CONFIGURATION OF IT, COMMUNICATION, ACCESS CONTROL &amp; SURVEILLANCE SYSTEM</b>	
<b>Project No : 120310</b>	<b>DOCUMENT NO : NPI-120310-LVS-S1-TD-01</b>	<b>Revision : 02</b> <b>Date : 2015-10-31</b>

## 1. NETWORKING & IT SYSTEM :-

This specification is intended to cover the technical requirements of design, manufacture, testing at works, inspection, supply, delivery, and Customization of the Functional Requirement at site of Networking/IT System. Refer Networking and IT System Architecture Drawing: **NPI/120310/LVS/DET/S1/001**

This specification shall be used in conjunction with all specifications and data sheets attached.

- a. Supply of the IT System as per specification and Data sheets.
- b. Transportation of all Equipment and Components to the Employer's store at site should be the part of the scope. Supervision of unloading of the all Components / Equipment are also to be considered in the scope.
- c. The items of work to be performed on all equipment and materials shall include but not limited to the following:
  - Loading and transportation at site. (to Employer or Contractor's stores).
  - Packing of the equipment suitable for (all) weather conditions for proper protection.
  - Obtaining Employer's written acceptance of satisfactory performance

The unloading & shifting, laying, testing, and commissioning of the System at site shall be done by this Contractor.

## 2. GENERAL INFORMATION:

- a) IT System shall be designed & manufactured in accordance with this specification and the applicable codes, standards indicated below. Materials and components not specifically stated in this specification but which are necessary for satisfactory and trouble free operation and maintenance of the System shall be supplied.
- b) The design and workmanship shall be in accordance with the Good Manufacturing Practice to ensure satisfactory performance, service life and Future integration.
- c) IT and Networking System shall be designed to withstand the severe conditions at site, with minimum expected ambient temperature of 45°C and 80% humidity weather.

## 3. SCOPE OF SUPPLY UNDER THIS SPECIFICATION AND CONTRACT:


As per Bill of Quantities enclosed.

## 4. TECHNICAL SPECIFICATION

### 4.1 Server 1 – (Active Directory Services/Terminal Server – 150 Users)

#### General:-

ADDS (Active Directory Domain Services) provides a distributed database that stores and manages information about network resources and application-specific data from directory-enabled applications. Administrators can use AD DS to organize elements of a network, such as users, computers, and other devices, into a hierarchical containment structure. The hierarchical containment structure includes the Active Directory forest, domains in the forest, and organizational units (OUs) in each domain. A server that is running AD DS is a domain controller.

Client : 	<b>TENDER DOCUMENT FOR SUPPLY, INSTALLATION, TESTING &amp; CONFIGURATION OF IT, COMMUNICATION, ACCESS CONTROL &amp; SURVEILLANCE SYSTEM</b>	<b>nne pharmaplan®</b>
Project No : 120310	DOCUMENT NO : NPI-120310-LVS-S1-TD-01	Revision : 02 Date : 2015-10-31

### Features in AD DS:-


Security shall be integrated with AD DS through logon authentication and access control to resources in the directory. With a single network logon, administrators can manage directory data and organization throughout the network. Authorized network users can also use a single network logon to access resources anywhere in the network. Policy-based administration eases the management of even the most complex network.

Additional AD DS features include the following:-

- A set of rules, the schema, that defines the classes of objects and attributes that are contained in the directory, the constraints and limits on instances of these objects, and the format of their names
- A global catalog that contains information about every object in the directory. Users and administrators can use the global catalog to find directory information, regardless of which domain in the directory actually contains the data
- A query and index mechanism, so that objects and their properties can be published and found by network users or applications.
- A replication service that distributes directory data across a network. All writable domain controllers in a domain participate in replication and contain a complete copy of all directory information for their domain. Any change to directory data is replicated to all domain controllers in the domain
- Operations master roles (also known as flexible single master operations or FSMO). Domain controllers that hold operations master roles are designated to perform specific tasks to ensure consistency and eliminate conflicting entries in the directory

### Server Specification:-

Features	Description
Processor	2 Nos of Intel Xeon Processor E5-2658A v3 (12 Core, 30M Cache, 2.20 GHz) Processor or Higher should be populated
Smart Cache	30 MB Smart Cache
Memory (RAM)	128 GB (8 x 16 GB) ECC LRDIMMS DDR4-2133 Mhz maximum support up to 768 GB with minimum 24 DIMMs
Chipset	Intel C610 or Equivalent or Higher
Slots	Should Support up to 9 Nos of PCIe 3.0 Slots
Connectors	Minimum 4 USB ports, 2 VGA, 1 Management Port, 1 Serial Port
Hard Disk	Hot pluggable 2 x 600GB 6G SAS 15K RPM 2.5 Inch HDD Should be populated. Should support minimum 8 Nos of 2.5 Inch SSD HDD
Disk Controller	SAS 12G/ SATA 6G Host Bus Adapter capable of supporting up to 32 Hard Disks with 2GB Nonvolatile cache Should support hardware RAID levels 0,1,10,5,50,6 and 60 with RAID state migration
Optical Driver	DVD WR
Network Interface	Minimum Four 10/100/1000 Base- T Ethernet ports should be populated
Supported OS	<ul style="list-style-type: none"> <li>• SUSE Linux Enterprise Server 11 SP3</li> <li>• Red Hat Enterprise Linux 6.5</li> <li>• Windows Server 2012 R2</li> </ul>

Client : 	<b>TENDER DOCUMENT FOR SUPPLY, INSTALLATION, TESTING &amp; CONFIGURATION OF IT, COMMUNICATION, ACCESS CONTROL &amp; SURVEILLANCE SYSTEM</b>	<b>nne pharmaplan®</b>
Project No : 120310	<b>DOCUMENT NO : NPI-120310-LVS-S1-TD-01</b>	<b>Revision : 02</b> <b>Date : 2015-10-31</b>

Features	Description
	<ul style="list-style-type: none"> <li>• Citrix 6.2</li> <li>• VMware 5.5</li> </ul>
10G NIC	2 Nos of Dual port 10G Optical port with 2 Nos of multimode transceivers should be supplied
Certification	Should be Energy Star, FCC and UL Compliant
Bench Mark	SPEC and VMmark test should be listed for the quoted Server Hardware
Energy Saving	80 Plus Platinum PSU with an efficiency 94%
RFK & RPS	Hot swappable Redundant Fan Kit and minimum 700W Redundant Power supply kit should be supplied
Form Factor	2U Rack with Mounting Kit and Cable management assembly
Management	standard management interfaces, such as SNMP and IPMI, provides the GUI, remote KVM, virtual media, SOL, Predictive Failure Analysis (PFA), intelligent power supply, remote control, and hardware monitoring
Reference Model	HUAWEI RH2288H V3 (or) Higher
Warranty	3 Years Onsite/Parts/Labour Warranty


#### 4.2 Server 2 (SAP Business One – 75 Concurrent Users)

##### General:-

SAP Business One shall be built for the Plant Facility and shall be for a single, integrated solution to manage their entire business. SAP Business One shall provide executives and managers with instant access to critical business information so it shall be confidently make informed business decisions, and offers more than just accounting. SAP Business One shall also give a comprehensive solution that covers virtually all aspects of the business including finance, logistics/operations and customer relationship management.

##### Key Functionality of SAP Business One:-

- Accounting and Finance  
It shall contain General ledger and journal entries, cost accounting, budget and project management, Banking Statements, Payment Processing and reconciliation, Financial Statement and reporting, Multicurrency support, etc.
- Sales and Customers  
It shall have Opportunities and pipeline management, Customer and prospect contact and activity management, sales quotations and orders, sales and pipeline forecast, web-based customer relationship management, service contact management, service call management entry and tracking, etc.
- E-Commerce and Web Store  
Shall have functionality of preparing Online product Catalogs, Web store integrated with inventory, e-mail and promotional campaigns, payment, tax, shipping and handling, etc.
- Purchasing and Operations  
It shall contain Purchase proposals, purchase orders and deliveries, Goods receipts and returns, A/P invoice and credit notes, Bill of Materials (BOMs), Production orders, forecasting and material requirements planning (MRP), etc.
- Inventory and Distribution  
Items management, items queries, Receipt to stock, release from stock, and stock transactions, warehouse transfer and serial numbers, inventory revaluation, Customer and vendor catalog, price lists and special pricing, Batch management, Pick and Pack, etc.
- Reporting and Administration

Client : 	<b>TENDER DOCUMENT FOR SUPPLY, INSTALLATION, TESTING &amp; CONFIGURATION OF IT, COMMUNICATION, ACCESS CONTROL &amp; SURVEILLANCE SYSTEM</b>	<b>nne pharmaplan®</b>
Project No : 120310	<b>DOCUMENT NO : NPI-120310-LVS-S1-TD-01</b>	<b>Revision : 02 Date : 2015-10-31</b>


Microsoft Exchange based reporting, Data migration workbench, user-defined fields, application-programming interface (API) and SAP Business One Software development Kit, payroll accounting, employee directory and administration, employee time, etc.

- Microsoft Outlook Integration  
SAP Business One shall be integrated with Microsoft Outlook, enabling the Users to exchange and share data to keep all parties up to date about account developments and business opportunities

#### Server Specification:-

Features	Description
Processor	2 Nos of Intel Xeon Processor E7-4850 V3 (14 Core, L3 35M Cache, 2.2 GHz) Processor or Higher should be populated. Should Support up to 4 physical processors.
Cache	35 MB Cache
Memory (RAM)	128 GB (8 x 16 GB) ECC RDIMMS DDR4-2133 Mhz maximum support up to 6 TB with 96 DIMMs
Chipset	Intel patsburg PCH or Equivalent or Higher
Slots	Should Support up to 16 Nos of PCIe Slots
Connectors	Minimum 4 USB ports, 2 VGA, 1 Management Port
Hard Disk	Hot pluggable 2 x 600 GB (RAID10) 12G SAS 15K RPM 2.5 Inch HDD Should be populated. Should support minimum 8 Nos of 2.5 Inch HDD
Disk Controller	SAS 6G/ SATA 6G Host Bus Adapter capable of supporting up to 32 Hard Disks with 1GB Nonvolatile cache Should support hardware RAID levels 0,1,10,5,50,6 and 60 with RAID state migration
Optical Driver	DVD ROM or Higher
Network Interface	Minimum Four 10/100/1000 Base- T Ethernet ports should be populated
Supported OS/ Application	<ul style="list-style-type: none"> <li>• SUSE Linux Enterprise Server 11 SP3</li> <li>• Red Hat Enterprise Linux 6.5</li> <li>• Windows Server 2012 R2</li> <li>• Citrix 6.2</li> <li>• VMware 5.5</li> <li>• SAP ECC\ HANA</li> </ul>
10G NIC	2 Nos of Dual port 10G Optical port with 2 Nos of multimode transceivers should be supplied
Certification	Should be Energy Star, FCC and UL Compliant
Bench Mark	SPEC test should be listed for the quoted Server Hardware
Energy Saving	80 Plus Platinum PSU with an efficiency 94%
RFK & RPS	Hot swappable Redundant Fan Kit and Redundant Power supply kit should be supplied
Form Factor	4U Rack with Mounting Kit and Cable management assembly
Management	standard management interfaces, such as SNMP and IPMI, provides the GUI, remote KVM, virtual media, SOL, Predictive Failure Analysis (PFA), intelligent power supply, remote control, and hardware monitoring



Client : 	<b>TENDER DOCUMENT FOR SUPPLY, INSTALLATION, TESTING &amp; CONFIGURATION OF IT, COMMUNICATION, ACCESS CONTROL &amp; SURVEILLANCE SYSTEM</b>	<b>nne pharmaplan®</b>
Project No : 120310	DOCUMENT NO : NPI-120310-LVS-S1-TD-01	Revision : 02 Date : 2015-10-31

Features	Description
Warranty	3 Years Onsite/Parts/Labour Warranty

#### 4.3 Server 3 (VM) (Antivirus / Visitor management )– MS SQL Database \ Oracle

##### ✓ Antivirus

###### ➤ General:-

Anti-malware protection shall be optimized for the resource constraints of virtualized deployments and shall ensure up-to-date security scans shall run according to policy. It shall offer offloads scanning to eliminate scanning bottlenecks and delays and update operations from individual guest images to a hardened virtual appliance/offload scan server. It shall maintain a global cache of scanned files to ensure that once a file is scanned and confirmed to be clean, subsequent virtual machines (VMs) accessing that file shall not have to wait for a scan. Memory resource allocation for each VM decreases and shall release back to the resource pool for more effective utilization. Intelligent scheduling of on-demand scans shall ensure that scans do not interfere with hypervisor performance. It shall provide a complete view into virtual data centers and populates key properties like servers, hypervisors, virtual machines, even the Cloud.

###### ➤ Features in Antivirus:-

- Instantly schedule an on-demand scan on a VM or group of VMs
- Automatically deploy an SVA on each hypervisor through integration with VMware NSX Service Composer
- Improved Data Center Connector for VMware Center.
- Deploy and configure the SVA on multiple hypervisors (Agentless)
- Restore quarantined files.
- Improved diagnostics.
- Flexible tuning policies.
- Deployment Scalability
- Communication to the VMs



##### ✓ Visitors Management

###### ➤ General:-

Visitor management system shall restrict access to visitors to any particular department or area. It shall monitor the visitors & their activities in the premises. Prescheduled appointments by officers shall be stored and make visitor pass issuing easy. Visitor management solutions shall generate a Photo ID of the first-time visitors in softcopy format. This is stored in the database to maintain records of all the people who visited the premises. Then print the Photo ID for one-time or continuing use to speed the security screening process. Modern visitor management systems shall enable the operator to know the total visitors inside the premises. It also provides the facility of restricting troublesome visitors by sounding an alarm at the time of their visit. It shall be combined with an access control / Surveillance system for greater safety.

###### ➤ Features in Visitors Management System:-

- Gain complete control over visitor form fields, including renaming labels and tabs, show/hide, enable/disable, setting required fields and data capture from ID scans
- Create and manage the lists for reasons, categories, clearances and more.
- It stores the information in a database file.
- It shall support two types of Visitors log: Microsoft Access database logs and ODBC (Open Database Connectivity) database logs. ODBC database logs shall include MSDE, MS SQL server and Oracle database.

Client : 	<b>TENDER DOCUMENT FOR SUPPLY, INSTALLATION, TESTING &amp; CONFIGURATION OF IT, COMMUNICATION, ACCESS CONTROL &amp; SURVEILLANCE SYSTEM</b>	
Project No : 120310	DOCUMENT NO : NPI-120310-LVS-S1-TD-01	Revision : 02 Date : 2015-10-31

- Seamless integration with over 50 leading access control systems to provide select visitors with customized card access from the available interface.
- Import employees list(s) from any ODBC database or Active Directory, with auto scheduling and updating.
- Employ flexible data import and export functions.
- Support single sign-on with hooks for alternative authentication methods.

➤ **Users Classes and Characteristics:-**

This Visitor Management System shall be used by four main users. They are Administrator, Employee, Security and Visitor.

- **Administrator**  
Assigns the Employees and Security. Administration area secured with user name and password defined. Can search, view, update, and edit visitor's list. Manages employee and security database
- **Employee**  
Approve or reject the visitation request from visitors. Update visitor log. Reports to administrator.
- **Security**  
Checks visitor's ID. Prints visitor's badge with bar code. Enters visitor's belongings details. Reports to Administrator.
- **Visitor**  
Send request to employee for approval of meeting and fixing an appointment. Visit the building or site and attend meeting

Refer Tender Specification of Server 1

**4.4 Server 4 (Surveillance / Access Control System) – MS SQL Database \ Oracle**

Refer Tender Specification of Server 1  
Refer the section below

**4.5 Server 5 (Backup Server) – DR Backup**


➤ **General:-**

It shall ensure data recovery and integrity and overcome the toughest backup and disaster recovery challenges. It shall provide faster backup and restore times and reduce the amount of storage necessary to protect ever-growing data sets. It shall manage backup operations for all Physical and Virtual System. It shall have features of restoring facility to the same hardware, dissimilar hardware and even a different hypervisor.

➤ **Features in DR Backup System:-**


- It shall reduce the storage footprint for backups.
- It shall enable backup data to remain on disk and online longer
- It shall reduce or eliminate the need for physical tapes for back up.
- It shall minimize the amount of data sent over networks to disaster recovery sites.
- It shall be extremely high efficient, high performance disk-based backup and recovery appliances available in both physical and virtual configurations. .
- It shall be simple to deploy and manage.
- It shall offer flexible and seamless capacity expansion.
- It shall offer Virtual tape library support.

➤ **Backup Server Specification:-**

<b>Client :</b> 	<b>TENDER DOCUMENT FOR SUPPLY, INSTALLATION, TESTING &amp; CONFIGURATION OF IT, COMMUNICATION, ACCESS CONTROL &amp; SURVEILLANCE SYSTEM</b>	<b>nne pharmaplan®</b>
<b>Project No : 120310</b>		<b>Revision : 02</b> <b>Date : 2015-10-31</b>



Features	Description
Processor	2 Nos of Intel Xeon Processor E5-2658A v3 (12 Core, 30M Cache, 2.20 GHz) Processor or Higher should be populated
Smart Cache	30 MB Smart Cache
Memory (RAM)	64 GB (4 x 16 GB) ECC LRDIMMS DDR4-2133 Mhz maximum support up to 768 GB with minimum 24 DIMMs
Chipset	Intel C610 or Equivalent or Higher
Slots	Should Support up to 9 Nos of PCIe 3.0 Slots
Connectors	Minimum 4 USB ports, 2 VGA, 1 Management Port, 1 Serial Port
Hard Disk	Hot pluggable 2 x 600GB(RAID10) 6G SAS 15K RPM 2.5 Inch HDD and 4 x 400GB(RAID 5) eMLC 2.5 inch 12G SAS SSD HDD Should be populated. Should support minimum 8 Nos of 2.5 Inch HDD
Disk Controller	SAS 12G/ SATA 6G Host Bus Adapter capable of supporting up to 32 Hard Disks with 2GB Nonvolatile cache
	Should support hardware RAID levels 0,1,10,5,50,6 and 60 with RAID state migration
Optical Driver	DVD WR
Network Interface	Minimum Four 10/100/1000 Base- T Ethernet ports should be populated
Supported OS/ Application	<ul style="list-style-type: none"> <li>• SUSE Linux Enterprise Server 11 SP3</li> <li>• Red Hat Enterprise Linux 6.5</li> <li>• Windows Server 2012 R2</li> <li>• Citrix 6.2</li> <li>• VMware 5.5</li> <li>• Commvault Simpana</li> <li>• Symantec Netbackup</li> </ul>
10G NIC	2 Nos of Dual port 10G Optical port with 2 Nos of multimode transceivers should be supplied
Certification	Should be Energy Star, FCC and UL Compliant
Bench Mark	SPEC and VMmark test should be listed for the quoted Server Hardware
Energy Saving	80 Plus Platinum PSU with an efficiency 94%
RFK & RPS	Hot swappable Redundant Fan Kit and Redundant Power supply kit should be supplied
Form Factor	2U Rack with Mounting Kit and minimum 700W Cable management assembly
Management	standard management interfaces, such as SNMP and IPMI, provides the GUI, remote KVM, virtual media, SOL, Predictive Failure Analysis (PFA), intelligent power supply, remote control, and hardware monitoring
Reference Model	HUAWEI RH2288H V3 (or) Higher
Warranty	3 Years Onsite/Parts/Labour Warranty

#### 4.6 Software:-

<b>Client :</b> 	<b>TENDER DOCUMENT FOR SUPPLY, INSTALLATION, TESTING &amp; CONFIGURATION OF IT, COMMUNICATION, ACCESS CONTROL &amp; SURVEILLANCE SYSTEM</b>	<b>nne pharmaplan®</b>
<b>Project No : 120310</b>	<b>DOCUMENT NO : NPI-120310-LVS-S1-TD-01</b>	<b>Revision : 02</b> <b>Date : 2015-10-31</b>

➤ **Backup Software:-**


- The proposed backup solution should be available on various OS platforms such as Windows ,Linux and UNIX platforms
- The proposed backup solution shall support industry leading cluster solution such as MSCS, MC Service Guard, Veritas Cluster.
- The proposed backup solution shall have same GUI across heterogeneous platform to ensure easy administration.
- The proposed backup solution should support tape mirroring of the same job running concurrently with primary backup.
- The proposed backup solution should allow creating tape clone facility after the backup process.
- The proposed backup solution shall be configured in such a fashion that no extra license for client and media servers is required while moving from LAN to SAN based backup.
- The proposed backup solution shall be configured with unlimited client and media licenses for both SAN based backup and LAN based backup.
- The proposed backup solution must not require separate licensing when upgrading from a lower end server (1-2 CPU-based server) to higher end server (4-and CPU-based server)
- The backup software should support either the Capacity based model or Application based model of licensing
- The proposed backup solution supports the capability to write up to 32 data streams.
- The proposed backup solution support de-multiplexing of data cartridge to another set of cartridge for selective set of data for faster restores operation to client/servers.
- The proposed backup solution has in-built media management and supports cross platform device and media sharing in SAN environment. It provides a centralized scratched pool thus ensuring backups never fail for media.
- The proposed backup solution has in-built frequency and calendar based scheduling system.
- The proposed backup solution has certified “hot-online” backup solution for different type of Enterprise databases and applications
- The proposed backup solution shall also support granular recovery for Vmware , Exchange server, Share point Portal
- The backup software should support Non Staged Granular recovery in VMWare
- The proposed backup software should use the same API for software and hardware deduplication
- The backup software should support backup to disk /VTL / Deduplication Device via Fiber channel
- The backup software should support IP sec encryption for the VTL / Disk device
- The proposed backup software should give the option to allow de duplication to be done either on the Application Server or on the Backup Server or at the Target Device.
- The proposed backup software should support contextual search based on meaning.
- The proposed backup software should support both on-premise and secure hosted backup solution
- The proposed backup solution shall support synthetic full backup / Virtual full backups.
- The proposed backup solution shall be able to copy data across firewall.
- The proposed backup solution shall support automatic skipping of backup during holidays.
- The proposed backup solution must support at least AES 256-bit encryption capabilities.
- The backup software should support the Recurrence type Every Minute which will support more frequent backup jobs
- The backup software should support Different Time Zone within enterprise environments, where backups can be scheduled across different time zones from the same single schedule
- The backup software should support priority based backup schedule
- The backup software should support missed job execution
- The Backup software should support Advanced Scheduling options
- The Backup software should be able to recover only critical volumes and later restore other volumes that were backed up in separate sessions.
- The backup software should be capable to supporting 99,999 backup sessions in day
- The backup software should be capable of supporting 1000 concurrent sessions
- The backup software should be able to support maximum of 40 Million files per directory

Client : 	<b>TENDER DOCUMENT FOR SUPPLY, INSTALLATION, TESTING &amp; CONFIGURATION OF IT, COMMUNICATION, ACCESS CONTROL &amp; SURVEILLANCE SYSTEM</b>	
Project No : 120310	DOCUMENT NO : NPI-120310-LVS-S1-TD-01	Revision : 02 Date : 2015-10-31

- The backup software should be supplied with 6TB capacity based license.
- Reference : HP Data protector
- Scope of work : Scope of work: Supplier should deploy, install and configure the features of Software as per customer requirement.
- 

➤ **Email Solution features:-**

- The email system should be as a single module / package with all the basic features mentioned below. If there are multiple modules / packages required to be installed, then specify those modules / packages clearly. Any additional modules / features / functionality including value added with financial implications (if any), should be mentioned separately and clearly.
- 1. Basic Features
- Should be able to install and run on Windows/Linux Operating System.
- Should support advanced search and file indexing for large inboxes.
- Should support all popular browsers (like IE/Firefox/Chrome/Safari etc).
- Should be allowed to use custom logos in the web interface.
- Should have Chat and Video features for specific users.
- Should have VoIP feature for specific users.
- Should have all in one Email WebClient for Email/Chat/Video/VoIP/Archive.
- Should have attachment linking through URL.
- Should support domain wide global and personal address book.
- Should support account grouping for classification/distribution purpose.
- Should have user wise mail quota restrictions.
- Should have feature to reduce storage space on server for multiple copies of E-mail / attachments.
- Should have calendar and task schedule feature with sharing option.
- Should have ability to access the Mail server via IMAP and POP3 clients, with the option to connect over SSL/TLS.
- Should support multiple mail domains on single mail server installation.
- Should have an ability to enforce client authentication to the SMTP server before relaying mail (with option to require authentication over TLS).
- Should have status monitor of all core system services in a single view.
- Users should be able to share their mailbox folders with permissions.
- The web mail session idle time should be configurable at the global level.
- Webmail client should support email encryption & digitally signed emails.
- Should have fully web based single window remote administration.
- Should have instant messenger for chat, group chat for text messages with full logging of entire communication.
- Should have SMS sending feature (via GSM modem or Hosted SMS gateway provided by HLL Biotech) from webmail with logging of communication.
- Should support synchronization of mails, calendar, contacts and tasks on MS outlook desktop client, webmail and mobile devices (like iPhone, iPad, Android, Windows Phone). This feature is required for specific users only using Exchange Active Sync ®
- Should have public folder manager feature for placing circular type mails.
- Should have mailing list feature for mass mailing.
- Should have user/group wise attachment restriction by file type and by size.
- Should support user defined spam controller for email white listing & black listing.
- Should support domain based mail communication. Some users can be given internal (within domain) mail facility only.
- Should support popular antivirus and antispam security solutions in-house.
- Should have easy backup and recovery system.
- Should have real-time monitoring for activities on the server e.g. current logged on users, mail send/receive etc.

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Project No : 120310	DOCUMENT NO : NPI-120310-LVS-S1-TD-01	Revision : 02 Date : 2015-10-31

- Should have detailed logging for granular reporting.
- Should have good and easy email message tracking system for troubleshooting.
- Should have vacation/auto responder feature.
- Should have user wise mail archiving feature for legal compliance.
- Scope of Work:-
- Vendor will install & configure mailing solution with all basic features specified above.
- Vendor will assist the migration of all old mailboxes (around 250 nos) with user mail folders from old mail system to new email system. If Possible
- Vendor will provide all the upgrades / updates regularly whenever it is available during update protection period.
- Vendor will provide technical details of email solution including all module and features.
- Vendor will provide system documentation of installation and configuration guidelines including detailed steps for installation of new email system and all the other modules (antivirus, antisipam, archival, sms, chat etc.)
- Technical Terms & Conditions:-
- Email solution platform and its architecture should be explained in detail. Documentation of the same will be provided to GNFC.
- The email system should be based on common industry standards and flexible to incorporate new features in future.
- Antivirus and antisipam software to be used with the email system is to be specified.
- Open source / free software and modules are not acceptable.
- Scope of work: Supplier should deploy, install and configure the features of Software as per customer requirement.


➤ **VMware vSphere 6 Essential Plus Kit Software:-**

Features	Description
VS6-ESP-KIT-C	VMware vSphere 6 Essentials Plus Kit for 3 hosts (Max 2 processors per host) SnS is required. VMware vSphere Essentials Plus includes vCenter Server Essentials and ESXi for 3 hosts, plus the following features: vCenter agents, Update Manager, Data Protection and High Availability. vSphere Essentials Plus is limited for use on up to 3 hosts and on servers with up to two processors only. The server hosts must be managed by the vCenter Server Essentials edition that is provided with this bundle, and that same vCenter Server Essentials edition cannot be used to manage other server hosts not included with this edition.
VS6-ESP-KIT-3P-SSS-C	Production Support/Subscription VMware vSphere 6 Essentials Plus Kit for 3 years

➤ **Microsoft Paper License:-**

Features	Description
P73-06285	Microsoft®Windows®ServerStandard 2012R2 Sngl OLP 1License NoLevel 2Proc
R18-04277	Microsoft®Windows®ServerCAL 2012 Sngl OLP 1License NoLevel DvcCAL
6VC-02071	Microsoft®WinRmtDsktpSvcCAL 2012 Sngl OLP 1License NoLevel DvcCAL
021-10257	Microsoft®Office 2016 Standard Sngl OLP 1License NoLevel



Client : 	<b>TENDER DOCUMENT FOR SUPPLY, INSTALLATION, TESTING &amp; CONFIGURATION OF IT, COMMUNICATION, ACCESS CONTROL &amp; SURVEILLANCE SYSTEM</b>	<b>nne pharmaplan®</b>
Project No : 120310	<b>DOCUMENT NO : NPI-120310-LVS-S1-TD-01</b>	<b>Revision : 02 Date : 2015-10-31</b>

Features	Description
T9L-00247	SysCtrStd SNGL LicSAPk OLP NL 2Proc Qlfd
J5A-00107	SysCtrCnfgMgrCltML SNGL LicSAPk OLP NL PerOSE

#### 4.7 Server 8 – Mail Server – MS Exchange or IceWrap


##### ➤ General:-

Mail Server also commonly known as mail transfer agent or MTA, a main transport agent, a mail router or an internet mailer. It shall receive incoming e-mail from local users (people with the same domain) and remote senders and forwards outgoing e-mail for delivery. The messaging system shall include all the application necessary to keep e-mail moving, as it should. The system shall use SMTP or ESMTP (extended SMTP) for sending e-mail and POP (Post office Protocol 3) or IMAP (Internet Messaging Access Protocol) for receiving e-mail.

##### ➤ Features of Mail Server:-

- SMTP/POP3 / IMAP / HTTP/ LDAP and Proxy services with SSL / TLS support.
- Advanced Access and Security Controls
- Effective Anti-Spam which can be tailored to your business
- Extensive Groupware including email, calendars, contacts, tasks and journals.
- Intuitive Webmail works with your browser, or use FT Gate Desktop Client
- Mail Client auto-configure support (e.g. Outlook/Thunderbird).
- IOS auto-configure.
- Fast, powerful message processing.
- It shall support multiple domains and mailboxes for a complete and comprehensive mail server implementation.
- Local and Remote Domains
- Multiple mailbox types.
- Authenticate against local passwords or active directory.
- Mailbox rules for automated message handling
- Limit access by time and date range.
- Flexible access control system
- Access via FT Gate Web Mail, FT Gate Desktop Client or IMAP/POP3 clients.
- Message archiving
- Full spam filtering
- Anti-virus support
- Comprehensive IP based access control system
- Mobile support.
- Address based controls
- User based controls
- Custom Trashcan support
- SSL/TLS support
- Easy to Set up and Administer
- Supports choice of anti-virus
- Extensive message Archiving ensures legal compliance
- Powerful message tracking - control your mail at all times
- Comprehensive logging
- Fast, reliable Server management
- Infinite flexibility with NET Script extensions
- Highly cost effective




Client : 	<b>TENDER DOCUMENT FOR SUPPLY, INSTALLATION, TESTING &amp; CONFIGURATION OF IT, COMMUNICATION, ACCESS CONTROL &amp; SURVEILLANCE SYSTEM</b>	<b>nne pharmaplan®</b>
Project No : 120310	DOCUMENT NO : NPI-120310-LVS-S1-TD-01	Revision : 02 Date : 2015-10-31

- SMTP Authentication
- Blacklisting
- IP address based controls
- Content filter controls
- Relay protection
- SPAM Blacklist controls
- Real time black hole Lists
- Message size control
- Greylisting, whitelisting, white hosting.
- CAPA Support
- SDPS support

➤ **Server Specification:-**

Features	Description
Processor	2 Nos of Intel Xeon Processor E5-2658A v3 (12 Core, 30M Cache, 2.20 GHz) Processor or Higher should be populated
Smart Cache	30 MB Smart Cache
Memory (RAM)	64 GB (4 x 16 GB) ECC LRDIMMS DDR4-2133 Mhz maximum support up to 768 GB with minimum 24 DIMMs
Chipset	Intel C610 or Equivalent or Higher
Slots	Should Support up to 9 Nos of PCIe 3.0 Slots
Connectors	Minimum 4 USB ports, 2 VGA, 1 Management Port, 1 Serial Port
Hard Disk	Hot pluggable 2 x 600GB(RAID10) 6G SAS 15K RPM 2.5 Inch HDD and 6 x 400GB(RAID 5) eMLC 2.5 inch 12G SAS SSD HDD Should be populated. Should support minimum 8 Nos of 2.5 Inch HDD
Disk Controller	SAS 12G/ SATA 6G Host Bus Adapter capable of supporting up to 32 Hard Disks with 2GB Nonvolatile cache Should support hardware RAID levels 0,1,10,5,50,6 and 60 with RAID state migration
Optical Driver	DVD WR
Network Interface	Minimum Four 10/100/1000 Base- T Ethernet ports should be populated
Supported OS/ Application	<ul style="list-style-type: none"> <li>• SUSE Linux Enterprise Server 11 SP3</li> <li>• Red Hat Enterprise Linux 6.5</li> <li>• Windows Server 2012 R2</li> <li>• Citrix 6.2</li> <li>• VMware 5.5</li> </ul>
10G NIC	2 Nos of Dual port 10G Optical port with 2 Nos of multimode transceivers should be supplied
Certification	Should be Energy Star, FCC and UL Compliant
Bench Mark	SPEC and VMmark test should be listed for the quoted Server Hardware
Energy Saving	80 Plus Platinum PSU with an efficiency 94%
RFK & RPS	Hot swappable Redundant Fan Kit and minimum 700W Redundant Power supply kit should be supplied
Form Factor	2U Rack with Mounting Kit and Cable management assembly


Client : 	<b>TENDER DOCUMENT FOR SUPPLY, INSTALLATION, TESTING &amp; CONFIGURATION OF IT, COMMUNICATION, ACCESS CONTROL &amp; SURVEILLANCE SYSTEM</b>	<b>nne pharmaplan®</b>
Project No : 120310	<b>DOCUMENT NO : NPI-120310-LVS-S1-TD-01</b>	<b>Revision : 02 Date : 2015-10-31</b>

Features	Description
Management	standard management interfaces, such as SNMP and IPMI, provides the GUI, remote KVM, virtual media, SOL, Predictive Failure Analysis (PFA), intelligent power supply, remote control, and hardware monitoring
Reference Model	HUAWEI RH2288H V3 (or) Equivalent (or) Higher
Warranty	3 Years Onsite/Parts/Labour Warranty

#### 4.8 IP KVM Switch/ IP PDU / CONSOLE & RACK

##### ➤ IP KVM Switch Specification:-

Features	Description
Functionality	<p>The KVM should be able to provide 16 ports. 16 Sets of necessary cables modules required for connecting servers should be supplied.</p> <p>The KVM should provide 2 concurrent port access thru IP sessions.</p> <p>KVM should have DVI digital local port for enhanced local administration</p> <p>The KVM should provide an additional port session thru local port making the total port access (2 Concurrent IP users + 1 thru Local port).</p> <p>The KVM should be able to take control of servers from BIOS level.</p> <p>The KVM should facilitate both in-band and out-of-band access.</p> <p>The KVM should have the capability to integrate with intelligent PDU to on/off/recycle power of remote device at port level.</p> <p>KVM should be capable of connecting to Servers/Headless Servers/Serial Devices directly or thru additional connectivity modules.</p> <p>KVM should have Dual power and dual Gigabit Ethernet with automatic failover.</p> <p>KVM should support Virtual Media to remotely install OS and software.</p> <p>KVM should connect directly thru a non-converted interface module to Digital video outputs such as DVI/HDMI/Display Port etc.</p> <p>KVM should have the capability to provide audio over IP to monitor audio applications on remote servers.</p>
Capability	<p>KVM should be capable of Absolute Mouse Synchronization™, out of the box.</p> <p>It should support High Definition (HD) remote video resolution — 1920x1080, including widescreen formats such as 1680x1050 and 1600x1200.</p> <p>KVM should be able to allow Server access from Windows®, Linux®, Sun® or Mac desktops via a wide range of Web browsers or standalone client.</p> <p>KVM should have Tiering/Cascading/Daisy Channing capacity to access minimum 16 to maximum 1024 servers.</p> <p>The KVM should be capable of providing view access of a connected server to multiple IP users.</p>
Security	<p>It should support 256-bit SSL AES or 128-bit RC4 encryption.</p> <p>It should be capable of integration with Active directory, LDAP, RADIUS.</p> <p>Single window access to all the equipment connected to the switch, equipment access logs, and event history and should send email alerts based on log details as triggers.</p> <p>It should have the capability to integrate with centralized management tool to give central access to multiple devices i.e. KVM switches, Serial consoles and IPDUs.</p> <p>FIPS 140-2 validated cryptographic module for enhanced encryption and SNMP v3 for secure logging will be a definite advantage.</p> <p>Support of Smart Card/Common Access Card (CAC) will be treated as a</p>

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Project No : 120310	<b>DOCUMENT NO : NPI-120310-LVS-S1-TD-01</b>	<b>Revision : 02 Date : 2015-10-31</b>



Features	Description
	competitive advantage. 2 Years Warranty and Support should be provided Reference Model : Raritan DKX3-216 Scope of work: Supplier should deploy, install and configure the KVM Switch with the supplied servers for BIOS level remote access of the servers to suite HBL Requirement, industry standards and best practices.

➤ **19 Inch Console Specification**

Features	Description
Size	19" LED Backlit Console
Form Factor	1U 19-inch Rack mountable
Display Type	19" A grade LCD, LED backlight
Display Size	19" TFT
Video Input	VGA and / or DVI
Contrast Ratio	1000:01:00
Display Colors	16.7 million
Maximum Resolution	1280x1024 @75 Hz
Keyboard	Notebook style
Number of Keys	104 keys with number pad
Pointing Device	Integrated touchpad
Operating Temperature	0° to 40° C
Storage Temperature	-5° to 60° C
Humidity	5~90% RH, non-condensing
Power	110-240V, 50~60Hz, auto-sensing
Agency Approvals	FCC, CE, VCCI, UL, and ROHS.
Warranty	2 Years Warranty and Support should be provided
Reference Model	Raritan T1900-LED (or) Higher

➤ **IP PDU Specification:-**



- IP based rack power distribution units (PDUs) to offer real-time remote unit-level power monitoring of current (amps), voltage, power (kVA, kW), power factor and energy consumption (kWh) with ISO/IEC +/- 1% billing-grade accuracy. It shall support plug-and-play environmental sensors.
- Intelligent PDU shall support user defined thresholds and send alerts via SNMP, e-mail and syslog from individual outlets, units, lines and circuit breakers when user-adjustable thresholds are exceeded for both power and environmental events.
- PDU shall have field replaceable controller to avoid downtime in case of any failure on the controller
- PDU shall support monitoring of residual current which Reduces the risk of electric shock by measuring current flowing in the ground wire.

Client : 	<b>TENDER DOCUMENT FOR SUPPLY, INSTALLATION, TESTING &amp; CONFIGURATION OF IT, COMMUNICATION, ACCESS CONTROL &amp; SURVEILLANCE SYSTEM</b>	
<b>Project No : 120310</b>	<b>DOCUMENT NO : NPI-120310-LVS-S1-TD-01</b>	<b>Revision : 02</b> <b>Date : 2015-10-31</b>

- PDU's shall have LED and alarms for unbalanced loads based on user-adjustable thresholds. IPDU's shall have Smart reversible LED/LCD display that changes orientation.
- It shall support user-adjustable power data sampling and buffering. With Standards based polling, configuration and alerting with encryption via SNMP v1, v2, v3 support, SETs, GETs and TRAPs
- IPDU shall support Directory services providing advanced authorization options, including permissions, LDAP/S, RADIUS and Active Directory®. 256-bit AES encryption and strong passwords. It shall support remote access via Web and CLI. Supports HTTP, HTTPS, SSH and Telnet
- It shall integrate with centralize power control , analytics and monitoring solution.
- IPDU's shall meet ISO 9000 quality manufacturing and quality components from Tyco, Hubbell® and Mennekes®
- IPDU's shall contain UL489 circuit breakers which meets Underwriters Laboratories latest branch circuit protection standards.
- PDU shall have the capability to control individual outlet on PDU over IP to switch on/off/recycle
- PDU shall have the capability of connecting to each other via grouping/cascading/daisy chain
- Circuit breaker shall either be in a closed housing prevent accidental tripping.
- PDU shall have two different colors for source A and source B other than black, grey and white
- Secure lock cables with different colors need to be included in the BOM to accommodate the sockets on the PDU for source A and B
- PDU shall be supplied with temperature and humidity sensor as per the ASHRAE guidelines.
- PDU shall have 20 outlets IEC- C13 and 4 outlets IEC-C19 outlets that support the IT devices allocated in the Rack
- PDU shall have sufficient power capacity to accommodate the IT devices in the Cabinet/Rack
- Each cabinet shall have 2 PDU's to support Source A and Source B
- 2 Years Warranty and Support shall be provided
- Reference Model : Raritan PX2-5493 .

➤ **Server Rack Specification:-**

- Rack Should be 750mm Wide x 1070mm Deep Enclosure with Sides Black
- Rack enclosure with increased cable management options for high density server and networking applications. 42U height to easily roll through doorways.
- Rack Should accommodate the above mentioned IP PDU, Zero U, 32A, 230V, (20) C13 & (4) C19;
- Rack Should Have PDU Power Cords, Input Connections: IEC-320 C14, Cord Length:8.2 feet ( 2.5 meters), Output Connections: IEC 320 C13 - 5 Nos

Client : 	<b>TENDER DOCUMENT FOR SUPPLY, INSTALLATION, TESTING &amp; CONFIGURATION OF IT, COMMUNICATION, ACCESS CONTROL &amp; SURVEILLANCE SYSTEM</b>	
<b>Project No : 120310</b>	<b>DOCUMENT NO : NPI-120310-LVS-S1-TD-01</b>	<b>Revision : 02</b> <b>Date : 2015-10-31</b>



- Rack Should have PDU Power Cords, Input Connections: IEC-320 C20, Cord Length:6.5 feet (1.98 meters), Output Connections: IEC 320 C19 - 5 Nos
- Rack Should have a cable trough 750 MM Wide for partition
- Rack Should have Data Cable Partition, 750mm Wide
- Data Cable Partition, NetShelter, 750mm Wide, pass-through
- Rack should have Modular tool less 1U Airflow Management Blanking Panel to prevent air recirculation by occupying unused rack space - 15 Nos
- Net Weight not less than 155 kg, Static load Weight Capacity 1363, Side panels of 18 gauge, Regulatory Approvals UL 2416, UL 60950-1, Standards, EIA-310-E, RoHS Compliant, 1 Year warranty including all accessories.
- 1 Year Warranty including all accessories

➤ **Storage Rack Specification:-**

- Rack Should be 750mm Wide x 1070mm Deep Enclosure with Sides Black
- Rack enclosure with increased cable management options for high density server and networking applications. 42U height to easily roll through doorways.
- Rack Should accommodate the above mentioned IP PDU, Zero U, 32A, 230V, (20) C13 & (4) C19;
- Rack Should Have PDU Power Cords, Input Connections: IEC-320 C14, Cord Length:8.2 feet ( 2.5 meters), Output Connections: IEC 320 C13 - 5 Nos
- Rack Should have PDU Power Cords, Input Connections: IEC-320 C20, Cord Length:6.5 feet (1.98 meters), Output Connections: IEC 320 C19 - 5 Nos
- Rack Should have a cable trough 750 MM Wide for partition
- Rack Should have Data Cable Partition, 750mm Wide
- Data Cable Partition, NetShelter, 750mm Wide, pass-through
- Rack should have Modular tool less 1U Airflow Management Blanking Panel to prevent air recirculation by occupying unused rack space - 15 Nos
- Net Weight not less than 155 kg, Static load Weight Capacity 1363, Side panels of 18 gauge, Regulatory Approvals UL 2416, UL 60950-1, Standards, EIA-310-E, RoHS Compliant, 1 Year warranty including all accessories.
- 1 Year Warranty including all accessories

➤ **Network Equipment Rack Specification:-**

- Rack Should be 750mm Wide x 1070mm Deep Enclosure with Sides Black
- Rack enclosure with increased cable management options for high density server and networking applications. 42U height to easily roll through doorways.
- Rack Should accommodate the above mentioned IP PDU, Zero U, 32A, 230V, (20) C13 & (4) C19;
- Rack Should have a ATS, 2U 230V, 32A, IEC309-32A In, (16)C13, (2)C19 Out - 1 NO
- Rack Should Have PDU Power Cords, Input Connections: IEC-320 C14, Cord Length:8.2 feet ( 2.5 meters ), Output Connections: IEC 320 C13 - 5 Nos
- Rack Should have PDU Power Cords, Input Connections: IEC-320 C20, Cord Length:6.5 feet ( 1.98 meters ), Output Connections: IEC 320 C19 - 5 Nos

<b>Client :</b> 	<b>TENDER DOCUMENT FOR SUPPLY, INSTALLATION, TESTING &amp; CONFIGURATION OF IT, COMMUNICATION, ACCESS CONTROL &amp; SURVEILLANCE SYSTEM</b>	
<b>Project No : 120310</b>	<b>DOCUMENT NO : NPI-120310-LVS-S1-TD-01</b>	<b>Revision : 02</b> <b>Date : 2015-10-31</b>

- Rack Should have a cable trough 750 MM Wide for partition
- Rack Should have Data Cable Partition, 750mm Wide
- Data Cable Partition, NetShelter, 750mm Wide, pass-through
- Net Weight not less than 155 kg, Static load Weight Capacity 1363, Side panels of 18 gauge, Regulatory Approvals UL 2416, UL 60950-1, Standards, EIA-310-E, RoHS Compliant, 1 Year warranty including all accessories.
- Rack should have Modular tool less 1U Airflow Management Blanking Panel to prevent air recirculation by occupying unused rack space - 15 Nos
- Full depth utility tray - 2 Nos
- 1 Year Warranty including all accessories



#### 4.9 Load Balancer (ADC) :-

##### ➤ Hardware Specification:-

- Shall be Appliance based solution
- Solution shall support minimum 5 Gbps
- Shall support up to 6000 SSL Transactions per second for 2048 bit key scalable to 10000
- Shall support SSL throughput of 4 Gbps
- Shall have minimum 32GB RAM
- Appliance Throughput upgrade shall be done via software license (Shall simultaneous Upgrade Compression / SSL throughput etc.)
- Guaranteed 5-year Platform Longevity
- System supports at least 6x 10/100/1000 BASE-T AND 2x10G BASE-X SFP+ with transceivers
- Same device shall support Web Application Firewall Functionality for future with license upgrade
- Shall be supplied with redundant power supply

##### ➤ Traffic Redirection:-

- System supports performing load balancing for Layers 4 through 7 of the Open Systems Interface (OSI) reference model with support to the IP, TCP and UDP protocols.
- System supports performing load balancing for Layers 4 through 7 based on source/destination IP
- System supports performing load balancing for Layers 4 through 7 based on application content
- System support load balancing based on relative weight
- System support load balancing based on CPU – Memory Utilization of Server using defined SNMP (MIB) data
- System support load balancing based on cyclic (round-robin)
- System support load balancing based on least connections
- System supports virtual servers that can listen on UDP and TCP ports
- System has the ability to enable and disable individual servers behind a virtual address. Servers can be removed in both a graceful and hard shutdown fashion.
- The offered solution should provide the configuration wizards for LB etc.

<b>Client :</b> 	<b>TENDER DOCUMENT FOR SUPPLY, INSTALLATION, TESTING &amp; CONFIGURATION OF IT, COMMUNICATION, ACCESS CONTROL &amp; SURVEILLANCE SYSTEM</b>	
<b>Project No : 120310</b>		<b>Revision : 02</b> <b>Date : 2015-10-31</b>

➤ **Persistency:-**

- System supports session persistency based on Layer 3.
- System is able to make persistency decisions based cookies



➤ **SSL VPN Functionality:-**

- Same device should be capable of supporting SSL VPN 200 concurrent users scalable to 3000
- SSL VPN solution should provide client less access for web based applications
- Should support URL masking of internal FQDN and IP addresses
- Must support Single Sign-On (SSO) for web based applications and web based file server access
- Should have On demand provisioning of L3 VPN client using ActiveX or JAVA applet, standalone and command line L3 VPN client support
- Should support different network pools defined per user or group
- Should Support IPV6
- Should support following Authentication methods like AD, LDAP, RADIUS, Local Database, Certificate Based Authentication.
- Appliance must support Access control options based on:-
  - a) User and group
  - b) Source IP and network
  - c) Destination network
  - d) Service/Port
  - e) Host name or IP address
  - f) IP range
  - g) Subnet and domain
- Suggested solution should support Granular Access for employee/customer based on the end point results
- Suggested solution should support Allow user to login if basic compliance are met like (based on IE , firefox, and safari Browser version, Antivirus, Windows firewall on/off
- Suggested solution should support Client-side cache cleanup
- Suggested solution should support Split Tunneling and RDP access without SSL VPN Client installed on end point.
- Suggested solution should support Portal Customization for Employee and customers

➤ **Health Monitoring:-**

- System supports the ability configure TCP and UDP monitors
- System supports HTTP-ECV health monitoring that mark nodes unavailable based on retrieval of a Web page for unique content
- System supports the ability to specify a minimum number of monitors to mark a Real Server as being available
- System supports multiple health checks per IP and per port



Client : 	<b>TENDER DOCUMENT FOR SUPPLY, INSTALLATION, TESTING &amp; CONFIGURATION OF IT, COMMUNICATION, ACCESS CONTROL &amp; SURVEILLANCE SYSTEM</b>	
<b>Project No : 120310</b>		<b>Revision : 02</b> <b>Date : 2015-10-31</b>

- System supports the ability to specify the number of retries for each monitor before marking a Real Server unavailable.
- System should support creating application specify custom monitor using scripts.

➤ **SSL Acceleration and Central:-**

- System supports SSL offload - the ability to manage client side SSL traffic by terminating incoming SSL connections and sending the request to the server in clear text
- Should support end – end SSL if required
- System supports hardware based SSL acceleration
- System should support 1024, 2048 and 4096 bit key for SSL offloading

➤ **TCP Multiplexing:-**

- System supports TCP Multiplexing
- System support HTTP connection pooling
- System support Front End Optimization

➤ **HTTP Compression:-**

- System supports HTTP compression
- Should support up to 2 Gbps of compression throughput
- Selective compression to avoid know compression problems in commonly used browsers


➤ **Mode of integration, IP Addressing (IPv4 and IPv6) and Routing features:-**

- System supports one-arm , two-arm mode deployment
- System supports direct server return mode
- Should support IPv4 addressing
- Should support IPv6 addressing
- Should support IPv6 client and IPv4 servers
- Should support IPv4 client and IPv6 servers
- Should support routing protocols RIP, OSPF and BGP.

➤ **High Availability & Redundancy**

- System supports active-active (AA) configuration
- System supports active-backup (AB) configuration
- System supports seamless failover between units in a pair
- Future upgrade to Cluster with software License should be possible.

➤ **Management:-**

Client : 	<b>TENDER DOCUMENT FOR SUPPLY, INSTALLATION, TESTING &amp; CONFIGURATION OF IT, COMMUNICATION, ACCESS CONTROL &amp; SURVEILLANCE SYSTEM</b>	<b>nne pharmaplan®</b>
Project No : 120310	<b>DOCUMENT NO : NPI-120310-LVS-S1-TD-01</b>	<b>Revision : 02</b> <b>Date : 2015-10-31</b>

- System supports Web Based Management for full device configuration (GUI)
- System supports modifying configuration via modular CLI
- System supports SSH and HTTPS access
- System enables to send logs to another server via Syslog
- System supports diagnostics which are readily available and easy to send to support (capture core dumps, configurations, logs, and so on).
- System should support Out of Box management if required.

➤ **Warranty, Service , Support & Training:-**

3 Years Warranty, Vendor operates 24/7/365 global Technical Assistance Center (TAC)

#### 4.10 Data Storage System :-


➤ **General:-**

It shall enhance storage devices to the operating systems such as disk arrays, tape libraries and accessible to serves. It shall have its own network of storage devices. It shall provide block level operation and file level access.

➤ **Specification:-**


- **Primary Storage**

Features	Description
Storage Controller Architecture	The Storage Array shall be based on a scale out architecture, initial configuration should be offered with dual controllers in the same enclosure for SAN access.
Processor	Shall be based on a multi core architecture.
Storage Cache	The Storage Array shall be configured with at least 48 GB or more Cache per controller pair, 96GB for a two Controller System.
Operating System	The Storage OS should be based on specialized OS designed specifically for data serving, should not be based on general purpose server based OS, should have ability to do performance acceleration, High Availability via dual controller takeover ability, as well as advanced data management features built in.
Data Protection	In case of any abrupt storage failure such as due to power failure, the Storage array must have mechanisms to provide for end-to-end data integrity via a BBU unit or de-stage to disk feature.
Disk Support	300 GB, 600 GB 15K RPM SAS 300 GB / 600 GB / 900GB / 1.2TB 10K RPM SAS 200 GB SSD SLC 400 GB/ 600GB/ 800GB SSD eMLC 2 TB/ 3TB/ 4TB/ 6TB 7.2K RPM NL-SAS
Storage Capacity Required	It should be configured with at least 40 TB of useable space, post RAID 6 using 10K RPM SAS disk drives and 10TB of useable space, post RAID 6 using SSD eMLC disk drives . This capacity is the space available to the application after considering all other storage overheads like RAID6 overhead, Storage OS, Spare drives & at least 10% of additional space headroom for better system performance. Criteria to calculate no. of disks shall be submitted.

<b>Client :</b> 	<b>TENDER DOCUMENT FOR SUPPLY, INSTALLATION, TESTING &amp; CONFIGURATION OF IT, COMMUNICATION, ACCESS CONTROL &amp; SURVEILLANCE SYSTEM</b>	<b>nne pharmaplan®</b>
<b>Project No : 120310</b>		<b>Revision : 02</b> <b>Date : 2015-10-31</b>

**DOCUMENT NO : NPI-120310-LVS-S1-TD-01**


Features	Description
Storage Scalability	The storage system must have a scalability to support upto 4000 TB Raw capacity in a single system using expansion enclosures. Any future expansion shall not require any downtime. There should be provisions for dynamic expansion of RAID group/LUN/Volume etc.
Hot Spare	The solution shall be provisioned with adequate global, enclosure, or dedicated hot spare drives as per best practices.
RAID Configuration	Global, dedicated or enclosure hot-spare Raid Levels 0, 1, 3, 5, 6, 10, 50 > Online expansion by: - Adding new drives > RAID migration
Enclosure Specifications	Proposed storage shall have support for 3U/24 bay, 2U/24 bay as well as 4U/75 bay expansion enclosures. They shall be provided with rack mounting kit.
Protocols Supported	The storage system initially be licensed and offered for the following Block Level Protocol: iSCSI and FC on the same storage controllers for the entire supported capacity. The storage system initially be licensed and offered for the following file level protocol: CIFS/ SMB,AFP,NFS,FTP by firmware upgrade or a NAS gateway, but not by way of using a external hardware or server.
Front-end GbE/FC ports	The storage system must have at least 4 x 10GbE Ethernet ports, 2 port 10Gb FCoE I/O module (optical SFP+) and 4 x 16G FC ports per controller for host/switch connectivity. All ports should be populated with transceivers/modules.
Back-end ports (expansion)	The storage system shall have at least 4 x 12 Gbps 4-lane SAS ports each controller for disks connectivity in addition.
RAID Virtualization	Should be able to stripe data sets across every available drive in the systems as per best practices, for best performance and faster rebuild times during a drive failure.
Power Management	Network UPS with SNMP management
Remote Replication	Proposed Storage shall have feature to replicate from existing storage by storage based replication feature (no need of server based software)
Data Protection	snapshot, LUN copy, Lun clone, volume mirror, remote replication, Smart Qos, SmartMotion, SmartThin, SmartPartition, SmartMigration, SmartErase, SmartMulti-Tenant, SmartVirtualization, HyperMirror, SmartCache, WORM, NDMP, Dedupe, Compression should be licensed for Block data and File System
OS Support	Support for industry-leading Operating System platforms including: Windows Server 2003 Windows Server 2008 R2 (including Hyper-V) Windows Server 2012 Red Hat SUSE Sun Solaris VMware Mac OS X Windows 8
System Management	Start-up wizard Web-based GUI Real-time system monitoring Dashboard monitoring Configurable alerts

<b>Client :</b> 	<b>TENDER DOCUMENT FOR SUPPLY, INSTALLATION, TESTING &amp; CONFIGURATION OF IT, COMMUNICATION, ACCESS CONTROL &amp; SURVEILLANCE SYSTEM</b>	<b>nne pharmaplan®</b>
<b>Project No : 120310</b>		<b>Revision : 02</b> <b>Date : 2015-10-31</b>


Features	Description
Capacity Management	De-Duplication Thin provisioning Data compression Quota management Auto capacity expansion
Licensing	All the required licenses on the system to support the above mentioned features shall be provided for an entire capacity supported by the system from day one.
Load Balancing	Multiple controllers shall concurrently process the same host service to eliminate the performance bottleneck of a single controller.
Multipath Software	Host based multipath software to be provided for HA and Load balancing.
Third Party Storage Virtualization	Consolidates storage resources of other third party storage products to manage and allocate them in a flexible and unified manner, this can be implemented natively, via additional gateway or license.
Reference Model	Huawei OceanStor 5500 V3(V300R002) (or) Higher
Warranty	Standard service: - Hardware warranty - Software update; 8x5 phone, web and email support Upgrade/Extension service: 24 x 7 Support, 4 Hours Response, Hardware Warranty - Parts/Labour/Onsite for 3 Year.

• **Backup Data Storage**

Features	Description
Storage Controller Architecture	The Storage Array shall be based on a scale out architecture, initial configuration should be offered with dual controllers in the same enclosure for SAN access.
Processor	Shall be based on a multi core architecture.
Storage Cache	The Storage Array shall be configured with at least 48 GB or more Cache per controller pair, 96GB for a two Controller System.
Operating System	The Storage OS should be based on specialized OS designed specifically for data serving, should not be based on general purpose server based OS, should have ability to do performance acceleration, High Availability via dual controller takeover ability, as well as advanced data management features built in.
Data Protection	In case of any abrupt storage failure such as due to power failure, the Storage array must have mechanisms to provide for end-to-end data integrity via a BBU unit or de-stage to disk feature.
Disk Support	300 GB, 600 GB 15K RPM SAS 300 GB / 600 GB / 900GB / 1.2TB 10K RPM SAS 200 GB SSD SLC 400 GB/ 600GB/ 800GB SSD eMLC 2 TB/ 3TB/ 4TB/ 6TB 7.2K RPM NL-SAS
Storage Capacity Required	It should be configured with at least 100 TB of useable space, post RAID 6 using 2TB 7.2K RPM SATA disk drives . This capacity is the space available to the application after considering all other storage overheads like RAID6 overhead, Storage OS, Spare drives & at least 10% of additional space headroom for better system performance.
Storage Scalability	The storage system must have a scalability to support upto 4000 TB Raw capacity in a single system using expansion enclosures. Any future expansion

<b>Client :</b> 	<b>TENDER DOCUMENT FOR SUPPLY, INSTALLATION, TESTING &amp; CONFIGURATION OF IT, COMMUNICATION, ACCESS CONTROL &amp; SURVEILLANCE SYSTEM</b>	<b>nne pharmaplan®</b>
<b>Project No : 120310</b>		<b>Revision : 02 Date : 2015-10-31</b>

Features	Description
	shall not require any downtime. There should be provisions for dynamic expansion of RAID group/LUN/Volume etc.
Hot Spare	The solution shall be provisioned with adequate global, enclosure, or dedicated hot spare drives as per best practices.
RAID Configuration	Global, dedicated or enclosure hot-spare Raid Levels 0, 1, 3, 5, 6, 10, 50 > Online expansion by: - Adding new drives > RAID migration
Enclosure Specifications	Proposed storage shall have support for 3U/24 bay, 2U/24 bay as well as 4U/75 bay expansion enclosures. They shall be provided with rack mounting kit.
Protocols Supported	The storage system initially be licensed and offered for the following Block Level Protocol: iSCSI and FC on the same storage controllers for the entire supported capacity. The storage system initially be licensed and offered for the following file level protocol: CIFS/ SMB,AFP,NFS,FTP by firmware upgrade or a NAS gateway, but not by way of using a external hardware or server.
Front-end GbE/FC ports	The storage system must have at least 4 x 10GbE Ethernet ports, 2 port 10Gb FCoE I/O module (optical SFP+) and 4 x 16G FC ports per controller for host/switch connectivity. All ports should be populated with transceivers/modules.
Back-end ports (expansion)	The storage system shall have at least 4 x 12 Gbps 4-lane SAS ports each controller for disks connectivity in addition.
RAID Virtualization	Should be able to stripe data sets across every available drive in the systems as per best practices, for best performance and faster rebuild times during a drive failure.
Power Management	Network UPS with SNMP management
Remote Replication	Proposed Storage shall have feature to replicate from existing storage by storage based replication feature (no need of server based software)
Data Protection	snapshot, LUN copy, Lun clone, volume mirror, remote replication, Smart Qos, SmartMotion, SmartThin, SmartPartition, SmartMigration, SmartErase, SmartMulti-Tenant, SmartVirtualization, HyperMirror, SmartCache, WORM, NDMP, Dedupe, Compression should be licensed for Block data and File System
OS Support	Support for industry-leading Operating System platforms including: Windows Server 2003 Windows Server 2008 R2 (including Hyper-V) Windows Server 2012 Red Hat SUSE Sun Solaris VMware Mac OS X Windows 8
System Management	Start-up wizard Web-based GUI Real-time system monitoring Dashboard monitoring Configurable alerts
Capacity Management	De-Duplication Thin provisioning


Client : 	<b>TENDER DOCUMENT FOR SUPPLY, INSTALLATION, TESTING &amp; CONFIGURATION OF IT, COMMUNICATION, ACCESS CONTROL &amp; SURVEILLANCE SYSTEM</b>	<b>nne pharmaplan®</b>
Project No : 120310	DOCUMENT NO : NPI-120310-LVS-S1-TD-01	Revision : 02 Date : 2015-10-31

Features	Description
	Data compression Quota management Auto capacity expansion
Licensing	All the required licenses on the system to support the above mentioned features shall be provided for an entire capacity supported by the system from day one.
Load Balancing	Multiple controllers shall concurrently process the same host service to eliminate the performance bottleneck of a single controller.
Multipath Software	Host based multipath software to be provided for HA and Load balancing.
Third Party Storage Virtualization	Consolidates storage resources of other third party storage products to manage and allocate them in a flexible and unified manner, this can be implemented natively, via additional gateway or license.
Reference Model	HUAWEI OceanStor 5500 V3(V300R002) (or) Higher
Warranty	Standard service: - Hardware warranty - Software update; 8x5 phone, web and email support Upgrade/Extension service: 24 x 7 Support, 4 Hours Response, Hardware Warranty - Parts/Labour/Onsite for 3 Year.

• **Tape Drive**

Features	Description
Capacity	Automated tape library must support Native data capacity of 60 TB It Shall be offered with Minimum of two LTO6FC tape drives. The Drives shall support encryption
Speed Offered	160MB/sec in Native mode and 400MB/sec in 2.5:1 Compressed mode
Tape Drive	Architecture Offered LTO6 drive in the Library shall conform to the Continuous and Data rate matching technique for higher reliability.
Connectivity Offered	Tape Library shall provide 8Gbps native FC connectivity to SAN switches. Necessary HBA Controller transceivers, and cables(10m) should be supplied for the backup server.
CARTRIDGES	Bidder must Supply 24 Blank- New Data cartridges & 2 Cleaning Cartridges with barcode labels.
Partitioning Offered	Tape Library must have partitioning support so that each drive can be configured in a separate partition. The Portioning License should be provided along with the Library.
Management	Tape Library shall provide web based remote management.
Front Panel	LCD Type
GUI	It shall have Graphic User Interface
Notification	Tape library must Set alerts for backup and archive events
Barcode Reader and Mail slots	Tape library shall support Barcode reader and min 1 mail slots- to deliver easy, secure access to individual tape cartridges without interrupting library operations.
Other Features	1. Tape Library shall have GUI Panel 2. Shall be rack mountable 2U. 3. The Tape library must Set alerts for backup and archive events. 4. 3 OR 5 YEARS warranty back to back with OEM. 5. LCD front panel.
Reference Model	Tanberg NEOs T24 (or) Higher
Warranty	3 OR 5 YEARS warranty back to back with OEM



Client : 	<b>TENDER DOCUMENT FOR SUPPLY, INSTALLATION, TESTING &amp; CONFIGURATION OF IT, COMMUNICATION, ACCESS CONTROL &amp; SURVEILLANCE SYSTEM</b>	<b>nne pharmaplan®</b>
Project No : 120310	<b>DOCUMENT NO : NPI-120310-LVS-S1-TD-01</b>	<b>Revision : 02 Date : 2015-10-31</b>

#### 4.11 Thin Client:-


##### ➤ General:-

Thin client is an inexpensive, barebones computer setup that serves as a user interface device in a client-server architecture. Similar to a dumb terminal, a thin client is without any processor or data storage device but, in contrast, it shall have enough RAM to run slimmed down version of operating system.

##### ➤ Specification:-

Features	Description
Flash Memory	Self-powered 16Gb Flash
Main Memory	4Gb DDR3 SO-DIMM, upgradable to 8 GB. 64 MB reserved for Graphics
Chassis	Fan less Chassis
Processor	Intel/AMD. Ghz Dual Core Processor or higher
BIOS	BIOS should be of the same OEM
Peripherals	(a) USB Optical mouse (b) 104 Keys USB OEM Keyboard
Network Interface	10/100 / 1000 Mbps Ethernet (auto sensing) NIC, RJ45 connector.
Graphics	AMD Radeon HD 8000 Graphics or Higher
Ports/Slots	4 External USB 2.0 or higher, 2 External USB 3.0 Ports
	1/8 inch 16 bit, stereo audio output, 8 bit mini mic input with internal speaker
	1 VGA & 2 Display Port 1.2
Security	Option to enable / disable external USB ports.
Display	Max Resolution 1920 x 1200, 32 Bit
OS Installed	Embedded Windows 8 or Higher
OS Security Feature	File based Write Filter support, config tool for configuring TC as Appliance Mode for Citrix, Vmware & Web appliance.
Emulation/Protocol support	Citrix Receiver 13.1 & HDX Support, xRDP with RemoteFX, Horizon View 3.2 Broker support Remote Management Agent Built-in tool to capture TC image and redeploy using a USB pendrive. Terminal Emulation Suite.
Network	(a) TCP/IP with DNS and DHCP wake on LAN (b) DHCP support for automatic firmware upgrades & unit configuration. (c) PPPTP, L2TP, SNTP)
Manageability	OEM Management software to manage Thin Clients from Centralized Server: -Asset Track -Grouping Of Terminals -Device Online/Offline status -Configure Device Settings -Should support upgrade of group of thin client from central location -Power management: Reboot, shutdown, Wake-on-LAN
Power supply	100-240 Volts AC, at 50-60 HZ, energy-saving automatic power-down, surge-tolerant, Must be external adapter to avoid internal heating
Network	Ergonomics- Approved ; Safety -UL 1950, CSA 950; TÜV-GS (EN60 950) ;





Client : 	<b>TENDER DOCUMENT FOR SUPPLY, INSTALLATION, TESTING &amp; CONFIGURATION OF IT, COMMUNICATION, ACCESS CONTROL &amp; SURVEILLANCE SYSTEM</b>	<b>nne pharmaplan®</b>
Project No : 120310	DOCUMENT NO : NPI-120310-LVS-S1-TD-01	Revision : 02 Date : 2015-10-31

Features	Description
	- FCC Class B; CE Mark; EN55022B; VCCI, Energy Star. EPEAT Gold registered.
Regulatory Standards	Ergonomics- Approved; Safety -UL 1950, CSA 950; TÜV-GS (EN60 950) ; - FCC Class B; CE Mark; EN55022B; VCCI, Energy Star. EPEAT Gold registered.
Monitor and VESA Bracket	Same Brand OEM 21.5 Inch high resolution, Wide screen monitor or higher with necessary VESA mounting bracket to mount the thin client directly on to the Monitor.
Manageability	Same Brand OEM 21.5 Inch high resolution, Wide screen monitor or higher with necessary VESA mounting bracket to mount the thinclient directly on to the Monitor.
Reference Model	HP Thin client T520 (or) Equivalent (or) Higher Display HP Pro Display P222va 21.5-inch Monitor (or) Higher
Warranty and Services	3 Yrs. Comprehensive Warranty Bidder/OEM Should have 150+ service centers across India (in Class- A, B, C Cities). Bidder/OEM should have 1 LS, 2LS,3LS backend infra for after sales support. Bidder/OEM Should have next Business Day response. Bidder/OEM Should have trained and certified Support staff. Bidder/OEM should have 6 days after sales support, i.e. Monday to Saturday

➤ **Surveillance Monitoring WorkStation**


Features	Description
Processor & System Bus	Intel Xeon E3-1226v3 3.3
Memory	16GB DDR3-1333 Mhz ECC upgradable to 32 GB
Memory slots	4 DIMM slots, up to 32 GB ECC/non-ECC, DDR3L-1600 (MT/s) (ECC/non-ECC choice and actual memory speed dependent on processor capability)
Cache	8 MB
No of Cores	4 Cores
Hard Disk	500 GB SATA Hard Disk Drive With 7.5 K RPM
Optical Drive	DVD R/W
Graphics	4 HDMI Port 2GB Graphic Card
Chipset	Intel® C226 chipset
Keyboard & Mouse	Industry standard Bilingual Key Board with Mouse (optical )
Connectivity	Integrated Intel I217LM PCIe GbE Controller; Optional Intel Ethernet I210-T1 PCIe as 2nd NIC; WLAN Intel 7260 802.11 a/b/g/n/ PCIe x 1 NIC
Cabinet	Tower
Drive Bays	2 internal 3.5-inch bays, 1 internal 2.5-inch bay (for SSD only), 1 external slim ODD bay, 2 external Half-Height 5.25-inch bays
Expansion Slot	1 PCIe Gen3 x16, 1 PCIe Gen2 x4 slot/x16 connector, 1 PCIe Gen2 x1 slot/x4 connector, 1 PCIe Gen2 x1 slot, 1 PCI 32-bit.
Operating System	Licensed Genuine Windows 7 Professional , 64 bit with media kit and manuals
Power	400W Wide Ranging, Active PFC, 92% Efficient;

<b>Client :</b> 	<b>TENDER DOCUMENT FOR SUPPLY, INSTALLATION, TESTING &amp; CONFIGURATION OF IT, COMMUNICATION, ACCESS CONTROL &amp; SURVEILLANCE SYSTEM</b>	
<b>Project No : 120310</b>		<b>Revision : 02</b> <b>Date : 2015-10-31</b>

Features	Description
Monitor	Same Brand OEM 23 Inch high resolution, Wide screen IPS monitor
USB CONNECTOR	2 USB 3.0, 1 USB 2.0, 1 USB 2.0 Charging Data Port. Rear 2 USB 3.0, 4 USB 2.0 Internal 1 USB 3.0 and 3 USB 2.0 ports available as 2 separate 2x10(3.0 x1, 2.0 x1) and 2x5(2.0 x2) headers: supports 1 HP Internal USB Port Kits plus one USB 3.0 Media Card Reader.
Remote Technology	Remote Graphics Software (RGS)
Remote Management	Intel® vPro™ with Intel® AMT 9.0
Certifications & Compliance	1. ISO 9001 : 2000 certification for OEM Manufacturing 2. ISO 14001 compliance certification 3. Enclose the documentary evidence as proof for the above compliance and certification. 4. Windows OS Certification of Authenticity 5. The quoted model should be certified by Microsoft for Windows 7 Operating System 6. The bidder should produce product brochure for the brand quoted. 7. Energy star compliance
Compliance & Certification	Manufacturer Authorisation Form address to this tender
Reference Model	HP Z230 MT (or) equivalent (or) Higher

➤ **Surveillance Monitoring Desktop**

Features	Description
Processor	Intel Core i7-4770 3.4 GHz 8MB cache, 4 Core or higher as per the requirement of the surveillance monitoring software
Chipset	Intel® Q85 Express
Motherboard	OEM Motherboard
Memory	8 GB DDR3 RAM ; Up to four DIMM slots; Non-ECC dual-channel 1600 MT/s DDR3 SDRAM, Memory Expandable to 32 GB DDR3-1600 MT/s
Hard Disk Drive & controller	1 TB SATA 3.0-( 6Gb/s Hard Drive ( 7200 RPM, NCQ, Smart IV) (Provision of Total of 2*Internal hard drive support), SED and SSD support
Optical Drive	SATA SuperMulti DVD Writer Drive
Graphics	NVIDIA GeForce GT 630 DP PCIe FH x16 Win
Audio	DTS Studio Sound, Realtek ALC 221 Audio (all ports stereo), microphone and headphone jacks, stereo audio line out and integrated speaker
Ethernet	Integrated Intel® I217LM Gigabit Network Connection; optional wireless LAN card available
Slots	3 PCIe x1 , 1 PCIe x16
Bays	Internal drive bays : One 2.5"; Two 3.5"
Ports	External drive bays :One 3.5"; One slim line; One 5.25"
Form Factor	SFF
Power Supply	Internal 240W Power Supply, Active PFC, up to
Keyboard	PS-2/USB 104 Keys OEM Key Board
Mouse	USB / PS/2 2 Button Scroll Mouse (Same make as PC)
Operating System	Genuine Windows® 8 .1 Professional 64-bit
Security	Trusted Platform Module (TPM) 1.2; SATA port disablement (via BIOS); Drive lock; Intel® Identify Protection Technology (IPT); Serial, parallel,

<b>Client :</b> 	<b>TENDER DOCUMENT FOR SUPPLY, INSTALLATION, TESTING &amp; CONFIGURATION OF IT, COMMUNICATION, ACCESS CONTROL &amp; SURVEILLANCE SYSTEM</b>	<b>nne pharmaplan®</b>
<b>Project No : 120310</b>	<b>DOCUMENT NO : NPI-120310-LVS-S1-TD-01</b>	<b>Revision : 02</b> <b>Date : 2015-10-31</b>

Features	Description
	USB enable/disable (via BIOS); Optional USB Port Disable at factory (user configurable via BIOS); Removable media write/boot control; Power-On password (via BIOS); Setup password (via BIOS); Chassis (1 bay) Security Kit; Solenoid Hood Lock / Sensor; Support for chassis padlocks and cable lock devices
Certification	Vendor should enclose the following certificates Energy Star 5.0 , Epeat Gold , UL, FCC and Win certification & Linux (Redhat/SuSe Certification)
Compliance & Certification	Manufacturer Authorisation Form address to this tender
Monitor	Same Brand OEM 21.5 Inch high resolution, Wide screen monitor
Warranty	Three Years OEM Onsite Warranty
Reference Model	HP Pro 600 G series (or) Equivalent (or) Higher

#### 4.12 Desktop Virtualization Solution:-

##### ➤ General:-


The solution shall cater to the following clients at the minimum Desktops, Laptops, Thin Clients, iPad/ Tablets, Mobile Clients . IT shall also supply 200 concurrent user licenses.

The proposed solution shall be able to deliver desktops/applications to the end user by providing dedicated OS per user and also by sharing the Operating System resources on the Server. The proposed solution shall optimize the usage of server resources (using para virtualization) and shall support network efficient protocols which are capable of delivering the desktops efficiently and effectively consuming minimum bandwidth. The solution shall be capable of load balancing and providing the Desktop delivery by internal load balancing algorithms. The same solution shall be capable of providing secure access over WAN using SSL VPN technology.



##### ➤ Features:-

The bidder shall provide a comprehensive training to the designated SIB personnel prior to commencement of warranty period. The proposed solution have all necessary licenses including SSL VPN to be bundled along with Desktop Virtualization license. The proposed solution shall have concurrent access at central system and shall not hamper the performance at any way. The proposed solution shall have high availability features to ensure that systems will be available at any time of the day. The proposed solution shall facilitate ease of download and installation on any device. The proposed solution must integrate with all known vendors offering device certificate, as a measure ensuring certified devices access central systems. The proposed solution shall support high definition user experience. The solution shall support different methods of Desktop Delivery like Hosted Share, VDI, and Streamed Desktop etc. with single product.

- The proposed solution shall support automatic internal load balancing algorithm and built in Profile management
- The solution shall deliver Apps based on User roles and profiles.
- The proposed solution shall support for Single Image Provisioning
- The solution shall support for intrasite DR capabilities like GSLB from the Same Vendor
- The solution shall support for all leading server Virtualization capabilities (Open Architecture)
- The proposed solution shall be able to do self-service application provisioning

<b>Client :</b> 	<b>TENDER DOCUMENT FOR SUPPLY, INSTALLATION, TESTING &amp; CONFIGURATION OF IT, COMMUNICATION, ACCESS CONTROL &amp; SURVEILLANCE SYSTEM</b>	<b>nne pharmaplan®</b>
<b>Project No : 120310</b>	<b>DOCUMENT NO : NPI-120310-LVS-S1-TD-01</b>	<b>Revision : 02</b> <b>Date : 2015-10-31</b>

- The proposed solution shall support various devices with any one of the platforms mentioned- Windows, Mac, Linux, Android, Blackberry, iOS, Windows Mobile
- The proposed solution shall be accessed from any mobile device like Laptop, I Pad, smart phone etc, there shall be no application conflicts between hosting server and end mobile devices, i.e local application configuration setting shalln't conflict
- The proposed solution shall provide integrated profile management that would facilitate users roaming or otherwise in having a customized profile with Session Auto-Logoff feature
- The proposed solution shall have latest plug ins/ features released by OEM on the internet when on network
- Load-Balancing device shall be software upgradable from 1 GBPS to 3 GBPS.
- DVS shall support all the existing applications of Bank and any other application Bank may implement in the future
- The proposed solution shall support all the serial, parallel and USB port printers
- The proposed solution shall enable all forms of printing from serial, parallel and USB ports.
- The Licenses provided shall be offering production support and subscription that include software support along with periodic fixes and enhancements to the products
- DR switching shall be instantaneous
- The proposed solution shall be integrated with Antivirus, password protection etc for centralized system
- The proposed solution shall integrate and work with backup solutions, Antivirus solutions, AD, storage solutions, Network and security solutions
- The software supplier shall ensure that the organization receives product updates as they are released at no additional charge during the period of contract
- The solution shall seamlessly scale up or down as per requirement with no/minimal downtime for existing users
- The solution shall be capable of efficiently handling planned or unplanned down times with facility to handle peak/low work loads
- The solution shall eliminate boot storms when all the users log into virtual desktops
- The solution shall be dynamically capable to change VMS in case of failures
- The proposed solution shall support video also.
- The solution shall be compatible with WAN optimization solution
- The proposed solution shall perform with all types of connectivity such as VSAT, 3G, 4G, CDMA etc
- The proposed solution shall be able to deliver application virtualization at no extra costs
- The proposed DVS solution shall be able capable to support centralized profile management for users
- The solution shall target efficient handling of resources like CPU, memory, storage IOPS, Network IOPS for critical/ Non- critical and resource hungry workloads and guarantee resources
- The solution shall be able to support uninterrupted work for end users during network fluctuations and outages
- The proposed DVS software shall be able to support high availability and load balancing between the servers
- The DVS software shall continuously monitor utilization across virtual machines and shall intelligently allocate available resources among virtual machines
- The solution shall have ability to provide different desktops to different categories of users



<b>Client :</b> 	<b>TENDER DOCUMENT FOR SUPPLY, INSTALLATION, TESTING &amp; CONFIGURATION OF IT, COMMUNICATION, ACCESS CONTROL &amp; SURVEILLANCE SYSTEM</b>	
<b>Project No : 120310</b>		<b>Revision : 02</b> <b>Date : 2015-10-31</b>

- The solution shall provide Windows 7/8/Linux look and feel to end users
- The solution must have capability to access USB devices
- The solution shall allow shared printing between printers connected to 'zero client', 'thin client' and 'Desktop' and it shall be seamless and without any end-user interference.
- The solution shall ensure that page transition while getting loaded and while scrolling up and down shall be fluid in end user experience while working while working in WAN environment
- The solution shall allow user to log off from one device and the same session is available on another device user logs in from
- The solution must be capable of protecting Virtual Environment from viruses/Malware at end point by controlling access to mass storage devices
- The solution shall support third party AV and Patch Management tool for virtual desktops
- End user authentication shall be through Active Directory during login to Virtual Desktop
- The proposed solution shall support any number of applications which can be accessed through virtualized environment
- The proposed solution shall support all leading bare metal hypervisors
- The proposed solution shall provide scalability/upgradability to provide comprehensive integrated monitoring for Failure analysis, Real Time client server latency, visibility to trouble shoot end user performance issues
- The solution shall provide scalability/ upgradability to provide comprehensive integrated reporting for Failure analysis, Real Time and historical client server latency, visibility to trouble shoot virtual Desktop performance over LAN and WAN
- The proposed solution shall be capable of integrating with Enterprise Mobility Solution to provide user single interface to access Windows desktop/ application along with mobile application

#### 4.13 FIREWALL:

##### ➤ General

- The Firewall must be appliance based and shall facilitate multi-application environment.
- Shall operate both in "bridge mode" or "transparent mode" apart from the standard NAT mode
- NAT, Transparent Mode shall be IPv6 ready. Shall provide NAT functionality, including PAT. Shall support NAT 66, NAT 64, DNS 64, Static NAT IPv4 to IPv6 and vice versa (VIP64 and VIP46) and IPv6-IPv4 tunneling or dual stack.
- Shall provide advanced NAT capabilities, supporting NAT Traversal for services like SIP/H.323 /SCCP
- Shall support Voice based protocols like H.323, SIP, SCCP, MGCP, etc. and RTP Pinholing.
- Shall support User-Group based Authentication (Identity based Firewalling) & Scheduling
- Provision to create secure zones / DMZ (ie Multi- Zone support)
- Shall Support 10 Virtual systems. Shall not require any additional license for these features
- Shall Support Packet Capture/sniffer to capture and examine the contents of individual data packets that traverse the firewall appliance for troubleshooting, diagnostics and general network activity
- Shall support more than one ISP/MPLS link with automatic ISP/MPLS link failover as well as ISP/MPLS link load sharing for outbound traffic

<b>Client :</b> 	<b>TENDER DOCUMENT FOR SUPPLY, INSTALLATION, TESTING &amp; CONFIGURATION OF IT, COMMUNICATION, ACCESS CONTROL &amp; SURVEILLANCE SYSTEM</b>	
<b>Project No : 120310</b>	<b>DOCUMENT NO : NPI-120310-LVS-S1-TD-01</b>	<b>Revision : 02</b> <b>Date : 2015-10-31</b>

➤ **Licensing & Certification:-**

- The Firewall OEM shall be ICSA Labs certified for Enterprise Firewall and shall be Common Criteria EAL 4 certified. OEM shall be having FIPS-140-2 certification for Client VPN software.
- OS shall be “IPv6 Phase II Ready” certified. Device based license for unlimited users for Firewall / VPN (IPSec & SSL) and other features. There shall not be any user/IP/host based licenses
- OEM Shall be having ICSA and VB100 lab certified embedded anti virus.
- OEM shall be having recommended rating from NSS Lab's 2015 Firewall,IPS, Next Generation Firewall testing with minimum 90% Firewall policy protection/ Security effectiveness.
- OEM Shall be having ISO certification. The Firewall OEM shall be leaders in Gartner's UTM Magic Quadrant from last 3years.

➤ **Interface & Connectivity:-**

- Shall support 8 or more gigabit interfaces with auto sensing 10/100/1000 capability.
- Shall support 8 or more GbE SFP Interfaces. Shall support 2 or more 10 Gigabit interfaces with minimum 2 x 10 G Fiber Transceivers included in the appliance should support 2 or more Number of USB ports required which shall also support 3G modems. Shall have 1 console port
- Shall have 1 Management port. Shall support the standards based Multi-Link aggregation technology (IEEE 802.3ad) to achieve higher bandwidth.
- Shall support VLAN tagging (IEEE 802.1q) in NAT/Route mode


➤ **Performance:-**

- Shall support at least 50,00,000 or more concurrent connections
- Shall support at least 250,000 or more new sessions per second processing.
- Shall have Firewall throughputs of minimum 32 Gbps or more
- IPSec VPN throughput shall be 16 Gbps or more with and shall be hardware accelerated
- IPS throughput shall be 6 Gbps or more
- Antivirus throughput shall be 3 Gbps or more in proxy mode
- Shall support a minimum 5000 client to site IPSEC vpn tunnels
- Shall support minimum 2000 ssl vpn users. The required license shall be included with the solution
- Shall include atleast 120 GB storage preferably by SSD

➤ **Network, Routing and IPv6:-**

- Shall support Static routing. Shall support IPV6 Policy based Routing
- Dynamic Routing (RIP, OSPF,BGP & IS-IS) must be supported for IPv4
- Shall support IPv6 Routing Protocols like RIP, OSPFv3 and BGP4+
- Device shall support multicast routing, Protocol independent Multicast (PIM) version 2 and Multicast destination NAT (DNAT). Device shall support PIM sparse mode and PIM dense mode . Device shall service multicast servers or receivers on the network segment to which the firewall interface is connected
- Shall support DHCPv6 Server, DHCPv6 relay and DHCPv6 client functionality



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<b>Project No : 120310</b>		<b>Revision : 02</b> <b>Date : 2015-10-31</b>

➤ **Authentication:-**

- Shall have authentication for Users/Admins (Local and Remote – RADIUS, LDAP & TACACS+)
- Support for RSA SecureID or other Token based Products
- Support for Native Windows Active Directory and Novell eDirectory Integration with SSO
- Shall support PKI / Digital Certificate based two-factor Authentication for all type of users

➤ **Encryption / VPN:-**

- The VPN shall be integrated with firewall and shall be ICSA Labs certified for both IPSec and SSL-TLS. Shall support protocols such as DES & 3DES, MD5, SHA-1, SHA-256 authentication, Diffie- Hellman Group 1, Group 2, Group 5, Group 14, Internet Key Exchange (IKE) v1 as well as IKE v2 algorithm, The new encryption standard AES 128, 192 & 256
- IPSec VPN shall support XAuth over RADIUS and RSA SecurID or similar product.
- Shall have integrated SSL VPN with no user license restriction. If license is required add license for 2000 concurrent SSL VPN users
- Shall support SSL Two-factor Authentication with Digital Certificates
- Shall support Single Sign-On Bookmarks for SSL Web VPN
- Shall support Windows, Linux and MAC OS for SSL-VPN (Shall have always-on clients for these OS apart from browser based access)
- Shall support NAT within IPSec/SSL VPN tunnels
- Shall also support PPTP and L2TP over IPSec VPN protocols.



➤ **High Availability:-**

- Shall support Active-Active as well as Active- Passive redundancy.
- Shall support Stateful failover for both Firewall and VPN sessions.
- The HA Architecture shall have the ability for Device Failure Detection and Notification as well as Link Status Monitor
- Shall support Server Load Balancing with features like HTTP persistence , TCP Multiplexing
- Shall support HTTPS Offloading with flexible Digital Certificate Management

➤ **IPS:**

- Should have ICSA Labs certified integrated Network Intrusion Prevention System
- Shall have a built-in Signature and Anomaly based IPS engine on the same unit
- Shall have protection for 7000+ signatures
- Able to prevent denial of service and distributed Denial of Service attacks.
- Supports user-defined signatures (i.e., Custom Signatures) with Regular Expressions.
- IPS shall also include Botnet filtering and detecting and preventing Botnet command and control traffic



Client : 	<b>TENDER DOCUMENT FOR SUPPLY, INSTALLATION, TESTING &amp; CONFIGURATION OF IT, COMMUNICATION, ACCESS CONTROL &amp; SURVEILLANCE SYSTEM</b>	
<b>Project No : 120310</b>	<b>DOCUMENT NO : NPI-120310-LVS-S1-TD-01</b>	<b>Revision : 02</b> <b>Date : 2015-10-31</b>

- In event if IPS shall cease to function, it will fail open by default and is configurable. This means that crucial network traffic will not be blocked and the Firewall will continue to operate while the problem is resolved.

➤ **Application Control:**

- Shall have Application control feature for 3000 or more applications
- Shall perform Traffic Shaping of popular P2P applications
- Shall control popular IM/P2P applications regardless of port/protocol
- The appliance shall facilitate embedded anti virus support

➤ **Antivirus:-**

- Gateway AV shall be supported for real-time detection of viruses and malicious code for HTTP,HTTPS, FTP, SMTP, SMTPS, POP3 and IMAP, NNTP and IM protocols
- Shall have configurable policy options. Possible to select traffic to scan for viruses
- Shall have options to prevent user downloads based on file extension as well as file type
- Shall have ability of IPS Checking, application control and Antivirus scanning for IPv6 traffic and for encrypted traffic like HTTPS
- Shall have integrated Gateway level Client Reputation detection feature whereby client Authorisation by device type independent of User, Device/User Monitoring & dynamically Control clients.

➤ **Web Filtering:-**

- The appliance shall facilitate embedded Web Content Filtering feature
- Web content filtering solution shall work independently without the need to integrate with External proxy server.
- URL database shall have 2 billion or more URLs under more than 75 categories
- Shall be able to block different categories/sites based on User Authentication.
- Shall include the options to add the custom Categories



➤ **Gateway Data Loss Prevention (DLP):-**

Shall support Gateway Data Loss Prevention (DLP) feature for popular protocols like HTTP, HTTPS, FTP, POP3, IMAP, SMTP, POP3S, IMAPS, SMTPS and IM( AIM, ICQ, Yahoo, MSN) with Document Fingerprinting or provide an equivalent external DLP appliance solution which can be integrated with firewall.

➤ **Advanced Persistent Threats (APT) :-**

- Shall support advanced anti-modern malware detection system for identifying and mitigating Advanced Persistent Threats.
- Shall support advanced heuristics and sandboxing (cloud Sandboxing) to determine malicious behavior.
- Shall identifies zero-day wares for further analysis in the cloud, contains up-to-date information about IP reputations and prevents remote command and control communications and uses URL matching and advanced DNS-based web filters to identify potentially harmful websites

➤ **Anti-Spam:-**

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<b>Project No : 120310</b>		<b>Revision : 02</b> <b>Date : 2015-10-31</b>


- The proposed system shall have the ability to provide antispam capabilities over SMTP, POP3 & IMAP without external solution, devices or hardware modules.
- The antispam solution shall have the capabilities to use the following techniques:
- Subscription based inhouse IP address black list, URL black list and checksum database
- IP address BWL
- DNSBL & ORDBL check
- MIME headers check
- Score based banned word check on email subject & body
- External DNSBL

➤ **System Management:-**

- The administrator authentication shall be facilitated by local database, PKI & remote services such as Radius, LDAP and TACAS+
- The system shall support profile base login account administration, offering gradual access control such as only to Policy Configuration & Log Data Access
- The proposed system shall be able to limit remote management access from certain trusted network or host with corresponding administrator account
- The proposed system should be able to facilitate administration audits by logging detailed activities to event log - management access and also configuration changes.

➤ **Log Support:-**

- The solution shall provide comprehensive security event logging, reporting & correlation with digital forensics i.e lawful interception & archiving of interesting popular protocol traffic such as SMTP, HTTP, POP3, IMAP, FTP, IM, NNTP etc for regulatory compliances & analysis purpose
- The Firewall must send log information to an external log server / appliance via an encrypted connection. It shall not store logs in the same device which can result in performance compromise
- The logging and analysis shall either be an appliance or on a dedicated PC/ Server platform. The bidder shall take the responsibility of supplying the hardware and the OS with suitable warranty.
- The hardware/appliance shall have a minimum capacity of 1 TB HDD
- The hardware/appliance shall have minimum 4 x 10/100/1000 Copper Gigabit.
- The logging and analysis device shall be licensed to handle logs from the security devices supplied.
- Shall support a minimum 350 Logs per second of log receive rate.
- The logs shall be Searchable & the log format must be customizable
- The Firewall administration software must provide a means of viewing, filtering, managing & customizing the log data. Shall have provision for Real-Time Traffic Viewer as well as Historical Traffic Viewer
- The Firewall logs must be generated and viewed on per policy basis
- Support to log and view blocked/denied connections
- Shall have options to generate reports in different formats like html, pdf etc.
- The solution shall have readymade templates (ie pre-defined reports) to generate reports like Events reports, Web/Mail Usage reports etc

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Project No : 120310	<b>DOCUMENT NO : NPI-120310-LVS-S1-TD-01</b>	<b>Revision : 02 Date : 2015-10-31</b>

- Shall Support generation of custom reports with redesigned layout
- Ability to produce Bandwidth Usage and Protocol usage reports
- Capability to produce reports of Attacks detected
- Capability to show Web Site Access And Blocked Web Sites Per User
- Capability to produce reports on antivirus detected
- Capability to quarantine AV files
- Provision to Backup / Restore log files
- Warranty\Support\Subscription:
- Shall be supplied with 24 x7 3 Years hardware warranty, hardware & software support and subscription.


➤ **Reference Model: -**

Fortinet FG-600D-BDL


#### 4.14 CORE / EDGE NETWORK SWITCHES & NETWORKING SOFTWARES

➤ **Specification for Core Switch:-**


Features	Description
Core Switch	Core Switch with redundant controller, FAN & power supply. Shall be populated with 2 Port 40GBase-X Interface (FC, QSFP+) should be populated with module 80 port 10GE optical interface (FC, SFP+) 96 port 100M/1000M Ethernet electrical interface (RJ45) Shall have WLAN feature inbuilt & included 128 AP license for controller function IPv6 Function License The Chassis switch Shall be configured to work with the other chassis switch for core failover configuration with necessary component.
Switching capacity	14.72 Tbit/s
Packet forwarding rate	5040 Mbps
Service slots	Minimum 6 Slots
Wireless network management	should support Access controller with integrated line card
	AP access control, AP region management, and AP profile management
	Radio profile management, uniform static configuration, and centralized dynamic management
	Basic WLAN services, QoS, security, and user management
User management	unified user management
	802.1x, MAC address, and Portal authentication
	Traffic- and time-based accounting
	User authorization based on user groups, domains, and time ranges
iPCA quality awareness or equivalent	Marking real service packets to obtain real-time count of dropped packets and packet loss ratio

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<b>Project No : 120310</b>		<b>Revision : 02</b> <b>Date : 2015-10-31</b>

Features	Description
	Counting number of dropped packets and packet loss ratio on devices and L2/L3 networks
SVF virtualization or equivalent	Virtualizing access switches (ASs) and APs into one logical device to simplify management and maintenance
	Two layers of ASs allowed in an SVF system
	Third-party devices allowed between SVF parent and clients
VLAN	Shall support adding access, trunk, and hybrid interfaces to VLANs
	Shall support the default VLAN
	Shall support VLAN switching
	Shall support QinQ and selective QinQ
	Shall support MAC address-based VLAN assignment
MAC address	Shall support automatic learning and aging of MAC addresses
	Shall support static, dynamic, and black hole MAC address entries
	Shall support packet filtering based on source MAC addresses
	Shall support MAC address limiting based on ports and VLANs
STP/ERPS	Shall support STP (IEEE 802.1d), RSTP (IEEE 802.1w), and MSTP (IEEE 802.1s)
	Shall support BPDU protection, root protection, and loop protection
	Shall support BPDU tunnel
	ERPS (G.8032)
IP routing	Shall support IPv4 routing protocols, such as RIP, OSPF, BGP, and IS-IS
	Shall support IPv6 dynamic routing protocols, such as, RIPng, OSPFv3, ISISv6, and BGP4+
Multicast	Shall support IGMP v1/v2/v3, IGMPv1/v2/v3 snooping
	Shall support PIM-SM, PIM-DM, PIM-SSM
	Shall support MSDP, MBGP
	Shall support prompt leave
	Shall support multicast traffic control
	Shall support multicast querier
	Shall support suppression on multicast packets
	Shall support multicast CAC
	Shall support multicast ACL
MPLS	Shall support basic MPLS functions
	Shall support MPLS OAM
	Shall support MPLS TE
	Shall support MPLS VPN/VLL/VPLS
Reliability	Shall support LACP and E-Trunk
	Shall support VRRP and BFD for VRRP
	Shall support BFD for BGP/IS-IS/OSPF/static route
	Shall support NSF, and GR for BGP/IS-IS/OSPF/LDP
	Shall support TE FRR and IP FRR

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<b>Project No : 120310</b>		<b>Revision : 02</b> <b>Date : 2015-10-31</b>


Features	Description
	Shall support Ethernet OAM (IEEE 802.3ah and 802.1ag) (Hardware level)
	Shall support ITU-Y.1731
	Shall support DLDAP
	Shall support In-Service Software Upgrade (ISSU)
QoS	Shall support traffic classification based on Layer 2 headers, Layer 3 protocols, Layer 4 protocols, and 802.1p priority
	Shall support actions of ACL, CAR, re-mark, and schedule
	Shall support queue scheduling algorithms, such as SP, WRR, DRR, SP+WRR, and SP+DRR
	Shall support congestion avoidance mechanisms, such as WRED and tail drop
	Shall support H-QoS
	Shall support traffic shaping
Configuration and maintenance	Shall support console, telnet, and SSH terminals
	Shall support the network management protocols, such as SNMP v1/v2c/v3
	Shall support file uploading and downloading using FTP and TFTP
	Shall support BootROM upgrade and remote upgrade
	Shall support hot patches
	Shall support user operation logs
Security and management	Shall support 802.1x authentication and Portal authentication
	Shall support NAC
	Shall support RADIUS and HWTACACS authentication for login users
	Shall support command line authority control based on user levels, preventing unauthorized users from using commands
	Shall support defense against DoS attacks, TCP SYN Flood attacks, UDP Flood attacks, broadcast storms, and heavy traffic attacks
	Shall support 1K CPU queues
	Shall support ping and traceroute functions based on ICMP packets
Value-added services	Shall support remote network monitoring
	Shall support firewall
	Shall support NAT
	Shall support NetStream
	Shall support IPSec

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Project No : 120310	DOCUMENT NO : NPI-120310-LVS-S1-TD-01	Revision : 02 Date : 2015-10-31

Features	Description
	Shall support wireless AC
	Shall support IPS
Interoperability	Shall support VBST (Compatible with PVST/PVST+/RPVST)
	Shall support LNP (Equivalent to DTP)
	Shall support VCMP (Equivalent to VTP)
Energy saving	Shall support IEEE 802.3az: Energy Efficient Ethernet (EEE)
Operating voltage	AC: 90 V to 290V
Power supply capability of the equipment	4400W Max
Reference Model	HUAWEI S9700 Core Routing Switch(V200R007) (or) Higher
Warranty	24 x7, 3 Years Onsite/Parts/Labour Warranty

➤ **Specification for Edge /Distribution Switch (24 port Gigabit, 4 Port SFP+):-**

Features	Description
Form Factor	1 U
Number of Ports	24 – 10/100/1000 Base-T Ethernet Ports
Fixed Ports	4x10GESFP+Ports
MAC Address Table	MAC address learning and aging, Static, dynamic, and blackhole MAC address entries, Packet filtering based on source MAC addresses, Interface-based MAC learning limiting, 16K MAC address entries
VLAN Features	4K VLANs, Guest VLAN and voice VLAN, GVRP, MUX VLAN, VLAN assignment based on MAC addresses, protocols, IP subnets, policies, and interfaces, 1:1 and N:1 VLAN mapping
Reliability	ERPS (G.8032), STP(IEEE 802.1d), RSTP(IEEE 802.1w), and MSTP(IEEE 802.1s), BPDU protection, root protection, and loop protection
IP routing	Static route
IPv6 features	Neighbour Discovery (ND), Path MTU (PMTU), IPv6 ping, IPv6 tracer, and IPv6 Telnet, ACLs based on the source IPv6 address, destination IPv6 address, Layer 4 ports, and protocol type, MLDv1/v2 snooping
Multicast	IGMPv1/v2/v3 snooping and IGMP fast leave, Multicast forwarding in a VLAN and multicast replication between VLANs, Multicast load balancing among member ports of a trunk, Controllable multicast, Interface-based multicast traffic statistics
QoS/ACL	Rate limiting on packets sent and received by an interface Packet redirection, Interface-based traffic policing and two-rate and three-color CAR, Eight queues on each interface WRR, DRR, SP, WRR+SP, and DRR+SP queue scheduling algorithms, Re-marking of the 802.1p priority and DSCP priority, Packet filtering at Layer 2 to Layer 4, filtering out invalid frames based on the source , MAC address, destination MAC address, source IP address, destination IP address, TCP/ UDP port number, protocol type, and VLAN ID, Rate limiting in each queue and traffic shaping on interfaces
Security	Hierarchical user management and password protection,


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Project No : 120310	DOCUMENT NO : NPI-120310-LVS-S1-TD-01	Revision : 02 Date : 2015-10-31

	DoS attack defense, ARP attack defense, and ICMP attack defense, Binding of the IP address, MAC address, interface number, and VLAN ID Port isolation, port security, and sticky MAC, MFF, Blackhole MAC address entries Limit on the number of learned MAC addresses IEEE 802.1x authentication and limit on the number of users on an interface, AAA authentication, RADIUS authentication, HWTACACS+ authentication or equivalent, and NAC, SSH V2.0, Hypertext Transfer Protocol Secure (HTTPS), CPU defense Blacklist and whitelist
Access Security	DHCP relay, DHCP server, DHCP snooping, and DHCP security
Lightning Protection	Service Interface : 6kV
Super Virtual	Working as an SVF client that is plug-and-play with zero configuration
Fabric (SVF) or equivalent	Automatically loading the system software package and patches of clients One-click and automatic delivery of service configurations, Supports independent running client
Management Maintenance	iStack, Virtual Cable Test (VCT), Remote configuration and maintenance using Telnet SNMP v1/v2c/v3, RMON, eSight and web-based NMS, HTTPS, System logs and multi-level alarms, 802.3az EEE, Dying Gasp, Device hibernation mode.
Interoperability	Supports VBST or Equivalent (Compatible with PVST/PVST=RPVST)
Operating Conditions	0 to 45 deg C 5 to 95 % (non-condensing) RH
Power Supply	180 to 240 V AC -50/60 Hz (1 Phase)
Power Requirement	Max 500 Watt
Reference Model	HUAWEI S5700-28X-LI-AC (or) Equivalent (or) Higher
Warranty	9 x 5, 3 Years Onsite/Parts/Labour Warranty

➤ **Specification for Edge /Distribution Switch (24 port Gigabit, PoE, 4 Port SFP+):-**

Features	Description
Form Factor	1 U
Number of Ports	24 – 10/100/1000 Base-T POE Ethernet Ports
Fixed Ports	4x10G SFP+ Ports
MAC Address Table	MAC address learning and aging, Static, dynamic, and blackhole MAC address entries, Packet filtering based on source MAC addresses, Interface-based MAC learning limiting, 16K MAC address entries
VLAN Features	4K VLANs, Guest VLAN and voice VLAN, GVRP, MUX VLAN, VLAN assignment based on MAC addresses, protocols, IP subnets, policies, and interfaces, 1:1 and N:1 VLAN mapping
Reliability	ERPS (G.8032), STP(IEEE 802.1d), RSTP(IEEE 802.1w), and MSTP(IEEE 802.1s), BPDU protection, root protection, and loop protection
IP routing	Static route
IPv6 features	Neighbour Discovery (ND), Path MTU (PMTU), IPv6 ping, IPv6 tracer, and IPv6 Telnet, ACLs based on the source IPv6 address, destination IPv6 address, Layer 4 ports, and protocol type, MLDv1/v2 snooping
Multicast	IGMPv1/v2/v3 snooping and IGMP fast leave, Multicast forwarding in a VLAN and multicast replication between VLANs, Multicast load balancing among member ports of a trunk,




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Project No : 120310	DOCUMENT NO : NPI-120310-LVS-S1-TD-01	Revision : 02 Date : 2015-10-31


Features	Description
	Controllable multicast, Interface-based multicast traffic statistics
QoS/ACL	Rate limiting on packets sent and received by an interface Packet redirection, Interface-based traffic policing and two-rate and three-color CAR, Eight queues on each interface WRR, DRR, SP, WRR+SP, and DRR+SP queue scheduling algorithms, Re-marking of the 802.1p priority and DSCP priority, Packet filtering at Layer 2 to Layer 4, filtering out invalid frames based on the source , MAC address, destination MAC address, source IP address, destination IP address, TCP/ UDP port number, protocol type, and VLAN ID, Rate limiting in each queue and traffic shaping on interfaces
Security	Hierarchical user management and password protection, DoS attack defense, ARP attack defense, and ICMP attack defense, Binding of the IP address, MAC address, interface number, and VLAN ID Port isolation, port security, and sticky MAC, MFF, Blackhole MAC address entries Limit on the number of learned MAC addresses IEEE 802.1x authentication and limit on the number of users on an interface, AAA authentication, RADIUS authentication, HWTACACS+ authentication or equivalent , and NAC, SSH V2.0, Hypertext Transfer Protocol Secure (HTTPS), CPU defense Blacklist and whitelist
Access Security	DHCP relay, DHCP server, DHCP snooping, and DHCP security
Lightning Protection	Service Interface : 6kV
Super Virtual	Working as an SVF client that is plug-and-play with zero configuration
Fabric (SVF) or equivalent	Automatically loading the system software package and patches of clients One-click and automatic delivery of service configurations, Supports independent running client
Management Maintenance	iStack, Virtual Cable Test (VCT), Remote configuration and maintenance using Telnet SNMP v1/v2c/v3, RMON, eSight and web-based NMS, HTTPS, System logs and multi-level alarms, 802.3az EEE, Dying Gasp, Device hibernation mode.
Interoperability	Supports VBST or Equivalent (Compatible with PVST/PVST=RPVST)
Operating Conditions	0 to 45 deg C 5 to 95 % (non-condensing) RH
Power Supply	180 to 240 V AC -50/60 Hz (1 Phase)
Power Consumption	AC <896.6 W(PoE: 800 W) with RPS
Reference Model	HUAWEI S5700-28X-PWR-LI-AC (or) Equivalent (or) Higher
Warranty	9 x 5, 3 Years Onsite/Parts/Labour Warranty

➤ **Specification for Edge /Distribution Switch (48 port Gigabit, 4 Port SFP+):-**

Features	Description
Number of Ports	48 – 10/100/1000 Base-T Ethernet Ports
Fixed Ports	4x10GESFP+Ports
MAC Address Table	MAC address learning and aging, Static, dynamic, and blackhole MAC address entries, Packet filtering based on source MAC addresses, Interface-based MAC learning limiting, 16K MAC address entries
VLAN Features	4K VLANs, Guest VLAN and voice VLAN, GVRP, MUX VLAN, VLAN assignment based on MAC addresses, protocols,


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Project No : 120310		Revision : 02 Date : 2015-10-31

Features	Description
	IP subnets, policies, and interfaces, 1:1 and N:1 VLAN mapping
Reliability	ERPS (G.8032), STP(IEEE 802.1d), RSTP(IEEE 802.1w), and MSTP(IEEE 802.1s), BPDU protection, root protection, and loop protection
IP routing	Static route
IPv6 features	Neighbour Discovery (ND), Path MTU (PMTU), IPv6 ping, IPv6 tracer, and IPv6 Telnet, ACLs based on the source IPv6 address, destination IPv6 address, Layer 4 ports, and protocol type, MLDv1/v2 snooping
Multicast	IGMPv1/v2/v3 snooping and IGMP fast leave, Multicast forwarding in a VLAN and multicast replication between VLANs, Multicast load balancing among member ports of a trunk, Controllable multicast, Interface-based multicast traffic statistics
QoS/ACL	Rate limiting on packets sent and received by an interface Packet redirection, Interface-based traffic policing and two-rate and three-color CAR, Eight queues on each interface WRR, DRR, SP, WRR+SP, and DRR+SP queue scheduling algorithms, Re-marking of the 802.1p priority and DSCP priority, Packet filtering at Layer 2 to Layer 4, filtering out invalid frames based on the source , MAC address, destination MAC address, source IP address, destination IP address, TCP/ UDP port number, protocol type, and VLAN ID, Rate limiting in each queue and traffic shaping on interfaces
Security	Hierarchical user management and password protection, DoS attack defense, ARP attack defense, and ICMP attack defense, Binding of the IP address, MAC address, interface number, and VLAN ID Port isolation, port security, and sticky MAC, MFF, Blackhole MAC address entries Limit on the number of learned MAC addresses IEEE 802.1x authentication and limit on the number of users on an interface, AAA authentication, RADIUS authentication, HWTACACS+ authentication or equivalent , and NAC, SSH V2.0, Hypertext Transfer Protocol Secure (HTTPS), CPU defense Blacklist and whitelist
Access Security	DHCP relay, DHCP server, DHCP snooping, and DHCP security
Lightning Protection	Service Interface : 6kV
Super Virtual	Working as an SVF client that is plug-and-play with zero configuration
Fabric (SVF) or equivalent	Automatically loading the system software package and patches of clients One-click and automatic delivery of service configurations, Supports independent running client
Management Maintenance	iStack, Virtual Cable Test (VCT), Remote configuration and maintenance using Telnet SNMP v1/v2c/v3, RMON, eSight and web-based NMS, HTTPS, System logs and multi-level alarms, 802.3az EEE, Dying Gasp, Device hibernation mode.
Interoperability	Supports VBST or Equivalent (Compatible with PVST/PVST=RPVST). Supports LNP or equivalent (Similar to DTP), Supports VCMP or equivalent (Similar to VTP)
Operating Conditions	0 to 45 deg C 5 to 95 % (non-condensing) RH
Power Supply	180 to 240 V AC -50/60 Hz (1 Phase)
Power Consumption	AC < 61 W
Reference Model	HUAWEI S5700-52X-LI-AC (or) Equivalent (or) Higher
Warranty	9 x 5, 3 Years Onsite/Parts/Labour Warranty

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Project No : 120310	DOCUMENT NO : NPI-120310-LVS-S1-TD-01	Revision : 02 Date : 2015-10-31

➤ **Specification for Edge /Distribution Switch (24 port Gigabit, PoE, 4 Port SFP+):-**

Features	Description
Number of Ports	48 – 10/100/1000 Base-T POE Ethernet Ports
Fixed Ports	4x10GESFP+Ports, All the 48 ports should be 802.3af (15.4 W per port) compliant.
MAC Address Table	MAC address learning and aging, Static, dynamic, and blackhole MAC address entries, Packet filtering based on source MAC addresses, Interface-based MAC learning limiting, 16K MAC address entries
VLAN Features	4K VLANs, Guest VLAN and voice VLAN, GVRP, MUX VLAN, VLAN assignment based on MAC addresses, protocols, IP subnets, policies, and interfaces, 1:1 and N:1 VLAN mapping
Reliability	ERPS (G.8032), STP(IEEE 802.1d), RSTP(IEEE 802.1w), and MSTP(IEEE 802.1s), BPDU protection, root protection, and loop protection
IP routing	Static route
IPv6 features	Neighbour Discovery (ND), Path MTU (PMTU), IPv6 ping, IPv6 tracer, and IPv6 Telnet, ACLs based on the source IPv6 address, destination IPv6 address, Layer 4 ports, and protocol type, MLDv1/v2 snooping
Multicast	IGMPv1/v2/v3 snooping and IGMP fast leave, Multicast forwarding in a VLAN and multicast replication between VLANs, Multicast load balancing among member ports of a trunk, Controllable multicast, Interface-based multicast traffic statistics
QoS/ACL	Rate limiting on packets sent and received by an interface Packet redirection, Interface-based traffic policing and two-rate and three-color CAR, Eight queues on each interface WRR, DRR, SP, WRR+SP, and DRR+SP queue scheduling algorithms, Re-marking of the 802.1p priority and DSCP priority, Packet filtering at Layer 2 to Layer 4, filtering out invalid frames based on the source , MAC address, destination MAC address, source IP address, destination IP address, TCP/ UDP port number, protocol type, and VLAN ID, Rate limiting in each queue and traffic shaping on interfaces
Security	Hierarchical user management and password protection, DoS attack defense, ARP attack defense, and ICMP attack defense, Binding of the IP address, MAC address, interface number, and VLAN ID Port isolation, port security, and sticky MAC, MFF, Blackhole MAC address entries Limit on the number of learned MAC addresses IEEE 802.1x authentication and limit on the number of users on an interface, AAA authentication, RADIUS authentication, HWTACACS+ authentication or equivalent , and NAC, SSH V2.0, Hypertext Transfer Protocol Secure (HTTPS), CPU defense Blacklist and whitelist
Access Security	DHCP relay, DHCP server, DHCP snooping, and DHCP security
Lightning Protection	Service Interface : 6kV
Super Virtual	Working as an SVF client that is plug-and-play with zero configuration
Fabric (SVF) or equivalent	Automatically loading the system software package and patches of clients One-click and automatic delivery of service configurations, Supports independent running client

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Project No : 120310		Revision : 02 Date : 2015-10-31

Features	Description
Management Maintenance	iStack, Virtual Cable Test (VCT), Remote configuration and maintenance using Telnet SNMP v1/v2c/v3, RMON, eSight and web-based NMS, HTTPS, System logs and multi-level alarms, 802.3az EEE, Dying Gasp, Device hibernation mode.
Interoperability	Supports VBST or Equivalent (Compatible with PVST/PVST=RPVST), Supports LNP or equivalent (Similar to DTP), Supports VCMP or equivalent (Similar to VTP)
Operating Conditions	0 to 45 deg C 5 to 95 % (non-condensing) RH
Power Supply	180 to 240 V AC -50/60 Hz (1 Phase)
Power Consumption	AC <896.6 W(PoE: 800 W) with RPS
Reference Model	HUAWEI S5700-52X-PWR-LI-AC (or) Equivalent (or) Higher
Warranty	9 x 5, 3 Years Onsite/Parts/Labour Warranty

#### 4.15 Wireless Access Point/Wireless System :-


##### ➤ General:-

It shall be used as a standalone access point in wireless environments or deployed as part of a larger data and communications network. It shall be designed to integrate with other system and shall make advanced wireless and communications applications easy to install, configure, and support


##### ➤ Specification:-

##### • Indoor Wireless Access Point

Features	Description
System Memory	256 MB DDR2 32 MB Flash Memory
Power Input	12V DC $\pm$ 10% PoE power supply: -48V DC (in compliance with IEEE 802.3af/at)
Antenna type	built-in antennas
Antenna gain	4 dBi (2.4 GHz); 5 dBi (5 GHz)
Maximum No of Users	256
maximum Transmit Power	20 dBm
Power increment	1 dBm
Receiver sensitivity	2.4 GHz 802.11b (CCK): -96 dBm @ 1 Mb/s; -89 dBm @ 11 Mb/s
	2.4 GHz 802.11g (non-HT20): -87 dBm @ 6 Mb/s; -74 dBm @ 54 Mb/s
	2.4 GHz 802.11n (HT20): -87 dBm @ MCS0; -71 dBm @ MCS7
	2.4 GHz 802.11n (HT40): -84 dBm @ MCS0; -68 dBm @ MCS7
	5 GHz 802.11a (non-HT20): -90 dBm @ 6 Mb/s; -73 dBm @ 54 Mb/s
	5 GHz 802.11n (HT20): -89 dBm @ MCS0; -70 dBm @ MCS7
	5 GHz 802.11n (HT40): -86 dBm @ MCS0; -66 dBm @ MCS7
	5 GHz 802.11ac (VTH20): -88 dBm @ MCS0NSS1; -65 dBm @ MCS8NSS1
	5 GHz 802.11ac (VTH40): -85 dBm @ MCS0NSS1; -60 dBm @ MCS9NSS1
	5 GHz 802.11ac (VTH80): -82 dBm @ MCS0NSS1; -57 dBm @ MCS9NSS1
WLAN	Compliance with IEEE 802.11a/b/g/n/ac


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<b>Project No : 120310</b>	<b>DOCUMENT NO : NPI-120310-LVS-S1-TD-01</b>	<b>Revision : 02</b> <b>Date : 2015-10-31</b>

Features	Description
features	Maximum rate: 1.75 Gbit/s Maximum Ratio Combining (MRC) Maximum Likelihood Detection (MLD) Data unit aggregation, including A-MPDU (Tx/Rx) and A-MSDU (Rx only) 802.11 Dynamic Frequency Selection (DFS) Short Guard Interval (GI) in 20 MHz, 40 MHz, and 80 MHz modes Priority mapping and packet scheduling based on a Wi-Fi Multimedia (WMM) profile to implement priority-based data processing and forwarding Automatic and manual rate adjustment (the rate is adjusted automatically by default) WLAN channel management and channel rate adjustment Automatic channel scanning and interference avoidance Service Set Identifier (SSID) hiding Signal Sustain Technology (SST) Unscheduled Automatic Power Save Delivery (U-APSD) Control and Provisioning of Wireless Access Points (CAPWAP) in Fit AP mode Automatic access in Fit AP mode WDS in Fit AP mode Mesh networking in Fit AP mode
QoS features	Compliance with IEEE 802.3u Auto-negotiation of the rate and duplex mode; automatic switchover between the Media Dependent Interface (MDI) and Media Dependent Interface Crossover (MDI-X) SSID-based VLAN assignment VLAN trunk on uplink Ethernet ports 4,094 VLAN IDs (1 to 4,094) and a maximum of 16 virtual APs (VAPs) for each radio AP control channel in tagged and untagged mixed mode DHCP client, obtaining IP addresses through DHCP Tunnel forwarding and direct forwarding STA isolation in the same VLAN Access control lists (ACLs) Link Layer Discovery Protocol (LLDP) Service holding upon CAPWAP link disconnection in Fit AP mode Unified authentication on the AC in Fit AP mode AC dual-link backup in Fit AP mode
Network features	Priority mapping and packet scheduling based on a WMM profile to implement priority-based data processing and forwarding WMM parameter management for each radio WMM power saving Priority mapping for upstream packets and flow-based mapping for downstream packets Queue mapping and scheduling User-based bandwidth limiting Adaptive bandwidth management (the system dynamically adjusts bandwidth based on the number of users and radio environment to improve user experience) Airtime scheduling
Security features	Open system authentication WEP authentication/encryption

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Project No : 120310	DOCUMENT NO : NPI-120310-LVS-S1-TD-01	Revision : 02 Date : 2015-10-31

Features	Description
	WPA/WPA2-PSK authentication and encryption WPA/WPA2-802.1x authentication and encryption WAPI authentication and encryption WIDS including rogue AP and STA detection, attack detection, STA/AP blacklist and whitelist
Maintenance features	Unified management and maintenance on the AC in Fit AP mode Plug-and-Play (PnP) in Fit AP mode: automatic ally going online and loading configurations WDS zero-configuration deployment in Fit AP mode WMN zero-configuration deployment in Fit AP mode Batch upgrade Local AP management through the serial port or using Telnet Real-time configuration monitoring and fast fault location using the NMS System status alarm
BYOD	Identifies the device type according to the Organizationally Unique Identifier (OUI) in the MAC address. Identifies the device type according to the User Agent (UA) information in an HTTP packet Identifies the device type according to DHCP options. The RADIUS server delivers packet forwarding, security, and QoS policies according to the device type carried in the RADIUS authentication and accounting packets.
Spectrum analysis	Identifies interference sources such as baby monitors, Bluetooth devices, digital cordless phones (at 2.4 GHz frequency band only), wireless audio transmitters (at both the 2.4 GHz and 5 GHz frequency bands), wireless game controllers, and microwave ovens. Works with Huawei eSight to locate and perform spectrum analysis on interference sources.
Safety standards	UL 60950-1 CAN/CSA 22.2 No.60950-1 IEC 60950-1 EN 60950-1 GB 4943
Radio standards	ETSI EN 300 328
	ETSI EN 301 893
	FCC Part 15C: 15.247
	FCC Part 15C: 15.407
	RSS-210
	AS/NZS 4268
EMC Standards	EN 301 489-1 EN 301 489-17 ETSI EN 60601-1-2 FCC Part 15 ICES-003 YD/T 1312.2-2004 ITU k.21 GB 9254 GB 17625.1 AS/NZS CIPSR22 EN 55022 EN 55024




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Project No : 120310	DOCUMENT NO : NPI-120310-LVS-S1-TD-01	Revision : 02 Date : 2015-10-31

Features	Description
	CISPR 22 CISPR 24 IEC61000-4-6 IEC61000-4-2
IEE Standards	IEEE 802.11a/b/g IEEE 802.11n IEEE 802.11ac IEEE 802.11h IEEE 802.11d IEEE 802.11e
Security Standard	802.11i, Wi-Fi Protected Access 2 (WPA2), and WPA 802.1X Advanced Encryption Standards (AES) and Temporal Key Integrity Protocol (TKIP) EAP Type (s)
Environmental standards	ETSI 300 019-2-1
	ETSI 300 019-2-2
	ETSI 300 019-2-3 ETSI 300 019-1-1
	ETSI 300 019-1-2
	ETSI 300 019-1-3
MF	CENELEC EN 62311 CENELEC EN 50385 OET65 RSS-102 FCC Parts 1 & 2 FCC KDB series
RoHS	Directive 2002/95/EC & 2011/65/EU
Reach	Regulation 1907/2006/EC
WEEE	Directive 2002/96/EC & 2012/19/EU
Reference Model	HUAWEI AP5030DN (or) Equivalent (or) Higher
Warranty	9 x 5, 3 Years Onsite/Parts/Labour Warranty


- Specification for Point to Multipoint Base Station Radio**

Features	Description
Frequency	Radio system should operate ISM Band - 5.8GHz
Topology	System should be able to perform as Point-to-Point and Point-to-Multipoint without changing Hardware
Channel Bandwidth	System must support 5MHz / 10MHz / 20MHz / 40 MHz Channel Bandwidth
Channel Spacing	Configurable on 5MHz increments
Max Output Power at Antenna port	+30 dBm (double chain combined), configurable in 1dB Step
Modulation	QPSK, 16-QAM, 64-QAM, MIMO, OFDM with Forward Error Correction (FEC)
	Should support automatic adaptive modulation
Architecture	90° / 120° sectoral Antenna for AP
	Single Cable between IDU & ODU



Client : 	<b>TENDER DOCUMENT FOR SUPPLY, INSTALLATION, TESTING &amp; CONFIGURATION OF IT, COMMUNICATION, ACCESS CONTROL &amp; SURVEILLANCE SYSTEM</b>	<b>nne pharmaplan®</b>
Project No : 120310	DOCUMENT NO : NPI-120310-LVS-S1-TD-01	Revision : 02 Date : 2015-10-31


Antenna gain	15 dBi for 90o and 14 dBi for 120o
Transmit Power	System must support Automatic Transmit Power Control (ATPC) to limit the CPE unwanted power
Distance Coverage	shall support at least for 15 KMs
Number of CPE per Base station	Device should support atleast 100 CPE with Data Encryption
Vlan Support	VLAN support based on IEEE 802.1Q with 802.1p priority
Encryption	128 bit AES
Throughput	System must deliver actual/usable aggregate throughput of at least 100 Mbps in 20 MHz Channel Width
Encryption effect on throughput	Throughput capacity should not be reduced when using AES encryption
LAN Interface	System must support 100/1000Base(T) half/full duplex, rate auto negotiated - 802.3af compliant
Management	System should have support of IPv4, UDP, TCP, IP, ICMP, SSH, SNMPv2c, HTTPs, FTP
	System should have support of Network Management with HTTPs, SSH, FTP, SNMPv2c
Quality of Service	Three level priority (Voice, High, Low) with packet classification by DSCP, COS, VLAN ID, IP & MAC Address, Broadcast, Multicast and Station Priority
ARQ	System should support ARQ
Ethernet Latency	Typical latency shall not exceed 18ms roundtrip
Surge Protection	System should have inbuilt surge protection mechanism up to 1 Joule
GPS synchronization	System should support GPS synchronization technique to eliminate UL and DL interference
Colocation of Sectors	Co-located radios using adjacent channels in a common place must not require a guard band for optimal performance
Power Consumption	Typical 8W but not more than 10W for AP
Priority Management	User must be able to define priority for management and data traffic
Prioritization of Multicast	System must support prioritization of Multicast for Video Streaming.
Classification	System must provide the provision to configure rules to classify High Priority Packets
MAC (Media Access Control) Layer	System must support scheduled access rather than CSMA Technology
Anti Cloning	system must support Anticlone Hardware for better security
Packets Per Second	Minimum 30000 PPS
Spectral Efficiency	Minimum 5 bps/Hz or better
Power Consumption	System should be able to configure symmetric & asymmetric bandwidth. Also should support flexible dynamic Upload and download percentage should be user configurable.
Identity-based user accounts	System must support minimum of four user with four possible user role as Administrator, Installer, User and Readonly
NAT	System must support NAT feature
DHCP	System must be able to receive the IP Address from DHCP Server
Layer 2 Firewall	System must support Layer 2 firewall based on VLAN, Ethernet type, Source and Destination Mac Address in wireless/Ethernet port direction
Layer 3 Firewall	System must support Layer 3 firewall based on IP Address, Network and DSCP/TOS.

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Project No : 120310	DOCUMENT NO : NPI-120310-LVS-S1-TD-01	Revision : 02 Date : 2015-10-31


Log	System must be able to generate log for firewall mach
Tools	System must supports inbuilt tool to Ping, Traceroute and UL/DL Throughput Testing
NTP	System must be able to derive clock from NTP Server
Syslog	System must support Syslog Feature to upload the log on Syslog Server
Spectrum Analyzer	System must support Spectrum analyzer tool to find the best available frequency to be used.
Performance Statistic	System must be able to provide detail statistic of Wireless and Lan Interface including Received packets, error, multicast, broadcast packet received
Ethernet Port	system must also support Secondary ethernet Port which can be directly connected to IP Camera
Operation Temp.	30°C to 60°C Outdoor
	20°C to 40°C Indoor
Protection	Shall support IP55
Antenna	120 Deg sector Antenna should be supplied
Certification	CE: EN 301 893 v1.7.1 EN 302 502 v1.2.1
	EMC: EN 301 489-1 v1.9.2 & EN 301 489-17 v2.2.1
	Health EME: EN50385:2002
	Safety: EN 60950-1:2006 + Amendment 12:2011 EN 60950-22:2006
Reference Model	Cambium C050900A011A (or) Equivalent (or) Higher
Warranty	9 x 5, 3 Years Onsite/Parts/Labour Warranty

- Point to Multipoint CPE & Point to Point Radio**

Features	Description
Frequency	Radio system should operate ISM Band - 5.8GHz
Topology	System should be able to perform as Point-to-Point and Point-to-Multipoint without changing Hardware
Channel Bandwidth	System must support 5MHz / 10MHz / 20MHz / 40 MHz Channel Bandwidth
Channel Spacing	Configurable on 5MHz increments
Max Output Power at Antenna port	+30 dBm (double chain combined), configurable in 1dB Step
Modulation	QPSK, 16-QAM, 64-QAM, MIMO, OFDM with Forward Error Correction (FEC)
	Should support automatic adaptive modulation
Architecture	13 dBi Integrated Antenna
	Single Cable between IDU & ODU
Antenna gain	CPE should have integrated antenna of at least 13 dBi gain and shall have support to increase the antenna gain of at least 5-6 dBi by adding an optional passive device without changing the CPE hardware
Transmit Power	System must support Automatic Transmit Power Control (ATPC) to limit the CPE unwanted power
Distance Coverage	shall support at least for 2 KMs
Vlan Support	VLAN support based on IEEE 802.1Q with 802.1p priority

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<b>Project No : 120310</b>	<b>DOCUMENT NO : NPI-120310-LVS-S1-TD-01</b>	<b>Revision : 02 Date : 2015-10-31</b>

Features	Description
Encryption	128 bit AES
Throughput	System must deliver actual/usable aggregate throughput of at least 100 Mbps in 20 MHz Channel Width if connected a single subscriber unit to Base Station
Encryption effect on throughput	Throughput capacity should not be reduced when using AES encryption
LAN Interface	System must support 100Base(T) half/full duplex, rate auto negotiated - 802.3af compliant
Management	System should have support of IPv4, UDP, TCP, IP, ICMP, SSH, SNMPv2c, HTTPs, FTP
	System should have support of Network Management with HTTPs, SSH, FTP, SNMPv2c
Quality of Service	Three level priority (Voice, High, Low) with packet classification by DSCP, COS, VLAN ID, IP & MAC Address, Broadcast, Multicast and Station Priority
ARQ	System should support ARQ
Ethernet Latency	Typical latency shall not exceed 18ms roundtrip
Surge Protection	System should have inbuilt surge protection mechanism up to 1 Joule
Power Consumption	Typical 5W but not more than 7W for CPE
Priority Management	User must be able to define priority for management and data traffic
Prioritization of Multicast	System must support prioritization of Multicast for Video Streaming.
Classification	System must provide the provision to configure rules to classify High Priority Packets
MAC (Media Access Control) Layer	System must support scheduled access rather than CSMA Technology
Anti Cloning	system must support Anticlone Hardware for better security
Packets Per Second	Minimum 30000 PPS
Spectral Efficiency	Minimum 5 bps/Hz or better
Bandwidth	System should be able to configure symmetric & asymmetric bandwidth. Also should support flexible dynamic Upload and download percentage should be user configurable.
Identity-based user accounts	System must support minimum of four user with four possible user role as Administrator, Installer, User and Readonly
NAT	System must support NAT feature
DHCP	System must be able to receive the IP Address from DHCP Server
Layer 2 Firewall	System must support Layer 2 firewall based on VLAN, Ethernet type, Source and Destination Mac Address in wireless/Ethernet port direction
Layer 3 Firewall	System must support Layer 3 firewall based on IP Address, Network and DSCP/TOS.
Log	System must be able to generate log for firewall machine
Tools	System must support inbuilt tool to Ping, Traceroute and UL/DL Throughput Testing
NTP	System must be able to derive clock from NTP Server
Syslog	System must support Syslog Feature to upload the log on Syslog Server
Spectrum Analyzer	System must support Spectrum analyzer tool to find the best available frequency to be used.

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Project No : 120310	DOCUMENT NO : NPI-120310-LVS-S1-TD-01	Revision : 02 Date : 2015-10-31

Features	Description
Performance Statistic	System must be able to provide detail statistic of Wireless and Lan Interface including Received packets,error ,multicast , broadcast packet received
Ethernet Port	system must also support Secondary ethernet Port which can be directly connected to IP Camera
Operation Temp.	30°C to 60°C Outdoor
	20°C to 40°C Indoor
Protection	Shall support IP55
Certification	CE: EN 301 893 v1.7.1 EN 302 502 v1.2.1
	EMC: EN 301 489-1 v1.9.2 & EN 301 489-17 v2.2.1
	Health EME: EN50385:2002
	Safety: EN 60950-1:2006 + Amendment 12:2011 EN 60950-22:2006
Reference Model	Cambium C050900C031A (or) Equivalent (or) Higher
Warranty	9 x 5, 3 Years Onsite/Parts/Labour Warranty



#### 4.16 Smart Board and LFD (Large Format Display):-

##### ➤ Smart Board:-

The Smart Board is an interactive whiteboard that uses touch detection for user input (for example scrolling and right mouse-click) in the same way as normal PC input devices. The Smart Board interactive whiteboard shall have 'flick and scroll' feature. The Smart Board interactive whiteboard shall operate as part of a system that includes the interactive whiteboard, a computer, a projector and white boarding software - Smart Meeting Pro software for business. The components are connected wirelessly or via USB or serial cables. A projector connected to the computer displays the desktop image on the interactive whiteboard. The whiteboard accepts touch input from a finger, pen or other solid object. Smart Board interactive whiteboards shall also be available as a front-projection flat-panel display – interactive surfaces that fit over plasma or LCD display panels.

##### ➤ Key Features and Performance:-


- **Dual touch capabilities** DViT technology shall provide support for two simultaneous touches, making it easy for two students to instantly collaborate, working together at the same time.
- **Freestyle interaction** Two person shall instantly start working together without having to switch to a multiuser mode or work in confined areas of the surface. Switch naturally from collaborating to interacting with lesson content.
- **Touch gestures** A natural touch experience shall make it easy for the users to interact with content, writing, erasing and performing mouse functions using a finger or pen. Flick, rotate and zoom using simple hand gestures.
- **SMART Notebook collaborative learning software** The software shall create engaging interactive lessons, and then saves notes and content from those lessons to share with users. It provides a common platform for linking Meeting Room technologies and mobile devices such as laptop, PC etc.
- **SMART Ink** shall improve the legibility of user handwriting as user write over applications, websites and videos. The ink becomes an object that can be move and manipulate.

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<b>Project No : 120310</b>		<b>Revision : 02</b> <b>Date : 2015-10-31</b>

- **Intuitive multiuser pen tray** shall have Quick access to ink color sections, on-screen keyboard and help functions, making it easy for the users to facilitate the interactive whiteboard.
- **Durable surface** shall be the low-gloss surface is optimized for projection, ensuring that content can be clearly seen from anywhere in the room. The surface is also easy to clean and is compatible with dry-wipe markers.
- **Projector controls** shall be available with the SMART Board system, projector controls are integrated into the pen tray for easy projector management.

➤ **Large Format Display (65 Inch)**

Features	Description
Screen Size	65
Panel Technology	IPS (PD)
Aspect Ratio	16:09
Native Resolution	1920x1080 (FHD)
Brightness	400cd/m <sup>2</sup>
Contrast Ratio	1300:01:00
Dynamic CR	500000:1
Viewing Angle (Hxv)	178x178
Surface Treatment	Hard Coating (3H), Anti glare treatment of the front polarizer (Haze 1% (Typ))
Guaranteed Operating Hour	18 Hours
Orientation	Portrait & landscape
Input	HDMI, DVI-D, RGB, Sterio Mini Jack, USB (2)
Output	Stereo Mini Jack, External Speaker Out
External Control	RS232C (In/Out), RJ45, IR Receiver
Bezel Colour	Black
Bezel Width	11.9mm (T/R/L), 18mm (B)
Monitor Dimension (WxHxD)	1456.9x83Bx41.1mm
Weight (Head)	27.7kg
Weight (Head + Stand)	32.9kg
Monitor with Optional Stand & Speaker Dimensions (WxHxD)	1456.9x89B.1x293.7mm
Weight (Head + Stand + Speaker)	33.4kg
Carton Dimensions (WxHxD)	1561x951x170mm
Packed Weight	33.6kg
VESA™ Standard Mount Interface	300x300
Special Features	USB Content Scheduling, Conformal Coating, SNMP Support, Wi-Fi Ready (Dongle), Power management modes (Sustain Aspect Ratio/Stand-by Screen, Etc), No Signal Image setting, Enhanced ISM (Image Sticking Minimization) Mode, Holiday Schedule/Local Time Auto, Setting, Fail-over (USB, RGB, DVI, HDMI) Wake on LAN
Operating Temperature Range	0°C to 40°C
Operating Humidity Range	10% to 80%
Power Supply	100-240V- 50/60Hz
Power Type	Built - in power
Typ	95W
Smart Energy Saving	70W


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<b>Project No : 120310</b>		<b>Revision : 02</b> <b>Date : 2015-10-31</b>

Features	Description
Safety	UL/cUL/CB/TUV/KC
EMC	FCC Class "A"/CE/KCC
ErP/Energy Star	yes/Yes (Energy Star 6.0)
External Media player Attachable	Yes (MP500/MP700)
SuperSign -w lite	Yes
SuperSign-c	Yes
Basic	Remote Controller (2 batteries Included), Power Cord, QSG, RGB Cable , Regulation Book, Phone to RS232C Gender
Optional	Speaker (SP-5000), Stand (ST-652T), Wall bracket (LSW350B), VESA Adapter (AM-B330B)
Warranty	3 Years Onsite\ Parts\ Labour Warranty

➤ **Large Format Display (43 Inch) – For Surveillance Viewing Station**

Features	Description
Screen Size	43
Panel Technology	IPS (PD)
Aspect Ratio	16:09
Native Resolution	1920x1080 (FHD)
Brightness	450cd/m²
Contrast Ratio	1100:1-1300:1
Dynamic CR	4000000:1
Viewing Angle (Hxv)	178x178
Surface Treatment	Hard Coating (3H), Anti glare treatment of the front polarizer (Haze 1% (Typ))
Orientation	Portrait & landscape
Input	HDMI, DP, DVI-D, RGB, Audio, USB 3.0, SD Card
Output	DP, Audio, External Speaker
External Control	RS232C (In/Out), RJ45, IR Receiver, Pixel sensor
Bezel Colour	Black
Bezel Width	11.9mm (T/R/L), 18mm (B)
Monitor Dimension (WxHxD)	969.6x563.9/54mm
Weight (Head)	10.0kg
Weight (Head + Stand)	12.3kg
Monitor with Optional Stand & Speaker Dimensions (WxHxD)	969.6x622.2x19.3mm
Weight (Head + Stand + Speaker)	12.8kg
Carton Dimensions (WxHxD)	1052x650x123mm
Packed Weight	12.6kg
VESA™ Standard Mount Interface	200x200
SPECIAL FEATURES	Temperature Sensor, ISM Method, Wi-Fi (802.11n combo built-in), USB Cloning, Contents Scheduling, Sync Mode, PM Mode, Local Time Auto setting Overlay Touch, Wake on LAN, Pivot Mode, Content Rotation 0.90, Fail Over, No Signal Image (Up to 5MB), BEACON On/Off, Embedded Template
Operating Temperature Range	0°C to 40°C
Operating Humidity Range	10% to 80%
Power Supply	100-240V- 50/60Hz




Client : 	<b>TENDER DOCUMENT FOR SUPPLY, INSTALLATION, TESTING &amp; CONFIGURATION OF IT, COMMUNICATION, ACCESS CONTROL &amp; SURVEILLANCE SYSTEM</b>	<b>nne pharmaplan®</b>
Project No : 120310	DOCUMENT NO : NPI-120310-LVS-S1-TD-01	Revision : 02 Date : 2015-10-31

Features	Description
Power Type	Built - in power
Typ	80W
Smart Energy Saving	50W
	20W (10Wx2) for Internal Speaker (6 ohm)
Safety	UL/cUL/CB/TUV/KC
EMC	FCC Class A/CE/KCC
ErP/Energy Star	yes/Yes (Energy Star 6.0)
External Media player Attachable	Yes (MP500/MP700, KT-OPSA)
SuperSign -w lite	Yes
SuperSign-c	Yes
Basic	Remote Controller (2 batteries Included), Power Cord, QSG, RGB Cable , Regulation Book, Phone to RS232C Gender, Memory Cover
Optional	Stand (ST-432T), Pixel Sensor (KT-SP0), Media player, Wall bracket (LSW230B), VESA Adapter (AM-B220S), OPS Kit (KT-OP5A), HDBaseT(EB-B100)
Warranty	3 Years Onsite\ Parts\ Labour Warranty

➤ **Large Format Display (43 Inch) – For Canteen**

Features	Description
Screen size	43
Type	LED
Resolution	1920x1080 (FHD)
Analog	PAL/NTSC-M
Digital	DVB-T2/C
Audio Output	5W+5W
HOSPITALITY FEATURES	Welcome Video/Screen, Lock Mode, One Channel Map, Multi-IR Code, Hotel Mode, Installer Menu, USB Cloning, IR Out, USB Auto Play Back
Connectivity	MHL
Management	Self diagnostics (USB)
Interactivity	HDMI-CEC , HTNG-CEC
RJP Compatibility	LG/Teleadapt (RS232C), Teleadapt/Guestlink (HDMI CEC)
RJP Interface	RS232C, HDMI CEC
Interface- Side	HDMI In, USB 2.0(2), Headphone Out (3.5mm Phone Jack)
Interface - Rear	RF In, AV In (Composite), Component In (Y, Pb, Pr) + Audio (L/R), Digital Audio Out (Optical), RGB In (D-sub 15pin), PC Audio Input, RS-232C (D-sub 9pin), HDMI In
Voltage, Hz	100 - 240V, 50/60Hz
Max (Watts)	43: 74.4W / 49:83.8W
Typical (Watts)	43: 60.0W / 49: 71.6W
Energy Saving (Min)	43:50 W / 49:49 W
Energy Saving (Med)	43:41 W / 49:48 W
Energy Saving (Max)	43:34 W / 49:40 W
Stand-by	43:0.18W / 49:0.26W



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Project No : 120310	DOCUMENT NO : NPI-120310-LVS-S1-TD-01	Revision : 02 Date : 2015-10-31


Features	Description
Standard Approval	CB, BIS, SIRIM, TISI, BPS, PSB, SNI CISPR MEPS, Tick, EE, CIF, BEE, Freeview
Warranty	3 Years Onsite\ Parts\ Labour Warranty

➤ **Large Format Display (55 Inch) – For Reception**

Features	Description
Screen size	55
Type	LED (Edge)
Resolution	1920x1080 (FHD)
Brightness	60: 350cd/m², 55: 330cd/m², 49:300cd/m²
Analog	PAL
Digital	DVB-C
Audio Output	10W+10W
HOSPITALITY FEATURES	Welcome Screen (Splash Image, Video), Lock Mode, One Channel Map, Multi IR Code, Hotel Mode, USB Cloning, IR Out (RS-232C), USB Auto Play Back, External Speaker out, Real Time Clock
Connectivity	MHL
Management	Remote diagnostics/Self diagnostics
Interactivity	HDMI-CEC (without ARC), HTNG-CEC
RJP Interface	RS232C, HDMI CEC
Interface - Side	HDMI In, USB 2.0(2), Headphone Out (3.5mm Phone Jack)
Interface - rear	RF In, AV In (Composite), Component In (Y, Pb, Pr) + Audio (L/R), Digital Audio Out (Optical), RGB In (D-sub 15pin), PC Audio Input, RS-232C (D-sub 9pin), HDMI In, LAN (RJ45), Ext Speaker out (3.5mm Phone Jack)
Voltage, Hz	100 - 240V, 50/60Hz
Typical (Watts)	60: 131.2W/55: 84.0W/49:83.5W
Stand-by	60: 0.22W/55: 0.20W/49: 0.22W
Warranty	3 Years Onsite\ Parts\ Labour Warranty

**4.17 Colour Multifunction Printer – Duplex, Network – Heavy Duty**


Features	Description
Technology	Laser
Functions	Print, copy, scan, fax, print and scan from USB
Print	
Print Speed	45 PPM or more
Print Resolution	1200 x 1200 dpi
Processor	800 MHz
Memory	2 GB or more
Duty cycle (monthly, A4)	200,000 pages
Copy	
Copy Resolution	600 x 600 dpi
Copy Settings	Auto colour detection, Image

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Project No : 120310	DOCUMENT NO : NPI-120310-LVS-S1-TD-01	Revision : 02 Date : 2015-10-31

Features	Description
	adjustments, Job build and all other regular copy features
Zoom	25 to 400%
Scan	
Colour Scanning	Yes
Scan Type	Flatbed with ADF
ADF Capacity	200 sheets, single pass duplexing ADF
Scan Resolution	600 x 600 dpi
Scan Speed	65 PPM or more (mono and color)
Scan file support	PDF, TIFF, MTIFF, JPEG, UNICODE TEXT, OCR features
Scanning features	Scan to email, scan to USB, scan to SharePoint, Scan to network folder, send to FTP
Fax	
Fax transmission speed	33.6 kbps
Fax resolution	300 x 300 dpi
Speed dials (max.)	Up to 100
Broadcast locations	100
Paper	
Input	100-sheet bypass tray, 4 x 500-sheet input trays
Output	500 sheets or more
Two-sided Printing	Automatic
Finishing accessory	Stapler/Stacker must be supplied
Media Supported	Tray 1: A3, A4, A4-R, A5, B5 (JIS), B4 (JIS), RA4, SRA4, 8K (270 x 390), 8K (260 x 368), 8K (7.75 x 10.75), 16K (195 x 270), 16K (184 x 260), 16K (7.75 x 10.75), RA3, SRA3, A6, B6 (JIS), Photo 2L, DPostcard (JIS), Envelopes: #9, #10, Monarch, B5, C5, C6, DL; Tray 2: A3, A4, A4-R, A5, B5 (JIS), B4 (JIS), 8.5 x 13, RA4, SRA4, 8K (270 x 390), 8K (260 x 368), 8K (7.75 x 10.75), 16K (195 x 270), 16K (184 x 260), 16K (7.75 x 10.75); Trays 3+: A3, A4, A4-R, A5, B5 (JIS), B4 (JIS), 8.5 x 13, RA4, SRA4, 8K (270 x 390), 8K (260 x 368), 8K (7.75 x 10.75), 16K (195 x 270), 16K (184 x 260), 16K (7.75 x 10.75), RA3, SRA3
Print Languages	PCL 5, PCL 6, PS 3
Connectivity	1 Gigabit Ethernet 10/100/1000T Network, USB connections, 1 foreign interface, 1 Hardware Integration Pocket (HIP)
Control Panel	8.0-in colour LCD with Capacitive touchscreen
Toner in high yield cartridge	28,000 pages or more for CMYK
Maximum power consumption	Not more than 1100 Watts
Badge Reader	Badge Readers should be supplied to enable identity management and security management.
Warranty	3 years Onsite\Parts\Labour Warranty
Reference Model	HP MFP M880 series (or) Equivalent (or) Higher

➤ **A4 Size, LaserJet Printer Specification:-**

Features	Description
Technology	Laser
Functions	Print, copy, scan, fax, print and scan from USB
Print Speed	14 A4 pages per minute (ppm),
Main input tray capacity	150 sheets of regular weight 75 g/m <sup>2</sup> (20-lb paper )
Priority feed slot capacity	10 sheets of paper up to 163 g/m <sup>2</sup> (43 lb)

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<b>Project No : 120310</b>		<b>Revision : 02 Date : 2015-10-31</b>

Features	Description
Paper weight	Output bin: 60 to 105 g/m <sup>2</sup> (16 lbsto 28lbs )
Base memory	8 MB of RAM
Print resolution	FastRes 600 : This setting provides 600 dpi effective output quality. FastRes 1200: This setting provides 1200 dpi effective output quality. EconoMode: Text is printed using less toner. This setting is useful when you are printing drafts. You can turn on this option independently of other print-quality settings.
Duty cycle	8,000 single-sided pages per month (maximum) 1,000 single-sided pages per month (average)
Voltage, Hz	285 Watts – Printing
Warranty	3 Years Onsite\ Parts\ Labour Warranty

#### 4.18 DEVIATION:

Deviations from this specification are only acceptable where the Vendor has listed in his quotation the requirements he cannot, or does not, wish to comply with and the Purchaser has accepted, in writing, the deviations before the order is placed.

In the absence of a list of deviations, it will be assumed by the Purchaser that the vendor complies fully with this specification.

#### 5. EXAMINATION


Examine site conditions prior to installation. Notify Architect and Owner in writing if unsuitable conditions are encountered. Do not start installation until site conditions are acceptable.

#### 6. INSTALLATION

- A. All the components shall be tested before shipping to the project location
- B. Video Management Software shall be installed, programmed and tested in accordance with manufacturer's installation instructions.
  - i. Coordinate interfaces with Owner's representative where appropriate.
  - ii. Provide back boxes, racks, connectors, supports, conduit, cable, and wire for a complete and reliable installation. Obtain Owner's approval for exact location of all boxes, conduit, and wiring runs prior to installation.
  - iii. Install conduit, cable, and wire parallel and square with building lines, including raised floors areas. Do not exceed forty percent fill in conduits. Gather wires and tie to create an orderly installation.
  - iv. Coordinate with other Contractors to provide proper sequencing of installation.

#### 7. FIELD COMMISSIONING AND CERTIFICATION

- A. Field Commissioning: Video Management Software Testing as recommended by manufacturer, including the following:
  - i. Conduct complete inspection and testing of equipment, including verification of operation with connected equipment.

<b>Client :</b> 	<b>TENDER DOCUMENT FOR SUPPLY, INSTALLATION, TESTING &amp; CONFIGURATION OF IT, COMMUNICATION, ACCESS CONTROL &amp; SURVEILLANCE SYSTEM</b>	<b>nne pharmaplan®</b>
<b>Project No : 120310</b>		<b>Revision : 02</b> <b>Date : 2015-10-31</b>

- ii. Test all the devices and demonstrate operational features to Owner's representative and authorities having jurisdiction as applicable.
- iii. Correct deficiencies until satisfactory results are obtained.
- iv. Submit written copies of test results.

## 8. WARRANTY


- A. OEM Warranty: OEM shall provide standard 12 months warranty for the offered products & application software.
- B. OEM shall provide free of cost patches upgrades for the offered version of the software.
- C. AMC: The vendor shall provide AMC for complete Video Surveillance System for a period of 12 months after the OEM product Warranty.

## 9. REFERENCES

- A. Give two references of similar installation of the Networking/IT system in other projects that have been successfully executed and implemented for other customers.
- B. The references should be such that they have been implemented in India

### Note:-

Contractor shall provide required Power Cord, Patch Cords (FO/Cat6A) , Crimping tools, Spicing and Jointing Tools, Pigtailes, Junction Box, Marshalling Units, clamps, brackets, etc,Punching of cables to meet the requirement and shall put the above said system in working conditions.

Client : 	TENDER DOCUMENT FOR SUPPLY, INSTALLATION, TESTING & CONFIGURATION OF IT, COMMUNICATION, ACCESS CONTROL & SURVEILLANCE SYSTEM	nne pharmaplan®
Project No : 120310	DOCUMENT NO : NPI-120310-LVS-S1-TD-01	Revision : 02 Date : 2015-10-31

## ANNEX 2



# TECHNICAL SPECIFICATION - TELEPHONE SYSTEM – VoIP / Digital

### 1. TELEPHONE COMMUNICATION SYSTEM :-

This specification is intended to cover the technical requirements of design, manufacture, testing at works, inspection, supply, delivery and Customization of the Functional Requirement at site of Telephone Communication System.

This specification shall be used in conjunction with all specifications and data sheets attached.

- a) Supply of the Telephone Communication System and its components to meet functional requirements /Telephone Sets as per specification and Data sheets.

Client : 	<b>TENDER DOCUMENT FOR SUPPLY, INSTALLATION, TESTING &amp; CONFIGURATION OF IT, COMMUNICATION, ACCESS CONTROL &amp; SURVEILLANCE SYSTEM</b>	
<b>Project No : 120310</b>	<b>DOCUMENT NO : NPI-120310-LVS-S1-TD-01</b>	<b>Revision : 02</b> <b>Date : 2015-10-31</b>

- b) Transportation of all Equipments and Components to the Employer's store at site should be the part of the scope. Supervision of unloading of the all Components / Equipments are also to be considered in the scope.
- c) The items of work to be performed on all equipment and materials shall include but not limited to the following:
- Loading and transportation at site. (to Employer or Contractor's stores).
  - Packing of the Equipments suitable for (all) weather conditions for proper protection.
  - Obtaining Employer's written acceptance of satisfactory performance

The unloading & shifting, laying, testing, commissioning and ensuring operability, maintainability, completeness and reliability of the System shall be responsible by the Bidder.

## 2. GENERAL INFORMATION:

The proposed VOIP and Digital system shall provide Two Tier architecture.

Tier-I: The VoIP Systems at Main Admin Block shall have VoIP servers along with Gateways/ Integrated Access Device for integrating with Telephone equipment (VoIP / Digital) to meet the requirement. These systems primarily equipped with SIP based VoIP and digital system features.

Tier-III: Remote units shall have VoIP end points and Digital End Points, which includes MDU, Jack Panel, Networking, phones, Integrated Access Devices and Gateways.

These systems primarily equipped with SIP based VoIP features, and under the control of Tier-I. The system shall support IPv4 & IPv6. The system shall be capable of supporting IP Phones, PC Based IP Softphone with suitable client software. The system shall use open standards for its Operating System, call processing, signalling and networking. It shall not be any proprietary / vendor specific protocols, call processing, signalling and networking. The offered Operating System shall be open standard platform and shall be hardened to avoid any virus attacks and provide security in various aspects.

It shall be fully redundant with two servers. The two servers should work in active / stand-by or active-active mode i.e if one server fails the second server shall be able to take the complete load of the calls automatically (without any manual intervention) without dropping existing calls.

There shall be no restriction on number of endpoints being backed up in case of one server failure. The system shall be capable of supporting duplicating the power supply/ hot swapping of servers without switching off the system, where the necessary server shall be interchanged or replaced even in online conditions without disruption of services.

The offered software shall be modular and fault tolerant architecture with self-healing capabilities.



## 3. SCOPE OF SUPPLY UNDER THIS SPECIFICATION AND CONTRACT:

As per Bill of Quantities enclosed.

## 4. TECHNICAL SPECIFICATION & FEATURES

### 4.1 System Administration:-

The proposed communications solution shall support advanced administration functions using user friendly software tools. The management system should be operated using by GUI tools, formatted screens, pull down menus, valid entry choices, templates, transactions, scheduling, and database import/ export. The required hardware & software

Client : 	<b>TENDER DOCUMENT FOR SUPPLY, INSTALLATION, TESTING &amp; CONFIGURATION OF IT, COMMUNICATION, ACCESS CONTROL &amp; SURVEILLANCE SYSTEM</b>	
<b>Project No : 120310</b>	<b>DOCUMENT NO : NPI-120310-LVS-S1-TD-01</b>	<b>Revision : 02 Date : 2015-10-31</b>

tools used to access and perform administrative operations shall be included. The administration shall be local for Exchanges at Assets/ Basins, and also shall have Centralized management.

### ***Centralized Management***

It is required that all management/maintenance operations shall be supported by a single management system with a unified customer database for all station users across all locations.

All station moves/ adds/ change operations must be able to be implemented transparently across all locations. System monitoring, diagnostic, and maintenance operations for all locations must be supported using a single centrally located applications server at the Admin location with distributed client stations across the network.

The core elements and management software should present a single enterprise wide view of the solution's routing policies.

### ***Configuration / Management***

- Configuration Manager (GUI) for configuration of remote gateways, end points.
- Alarm monitoring, call monitoring and CDR monitoring.
- SNMP v2 Agent.
- Command Line Interface

### ***Call Management Features***

- Automatic call type detection: Voice/Modem/Fax
- Answer and Disconnect Supervision
- User programmable dial plan support
- Automated load balancing
- Forced IP routing and IP port mapping
- Automatic appending and stripping of digits to dialed numbers
- Call Detail Records
- Call Blocking
- Caller ID delivery

### ***System Maintenance Terminal***



System administration and maintenance Terminal with the above capabilities and tools, including standard maintenance terminal screen features and functions shall be provided with each Server. All the maintenance process shall be able to be carried out using web interface.

## **4.2 System Diagnostics:-**

The proposed communications system shall be able to support advanced diagnostics and maintenance capabilities. The diagnostics shall be able to monitor and detect system failures and errors. At minimum, the following diagnostic functions must include:

- Monitoring of processor status
- Monitoring and testing of all port and service circuit packs
- Monitoring and control of all power units
- Emergency transfer and control of active processing, switching, and power systems to backup systems
- Originate alarm information and activates alarms.
- System should have in-built health monitoring software to check the functioning of the system.
- The system should have in built diagnostic features such as isolation/ detection of fault in the system/ server/ junction and restoration of faulty system/junctions after rectification.
- When the system go down due to any reason, it should have auto restart capability to automatically reload the system software after system power is restored/fault rectified.



Client : 	<b>TENDER DOCUMENT FOR SUPPLY, INSTALLATION, TESTING &amp; CONFIGURATION OF IT, COMMUNICATION, ACCESS CONTROL &amp; SURVEILLANCE SYSTEM</b>	
<b>Project No : 120310</b>	<b>DOCUMENT NO : NPI-120310-LVS-S1-TD-01</b>	<b>Revision : 02</b> <b>Date : 2015-10-31</b>

The system shall provide Remote diagnostics of Servers, Gateways and end points. It shall provide full access to system diagnostic functions to monitor system performance and perform necessary maintenance operations. The interface shall be web based.

#### 4.3 Alarm Reporting

The proposed communications system solution shall alert maintenance personnel of system errors and failures by a variety of means, including an audible alarm, management screen alert, and printed record. System shall able to define threshold values, and measure generated alarms. The solution shall be able to be programmed to define customized major and minor alarm conditions. Alarms shall be recorded in an Alarm Record Log. The devices shall include tone receivers; DTMF senders and receivers; conference bridges; trunk routes etc.

#### 4.4 End Points

- The Unified Communication System shall be able to support all type of endpoints i.e. analog phones, digital phones, IP Phones with appropriate hardware. IP Unified Communication System shall have the support for IP Soft phones as well.
- The IP endpoints spread across all locations shall have a desktop controlled IP endpoint.
- The desktop client shall be able to initiate a point-to-point SD video call to any other location.
- The desktop client shall have an inbuilt IM and presence functionality.

#### 4.5 Interface Compatibility

The telephony server shall support following trunk interfaces/ protocols with appropriate hardware/ software:

- CO trunks-system shall be able to provide interface to the CO trunks with appropriate hardware.
- ISDN-PRI with QSIG: The server shall support ISDN-PRI trunks.
- H323 and SIP trunks: The server shall have the integrated H323 and SIP trunk Interface based on Internet Protocol (IP) technology to provide a lower cost of usage by transmitting voice over corporate Intranet, or private Local Area Network (LAN).

#### 4.6 Flexible Dialing Plan

It is required that the proposed solution shall support flexible multi-digit dialing up to 10 digits plan between stations across all locations. The system shall support one enterprise dial plan across all multi-vendor systems.

#### 4.7 Call Processing Capacity

The call processing capacity of the proposed system shall be able to satisfy current and future communication requirements. The minimum call processing capacity of the proposed primary controller is 500,000 Busy Hour Call Completions (BHCCs).



#### 4.8 Scalability

The proxy shall be available in Microsoft Windows and Linux versions. The proxy shall be able to scale to 40000 users.

#### 4.9 Call Features

Call features required to operate transparently across the system locations shall at minimum include:

- Call Transfer
- Call Forwarding – All Calls
- Call Forwarding – Don't Answer
- Call Forwarding – Busy

Client : 	<b>TENDER DOCUMENT FOR SUPPLY, INSTALLATION, TESTING &amp; CONFIGURATION OF IT, COMMUNICATION, ACCESS CONTROL &amp; SURVEILLANCE SYSTEM</b>	
<b>Project No : 120310</b>	<b>DOCUMENT NO : NPI-120310-LVS-S1-TD-01</b>	<b>Revision : 02</b> <b>Date : 2015-10-31</b>

- Automatic Call Back
- Calling Number & Name on Telephone Display
- Trunk ID on Telephone Display
- Call Diversion Information on Telephone Display
- Add-on Conference
- Call Waiting
- Barge-in (Busy Override)
- Emergency Access to Attendant
- Paging System Access
- Station User Roaming (Logical Station Assignment)
- Message Waiting Activation

System features required to operate transparently across the system locations shall at minimum include:

- Automatic Camp-on
- Automatic Recall
- Automatic Alternate Routing
- Meet-me Conferencing
- Trunk Callback Queuing
- Hunting
- Uniform Call Distribution
- Call Details Recording
- Uniform Dial Plan

#### **4.10 Networking Protocol – QSIG**

System shall provide Industry standard based QSIG functionality on ISDN-PRI trunks Call Services:

- Basic Call Setup
- Name and Number Transport
- Transit Counter
- Called/Calling/Busy/Connected Name and Number
- Name Identification Services
- Diversion (Call Forwarding)
- Diversion (Call Forwarding) with Reroute (using Path Replacement)
- Call Transfer
- Call Offer
- Path Replacement
- Call Transfer into QSIG Message Center



#### **4.11 In-Built Conferencing**

The VoIP Communication System shall be capable of supporting multiple 6- Party audio conferencing in any combination of external and internal calls. The conferences should be password protected.

#### **4.12 User-Based Access Control**

End-users may log onto the proxy and change their personal preferences. They shall be able to set the redirection to home, out of office and mailbox. They shall also be able to see the call list from the proxy, initiate conferences from the proxy and start call- back services.

#### **4.13 Speed Dial**

Client : 	<b>TENDER DOCUMENT FOR SUPPLY, INSTALLATION, TESTING &amp; CONFIGURATION OF IT, COMMUNICATION, ACCESS CONTROL &amp; SURVEILLANCE SYSTEM</b>	
<b>Project No : 120310</b>		<b>Revision : 02</b> <b>Date : 2015-10-31</b>

The speed dial feature shall allow easy translation of short telephone numbers into SIP URLs. The speed dial shall be able to be set up on domain, group and user level.

#### **4.14 Find Me Follow Me**

Ability to call several user agents in parallel or serial based on set probabilities.

#### **4.15 Instant Messaging**

Instant messaging shall supported by the standard procedures of the proxy. In addition to this, the proxy shall supports storage and forwarding of messages to users that are known but not registered with the proxy. A welcome message may be delivered upon the first registration of a user.

#### **4.16 Call Hunting**

Unlimited call stages support for each stage, a specific waiting time and different ringing melody can be specified. Shall allow round robin and one-way contact attempts. A default definition may specify a call-waiting queue for later processing.

#### **4.17 Address Book**

Address book on per domain basis or per group or per user shall be supported and possibility to directly import address books from Microsoft outlook shall be supported.

#### **4.18 Mass Deployment**

Mass deployment shall be possible by ability to deploy VOIP end point devices from central site without having to physically configure each remote CPE.

#### **4.19 Attendant Console**

An attendant console with general capabilities and features of attendant console applications shall be provided for each Server.

#### **4.20 Telephony Specifications**


- Voice algorithms: G.723.1a, G.729ab, G.726 ADPCM, G.711 with auto negotiation
- Fax support: Industry standard T.38 and Group III at 2.4, 4.8, 7.2, 9.6,14.4 kbps
- Modem over IP
- FXS/FXO support.
- Standard 50 pin Telco "D" Connectors
- Coding: A-law,  $\mu$ -law
- Enhanced (Carrier Grade) Echo Cancellation: ITU Rec. G168, up to 128 msec tail size
- Loop Start, Reverse Battery, Battery Disconnect
- Tandem/TDM switching

#### **4.21 IP Network Specification**

- LAN Interface: 1 Fast Ethernet port (10/100/1000 Base-T) with standard RJ-45
- DHCP Client
- QoS Support: IP TOS, Diff Serv

#### **4.22 IP Network Specification**

- H.323 v.4 Gateway, and Gatekeeper

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Project No : 120310	DOCUMENT NO : NPI-120310-LVS-S1-TD-01	Revision : 02 Date : 2015-10-31

- SIP User Agent
- Adaptive Voice Activity Detection (VAD) with Comfort Noise Generation(CNG)
- Adaptive Jitter Buffer
- Packet Loss Compensation
- Should work securely behind NAT enabled firewall
- Security: IP Filtering
- Packet multiplexing technology for saving Bandwidth

#### 4.23 SIP Proxy Specification

**Registrar and Location Server:** Shall be based on SIP (RFC 3261) .Server shall accept REGISTER requests. The register server shall support authentication. Registrar server shall offer location services.

**Domain Hosting Support:** Multiple Domains shall be supported. Each domain shall have its own log, its own user list, its own dial plan, its own registration policy, its own password, its own welcome message policy, and so on. DNS A, NAPTR, SRV, ENUM: shall be supported.

**User-Based Access Control:** End-users may log onto the proxy and change their personal preferences. They shall be able to set the redirection to home, out of office and mailbox. They shall also be able to see the call list from the proxy, initiate conferences from the proxy and start call-back services.


**Controlling:** Proxy shall generate controlling information based on patterns for an unlimited number of groups. The information shall be possible to be accumulated over a period of three months and be able to be fed into standard tools such as Microsoft.

**Instant Messaging:** Instant messaging shall supported by the standard procedures of the proxy. In addition to this, the proxy shall supports storage and forwarding of messages to users that are known but not registered with the proxy. A welcome message may be delivered upon the first registration of a user.

**Note:-** Bidders shall submit brief write up on how these services are provided by their solution as part of the bid document and not mere compliance statements. These shall also be tested during SAT tests.

#### 4.24 Work Station Specification for Telephone System:-

Features	Description
Processor & System Bus	Intel Xeon E3-1226v3 3.3
Memory	16GB DDR3-1333 Mhz ECC upgradable to 32 GB
Memory slots	4 DIMM slots, up to 32 GB ECC/non-ECC, DDR3L-1600 (MT/s) (ECC/non-ECC choice and actual memory speed dependent on processor capability)
Cache	8 MB
No of Cores	4 Cores
Hard Disk	500 GB SATA Hard Disk Drive With 7.5 K RPM
Optical Drive	DVD R/W
Graphics	4 HDMI Port 2GB Graphic Card
Chipset	Intel® C226 chipset
Keyboard & Mouse	Industry standard Bilingual Key Board with Mouse (optical )
Connectivity	Integrated Intel I217LM PCIe GbE Controller; Optional Intel Ethernet I210-T1 PCIe as 2nd NIC; WLAN Intel 7260 802.11 a/b/g/n/ PCIe x 1 NIC


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Project No : 120310	<b>DOCUMENT NO : NPI-120310-LVS-S1-TD-01</b>	Revision : 02 Date : 2015-10-31

Features	Description
Cabinet	Tower
Drive Bays	2 internal 3.5-inch bays, 1 internal 2.5-inch bay (for SSD only), 1 external slim ODD bay, 2 external Half-Height 5.25-inch bays
Expansion Slot	1 PCIe Gen3 x16, 1 PCIe Gen2 x4 slot/x16 connector, 1 PCIe Gen2 x1 slot/x4 connector, 1 PCIe Gen2 x1 slot, 1 PCI 32-bit.
Operating System	Licensed Genuine Windows 7 Professional , 64 bit with media kit and manuals
Power	400W Wide Ranging, Active PFC, 92% Efficient;
Monitor	Same Brand OEM 23 Inch high resolution, Wide screen IPS monitor
USB CONNECTOR	2 USB 3.0, 1 USB 2.0, 1 USB 2.0 Charging Data Port. Rear 2 USB 3.0, 4 USB 2.0 Internal 1 USB 3.0 and 3 USB 2.0 ports available as 2 separate 2x10(3.0 x1, 2.0 x1) and 2x5(2.0 x2) headers: supports 1 HP Internal USB Port Kits plus one USB 3.0 Media Card Reader.
Remote Technology	Remote Graphics Software (RGS)
Remote Management	Intel® vPro™ with Intel® AMT 9.0
Certifications & Compliance	1. ISO 9001 : 2000 certification for OEM Manufacturing
	2. ISO 14001 compliance certification
	3. Enclose the documentary evidence as proof for the above compliance and certification.
	4. Windows OS Certification of Authenticity
	5. The quoted model should be certified by Microsoft for Windows 7 Operating System
	6. The bidder should produce product brochure for the brand quoted.
	7. Energy star compliance
Compliance & Certification	Manufacturer Authorisation Form address to this tender
Reference Model	HP Z230 MT (or) equivalent (or) Higher

#### 4.25 Integrated Access Devices

##### General:

These devices shall offer best-in-class customer premises equipment (CPE) to service providers delivering managed, integrated voice and data services to small and medium-sized businesses (SMB). It shall be cost-effective device that can help accelerate migration from traditional time-division multiplexing (TDM) voice to voice over IP (VoIP) by supporting quality of service (QoS) and IP service-level agreements (IP SLAs). It shall support both analog voice and VoIP, with multiple call-control protocols, including Session Initiation Protocol (SIP), Media Gateway Control Protocol (MGCP), and H.323, along with diverse VoIP codecs.

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Project No : 120310	DOCUMENT NO : NPI-120310-LVS-S1-TD-01	Revision : 02 Date : 2015-10-31


Features	Description
User port	FXS - 32 FXO - N/A
Physical port	WAN - 1 LAN - 3 (used for IAD cascading) Console – 1
Protocol	SIP – Yes MGCP – Yes
Voice codec	G.711a/μ and G.729
Reliability	Power-off survival - No Network outage survival – No Local switch – Yes Dual-homing – Yes Multi-registration – Yes
Physical specifications	Dimensions (H x W x D) - 42 mm x 436 mm x 365 mm (a standard 19-inch 1 U chassis) Power supply - Input: 100–240 V AC Maximum power consumption (W) – 86
Accessories	Necessary cables, Mounting kit and any other component required should be supplied
Scope	Supplier should deploy, install and configure the Integrated Access Device to connect the digital/analog with the IP telephony network (unified voice gateway network) to suite HBL Requirement, industry standards and best practices. For further detail refer location detail, architecture diagram.
Reference Model	HUAWEI eSpace IAD132E(T) (or) Equivalent (or) Higher
Warranty	24 x 7, 3 Years Onsite/Parts/Labour Warranty

#### 4.26 Unified Gateway:-

##### ➤ General:

The Unified communications enables organizations to collaborate more effectively and streamline business processes. It shall Improve productivity and profitability.

Features	Description
User capacity	1,000 (a maximum of 192 FXS ports for analog users or 1,000 SIP users)
Terminals supported	Analog phones, IP phones, video phones and soft clients
Trunk ports	A maximum of 72 FXO ports, 28 E1/T1 ports or 24 BRI ports
Trunk protocols	SS7, R2, PRI, QSIG, SIP, BRI
Codec	G.711a/μ, G.729a/b/ab, iLBC, and G.722/G.722.1/G.722.2

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Features	Description
Conference capacity	A maximum of 360 conference participants which can be allocated to 120 conference halls (each hall can support up to 60 participants)
Built-in voice mail	30 channels concurrently Built-in 16G SD storage card
Power supply	AC: 100 V to 240 V, 50 Hz/60 Hz DC: -38.4 V to -60 V (typical value: -48 V) Redundancy: 1+1 backup
Power consumption	350 W (full configuration)
Dimensions (H x W x D)	Standard 19-inch 2 U subrack 86.1 mm x 442 mm x 310 mm
Weight	10 kg (full configuration)
Temperature	Storage temperature: -40°C to +70°C Long-term operating temperature: 0°C to 45°C Short-term operating temperature: -5°C to +55°C
Relative humidity	5% to 95% (without condensation)
Dustproof	Less than 180 mg/m <sup>3</sup> dust in the air (Dustproof measures should be taken in the work environment)
System Reliability	99.995%
Maintainability	Centralized/remote equipment management, log management, resource management, and alarm management
Provisioning	Should be provisioned for minimum 225 SIP Users Should be provisioned for minimum 4 PRI lines and 4 Analog trunk lines and should be upgradable to 8 PRI lines and 8 Analog trunk lines Should be licensed for minimum 600 Voice subscriber port license and 2 softconsole client subscriber license All necessary cables and accessories required shall be supplied as required. Necessary rack mounting accessories should be supplied.
Scope of work	Supplier should deploy, install and configure the Unified Voice Gateway to enable IP telephony network and Analog Phone network to suite HBL Requirement, industry standards and best practices. For further detail refer location detail, architecture diagram. The 2 Voice Gateway should be configured for Active - Standby failover configuration.
Reference Model	HUAWEI eSpace U1960(V200R003) (or) Equivalent (or) Higher
Warranty	24 x 7, 3 Years Onsite/Parts/Labour Warranty


#### 4.27 Digital Phone

##### ➤ General:

The Digital phones shall have digital functions support voicemail and many other computer-like operations in addition to the actual processing of the audio signal. These digital phones are used in offices various location as indicated in the Drawing. It shall receive signal from IAD and process it and handle the other new functions digitally.

Features	Description
Audio Features	Slim Design Speaker Phone C-ID, 30 Call Log 5 Re-Dial Memory



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Project No : 120310	DOCUMENT NO : NPI-120310-LVS-S1-TD-01	Revision : 02 Date : 2015-10-31


Features	Description
	LCD (7 Segment 2 Line)
Reference Model	Panasonic KX-TSC62SX
Scope	Supplier should deploy, install and configure the Phones to suite Client's Requirement, industry standards and best practices.
Compatibility	Should be compatible with Voice gateway

#### 4.28 VoIP Telephone Instruments (Operator Phone with expansion Module)


##### ➤ General:

The Voice over IP (VoIP) is a methodology and group of technologies for the delivery of voice communications and multimedia sessions over Internet Protocol (IP) networks, such as the Internet. It shall offer business models and technical solutions that mirrored the architecture of the legacy telephone network.

Features	Description
Screen	5-inch, 800 x 480 pixels, 16 million colors, color screen
LEDs	Line, Message Waiting Indicator (MWI), Mute, Speaker, Call History, Headset, and programmable button LEDs
Angle adjustment	2 adjustable angles
Buttons	<ul style="list-style-type: none"> <li>• 6 line buttons</li> <li>• 5 navigation buttons: Up/Down/Left/Right/OK</li> <li>• 4 soft keys</li> <li>• 4 fixed function buttons (with LEDs): Speaker, Headset, Mute, and Call History</li> <li>• 5 fixed function buttons (without LEDs): Home, Message, Volume, Contacts, and Transfer</li> </ul>
Ethernet ports	2 GE ports: 10/100/1000 Mbit/s adaptive, support for VLAN configuration
Handset port	RJ-9
Headset port	RJ-9/USB
PoE	Class 2
Power adapter	Input: 100–240 V AC Output: 5 V DC, 2 A
Dimensions	217 mm x 208 mm x 124 mm
Power consumption	About 6.49 W
Weight	About 0.9 kg
Network protocols	TCP/IP, SIP, SDP, UDP, RTP, RTCP, DHCP, DNS, PPPoE, HTTP, HTTPS, Sntp, XCAP
Multiple lines	6
Multiple accounts	6
Audio codecs	G.711a, G.711μ, G.722, G.722.1, G.722.2, G.729AB, iLBC, Opus, AAC-LD

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Project No : 120310	DOCUMENT NO : NPI-120310-LVS-S1-TD-01	Revision : 02 Date : 2015-10-31


Features	Description
Audio features	Dual-tone Multiple Frequency (DTMF): Inband/RFC2833 • Anti-clipping (ACLP) • Acoustic Echo Cancellation (AEC) • Automatic Gain Control (AGC) • Adaptive Jitter Buffer (AJB) • Automatic Noise Restraint (ANR) • Comfort Noise Generation (CNG) • Hearing Aid Compatibility (HAC) • Packet Loss Concealment (PLC) • Voice Activity Detection (VAD) • Side Tone Cancellation • Voice Quality Monitor (VQM) • Buzz Cancellation
Call history	• Up to 100 records each for placed, received, and missed calls • Missed call notification
Contacts	• Up to 1000 contacts • Contact query, import, and export
Languages	Display: Chinese (simplified and traditional), English, Portuguese, Spanish, French, Arabic, Turkish, Russian, German, Polish, and Hungarian Input: Chinese (simplified and traditional), English, French, Portuguese, Spanish, Arabic, Polish, Hungarian, and Russian
Ringtone	• 10 system ringtones • Ringtone import
Wallpaper	• 12 system wallpapers • Wallpaper import
Local conference	• 6-party audio conference • Participant status display • Operations including adding, muting, and removing participants
Basic voice services	Call Waiting, Call Hold, Call Transfer, Call Forward, Call Deflection, DND, Advanced Secretary Service, Call Park, Pickup, Group Pickup, Distinctive Ring, Automatic Call Back, Voicemail, Abbreviated Dial, BLF, Paging Broadcast, Hunt Group, Password-based Call Barring, and Emergency Call
Corporate directory	Contact query, direct dial, and adding contacts to the local address book
Name and department display	Peer party's name, department, and phone number display for incoming and outgoing calls
Profile picture display	Peer party's profile picture display for incoming and outgoing calls
Linkage	• Call control using eSpace Desktop • Status synchronization between eSpace Desktop and eSpace 7910/7950
Call recording	Recording during audio calls • Recorded information saved on the server • Recording control (start or stop) on eSpace 7910/7950
Instant conference	Instant audio conference with the conference button
Group conference	Audio conference with participants in a contact group
Expansion Module	Multi-functional IP Phone Expansion Module should be supplied
Warranty	9 x 5, 3 Years Onsite/Parts/Labour Warranty

Client : 	<b>TENDER DOCUMENT FOR SUPPLY, INSTALLATION, TESTING &amp; CONFIGURATION OF IT, COMMUNICATION, ACCESS CONTROL &amp; SURVEILLANCE SYSTEM</b>	<b>nne pharmaplan®</b>
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Features	Description
Reference Model	HUAWEI eSpace7950 (or) Equivalent (or) Higher
Scope of work	Supplier should deploy, install and configure the operator IP Phones with the unified voice gateway to suite HBL Requirement, industry standards and best practices. For further detail refer location detail, architecture diagram. Should be powered by POE.



#### 4.29 VoIP Telephone Instruments (User Phone)

Features	Description
Screen	2.83-inch, 320 x 240 pixels, 260 thousand colors, color screen
LEDs	Line, Message Waiting Indicator (MWI), Mute, Speaker, Call History, Headset, and programmable button LEDs
Angle adjustment	2 adjustable angles
Buttons	<ul style="list-style-type: none"> <li>• 2 line buttons</li> <li>• 5 navigation buttons: Up/Down/Left/Right/OK</li> <li>• 10 programmable buttons</li> <li>• 4 soft keys</li> <li>• 4 fixed function buttons (with LEDs): Speaker, Headset, Mute, and Call History</li> <li>• 7 fixed function buttons (without LEDs): Home, Message, Volume, Contacts, Hold, Conference, and Transfer</li> </ul>
Ethernet ports	2 GE ports: 10/100/1000 Mbit/s adaptive, support for VLAN configuration
Handset port	RJ-9
PoE	Class 1
Input Power	Input: 100–240 V AC
Output Power	Output: 5 V DC, 2 A
Dimensions	231 mm x 208 mm x 103 mm
Power consumption	About 3.84 W
Weight	About 0.85 kg
Network protocols	TCP/IP, SIP, SDP, UDP, RTP, RTCP, DHCP, DNS, PPPoE, HTTP, HTTPS, SNTP, XCAP
Multiple lines	3
Multiple accounts	3
Audio codecs	G.711a, G.711μ, G.722, G.722.1, G.722.2, G.729AB, iLBC, Opus, AAC-LD
Audio features	Dual-tone Multiple Frequency (DTMF): Inband/RFC2833 <ul style="list-style-type: none"> <li>• Anti-clipping (ACLP)</li> <li>• Acoustic Echo Cancellation (AEC)</li> <li>• Automatic Gain Control (AGC)</li> <li>• Adaptive Jitter Buffer (AJB)</li> <li>• Automatic Noise Restraint (ANR)</li> <li>• Comfort Noise Generation (CNG)</li> <li>• Hearing Aid Compatibility (HAC)</li> </ul>

<b>Client :</b> 	<b>TENDER DOCUMENT FOR SUPPLY, INSTALLATION, TESTING &amp; CONFIGURATION OF IT, COMMUNICATION, ACCESS CONTROL &amp; SURVEILLANCE SYSTEM</b>	<b>nne pharmaplan®</b>
<b>Project No : 120310</b>		<b>Revision : 02</b> <b>Date : 2015-10-31</b>

Features	Description
	<ul style="list-style-type: none"> <li>• Packet Loss Concealment (PLC)</li> <li>• Voice Activity Detection (VAD)</li> <li>• Side Tone Cancellation</li> <li>• Voice Quality Monitor (VQM)</li> <li>• Buzz Cancellation</li> </ul>
Call history	<ul style="list-style-type: none"> <li>• Up to 100 records each for placed, received, and missed calls</li> <li>• Missed call notification</li> </ul>
Contacts	<ul style="list-style-type: none"> <li>• Up to 1000 contacts</li> <li>• Contact query, import, and export</li> </ul>
Languages	Display: Chinese (simplified and traditional), English, Portuguese, Spanish, French, Arabic, Turkish, Russian, German, Polish, and Hungarian Input: Chinese (simplified and traditional), English, French, Portuguese, Spanish, Arabic, Polish, Hungarian, and Russian
Ringtone	<ul style="list-style-type: none"> <li>• 10 system ringtones</li> <li>• Ringtone import</li> </ul>
Wallpaper	<ul style="list-style-type: none"> <li>• 12 system wallpapers</li> <li>• Wallpaper import</li> </ul>
Local conference	<ul style="list-style-type: none"> <li>• 6-party audio conference</li> <li>• Participant status display</li> <li>• Operations including adding, muting, and removing participants</li> </ul>
Basic voice services	Call Waiting, Call Hold, Call Transfer, Call Forward, Call Deflection, DND, Advanced Secretary Service, Call Park, Pickup, Group Pickup, Distinctive Ring, Automatic Call Back, Voicemail, Abbreviated Dial, BLF, Paging Broadcast, Hunt Group, Password-based Call Barring, and Emergency Call
Corporate directory	Contact query, direct dial, and adding contacts to the local address book
Name and department display	Peer party's name, department, and phone number display for incoming and outgoing calls
Profile picture display	Peer party's profile picture display for incoming and outgoing calls
Linkage	<ul style="list-style-type: none"> <li>• Call control using soft client</li> <li>• Status synchronization between soft client and phone</li> </ul>
Call recording	Recording during audio calls <ul style="list-style-type: none"> <li>• Recorded information saved on the server</li> <li>• Recording control (start or stop) on eSpace 7910/7950</li> </ul>
Instant conference	Instant audio conference with the conference button
Group conference	Audio conference with participants in a contact group
Warranty	9 x 5, 3 Years Onsite/Parts/Labour Warranty
Reference Model	HUAWEI eSpace 7900 Series(Site) (or) Equivalent (or) Higher
Scope of work	Supplier should deploy, install and configure the user IP Phones with the unified voice gateway to suite HBL Requirement, industry standards and best practices. For further detail refer location detail, architecture diagram. Should be powered by POE.

## 5. DEVIATION:

Client : 	<b>TENDER DOCUMENT FOR SUPPLY, INSTALLATION, TESTING &amp; CONFIGURATION OF IT, COMMUNICATION, ACCESS CONTROL &amp; SURVEILLANCE SYSTEM</b>	
<b>Project No : 120310</b>	<b>DOCUMENT NO : NPI-120310-LVS-S1-TD-01</b>	<b>Revision : 02</b> <b>Date : 2015-10-31</b>

Deviations from this specification are only acceptable where the Vendor has listed in his quotation the requirements he cannot, or does not, wish to comply with and the Purchaser has accepted, in writing, the deviations before the order is placed.

In the absence of a list of deviations, it will be assumed by the Purchaser that the vendor complies fully with this specification.

## 6. EXAMINATION

Examine site conditions prior to installation. Notify Architect and Owner in writing if unsuitable conditions are encountered. Do not start installation until site conditions are acceptable.

## 7. INSTALLATION

All the components shall be tested before shipping to the project location

Video Management Software shall be installed, programmed and tested in accordance with manufacturer's installation instructions.

- i. Coordinate interfaces with Owner's representative where appropriate.
- ii. Provide back boxes, racks, connectors, supports, conduit, cable, and wire for a complete and reliable installation. Obtain Owner's approval for exact location of all boxes, conduit, and wiring runs prior to installation.
- iii. Install conduit, cable, and wire parallel and square with building lines, including raised floors areas. Do not exceed forty percent fill in conduits. Gather wires and tie to create an orderly installation.
- iv. Coordinate with other Contractors to provide proper sequencing of installation.

## 8. FIELD COMMISSIONING AND CERTIFICATION


Field Commissioning: Video Management Software Testing as recommended by manufacturer, including the following:

- i. Conduct complete inspection and testing of equipment, including verification of operation with connected equipment.
- ii. Test all the devices and demonstrate operational features to Owner's representative and authorities having jurisdiction as applicable.
- iii. Correct deficiencies until satisfactory results are obtained.
- iv. Submit written copies of test results.

## 9. WARRANTY

- A. OEM Warranty: OEM shall provide standard 12 months warranty for the offered products & application software.
- B. OEM shall provide free of cost patches upgrades for the offered version of the software.
- C. AMC: The vendor shall provide AMC for complete Video Surveillance System for a period of 12 months after the OEM product Warranty.


## 10. REFERENCES

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Project No : 120310	DOCUMENT NO : NPI-120310-LVS-S1-TD-01	Revision : 02 Date : 2015-10-31

- A. Give two references of similar installation of the VoIP system in other projects that have been successfully executed and implemented for other customers.
- B. The references should be such that they have been implemented in India

**Note:-**

**The Bidder shall use Configuration as mentioned in Telephone System and shall follow the architecture drawing to meet the functional requirement of the Plant.**

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Project No : 120310	DOCUMENT NO : NPI-120310-LVS-S1-TD-01	Revision : 02 Date : 2015-10-31

## ANNEX 3

# TECHNICAL SPECIFICATIONS - ACS & SECURITY SYSTEM

### 1. SYSTEM OVERVIEW and SCOPE


Refer System Architecture Drawing ((**DWG NO. NPI/120310/LVS/DET/S1/003**))

Contractor shall Supply, Store at Site, Installation and Commissioning, Configuration to meet the Client's requirement and putting in to full operational condition of the Access Control and Security System.

Contractor shall also responsible to provide required interlocking and interfacing facility to Door Interlocking System and Fire Alarm System. Required Cables, Relay Modules, Cable End Termination , Laying , Installation shall be included in this scope of supply for the mentioned third party interfacing and integration (Door Interlock System and Fire Alarm System)

### 2. BASIC SYSTEM CAPABILITIES




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- Should provide an open architecture family of interface devices that provides a complete and fully functional hardware/firmware infrastructure for access control software host systems.
- The controllers shall communicate with a host system by using industry standard TCP/IP protocol, over 10/100 Mbps Ethernet, Internet.

### 3. VISITOR MANAGEMENT SYSTEM


Features	Description
General	<p>Application should consists of three Different Roles :</p> <ol style="list-style-type: none"> <li>Administrator</li> <li>Host Employee</li> <li>Security</li> </ol> <p>Application should support Client Sever &amp; Web Based Architecture</p>
Administrator Login	<p>Application should Support multiple companies</p> <p>Application should support Multiple Departments &amp; Designations</p> <p>Application should have facility to add/edit/delete employee details.</p> <p>Application should have facility to add following details</p> <ol style="list-style-type: none"> <li>visitor Organization details</li> <li>Vehicle type</li> <li>Meeting purpose</li> <li>Contract Type</li> <li>Nationality</li> <li>Floor Detail</li> <li>Organization Details</li> <li>Visitor details</li> </ol> <p>Application should have facility to create multiple role (System User):</p> <ol style="list-style-type: none"> <li>Admin</li> <li>Security</li> </ol> <p>Application should have Email Facility</p> <p>Application should support custom gate pass design :</p> <p>User should be able to define multiple gate pass profile.</p> <p>Application should have facility to allocate multiple gate pass profile with different Location address</p> <p>Application should have facility for SMS</p> <p>Application should have facility to import bulk employee data.</p> <p>Application should have facility to show visit list details:</p> <ol style="list-style-type: none"> <li>Waiting</li> <li>Inside</li> <li>Visited</li> <li>Inside</li> <li>Denied</li> </ol> <p>User should be able to search the visitor ( Visitor Search should by: Date, Visitor Name, waiting, Inside, Visited, denied)</p> <p>User should be able to select the visitor &amp;</p> <p>User should be able to Print the visitor pass</p> <p>Application should have facility to set message for Security, Host &amp; Admin.</p> <p>This facility Immediate POP up should appear on screen if the message is set.</p> <p>Admin should have facility to:</p> <ol style="list-style-type: none"> <li>Block the employee</li> <li>Remove from Block list</li> <li>Include in watch list</li> <li>Remove from watch list</li> <li>Preapprove</li> </ol>

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Features	Description
	<p>The window should have facility to search visitor by:</p> <ol style="list-style-type: none"> <li>1. Visitor Name</li> <li>2. Organization</li> <li>3. Nationality</li> </ol> <p>Application should have facility to scan visitor document</p> <p>Application should support any Microsoft web camera &amp; Motorola Bar code scanner</p> <p>Reports:</p> <p>Master report should contain:</p> <ol style="list-style-type: none"> <li>a. Host wise report</li> <li>b. Department wise report</li> <li>c. Designation wise report</li> <li>d. Visitor organization report</li> <li>e. Vehicle type report</li> <li>f. Meeting purpose report</li> </ol> <p>Visits report should contain:</p> <ol style="list-style-type: none"> <li>a. Visits report</li> <li>b. Security wise visitor report</li> <li>c. Contract visitor report</li> </ol> <p>Visitors report should contain:</p> <ol style="list-style-type: none"> <li>a. Present in preapproved list</li> <li>b. Present in Banned list, Watch list</li> <li>c. Removed from Banned list, Watch list</li> </ol> <p>Application should have facility to add more client</p>
Host Employee Login	<p>Host login should be through Web login.</p> <p>Host employee should be able to view visit list</p> <p>Host employee should be able to generate the new visitor appointment</p> <p>Host employee should be able to delete previously added visitor entry</p> <p>Host employee should have facility to:</p> <ol style="list-style-type: none"> <li>a. Block the employee</li> <li>b. Remove from Block list</li> <li>c. Include in watch list</li> <li>d. Remove from watch list</li> <li>e. Preapprove</li> </ol> <p>The window should have facility to search visitor by:</p> <ol style="list-style-type: none"> <li>1. Visitor Name</li> <li>2. Organization</li> <li>3. Nationality</li> </ol> <p>Host should have facility to create message for Security Guard.</p> <p>Host should have facility to change his/her password for login.</p>
Security Login :	<p>Security should have facility to:</p> <ol style="list-style-type: none"> <li>a. Generate new gate pass</li> <li>b. To take fingerprint &amp; Photograph of visitor</li> <li>c. To send SMS &amp; Email to Host</li> <li>d. To select the Host details to print the gate pass if visitor is new.</li> </ol> <p>Application should support Fingerprint device to search previously visited visitor when he presses finger on fingerprint device.</p> <p>Security login should support contract gate pass printing</p> <p>Application should support employee gate pass printing in case of contractual employees.</p> <p>Security should be able to search the visitor from appointment list by :</p> <ol style="list-style-type: none"> <li>a. Visitor Name</li> <li>b. Date</li> <li>c. department</li> </ol>

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Project No : 120310	<b>DOCUMENT NO : NPI-120310-LVS-S1-TD-01</b>	Revision : 02 Date : 2015-10-31

Features	Description
	<p>d. Organization.</p> <p>Security should have facility to show visit list details:</p> <ol style="list-style-type: none"> <li>Waiting</li> <li>Inside</li> <li>Visited</li> <li>Inside</li> <li>Denied</li> </ol> <p>User should be able to search the visitor ( Visitor Search should by: Date, Visitor Name, waiting, Inside, Visited, denied)</p> <p>User should be able to select the visitor &amp;</p> <p>User should be able to Print the visitor pass</p> <p>Security should have facility to sign out the visitor with double click on visitor recorded or with barcode in case bar code scanner.</p> <p>Security should have facility to scan visitor listed in:</p> <ol style="list-style-type: none"> <li>Preapproved list</li> <li>Watch List</li> <li>Banned list</li> </ol> <p>Security should have facility to change his/her password.</p> <p>Mandatory features and licenses to be supplied:</p> <ol style="list-style-type: none"> <li>Minimum 1 no of client software with standard feature.</li> <li>Minimum 1 no of client software with Advanced feature.</li> <li>User web login for 150 Employees.</li> </ol>
Warranty	Minimum 3 Years warranty, support, bug fixing and upgrades should be provided for the Software

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Project No : 120310	DOCUMENT NO : NPI-120310-LVS-S1-TD-01	Revision : 02 Date : 2015-10-31

#### 4. Vehicle scanning at Security Entry

The design considers for scanning the vehicles under the chassis through buried cameras. The system should be capable of comparing the existing image and detecting the variation in the system.

The Under vehicle boom detection system provided with necessary under floor cameras, monitors, connection wire, control equipment etc. The camera should provide suitable for day /night operation along with LCD monitor for viewing. The recording equipment should have 1 TB hard disk to review the pictures as required by the end user. The equipment shall be located at nearest security Gate at entry side. The equipment should be provided along with speed hump at entry point


#### 5. ID Card Printer

One colour printer capable of printing on adhesive labels is included in the scope of the this contractor. This is to be used to print user identification details such as photograph, name, company's name etc. on adhesive labels that are to be pasted on the card. The software supplied shall allow composing of above information and printing on the label. The printer shall be a colour dye sublimation thermal transfer type of printer capable of directly printing on the card and on suitably coated adhesive labels. It shall be capable of photo quality printing with a resolution of 11.8 dots / mm. It shall also give wireless Access code (managed by IT System Personal).

#### 6. Technical Specifications

##### o Biometric Finger Print Reader


Features	Description
Compliance	Finger Print Readers shall comply with ISO 15693, ISO 14443A (CSN), and ISO 14443B and shall read credentials that comply with these standards
Authentication	The fingerprint reader shall read a fingerprint template(s) from an iCLASS credential and verify with a live finger placed on the fingerprint sensor, once verified, a pre-programmed access control identification number is transmitted back to the host panel, giving an audible and visual indication of a successful authentication
Operation	It shall have the ability to withstand up to 10 k volts of EDS and continue uninterrupted operation
Keypad	A 3x4 keypad which can provide supplemental PIN operation. The keypad shall provide the most popular industry formats including 4 bit or 8 bit bursts for every key press
Configuration	Reader Should be configured as a dual-purpose reader/enroller, single purpose enroller-only or reader-only
Display	The backlit graphical LCD display offers a 60 x 18 mm viewing area, 120 x 32 resolution. It is factory preset to provide written instructions to the user.
Sensor type	Optical
Resolution	Resolution: 500 dpi, 256-bit gray scale, 18 x 22 mm sensor area
Timing	Timing: Card read < 0.5 sec Fingerprint capture < 2 sec, typical 1 sec Verification of captured finger < 1 sec
False Acceptance and Recognition	FAR < 0.01%, FRR < 0.01%
Security	Data security with Credentials shall use 64-bit authentication keys to reduce the risk of compromised data or duplicate cards
Programming	Additionally, firmware may be updated. Operational programming options shall include:

Client : 	<b>TENDER DOCUMENT FOR SUPPLY, INSTALLATION, TESTING &amp; CONFIGURATION OF IT, COMMUNICATION, ACCESS CONTROL &amp; SURVEILLANCE SYSTEM</b>	<b>nne pharmaplan®</b>
Project No : 120310	DOCUMENT NO : NPI-120310-LVS-S1-TD-01	Revision : 02 Date : 2015-10-31

Features	Description
	a. Output configurations b. LED & Audio configurations c. Keypad configurations
Indications	Readers shall provide the following programmable audio/visual indication:  a. LCD display provides user feedback of reader operation b. An audio transducer shall provide various tone sequences to signify: access granted, access denied, power up, and diagnostics.  c. A high-intensity light bar shall provide clear visual status (red/green/amber) that is visible even in bright sunlight.
Material	UL94 Polycarbonate
Voltage	Operating voltage: 9 – 12 VDC, reverse voltage protected. Linear power supply recommended.
Current	Current requirements: (average/peak) 350/520mA @ 12 VDC
Certifications	Readers shall meet the following certifications: a. UL 294 b. Canada/UL 294 c. FCC Certification d. Canada Radio Certification e. EU and CB Scheme Electrical Safety f. EU – R&TTE Directive g. CE Mark (Europe) h. C-Tick (New Zealand/Australia/Taiwan)

○ **8” Read Range Proximity Card Reader:**


Features	Description
Compliance	Card Readers shall comply with ISO 15693, ISO 14443A (CSN), and ISO 14443B and shall read credentials that comply with these standards
Authentication	The card reader shall sense from the card and verify, once verified, a pre-programmed access control identification number is transmitted back to the host panel, giving an audible and visual indication of a successful authentication
Operation	It shall have the ability to withstand up to 10 k volts of EDS and continue uninterrupted operation
Configuration	Reader Should be configured as a dual-purpose reader/enroller, single purpose enroller-only or reader-only
Resolution	Resolution: 500 dpi, 256-bit gray scale, 18 x 22 mm sensor area
False Acceptance and Recognition	FAR < 0.01%, FRR < 0.01%
Security	Data security with Credentials shall use 64-bit authentication keys to reduce the risk of compromised data or duplicate cards
Programming	Additionally, firmware may be updated. Operational programming options shall include: a. Output configurations b. LED & Audio configurations
Indications	Readers shall provide the following programmable audio/visual indication: a. An audio transducer shall provide various tone sequences to signify: access granted, access denied, power up, and diagnostics.

Client : 	<b>TENDER DOCUMENT FOR SUPPLY, INSTALLATION, TESTING &amp; CONFIGURATION OF IT, COMMUNICATION, ACCESS CONTROL &amp; SURVEILLANCE SYSTEM</b>	<b>nne pharmaplan®</b>
Project No : 120310	DOCUMENT NO : NPI-120310-LVS-S1-TD-01	Revision : 02 Date : 2015-10-31

Features	Description
	b. A high-intensity light bar shall provide clear visual status (red/green/amber) that is visible even in bright sunlight.
Material	UL94 Polycarbonate
Voltage	Operating voltage: 9 – 12 VDC, reverse voltage protected. Linear power supply recommended.
Current	Current requirements: (average/peak) 350/520mA @ 12 VDC
Certifications	Readers shall meet the following certifications: a. UL 294 b. Canada/UL 294 c. FCC Certification d. Canada Radio Certification e. EU and CB Scheme Electrical Safety f. EU – R&TTE Directive g. CE Mark (Europe) h. C-Tick (New Zealand/Australia/Taiwan)

Features	Description
UHF Reader	Transmission Frequency - 865 - 868 MHz / 902 - 928 MHz dependent on regional regulations
Typical Maximum Read Range	3 to 5 meters
Input Voltage (VDC)	12VDC or 24VDC
Peak Current	1.0A @ 12VDC 0,5A @ 24VDC
Dimensions	9.10" x 9.10" x 2.75" (23.1 cm x 23.1 cm x 7.0 cm)
Color	Black
Housing Material	UL94 Polycarbonate
Mounting	Drill mounting box to meet application. Drill points provided for US and EU wall boxes and 75 mm, 100 mm, 200 mm VESA mounts.
Storage Temperature	-67° to 185° F (-55° to 85° C)
Operating Temperature	-30° to 150° F (-35° to 65° C)
Operating Humidity	5% to 95% relative humidity non-condensing
Environmental Rating	IP65
Standards	UL294/cUL (US & Canada), CB Scheme, FCC Certification (US), IC (Canada), CE (EU), IFETEL (Mexico), ANATEL (Brazil)
Crypto-Processor Hardware Common Criteria Rating	EAL5+
Card Compatibility	UHF EPC Class 1 Gen 2, ISO 18000-6C

- **Proximity Card:**


Client : 	<b>TENDER DOCUMENT FOR SUPPLY, INSTALLATION, TESTING &amp; CONFIGURATION OF IT, COMMUNICATION, ACCESS CONTROL &amp; SURVEILLANCE SYSTEM</b>	<b>nne pharmaplan®</b>
Project No : 120310	<b>DOCUMENT NO : NPI-120310-LVS-S1-TD-01</b>	<b>Revision : 02 Date : 2015-10-31</b>

Features	Description
General	The contactless smart card shall function as an access control card, used with access readers to gain entry to controlled portals and to hold identification information specific to the user.
Frequency	The contactless smart card shall be a passive device, with an operating frequency of 13.56 MHz, and shall meet ISO 15693 and ISO 14443B2
Size of the bit	The card shall contain a 64 bit unique serial number
Memory	Memory -32Kbits (4Kbytes) EEPROM memory configured with 2 OR 16 application areas plus an additional 16k user configurable memory
Flexibility	Each application area shall contain a unique 64 bit diversified authentication key to reduce the risk of compromised data or duplicate cards. The contactless smart card and card reader shall require matching keys in order to function together. All radio frequency (RF) communication between card and reader shall be encrypted, using a secure algorithm
Encryption	Wiegand card data, up to 84 bits in length, shall be encoded in Application Area 1 for use with access control systems
Availability	There should be compatibility with all available Access control formats (E.g. 26-bit, 32, 35-bit, 37-bit, 56-bit, and HID Corporate 1000 formats).
Programming	The contactless smart card will support programming and updating of custom applications after issue, using an appropriate reader/writer
Size	Dimensions as per ISO 7810 specifications
Range	Typical contactless smart card read ranges shall be 2.0-3.0" (5.0-7.6 m) with the proposed Reader.
Construction	Material and construction: PVC card materials. Card surface shall be glossy and of a material compatible with direct to card dye-sublimation or thermal transfer printing. Card construction shall meet durability requirements of ISO 7810
Operating Environment	Operating Temperature: -40oF to 158oF (-40oC to 70oC)
Operating Environment	Operating Humidity: 5% to 95% relative humidity non-condensing
Warranty	Warranty of contactless smart cards shall be lifetime against defects in material and workmanship

○ **Keypad :**

Features	Description
Compliance	Keypad Access shall comply with ISO 15693, ISO 14443A (CSN), and ISO 14443B and shall comply with these standards
Authentication	Once Key Number is verified, a pre-programmed access control identification number is transmitted back to the host panel, giving an audible and visual indication of a successful authentication
Operation	It shall have the ability to withstand up to 10 k volts of EDS and continue uninterrupted operation
Keypad	A 3x4 keypad which can provide for PIN operation. The keypad shall provide the most popular industry formats including 4 bit or 8 bit bursts for every key press
Display	Status Monitoring LED




Client : 	<b>TENDER DOCUMENT FOR SUPPLY, INSTALLATION, TESTING &amp; CONFIGURATION OF IT, COMMUNICATION, ACCESS CONTROL &amp; SURVEILLANCE SYSTEM</b>	<b>nne pharmaplan®</b>
Project No : 120310	<b>DOCUMENT NO : NPI-120310-LVS-S1-TD-01</b>	<b>Revision : 02 Date : 2015-10-31</b>



Features	Description
Security	Data security with Credentials shall use 64-bit authentication keys to reduce the risk of compromised data or duplicate cards
Material	Rugged Stainless Steel Construction, (Flushed into the Modular Panel). (Especially for Clean Room Applications)
Voltage	Operating voltage: 9 – 12 VDC, reverse voltage protected. Linear power supply recommended.
Current	Current requirements: (average/peak) 350/520mA @ 12 VDC
Certifications	Readers shall meet the following certifications: a. UL 294 b. Canada/UL 294 c. FCC Certification d. Canada Radio Certification e. EU and CB Scheme Electrical Safety f. EU – R&TTE Directive g. CE Mark (Europe) h. C-Tick (New Zealand/Australia/Taiwan)

○ **Access Control panel:**


Features	Description
General	<p>Should Provide an open architecture family of interface devices that provides a complete and fully functional hardware/firmware infrastructure for access control software host systems.</p> <p>The controllers shall communicate with a host system by using industry standard TCP/IP protocol, over 10/100 Mbps Ethernet, Internet.</p> <p>The controller should be based on 64 MB RAM, 32 bit ARM 9 processor, 200 Mips Speed 100 MHz Microcontroller running the Linux 2.6 Operating System</p> <p>The controller should have 256 MB On-board flash memory allows program updates to be downloaded via the network</p> <p>Secure Shell and Transport Protocol (SSH/SCP) enabled.</p> <p>A networked controller / reader interface that supports two Wiegand or Clock and Data card / PIN readers, and provides a TCP/IP connection to a Host system.</p> <p>TCP/IP connections shall be used for high speed connection to host and connectivity to existing and new Ethernet network cabling.</p> <p>Fully featured access control hardware and firmware infrastructure for host-based access control software applications.</p> <p>The products shall not be a proprietary product of the manufacturer of the host access control software application, and must have the ability to migrate to an alternative manufacturer's host access control software application by remote reconfiguration or firmware upgrade and without intervention from the original controller manufacturer. Controller Should Support Multiple Applications from various manufacturers.</p> <p>The Controller should have User ID storage upto 250000 users</p> <p>Should provide full distributed processing of all access control functions.</p> <p>The unit shall provide fully functional off line operation when not actively communicating with the host access control software application; performing all access decisions and event logging. Upon connection with the host access control software application, the networked door controller or networked controller/reader shall upload all buffered off-line transactions (minimum of 99,999) to the host software.</p>

<b>Client :</b> 	<b>TENDER DOCUMENT FOR SUPPLY, INSTALLATION, TESTING &amp; CONFIGURATION OF IT, COMMUNICATION, ACCESS CONTROL &amp; SURVEILLANCE SYSTEM</b>	<b>nne pharmaplan®</b>
<b>Project No : 120310</b>	<b>DOCUMENT NO : NPI-120310-LVS-S1-TD-01</b>	<b>Revision : 02</b> <b>Date : 2015-10-31</b>


Features	Description
	<p>Should provide diagnostics and configuration operations through connection to a local laptop computer</p> <p>Products shall be warranted against defects in materials and workmanship for 18 months</p> <p>Visual Indicators - Power LED to indicate that sufficient DC voltage is being provided to the unit. solid green to indicate successful communications to downstream devices, red flash to indicate a failed communications attempt, solid red to indicate no communications.</p> <p>The Controller shall be compatible with the following:</p> <ol style="list-style-type: none"> <li>1. Microsoft Windows 7, XP and any other Host System supporting TCP/IP networked interface</li> <li>2. TCP/IP (using applicable IEEE standards)</li> <li>3. Category 5 Cable, using RJ-45 connectors</li> <li>4. Wiegand Standard or Long Card Formats or C&amp;D Output Readers (up to 128-bit data)</li> <li>5. ODBC Systems and any other data storage systems whose data can be translated for transport over TCP/IP interface.</li> <li>6. Host systems with HID web browser API or DLL software installed</li> </ol> <p>The controller should be able to report supervised inputs/alarms with 255 priorities</p> <p>The Controller shall be designed to have a lifetime of ten years based on normal usage levels and environmental conditions. This shall include components such as batteries, real time clocks and non-volatile memory</p>
Regulatory Compliance	<p>a. UL Standards</p> <ol style="list-style-type: none"> <li>1. The Controller should provide input monitoring and reporting functions meeting applicable UL 1076 Proprietary Burglar Alarm System standards as a UL Recognized system component, including specific requirements for speed of reporting time, verifying communications with field hardware, detection of substitution of similar field hardware device, four-state alarm monitoring.</li> <li>2. The Controller Should meet applicable UL294 Access Control standards as a UL Recognized system component, including criteria for false accepts/rejects, attack resistance and electrical safety.</li> </ol> <p>b. CE Mark - The Controller should meet European CE Mark standards for electrical safety and RF emissions.</p>
Additional features	<p>The Controller Should have communications Indicator LEDs, which flash whenever communications occur between the interface unit and an upstream device. The communication LED flash codes are as follows:</p> <ol style="list-style-type: none"> <li>1. Communications TO the upstream device is green flashing.</li> <li>2. Communications FROM the upstream device is red flashing.</li> <li>3. Absence of one color indicates that communications are occurring in one direction only.</li> <li>4. Absence of flashing indicates a communications failure.</li> </ol> <p>The Controller Should have a voltage indicator LED on the interface unit, which shall indicate that sufficient DC voltage is being provided to the unit. The Controller should be capable of using beepers in the connected (HID and possibly other) readers to indicate door held/forced, PIN Retry Error, Tamper Alarm, Communications Failure, AC Power Failure, Battery Failure, etc.</p> <p>The Controller should include a dedicated input for enclosure tamper configurable to be supervised or unsupervised.</p> <p>The Controller should have configurable inputs for AC Failure and Low Battery/ Battery Presence, which are compatible with Supervised DC supplies which monitor the AC Input Voltage and Battery Voltage and</p>

Client : 	<b>TENDER DOCUMENT FOR SUPPLY, INSTALLATION, TESTING &amp; CONFIGURATION OF IT, COMMUNICATION, ACCESS CONTROL &amp; SURVEILLANCE SYSTEM</b>	
Project No : 120310	<b>DOCUMENT NO : NPI-120310-LVS-S1-TD-01</b>	<b>Revision : 02</b> <b>Date : 2015-10-31</b>

Features	Description
	<p>report status using two dry contact relay outputs.</p> <p>Mounting</p> <p>a. The Controller should be capable of mounting on any flat wall surface, using the appropriate fasteners. They shall be directly mountable in their standard plastic housings, or they shall be mountable in a stacked configuration on non-conductive standoffs inside a customer supplied utility box.</p> <p>b. The Controller should be installed indoors, inside a secure area, such as in a utility closet or on a wall above a suspended ceiling.</p> <p>c. The Controller should include 4 mounting screws and an installation manual.</p> <p>The Controller should work using customer-supplied 12VDC regulated Power Supply, with Battery Backup and Input Surge protection, and AC Failure and Battery Low contact outputs.</p> <p>The Controller should be capable of operation from 0° to 50° C (32° to 120° F), 0-95% RH, Non-condensing.</p> <p>The Controller should be capable of installation in an indoor environment, or otherwise protected in a NEMA-4 Rated Enclosure.</p>
Functional Description	<ol style="list-style-type: none"> <li>1. The Access Controller should control cardholder access to secured areas.</li> <li>2. The Access Controller should monitor and report access control activity.</li> <li>3. The Access Controller should monitor and report input status changes pertaining to intrusion alarms.</li> <li>4. The Access Controller should monitor and report the integrity of all network devices, circuits and communications.</li> <li>5. The Access Controller should control various electrical and annunciation devices.</li> <li>6. The Access Controller should enable a host system to allow a human operator to acknowledge and respond to alarm conditions.</li> <li>7. The Access Controller should enable a host system to allow a human operator to configure the network and obtain configuration and historical reports.</li> <li>8. The Access Controller should enable a host system to allow an operator to manually unlock and lock doors, and to shunt or unshunt input points.</li> </ol>
Access Schedules and Holidays	<ol style="list-style-type: none"> <li>a. The Controller should provide access control based on access groups, which shall consist of groups of readers and schedules which can be named and assigned to cardholders.</li> <li>b. The Controller should allow cardholder to have one or more access control schedules consisting of a valid time period for valid days of the week, for a given reader (or group of readers).</li> <li>c. The Controller should provide a time schedule for each week day (Sunday through Saturday) and the cardholder shall also have a time schedule for up to 255 Holiday Groups, allowing Holidays to be assigned different schedules than those normally used for a given day of the week.</li> <li>d. The Controller should allow a list of Holiday calendar dates and types to be entered into the networked controller.</li> <li>e. The Controller should allow any card to have a start and end date in addition to access groups such that the card shall be denied access outside the start-end period.</li> <li>f. The Controller should Schedules to be assigned to other functions such as input group suppression or output group activation</li> </ol>
Door Monitoring and Control	<ol style="list-style-type: none"> <li>a. The Access Controller should provide configurable inputs to monitor and report door position to the host.</li> <li>b. The Access Controller should suppress door monitor input alarm reporting during a valid access transaction for the duration of the lock relay time plus</li> </ol>


Client : 	<b>TENDER DOCUMENT FOR SUPPLY, INSTALLATION, TESTING &amp; CONFIGURATION OF IT, COMMUNICATION, ACCESS CONTROL &amp; SURVEILLANCE SYSTEM</b>	<b>nne pharmaplan®</b>
Project No : 120310	<b>DOCUMENT NO : NPI-120310-LVS-S1-TD-01</b>	<b>Revision : 02 Date : 2015-10-31</b>

Features	Description
	<p>the alarm shunt time.</p> <p>c. The Access Controller should interpret Door Forced and Door Held Open as two distinct alarm conditions.</p> <p>d. The Access Controller should send status change data to the Host in real time, if the Door Monitor senses a forced door (a door opened without using a card, PIN, REX or Host command), and, if configured as a Forced Door Alarm, the local Aux Relay shall be activated until turned off from the Host (even if the door is re- closed).</p> <p>e. The Access Controller should maintain a forced door alarm until cancelled by the host.</p> <p>f. The Access Controller should have a configurable delay for door forced reporting.</p> <p>g. The Access Controller should send a Door Held status change to the Host, if the Door Monitor senses a door held open beyond the relay + shunt time + reporting delay time, and (if configured as a Door Held Alarm) the local Aux Relay shall be triggered and latched until the door is re-closed. VertX shall provide a user defined reporting delay time to reduce false alarms.</p> <p>h. The Access Controller should have a configurable delay for door held reporting.</p>
Lock Relays	<p>a. The controller should have one relay per reader, which defaults to be a door lock relay, but shall be configurable as a general purpose relay.</p> <p>b. The controller should have a second relay per reader, which can be configured for one of the following functions: off, door forced alarm; door held alarm, door forced and door held alarm, communication failure alarm, or general purpose.</p> <p>c. The controller should allow the Aux Relay to be configured to control an annunciator for both Door Held and Door Forced conditions by providing two different default annunciation patterns: for Door Held the relay shall be activated 100ms every 2 seconds, and for Door Forced the relay shall be activated for ½ second on, ½ second off.</p> <p>d. The controller should allow the Aux Relay to be configured as a Shunt relay, such that it shall bypass a door contact connected to a separate alarm system during the Access/Alarm shunt time period.</p>
Extended Access Time	<p>a. The controller should be capable of providing configurable normal and extended access times.</p> <p>b. The controller should be configurable such that any designated card may have extended access time at readers also configured to provide extended access times. A second relay may also be actuated to control a powered door opener.</p>
Reader Beeper Control	<p>a. The controller should be capable of causing the readers to beep upon detecting a door forced or door held condition.</p> <p>b. The controller should be capable of causing the readers to emit a distinctive beep upon denial of access.</p> <p>c. The controller should be capable of causing the readers to emit a distinctive beep upon entry of an invalid PIN.</p> <p>d. The controller should be capable of using the readers beeper and LED to annunciate AC Failure, Battery Failure, and Enclosure Tamper alarm states.</p>
Parity Checking	The controller should perform parity checking on card data, and shall notify the network device on parity failure.
PIN Processing	<p>a. The controller should allow Card/PIN readers to be configurable to require Card+PIN, PIN only, Card or PIN, or Card only.</p> <p>b. The controller should provide PIN Suppression schedules, so that an HID or certain other PIN/Card readers can operate in Card-only mode on a</p>


Client : 	<b>TENDER DOCUMENT FOR SUPPLY, INSTALLATION, TESTING &amp; CONFIGURATION OF IT, COMMUNICATION, ACCESS CONTROL &amp; SURVEILLANCE SYSTEM</b>	nne pharmaplan®
Project No : 120310		Revision : 02 Date : 2015-10-31

Features	Description
	<p>scheduled basis, such as during the day when higher security is not required.</p> <p>c. The controller should be capable of signaling the cardholder with an alternating red/green LED on an HID or certain other card readers when a Card is presented and PIN is also required.</p> <p>d. The controller should invoke a configurable PIN Error lockout period of up to 99 seconds, which shall prevent the reader from being used after a configurable number of incorrect PINs have been attempted.</p>
Anti-Tailgating	<p>The controller should be capable of invoking the Relay Timer and Alarm Shunt timer to be cancelled 100 ms after the Door Monitor input senses that the door is closed.</p>
Facility Code Only	<p>The Controller should be configurable to provide access on the basis on facility code only when communications with the network interface are lost; alternately the reader interface shall be configurable to deny access to all when communications with the network interface are lost.</p>
REX Processing	<p>a. The controller should include a Request to Exit (REX) Input for each controlled door, which is used to suppress the Door Monitor alarm, and optionally, unlock the lock for an authorized entrance or exit without the use of a card.</p> <p>b. The controller should allow the Green LED at the associated reader to be suppressed during REX activation, to avoid alerting potential intruders when the door has been unlocked from the inside</p>
Anti-Passback	<p>a. The controller should allow Anti-Passback to be implemented in one of two modes: Real and Timed.</p> <p>b. When implemented in Real mode:</p> <ol style="list-style-type: none"> <li>1. The controller should provide that when Real Antipassback is implemented, each cardholder's APB status can be defined as IN, OUT, UNDEFINED and EXEMPT.</li> <li>2. The controller should allow an area to be defined by reader-controlled entrances and exits. Readers may be designated as IN or OUT readers.</li> <li>3. The controller should deny access to a card which is re-used at an IN reader prior to badging at an OUT reader. Alternatively, the family of products can be configured to grant access while logging an Anti-Passback violation at an IN reader, subsequently denying access when the cardholder attempts to exit the Anti-Passback area at an OUT reader.</li> </ol> <p>c. When implemented in Timed Anti-Passback mode:</p> <ol style="list-style-type: none"> <li>1. The controller should provide timed antipassback, which prevents a card from being used in a reader (or group of readers) until a configurable timer expires.</li> <li>2. The controller should allow any cardholder to be designated exempt from Anti-passback.</li> </ol>
Area Control	<p>a. The controller should provide Area Control, such that readers which control cardholder access or egress to a contiguous area and/or perimeter are logically associated in software.</p> <p>b. The controller should keep track of which cardholders have entered or left an area.</p> <p>c. The controller should be capable of denying access based on incorrect progression of cardholders through controlled areas.</p>
Card Formats	<p>a. The Controller should be capable of accepting multiple card formats, allowing multiple existing card populations to be merged into the same network.</p> <p>b. The controller should be able to accept card format files downloaded from the host.</p> <p>C. The Controller should be able to accept 255 types of formats at a time.</p>




Client : 	<b>TENDER DOCUMENT FOR SUPPLY, INSTALLATION, TESTING &amp; CONFIGURATION OF IT, COMMUNICATION, ACCESS CONTROL &amp; SURVEILLANCE SYSTEM</b>	nne pharmaplan®
Project No : 120310		Revision : 02 Date : 2015-10-31

Features	Description
Visitor Control	The controller should allow cardholders to be designated as visitor cards, which shall be assigned to an escort card such that badging by visitors shall also require an escort badging to obtain access
Functional Description for Input Point Monitoring	<p>a. The Controller should provide Input Points to monitor switch contact status changes. All inputs shall be capable of being supervised, with a specified resistor value wired both in series and parallel with the switch and a voltage applied to the circuit, allowing an input to be reported in any of three states: Normal, Off-Normal and Alarm.</p> <p>b. The Controller should also provide two-state inputs that report either OPEN or SHORT as the active state.</p> <p>2. Input Point Groups</p> <p>a. The Controller should provide input points that can be logically grouped in software to allow simultaneous control.</p> <p>b. The Controller should enable input reporting of any point or group of input points to be suppressed on a Scheduled basis. For example, this can be used to disarm intrusion or door-open detectors during the day.</p> <p>3. Input Point Status</p> <p>a. The Controller should provide input points that shall be configurable such that the normal or off normal state of any given input can be set for NO or NC devices.</p> <p>b. The Controller should provide input points that shall be configurable to match the EOL resistance used with any input.</p> <p>c. The Controller should allow the host system to query the digital representation of the DC voltage present at any input.</p> <p>d. The Controller should allow status changes to be reported to the Host in 0.5 Seconds or less. (This may be subject to Network conditions.)</p>
Network Communications	<p>a. The networked controller should have TCP/IP connectivity.</p> <p>b. The controller models should send a periodic "I'm Alive" message to the host at configurable intervals.</p> <p>d. The controller should have a firewall which can be used to restrict access thru the TCP/IP port.</p> <p>e. The controller should be capable of deploying AES 256 with symmetrical key encryption for all communications between the controller and host(s) system(s).</p>
Reader Supervision	The controller should be capable of monitoring a periodic Reader Supervision message from a reader with this capability, and shall send a reader offline message to the Host, if the message is not received in the event of reader failure or tampering.
Clock Synchronization	The controller should allow all networked controllers to be synchronized with the Host. Time Sync shall be sent automatically at regular intervals.
Host Control Commands Support by the Access Controller	<p>a. The Controller should be able to execute operator or system commands received via the Network from the Host, including:</p> <ol style="list-style-type: none"> <li>1. Open Door – specify doorname – unlocks door, shunts associated alarm, for locally programmed unlock times -- door relocks automatically when timers expire -- overrides any restrictions</li> <li>2. Open a Group or list of doors – same as open door – specify door group or list</li> <li>3. Open all Doors – same as above</li> <li>4. Unlock Door (or group/list, or All doors)– specify door(s) – unlocks doors indefinitely -- usually used in an emergency situation -- overrides any restrictions</li> <li>5. Lock Door (or group/list, or All Doors) – resets Unlock Door --overrides any current/pending “door unlock by time schedule” controlled at the</li> </ol>

Client : 	<b>TENDER DOCUMENT FOR SUPPLY, INSTALLATION, TESTING &amp; CONFIGURATION OF IT, COMMUNICATION, ACCESS CONTROL &amp; SURVEILLANCE SYSTEM</b>	nne pharmaplan®
Project No : 120310	DOCUMENT NO : NPI-120310-LVS-S1-TD-01	Revision : 02 Date : 2015-10-31

Features	Description
	<p>interface level</p> <p>6. Set Output Relay – latch a relay, or group/list of relays indefinitely</p> <p>7. Reset Output Relay (or group/list)</p> <p>8. Suppress Input Point (or group/list) – disable reporting/logging from a specified input points</p> <p>9. Un-suppress Input Point (or group/list)</p> <p>10. Reset Various Local Alarm conditions (as annunciated by aux relay or reader beeper) including:</p> <ol style="list-style-type: none"> <li>PIN Code error count</li> <li>Door Held</li> <li>Door Forced</li> </ol> <p>b. The controller should allow the Host System to query any local database for status or configuration information.</p> <p>c. The Controller should contain persistent application and data storage, allowing them to be reprogrammed from the Host if necessary.</p> <p>d. The Controller should be capable of receiving a command from the Host system operator which shall manually override any locally-invoked relay condition, in either latched or timed mode.</p> <p>e. The Controller should be capable of receiving a command from the Host system operator which shall manually override the condition of any Aux relay. It shall also be capable of enabling, disabling or resetting any individual alarm.</p> <p>f. The Controller should be capable of receiving a command from the Host system operator which shall manually activate or release the Hold line on any connected reader having the Hold feature.</p> <p>g. The Controller should allow the Host system to query any reader, output or input interface as to the application file revision, EEPROM file revision, ID number, and type.</p> <p>h. The Controller should allow the Host to set time of day on all Network Gateways, to view add or modify card records, to control outputs, to get input or output status, to write to the EEPROM, to read local memory, to get A/D values, to upload the current messages or all messages in the Event log, to clear the event file, to reload the card database, to reload access configuration files, to get or set I/O linker inputs, to reboot any interface.</p> <p>i. The Controller should report the current state of each input and output upon query from the host.</p>
Event Logger	<p>The Controller should be capable of sending the following event messages to the host system:</p> <ol style="list-style-type: none"> <li>Access Granted</li> <li>Access Granted PIN only</li> <li>Extended Access Granted</li> <li>Deny Access Card not found</li> <li>Deny Access Door Schedule Not Valid</li> <li>Deny Access Unknown Reader</li> <li>Deny Access Card Deleted from database</li> <li>Deny Access PIN not found</li> <li>Deny Access PIN deleted from database</li> <li>Deny Access Wrong PIN used</li> <li>Deny Access Timed Antipassback violation</li> <li>Deny Access Real Antipassback violation</li> <li>Deny Access Real Antipassback violation at Exit Reader</li> <li>Deny Access Area Violation</li> <li>Deny Access Area Violation at Exit Reader</li> <li>Deny Card Access – Not in Door Group</li> </ol>



Client : 	<b>TENDER DOCUMENT FOR SUPPLY, INSTALLATION, TESTING &amp; CONFIGURATION OF IT, COMMUNICATION, ACCESS CONTROL &amp; SURVEILLANCE SYSTEM</b>	<b>nne pharmaplan®</b>
Project No : 120310	<b>DOCUMENT NO : NPI-120310-LVS-S1-TD-01</b>	<b>Revision : 02 Date : 2015-10-31</b>

Features	Description
Alarm Messages	<p>The controller should be capable of sending the following alarm messages to the host system:</p> <ol style="list-style-type: none"> <li>1. Door Forced</li> <li>2. Door Held</li> <li>3. Tamper Failure</li> <li>4. Tamper Alarm</li> <li>5. Battery Failure</li> <li>6. Battery Alarm</li> <li>7. AC Failure</li> <li>8. AC Alarm</li> <li>9. REX Door Bit</li> <li>10. REX Door Alarm</li> </ol> <p>The controller should have configurable command priorities for each event type.</p> <p>The controller should optionally be encrypted to prevent data from being intercepted or simulated by an intruder</p>
Capacity	The Controller should be capable of supporting cardholder databases of the following sizes 2,50,000 using standard memory configuration.
Environment	<p>Enclosure Material: UL94 Polycarbonate</p> <p>Power Supply Requirements - 160 mA @ 12-18 VDC (with no readers connected)</p> <p>Operating Environment - Indoors or customer supplied NEMA-4 rated enclosure</p> <p>Temperature - 32° to 122° F (0° to 50° C)</p> <p>Humidity - 5% to 95% relative, non-condensing</p>

○ **Electromagnetic Lock:**


**Single Leaf doors.**

- Surface Mount Electromagnetic Lock with built in magnetic read switch contractor shall consider the U , L , Z brackets based on the site conditions accordingly
- The EM Lock shall have minimum with following specifications  
Each panel shall support two card readers, each of which may be up to

Suitable for surface mount on single leaf doors  
Current Draw: 500mA / 12V, 250mA / 24V  
Dual Voltage: 12V / 24 V  
Holding Force: About 600 lbs.  
Built-in magnetic read switch and Voltage Spike Suppressor  
UL Listed


**Double Leaf doors.**

- Surface Mount Electromagnetic Lock with built in magnetic read switch contractor shall consider the U , L , Z brackets based on the site conditions accordingly
- The EM Lock shall have minimum with following specifications  
Suitable for surface mount on double leaf doors  
Current Draw: 1A / 12V, 500 mA / 24V  
Dual Voltage: 12V / 24 V  
Holding Force: About 600 lbs.  
Built-in magnetic read switch and Voltage Spike Suppressor.  
UL Listed.

Client : 	<b>TENDER DOCUMENT FOR SUPPLY, INSTALLATION, TESTING &amp; CONFIGURATION OF IT, COMMUNICATION, ACCESS CONTROL &amp; SURVEILLANCE SYSTEM</b>	<b>nne pharmaplan®</b>
Project No : 120310	DOCUMENT NO : NPI-120310-LVS-S1-TD-01	Revision : 02 Date : 2015-10-31

○ **BOOM BARRIERS**


Features	Description
Application	Outdoor
IP Rating	54
Housing	Barrier Housing Unit: Powder Coated Boom: Powder Coated White RAL 9010 with Red reflective strips.
Housing Dimension	Modular
Housing Material Of Construction	All Aluminum Housing with Base frame in SS-304 for high protection against corrosion.
Protection	All Housing and internal parts will be rust & corrosion free metals or alloys of high strength with suitable Epoxy coating as applicable.
Housing Dimension (W X D X H)	315mm X 360mm X 915mm approximately
Boom Specifications	The Booms shall be extruded aluminum with octagonal profile (straight/articulated) 100mm. X 55mm. X 1.6 mm. shall be the structure of the profile/ Alternatively the boom may also be offered as extruded aluminum with round profile of dia 74 mm X 1.4 mm . 8 /10 meter booms may be supplied as two pieces joined together .The extension dimensions shall match the main boom length as per manufacturers design .
Intelligence	The barrier shall use a Block able DC High Torque Drive in combination with CAN bus communication standard interfaced Controller. It shall offer LCD Display & Graphic User Interface for easy control setting. Possibility for integration via standard user interfaces.
Digital Inputs	Minimum 8
Digital Outputs	Minimum 4
RelayOutputs	At least 6
Compliance & Safety	<ul style="list-style-type: none"> <li>• Compliance to CE.</li> </ul> Adherence to Safety Requirements of the <ul style="list-style-type: none"> <li>• EMC Directive 2004/108/EC,</li> <li>• Low Voltage Directive 2006/95/EC and</li> <li>• The basic requirements of the Machinery Directive 2006/42/EC</li> <li>• The basic requirements of the Machinery Directive 2006/42/EC</li> </ul>
Power Supply	230+/- 10% VAC, 50 Hz.
Maximum Power Consumption	Not More than 120 watts for Barrier Length up to 6Meters &Not More than 250 watts for Barrier Length between 6 to 10Meters
Opening & Closing Time	1.3 seconds for Boom Length up to 3.5 Meters 4 seconds for Boom Length Between 3.5 to 6 Meters seconds for Boom Length Between 6 to 8 Meters seconds for Boom Length Between 8 to 10 Meters
Operating Temperature	- 30 Degree Celsius to + 50 Degree Celsius
Safety	S/W for Detection of Presence of Vehicle in Loop or in the path of Infrared Safety Sensors available. Loops or Sensors to be used to prevent barriers from closing on the vehicle.
Duty Cycle	100%
Integration	Shall function in integration with Smart cards, proximity reader based access control systems etc

Client : 	<b>TENDER DOCUMENT FOR SUPPLY, INSTALLATION, TESTING &amp; CONFIGURATION OF IT, COMMUNICATION, ACCESS CONTROL &amp; SURVEILLANCE SYSTEM</b>	<b>nne pharmaplan®</b>
Project No : 120310	<b>DOCUMENT NO : NPI-120310-LVS-S1-TD-01</b>	<b>Revision : 02 Date : 2015-10-31</b>

Features	Description
Performance Requirement	MCBF- 10 Mil Cycles MTBF- 50,000 Hours MTTR- 30 Minutes
Certificates Required	TUV For Opening & Closing time ISO Certificate of the Company from the country of Origin UL Certification for the product Certification for Ingress Protection EMC Test report
Warranty	1 Year Warranty

○ **TRIPOD**

Features	Description
Architecture	The Tripod or Pivot Type Turnstile shall mean a barrier with three arms spaced out by 120°. These arms attached to a disk shall rotate in a circle when the motor/drive is powered.
Design	This tripod design provides a cost effective anti - tailgating solution. This model of a tri-arm design can be used for bi-directional pedestrian access control applications with high volume pedestrian traffic. The design shall be available in two types Sleek housing Version & Long Housing Version. The Sleek housing may have a dimension of 1000mm Height X 200mm Thick X 400mm Wide. The Long housing construction consists of a center housing connected to two end modules with the total dimension being around 1000mm X 200mm thick X 1300mm wide. Both Types of Barrier's housing-top covers shall be hinged & provide an IP rating of 32-44 depending on the application to be specified separately.
Integration	The Barrier shall be possible to be integrated with varied access control devices such as card readers, finger print readers, bar-code readers etc. The Sleek housing Barrier shall accommodate the readers on a separate pedestal or on the housing top cover. The Long Housing Version shall provide space for locating proximity card readers (of small dimensions) within the housing so as to offer a clear top panel w/o protrusions.
Housing	The tripod or pivot barrier design shall also be available in two types of housing constructions: The housing Standard type for internal installation would be Polished stainless steel plate 304 with protection class IP 32 & for external installation it would be 316 stainless steel with protection class IP 44 (so as to be operable outdoor; roofing of any nature shall not be required)
Drive System	The Drive System shall be maintenance-free & almost noise-less providing 100% duty cycle. The High Torque Motor shall be free of any mechanical gears or gear box so as to avoid maintenance & shall come with a built-in mechanism for precise position feedback but not using limit switches. The design lifetime of the drives shall be at least 30 Million cycles or 10 years In case of an unauthorised/forced entry when the force exerted in such a situation is more than the motor power- to prevent someone from an unauthorised or illegal entry or a vandalized forced rotation in the opposite direction there shall be an activation of a secondary coupling that shall prevent fraudulent use. However, under normal operation the secondary coupling shall remain inactive. The secondary coupling however shall be designed to slip in excess of forces greater then 700 to 800 N so as to prevent mechanical damage to the drive mechanism. The system shall reset and the rotating center shall find the home position. Under these

Client : 	<b>TENDER DOCUMENT FOR SUPPLY, INSTALLATION, TESTING &amp; CONFIGURATION OF IT, COMMUNICATION, ACCESS CONTROL &amp; SURVEILLANCE SYSTEM</b>	<b>nne pharmaplan®</b>
Project No : 120310	<b>DOCUMENT NO : NPI-120310-LVS-S1-TD-01</b>	<b>Revision : 02 Date : 2015-10-31</b>

Features	Description
	circumstances an o/p from the controller shall be available to provide for emergency alarm to be sounded. The barrier shall optionally be available with Lane Indicators where Green Arrow signals access possible & Red Cross meaning Access Denied.
Drop Arm	The Pedestrian Pivot/Tripod Barrier shall optionally be available with a Drop Arm. This Drop Arm shall be designed for emergency situations, e.g. fire alarm or accident or in the event of power failure to allow free passage. The turnstile arm shall drop down on failure of power or when power is switched off manually. On resumption of power the Arms shall however return to it's correct position and the rotating center shall reset and return to the operating home position w/o having to rotate 3X120 degree but in just 1X120 degree turn. However, as a standard feature when the Drop Arm option is not chosen on power failure, the turnstile arms shall rotate freely when turned in either direction. No clutch shall be required to be released for this safety feature.
Warranty	1 Year

o **Cable:**

Following shall be the cables for the various components of the networked access control system

- Reader – 6or 8 (to suite the requirement) conductor shielded, 1.0 sq.mm, FRLS, PVC
- Power - twisted pair, (As required), however UPS Power point will be available near the location, contractor shall consider required power cable for all the supply items in this scope of Contract.
- Push Button, EBUD Unit – Cable shall be PVC, FRLS (2x1.5 sq.mm)
- For EML – Minimum (4x1.5 or 2.5 sq.mm to maintain 600 lbs force, Cable shall be FRLS, PVC and Shielded )
- Cat 6 A Cable for Interfacing with other ACS and Server.
- FO Cable as specified to meet the baud rate.
- RS-485 - 24 AWG, 4,000 ft. (1,200 m) max., 2 twisted pairs' with shield (120W, 23pF)
- RS-232 – 8 conductors 24 AWG, 25 ft. (7.6 m) max.
- Alarm input – 2 conductor twisted pair, 30 ohms max.

## 7. EXAMINATION



Examine site conditions prior to installation. Notify Architect and Owner in writing if unsuitable conditions are encountered. Do not start installation until site conditions are acceptable.

## 8. INSTALLATION

A. All the components shall be tested before shipping to the project location

B. Video Management Software shall be installed, programmed and tested in accordance with manufacturer's installation instructions.

- Coordinate interfaces with Owner's representative where appropriate.
- Provide back boxes, racks, connectors, supports, conduit, cable, and wire for a complete and reliable installation. Obtain Owner's approval for exact location of all boxes, conduit, and wiring runs prior to installation.

Client : 	<b>TENDER DOCUMENT FOR SUPPLY, INSTALLATION, TESTING &amp; CONFIGURATION OF IT, COMMUNICATION, ACCESS CONTROL &amp; SURVEILLANCE SYSTEM</b>	
<b>Project No : 120310</b>	<b>DOCUMENT NO : NPI-120310-LVS-S1-TD-01</b>	<b>Revision : 02</b> <b>Date : 2015-10-31</b>

- iii. Install conduit, cable, and wire parallel and square with building lines, including raised floors areas. Do not exceed forty percent fill in conduits. Gather wires and tie to create an orderly installation.
- iv. Coordinate with other Contractors to provide proper sequencing of installation.

## 9. FIELD COMMISSIONING AND CERTIFICATION

- A. Field Commissioning: Video Management Software Testing as recommended by manufacturer, including the following:
  - i. Conduct complete inspection and testing of equipment, including verification of operation with connected equipment.
  - ii. Test all the devices and demonstrate operational features to Owner's representative and authorities having jurisdiction as applicable.
  - iii. Correct deficiencies until satisfactory results are obtained.
  - iv. Submit written copies of test results.

## 10. WARRANTY


- A. OEM Warranty: OEM shall provide standard 12 months warranty for the offered products & application software.
- B. OEM shall provide free of cost patches upgrades for the offered version of the software.
- C. AMC: The vendor shall provide AMC for complete Video Surveillance System for a period of 12 months after the OEM product Warranty.

## 11. REFERENCES

- A. Give two references of similar installation of the Access Control and Security system in other projects that have been successfully executed and implemented for other customers.
- B. The references should be such that they have been implemented in India


### Note :-

**The Bidder shall use as mentioned in the above system and shall follow the architecture drawing to meet the functional requirement of the Plant.**

<b>Client :</b> 	<b>TENDER DOCUMENT FOR SUPPLY, INSTALLATION, TESTING &amp; CONFIGURATION OF IT, COMMUNICATION, ACCESS CONTROL &amp; SURVEILLANCE SYSTEM</b>	<b>nne pharmaplan®</b>
<b>Project No : 120310</b>		<b>Revision : 02 Date : 2015-10-31</b>

## ANNEX 4

# TECHNICAL SPECIFICATIONS - SURVEILLANCE / CCTV SYSTEM

<b>Client :</b> 	<b>TENDER DOCUMENT FOR SUPPLY, INSTALLATION, TESTING &amp; CONFIGURATION OF IT, COMMUNICATION, ACCESS CONTROL &amp; SURVEILLANCE SYSTEM</b>	<b>nne pharmaplan®</b>
<b>Project No : 120310</b>		<b>Revision : 02</b> <b>Date : 2015-10-31</b>

## 1. GENERAL

### ➤ Section includes

Provide a complete video surveillance and management system, including engineering, components, installation and commissioning and put in to workable to meet the requirement of the Plant.

### ➤ Submittals

Manufacturer's Product Data: Submit manufacturer's data sheets indicating systems and components proposed with property details like physical, mechanical, electrical, thermal along with instruction/Installation manuals & Operational maintenance Manuals.

Shop Drawings: Submit complete shop drawings including connection diagrams for interfacing equipment, list of connected equipment, and locations for major equipment components.

Product /Material certifications from relevant authorities, manufacturers, testing labs etc as and where required as per the tender specifications.

List of recommended & mandatory spares and consumables.

Manufacturer's Authorization Letter: This document certifies that company's personnel are competent in the field of sales, installation, commissioning and maintenance of OEM's Products and Systems and will ensure that their staffs are continually updated on training on new products and technology as they are introduced by OEM.

### ➤ Quality assurance

Original Equipment Manufacturer: Minimum ten years' experience in manufacturing and maintaining Video & Security management systems. OEM should have presence in India and shall provide service support through local system integrator/partner.. Manufacturer shall provide technical assistance and support on the product & solution to their System Integrator/Partner.

Installer: Minimum two years' experience installing similar systems, and acceptable to the manufacturer of the video management system.

Power Requirements: Components shall have the following electrical specifications: 100-230 VAC (50 Hz)/24V DC and PoE.

### Delivery, Storage and Handling

Deliver materials in manufacturer's labeled packages. Store and handle in accordance with manufacturer's requirements, in a facility with environmental conditions within recommended limits.



## 2. TECHNICAL SPECIFICATION

### ➤ Objective

To achieve an Enterprise Level Surveillance & Security System, the vendor shall supply and commission an IP based CCTV system with the objective to provide high degree of surveillance system for the entire site.

The purpose is to monitor & supervise the entire area for security purpose, as well as record and inform officials on unwanted, untoward incidents. The hardware required for the system including servers, workstations, monitors,



<b>Client :</b> 	<b>TENDER DOCUMENT FOR SUPPLY, INSTALLATION, TESTING &amp; CONFIGURATION OF IT, COMMUNICATION, ACCESS CONTROL &amp; SURVEILLANCE SYSTEM</b>	
<b>Project No : 120310</b>	<b>DOCUMENT NO : NPI-120310-LVS-S1-TD-01</b>	<b>Revision : 02</b> <b>Date : 2015-10-31</b>

networking components, cables, connectors, conduits, power supplies etc. will be in the bidder's scope. It will be the responsibility of the vendor/bidder to make the entire system fully functional as per the specifications. Vendor/bidder shall consider any equipment/devices required to make the system functional if not mentioned herewith.

Further, the CCTV system shall be seamlessly integrated with security/ACS system.. CCTV System shall provide SDK Kit for such integration to be developed by Security/Access Control System.

➤ **Scope of Work**

The scope of work under this tender shall consist of design, supply, installation, testing, training & handing over of all materials, equipment, hardware, software applications and necessary workmanship to commission said system with all the required components strictly as per the enclosed tender specifications, design details. The scope also include the supply, Installation & commissioning of any material or equipment including civil works that are not specifically mentioned in the specification.

➤ **System Architecture:**



Video Management System (VMS) shall be a fully digital IP-based video surveillance system that brings together in one system a network video recorder (NVR) with unlimited storage capacity. It shall provide an option for integration onto the Access Control System or an option to get integrated by Access Control System. It shall provide an option for integration onto the Access Control System. As a software-based enterprise-level video and data management system, VMS shall provide a single GUI that monitors, records, and offers functionality to deliver the timely, accurate information required for effectively responding to any challenge. VMS shall be a fully scalable enterprise-class system with centralized management capability. VMS shall be a fully scalable enterprise-class media management system. This advanced network-based system architecture enables simultaneous live monitoring from multiple stations and is easily configurable for storage both on and off site. The software can be configured to store and to view images captured by one camera or thousands of cameras and monitor connections across an unrestricted number of servers. VMS can be designed to effectively integrate with access control system and video equipment including NVRs, keyboards, and cameras to leverage and protect investments in legacy infrastructure and equipment.

➤ **System Components**

**VMS-Client Application** shall provide live video view, various video playback support, historical video search and playback, alarm management, Map integration and front end control features to an operator. Client Application shall also able to manage & control all devices depending on the user access privileges. System should support virtually unlimited VMS Clients and the licenses for the same shall be included in the VMS Software.

**VMS Database Server** contain a web based data management center includes user management, facility management system logs etc. and event & control service which receives and controls events and commands of various formats via different communication modes, integrating video and access control devices. The System shall able to support upto 1000 cameras. However the system should be capable to expand virtually upto unlimited number of cameras by incorporating multiple servers to make a complete enterprise security systems.

**Network Video Recorder (NVR)** shall able to receive and store videos from various front end devices and forward to various decoders, clients applications connected to the enterprise security system; ensuring a smooth transmission when transmitting mass videos in various bandwidth levels. Each NVR server shall able to support upto 256Mbps data throughput which can take upto 128 cameras recording @ D1 resolution. Each NVR shall be provided with a storage chassis which should able to expand upto 20TB RAID 5 applied and can be further expanded upto 120 TB RAID 5 by incorporating the additional storage chassis.

Client : 	<b>TENDER DOCUMENT FOR SUPPLY, INSTALLATION, TESTING &amp; CONFIGURATION OF IT, COMMUNICATION, ACCESS CONTROL &amp; SURVEILLANCE SYSTEM</b>	
<b>Project No : 120310</b>		<b>Revision : 02</b> <b>Date : 2015-10-31</b>

### ➤ System Component Description & Integration

System shall support integration of various system components as detailed below as a minimum to create an enterprise level Security Management System.

**A. Recorders: Video Management System (VMS)** shall support integration with digital and network video recorders (NVRs). VMS shall have the ability to access and manage necessary functions of the recording devices through the **VMS** client interface, such as live video, recorded video, playback, camera configuration and other associated functions. The system shall support 128 Channel NVR at 25 fps @ D1 resolutions as a minimum.

**B. Cameras:** VMS shall be able to support Dome and Bullet/Box cameras for its functionality.

**C.** VMS shall have the capability to integrate with Access control system and Intrusion systems in future. Optionally VMS shall provide SDK for 3<sup>rd</sup> Party Systems to develop integration with VMS.

### ➤ Operational Requirements

A. VMS shall provide a single graphical user interface (GUI) to monitor, control and administer digital video surveillance equipment from multiple systems and platforms

B. All the Alarms from all the interfaces i.e CCTV; Access Control System shall be reported into a single GUI.

C. VMS shall be configured to store and view images captured by one camera or numerous cameras and monitor connections across an unrestricted number of servers.

D. All the Software & hardware equipments for CCTV, shall be of same make/manufacture.

### ➤ VMS Software Features:

The VMS application software shall have following major features:


**Scalability:** System shall be enterprise level system so that increase in the number of cameras; number of servers & number of Clients shall not affect the currently running system operations & functionality.

**Multi-location:** System shall work on an enterprise class environment over the TCP/IP network. The system shall be designed on central site connected with multiple remote sites along with the following required conditions / aspects:

- System shall be capable of local recording, local monitoring and video management at each local site. The system ideally shall not transmit any video through remote VMS Database Server (to optimize the WAN bandwidth) for any local access to videos (LIVE and recorded). System shall be capable of Video monitoring (LIVE / Recorded), system & user management through a master central location.
- The system shall be designed & proposed in a way that in the event of connection failure between central VMS Database Server & local location, system shall continue to work & deliver the key functions at local site i.e. local monitoring and local recording.

**Open Standard Support:** VMS Software shall be ONVIF compliant so that it can integrate with multiple digital IP cameras, multiple digital and network video recording devices.

**System Integration:** System shall have Integration capabilities with electronic access control system or vice versa.

Client : 	<b>TENDER DOCUMENT FOR SUPPLY, INSTALLATION, TESTING &amp; CONFIGURATION OF IT, COMMUNICATION, ACCESS CONTROL &amp; SURVEILLANCE SYSTEM</b>	nne pharmaplan®
Project No : 120310		Revision : 02 Date : 2015-10-31

Integration capabilities of the system shall be measured on below mentioned aspects as a minimum:

In an event of an alarm generated by Access Controller System the software shall ensure that the operator is automatically provided with the CCTV video from the designated camera to view the alarm location as soon as the alarm is received, allowing the operator to visually assess the event and also providing continuous recording.

In an event of a card being shown to a card reader (where there is camera located near the door), the system shall capture a video clip containing at least 2 minutes before the card swipe, during card swipe event & 2 minutes after card swipe and bundle them together & tag them along with the card event database. When the card event is retrieved then it should be possible to play the associated video clip of that particular Event/Alarm.

VMS shall support defining multiple rule logics which can be assigned to any alarm to run automatically when those alarms received in the system. There shall not be any limitation in defining such rule logic. In future; Example of such rule is “in case there is an alarm received from a zone of Intrusion Detection System, then specific Camera assigned to that Zones shall automatically POP up on the VMS-Client GUI and start recording based on the Pre & Post record time defined during the configuration and defined set of Access Controlled doors shall go into Locked/Unlocked state as defined.

➤ **Access Control Integration Operation:**

- User name, card No., card type, privilege and reader No. can be gained up on swiping card.
- Door control can be fulfilled manually or automatically assigned in rule defined in the system.
- Above information shall be able to be logged in system database.

**Compression Techniques:** System shall use various compression techniques simultaneously to utilize storage and network bandwidth effectively. Video compression techniques shall including H.264, MPEG-4 and M-JPEG as minimum.

**Multi Operations:** Managing pentaplex user operations of attached recording devices simultaneously, including live viewing, recording, playback, and handling the exchange of data between the server and a remote workstation.


**Live View:** Live viewing of up to 64 cameras on a single VMS-Client up to D1 resolution. VMS-Client application shall have capability to connect to 4 monitors & 16 cameras can be viewed on one Monitor.

**Alarm Management:** System shall receive alarms & events from multiple video, access and alarm devices. It shall provide capability of Alarm & event viewing, management and interlocking. Alarm interlock logic shall reside in VMS Server which will trigger device to execute preset operations on receiving of an alarm.

**Reports:** Log Report shall be used to search the device alarm events, device operations, user login, and web operation. It shall also be used to set queries to get results quickly. Log reports shall be exported in XML, CSV, TIFF, PDF, Web Archive and Excel file formats.

**Search:** System shall manage investigation, post-recording motion detection, motion detection-based recording, Alarm (from any of integrated solution CCTV, Access Control and Intrusion Detection) Based recording and search tools with advanced search capabilities of the recording devices.

**User Rights:** System shall provide multi-level user access rights for viewing and managing access to the recorder functions.

Client : 	<b>TENDER DOCUMENT FOR SUPPLY, INSTALLATION, TESTING &amp; CONFIGURATION OF IT, COMMUNICATION, ACCESS CONTROL &amp; SURVEILLANCE SYSTEM</b>	nne pharmaplan®
<b>Project No : 120310</b>		<b>Revision : 02</b> <b>Date : 2015-10-31</b>

**Recording Modes:** System shall support recording modes of continuous, scheduled, manual, event and alarm-based recording.

**Network:** System shall support for both multicast and unicast network topologies and communication protocols.

**Rule engine:** This capability shall allow for custom scripts and to provide both customization and third party integration. Rules Engine Service shall provide functions such as rules analysis, state monitoring and rules management. By way of logical programming for various devices and event alarms in graphical editing interface, Rules Engine Service shall perform automatic execution of rules when emergency occurs. The visual dynamic user interface shall make it easy to acknowledge alarm circumstances and allows prompt response in case on emergency.

**Client Application:** VMS shall provide at least Unlimited licenses as inbuilt. System shall provide unified VMS-Client login to users. User shall be able to login from any PC loaded with VMS-Client application.

i.

**Hardware:** System shall utilize off-the-shelf computer workstations, servers, networking and storage equipment. No proprietary hardware shall be acceptable.

#### ➤ **VMS OPERATOR FEATURES:**

VMS shall provide the following operator functions:

**Configuration:** The operator (with Administrator privileges) shall have the option to configure the system. It shall support live updates of all configurations. The configurations shall provide the option to add/edit/delete recorders, cameras, switchers, keyboards, users and roles, sites, recording rule, rule engine service etc. Configuration of video recording trigger service and device recovery service parameter shall be basic feature of VMS.

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**Data Dynamic Synchronization:** The configuration data in VMS shall be able to synchronous to all connected VMS-Clients and NVR services.

**Log Report:** The operator shall be able to view the log reports:



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#### ➤ **VMS-CLIENT FEATURES:**

VMS-Client Application shall have below mentioned features:



- **Live View:** Main **video** viewing screen capable of showing 1, 4, 9, 16 and other customized split layout of live or recorded video. Standard presets may be customized to the user preferences.
- **Scenarios:** Current view can be saved as scenario and allowing the user to restore this view at any later point in time. These scenarios shall be modified, overwrite or deleted as and when ever required.
- **Drag and Drop:** VMS-Client **application** shall provide drag and drop functionality. Particular video device can be dragged onto main video viewing screen to view live video.
-

Client : 	<b>TENDER DOCUMENT FOR SUPPLY, INSTALLATION, TESTING &amp; CONFIGURATION OF IT, COMMUNICATION, ACCESS CONTROL &amp; SURVEILLANCE SYSTEM</b>	
<b>Project No : 120310</b>	<b>DOCUMENT NO : NPI-120310-LVS-S1-TD-01</b>	<b>Revision : 02</b> <b>Date : 2015-10-31</b>

- **PTZ Control:** Support both analog and digital PTZ through GUI and the keyboard. PTZ control shall be used for adjusting PTZ movement and setting the focus, aperture and preset bit of the camera.
- **Snapshot:** Capable of capturing snapshot of live video and allowing user to export snapshot. Snapshot tool shall be available in video window itself. Only the authorized users shall have snapshot functionality.
- **Video Export:** VMS-Client shall have capability of download and export recorded video from recorders. Exported video clip shall be in OEM's native format to ensure data integrity. → However there should be the provision in the system to export in other formats such as JPEG Images, AVI, pdf etc.
- **Playback:** VMS-Client shall be able to playback recorded video from recorders. Different playback modes shall be there as forward and backward playback.
- 
- **Alarm Management:** Capability of complete alarm management for the alarms coming from recorders, switchers and access control systems. Alarm Management shall be based on below mentioned aspects:
  - i. User shall get the pop-up message for response plan upon receiving the alarm so that same response plan can be followed by each operator.
  - ii. E-mail notification can be sent out which shall include alarm information and User editable information along with individual alarm.
- i.
- **Operations:** Option to perform various operations through context menu on a particular video (live/recorded/patrol). These operations shall include: Full screen, point and drag, enable square select, digital zoom, start recording, stop recording, take snapshot .
- **Timeline Control:** Ability to manage timeline control of the recording device, which provides camera recording statistics. Timeline control shall have following features: time slider, time search, time jump, play controls. Timeline control shall also include dedicated buttons for step reverse and step forward and keyboard shortcuts for playback operations.
- **Keyboard Functionality:** VMS-Client shall be controllable by a keyboard controller connected to the VMS server and shall have following major features: Selecting layout, ending monitor commands, switching operations, PTZ control operations. PTZ control latency shall be less than 500ms
- **Search:** The search facility shall include search based on date and time, event, thumbnail alarm, .
- **Device and Service Status:** VMS-Client shall be capable to show the running status of Event & Control services, Rule Engine service and VMS site in bottom status bar. It shall also monitor connected devices status.
- **Server Usage:** VMS-Client shall provide facility to view CPU, Memory and Network usage information.
- **NVR CAPABILITIES:**

NVR shall have below mentioned capabilities

  - **Video Streaming:** NVR shall relay the real-time streaming to the VMS-Client.
  - **Recording:** NVR shall store the real-time streaming for a certain period of time when it receives the storage command from Trigger Service.

Client : 	<b>TENDER DOCUMENT FOR SUPPLY, INSTALLATION, TESTING &amp; CONFIGURATION OF IT, COMMUNICATION, ACCESS CONTROL &amp; SURVEILLANCE SYSTEM</b>	
Project No : 120310	DOCUMENT NO : NPI-120310-LVS-S1-TD-01	Revision : 02 Date : 2015-10-31

- Each individual camera can be set a different preset recording frame rate .Camera recording There shall be a provision to set motion based/scheduled recording.
- **Video playback and download:** NVR shall allow the user to playback and download video records from NVR-Client. It shall also allow the user to configure the storage locations.
- **Pre-alarm Recording:** NVR shall be capable to cache the real-time streaming for a certain time (no longer than 10 minutes). When there is an event or alarm triggering recording, prerecording can help trace the situation before the event or alarm occurs.

a.

**Remote Upgrade:** NVR shall be able to be upgraded without sending device back to factory. It shall be remotely upgraded from VMS-Client.

- **Server with Direct Attach Storage :-**

Rack mounted with required software with hardware keys/soft keys and online updation to meet the requirement. Customization of softwares, etc. Server shall be in failover redundancy mode for recording 20% of critical camera as well as configuration setup. The features are specified in the technical specification. It shall be integrated with ACS system and Data and IT System, if required in future to meet the functional requirement.


- **Specification of NVR**

- Supply installation, Testing and Commissioning of adequate qty. of NVRs which shall include the required hardware & software as per the system requirement.
- The hardware shall eliminate single point of failure, by including redundant power supplies and RAID 5 storage to optimize reliability. The System shall have a storage capacity so as to record all cameras at 1080P/2MP resolution, H.264 compression and 12 fps/10fps for multi sensor cameras and complying with below mentioned details:
- Licensed to support a minimum of 128 cameras and shall be licensed to support unlimited clients.
- 30 days Storage. The Bidder is to submit the Storage Calculations with the offer. Comprehensive & Integrated Software platform to handle Surveillance System.
- H.264 profile, multicasting & Dual Streaming features to make the best use of the network and storage resources. Mapping feature to enable for the quick identification of the emergencies and response.
- Complete hardware & software are of factory fitted, qualified and tested.
- Capability to search the devices in the network, their configuration and their addition to the platform & maintain database for the Alarms, errors, System health for easy diagnostic & System health
- Multi-layer Map Support. Supports BMP & JPEG Map Import. Hot swappable Disc storage enable for hot rebuild & replacement. Software shall be scalable to add multiple ( min. 70 or more ) NVRs in a site and there shall be a provision in the client to connect multiple sites/NVRs for displaying the combination of cameras from any of the sites.
- ONVIF compliant, 3 Years Warranty.

- **VMS Software**

- VMS Software to provide data management center\tool includes user management, system logs etc. and event & control service which receives and controls events. However, the system should be capable to expand virtually up to unlimited number of cameras, access points by incorporating multiple servers to make a complete enterprise security system. System shall be capable of local recording, local monitoring



Client : 	<b>TENDER DOCUMENT FOR SUPPLY, INSTALLATION, TESTING &amp; CONFIGURATION OF IT, COMMUNICATION, ACCESS CONTROL &amp; SURVEILLANCE SYSTEM</b>	<b>nne pharmaplan®</b>
Project No : 120310	DOCUMENT NO : NPI-120310-LVS-S1-TD-01	Revision : 02 Date : 2015-10-31

and video management. Licensed to support a minimum of 140 cameras and shall be licensed to support unlimited clients. VMS shall have the capability to integrate with Access control system and Intrusion systems if required in future. 3 Years Warranty & Support

- VMS-Client Application to provide live video view, various video playback support, historical video search and playback, alarm management, Map integration and front end control features to an operator. Client Application shall also able to manage & control all devices, PTZ Camera depending on the user access privileges. System should support virtually unlimited VMS Clients. 3 Years Warranty & Support.


#### • Cameras

The proposed system shall be able to support the below mentioned types of cameras and the specifications specified for each.

#### Fixed Dome Camera:

S No	Parameter	Specification
1.	Sensor	1/3" Progressive Scan CMOS Sensor
2.	Effective Pixels	2048(H) x 1536(V)
3.	Compression	H.264 Main Profile (MPEG-4 part 10/AVC) and Motion JPEG simultaneously
4.	Dual Streaming	Multiple, individually configurable streams in H.264 and Motion JPEG Controllable frame rate and bandwidth. VBR/CBR H.264
5.	Resolution	3 mega Pixel
6.	Image Frame Rate	Up to 25 fps at 50 Hz
7.	Sensitivity	Color 0.5 Lux , B/W 0.05
8.	Automatic Lens Control	Automatic/Manual Iris Control
9.	Lens	3 - 9 mm Vari-focal Remote Focus & Zoom
10.	WDR	ON/OFF
11.	Sync System	Internal
12.	---	---
13.	Security	Password protection, user access log
14.	Data Storage	Video or Snapshot
15.	White Balance	Automatic , Manual
16.	Electric Shutter	1/10 to 1/6000
17.	Bit Rate	32Kbps-16Mbps continuously adjustment ; CBR/VBR
18.	Audio Compression	G.711
19.	Motion Detection	4 zones
20.	Alarm Trigger	Intelligent video motion detection and external input




<b>Client :</b> 	<b>TENDER DOCUMENT FOR SUPPLY, INSTALLATION, TESTING &amp; CONFIGURATION OF IT, COMMUNICATION, ACCESS CONTROL &amp; SURVEILLANCE SYSTEM</b>	<b>nne pharmaplan®</b>
<b>Project No : 120310</b>		<b>Revision : 02</b> <b>Date : 2015-10-31</b>

S No	Parameter	Specification
21.	Supported Protocol	TCP/IP, UDP, RTP, RTSP, RTCP, HTTP, DNS, DHCP,
22.	Network Video Interface	ONVIF
23.	---	---
24.	Local Storage	SD/SDHC/SDXC Slot
25.	Power Supply	12V DC / 24V AC
26.	PoE	IEEE 802.3af
27.	Operating Temperature	--10°C to +55°C
28.	Operating Humidity	10 to 90% (non-condensing)
29.	Power Consumption	< 10W
30.	Certification	UL ,CE, FCC, EN, IEC/EN

**True Day/Night Outdoor IP PTZ Camera:**


S No	Parameter	Specification
1	Sensor	1/3” or 1/2.8” or better Progressive scan CMOS.
2	Lens	F=4.7 – 94mm, autofocus, automatic day/night.
3	Compression	H.264, MJPEG
4	Dual Streaming	Multiple, individually configurable streams in H.264 and Motion JPEG Controllable frame rate and bandwidth. VBR/CBR H.264
5	Resolution	2 MP ( 1980(H)X1080(V)
6	Image Frame Rate	Up to 30/25fps
7	Sensitivity	Color 0.5 Lux Monochrome 0.05 Lux
8	Automatic Lens Control	Automatic/Manual Iris Control
9	Pan /Tilt / Zoom	E-filip, 100 preset positions Pan: 360deg endless, 0.05 deg to 450 deg / sec Tilt : 180 deg, 0.05 deg to 450 deg /sec 20Xoptical zoom and 12x digital zoom ,
10	----	----
11	Sync System	Internal
12	Auto Gain Control	On
13	S/N Ratio	50dB
14	Gamma Correction	0.45/1
15	White Balance	Automatic, Manual
16	Electric Shutter	1/10 to 1/6000
17	BLC	Off/On ( Ajustable)

<b>Client :</b> 	<b>TENDER DOCUMENT FOR SUPPLY, INSTALLATION, TESTING &amp; CONFIGURATION OF IT, COMMUNICATION, ACCESS CONTROL &amp; SURVEILLANCE SYSTEM</b>	<b>nne pharmaplan®</b>
<b>Project No : 120310</b>		<b>Revision : 02</b> <b>Date : 2015-10-31</b>

S No	Parameter	Specification
18	Audio/Two-way	Audio Input/Output
19	Video Output	NTSC/PAL
20	Alarm	1 in / 1 out
21	Supported Protocol	HTTP, TCP, RTSP, RTP, ICMP, UDP, IGMP , RTCP, DNS, DHCP, ARP, NTP
22	Network Video Interface	ONVIF
23	Alarm Trigger	Intelligent video motion detection and external input
24	----	----
25	PoE	IEEE 802.3at
26	Power	24VAC or 24 VDC Option shall be available
27	Operating Temperature	- 30°C ~ 50°C
28	Operating Humidity	0% ~ 90% (non-condensing)
29		
30	Housing	IP 66 weatherproof Housing
31	Certification	UL,CE/EN, FCC

#### Indoor BOX IP Camera:

S No	Parameter	Specification
1	Sensor	Progressive scan CMOS 1/3"or
2	Lens	Auto Iris Varifocal 5.5-50 mm Remote Focus & Zoom
3	Compression	H.264, MJPEG
4	Dual Streaming	Multiple, individually configurable streams in H.264 and Motion JPEG Controllable frame rate and bandwidth. VBR/CBR H.264
5	Resolution	2 Mega Pixel ( 1980(H)X1080(V)
6	Image Frame Rate	Up to 30/25fps
7	Sensitivity	Color 0.5 Lux Monochrome 0.05 Lux
8	Automatic Lens Control	Automatic Iris Control
9	Image Settings	Compression, Colour, brightness, sharpness, contrast, white balance, exposure control, back light compensation, fine tuning of behavior at low light, WDR
10	-----	-----
11	Sync System	Internal
12	Auto Gain Control	On
13	S/N Ratio	50dB

Client : 	<b>TENDER DOCUMENT FOR SUPPLY, INSTALLATION, TESTING &amp; CONFIGURATION OF IT, COMMUNICATION, ACCESS CONTROL &amp; SURVEILLANCE SYSTEM</b>	<b>nne pharmaplan®</b>
Project No : 120310	<b>DOCUMENT NO : NPI-120310-LVS-S1-TD-01</b>	<b>Revision : 02 Date : 2015-10-31</b>



S No	Parameter	Specification
14	-----	-----
15	White Balance	Automatic, Manual
17	BLC	Off/On (Adjustable)
18	Audio/Two-way	Audio Input/Output
19	Video Output	NTSC/PAL
20	Alarm	1 in / 1 out
21	Supported Protocol	HTTP, TCP, RTSP, RTP, ICMP, UDP, IGMP , RTCP, DNS, DHCP, ARP, NTP
22	Network Video Interface	ONVIF
23	Alarm Trigger	Intelligent video motion detection and external input
26	PoE	IEEE 802.3af
27	Operating Temperature	-10°C ~ 50°C
28	Operating Humidity	0% ~ 90% (non-condensing)
29	Lens	IR Corrected Day/Night 5-50 mm Lens with metal mount.
30	Housing	IP 66 weatherproof Housing
31	Certification	UL,CE/EN, FCC

• **Key Board for PTZ Camera**

**Features**

- Joystick Keyboard
- Shall interface with the Workstation Client.
- 
- Camera/Monitor Selection
- 

S No.	Parameter	Technical Specification
1.	Keyboard Interface	RS232/RS422/USB
2.	PTZ Control	Joystick
3.	Standard Keys	0-9, Clr, Ent, Cam, Mon, Mux, Device, Alarm, Seq, Login
4.	-----	-----
5.	-----	Laser cut with blue backlight
6.	Camera Function Keys	View, Tour, PTZ Call,
7.	Operating Voltage	12 VDC or POE (48 VDC, Class 3) or USB Port
8.	-----	-----

<b>Client :</b> 	<b>TENDER DOCUMENT FOR SUPPLY, INSTALLATION, TESTING &amp; CONFIGURATION OF IT, COMMUNICATION, ACCESS CONTROL &amp; SURVEILLANCE SYSTEM</b>	
<b>Project No : 120310</b>		<b>Revision : 02</b> <b>Date : 2015-10-31</b>

S No.	Parameter	Technical Specification
9.	COM 1 and 2	20% to 80%, non-condensing
10.	-----	-----
11.	Certifications	CE/EN, FCC

### 3. EXAMINATION

Examine site conditions prior to installation. Notify Architect and Owner in writing if unsuitable conditions are encountered. Do not start installation until site conditions are acceptable.

### 4. INSTALLATION


- A. All the components shall be tested before shipping to the project location
- B. Video Management Software shall be installed, programmed and tested in accordance with manufacturer's installation instructions.
  - i. Coordinate interfaces with Owner's representative where appropriate.
  - ii. Provide back boxes, racks, connectors, supports, conduit, cable, and wire for a complete and reliable installation. Obtain Owner's approval for exact location of all boxes, conduit, and wiring runs prior to installation.
  - iii. Install conduit, cable, and wire parallel and square with building lines, including raised floors areas. Do not exceed forty percent fill in conduits. Gather wires and tie to create an orderly installation.
  - iv. Coordinate with other Contractors to provide proper sequencing of installation.

### 5. FIELD COMMISSIONING AND CERTIFICATION

- A. Field Commissioning: Video Management Software Testing as recommended by manufacturer, including the following:
  - i. Conduct complete inspection and testing of equipment, including verification of operation with connected equipment.
  - ii. Test all the devices and demonstrate operational features to Owner's representative and authorities having jurisdiction as applicable.
  - iii. Correct deficiencies until satisfactory results are obtained.
  - iv. Submit written copies of test results.

### 6. WARRANTY

- A. OEM Warranty: OEM shall provide standard 36 months warranty for the offered products & application software.
- B. OEM shall provide free of cost patches upgrades for the offered version of the software.
- C. AMC: The vendor shall provide AMC for complete Video Surveillance System for a period of 12 months after the OEM product Warranty.


Client : 	TENDER DOCUMENT FOR SUPPLY, INSTALLATION, TESTING & CONFIGURATION OF IT, COMMUNICATION, ACCESS CONTROL & SURVEILLANCE SYSTEM	nne pharmaplan®
Project No : 120310	DOCUMENT NO : NPI-120310-LVS-S1-TD-01	Revision : 02 Date : 2015-10-31

## 7. REFERENCES

- A. Give two references of similar installation of the IP based CCTV system in other projects that have been successfully executed and implemented for other customers.
- B. The references should be such that they have been implemented in India


### Note:-

The Bidder shall use Server Configuration as mentioned in Networking and IT System and shall follow the architecture drawing to meet the functional requirement of the Plant.

Client : 	TENDER DOCUMENT FOR SUPPLY, INSTALLATION, TESTING & CONFIGURATION OF IT, COMMUNICATION, ACCESS CONTROL & SURVEILLANCE SYSTEM	nne pharmaplan®
Project No : 120310	DOCUMENT NO : NPI-120310-LVS-S1-TD-01	Revision : 02 Date : 2015-10-31

## ANNEX 5

# TECHNICAL SPECIFICATIONS OF NETWORKING/DATA/COMMUNICATION/CCTV/AC S CABLING SYSTEM & UPS SYSTEM

<b>Client :</b> 	<b>TENDER DOCUMENT FOR SUPPLY, INSTALLATION, TESTING &amp; CONFIGURATION OF IT, COMMUNICATION, ACCESS CONTROL &amp; SURVEILLANCE SYSTEM</b>	<b>nne pharmaplan®</b>
<b>Project No : 120310</b>		<b>Revision : 02 Date : 2015-10-31</b>

## 1. SCOPE OF SERVICES:-

Procurement, Transportation, assembly & erection at site, testing and commissioning of required cabling System Items and UPS and putting into successful and satisfactory operations as per requirement.


## 2. TECHNICAL SPECIFICATION

### Voice and Data Outlets (Outlet:-RJ45)

#### ➤ Outlets and Accessories

- a. CRCA Box shall be concealed/surface type shall be made out from metal sheet enclosure Galvanized – prevent from rusting, Top, Bottom and back side knock out for conduit entry from any direction . Possible to break open knock out without any special tool, sliding clamp for vertical adjustment, Adjustment bracket are taped to prevent cement ingress.
- b. CRCA box minimum wall thickness shall be 1.6 mm in all Sides except in the front.
- c. Depth of boxes shall not be more than 47 mm
- d. The boxes shall be provided with suitable Earthing screw/studs and no welding spot, free from the rust
- e. Metal Flush boxes shall be of 1//3/4/6/8/12 module as per schedule
- f. General Data and Voice outlets shall be of a RJ45 and shall be flush mounting modular type
- g. Outlets shall Conforms to the standards ISO11801 ed 2.0, EN 50173 & EIA / TIA 568- B1
- h. Easily identifiable connector: Separate colour for Cat6A and Cat3 for Telephone
- i. Insulation displacement contact (IDC) :Tool-free connection (self-stripping connection) should holds wires in place by locking the lever, should ensure easy untwisting of pairs for less than 13mm.
- j. Possibility of remaking the connection if a mistake is made by simply unclipping
- k. Visibility of the connection
- l. Colour code as per EIA / TIA568A & B to avoid wiring mistakes and Colour of the outlets shall be in white colour or as per Purchaser approved colour
- m. Cable can be fed from any direction
- n. General Data outlets shall be of a RJ45 and shall be flush mounting modular type
- o. Colour of the Data outlets shall be in white colour or as per Purchaser approved colour
- p. Modular Plate shall have superior finish, screwless curved look, Supported by Metal frame behind



Client : 	<b>TENDER DOCUMENT FOR SUPPLY, INSTALLATION, TESTING &amp; CONFIGURATION OF IT, COMMUNICATION, ACCESS CONTROL &amp; SURVEILLANCE SYSTEM</b>	nne pharmaplan®
<b>Project No : 120310</b>		<b>Revision : 02</b> <b>Date : 2015-10-31</b>

for solid strength, shall possible to adjust in horizontal or vertical directions, when flush is tilted

- q. Modular plate shall be supplied with 30mm long screws for perfect fixing if wall box is over flushed.
- r. Modular plate shall be made of from High grade Polycarbonate material, Curved smooth finish screwless appearance, no accumulation of dust.
- s. Modular plate shall be of 1 / 2 Module as per schedule.
- t. Data and Voice outlets shall have integral Poly carbonate mounting plates of minimum 4.5 mm thick and outer plates shall be SS 304 matt finish of min. 1.6 mm thick. For clean room area and Poly carbonate plates of minimum 4.5 mm thickness for non clean room area.

➤ **Telephone Cables (Cat 6A) (Supplied by Others)**


- a. All Telephone conductors shall be halogen free LSZH insulated 4pair Cat 3 Cable.
- b. The maximum length of the telephone cable shall be to suite the requirement.
- c. Telephone cable shall Conforming to the standards ISO 11801 ed 2.0, EN50173 and EIA/TIA 568-B
- d. Telephone Cable shall have EIA/TIA colour code and PVC sheath and PVC sleeve shall be Fame retardant
- e. Telephone conductors shall be in colours for easy identification of pairs.
- f. Data cable colour shall be Luminous yellow RAL 1026
- g. For Flame proof area the cable should be low smoke zero halogen (LSZH) or jelly filled armoured cable.

➤ **Patch Cords**

- a. Patch cord shall be halogen free LSZH insulated 4pair Cat 6 or Cat 6A Cable.
- b. Patch cord shall be with 4 twisted pairs 100
- c. Patch cord shall Conforming to the standards ISO 11801 ed 2.0, EN50173 and EIA/TIA 568-B
- d. Patch cord shall have EIA/TIA colour code and PVC sheath and PVC sleeve shall be Fame retardant
- e. Patch cord colour shall be as per data cable for particular I/Os
- f. Patch cord shall be as per following:
  - U/UTP – Unscreened, impedance 100 PVC
  - F/UTP – screened, impedance 100 LSZH
  - SF/UTP – Shielded, impedance 100 LSZH
- g. Patch cord shall be in standard length 1/2/3 Mtr; with both side connector.

➤ **Patch Panel**

- a. Patch panel shall Conforms to the standards ISO 11801 ed 2.0, EN 50173 and EIA / TIA 568-B-1

Client : 	<b>TENDER DOCUMENT FOR SUPPLY, INSTALLATION, TESTING &amp; CONFIGURATION OF IT, COMMUNICATION, ACCESS CONTROL &amp; SURVEILLANCE SYSTEM</b>	<b>nne pharmaplan®</b>
Project No : 120310	DOCUMENT NO : NPI-120310-LVS-S1-TD-01	Revision : 02 Date : 2015-10-31

- b. Patch Panel shall have Automatic panel earthing of each connector for FTP and STP supplied with Screws
- c. Patch panel shall have Capacity of 24 / 48 connectors
- d. Patch Panel can also receive optical fiber blocks or optic fiber to copper converter
- e. It shall have facility to terminate Multiple media copper / fiber on the same panel
- f. Totally accessible: Wiring is done at the front after assembly of the patch panels
- g. It shall have simplicity of connection with the RJ45 connector

➤ **OFC Cable (Supplied by others)**

This Specification covers the design, manufacture, testing and installation of single mode optical fibre cables, accessories and termination facilities.

The optical fiber cables shall be designed, manufactured and tested in accordance with the latest applicable sections of the IEC and ITU standards listed below. Cables manufactured in India shall be designed, manufactured and tested in accordance with either the quoted codes or their equivalent IS standards. Appropriate National Standards shall be used where relevant.


➤ **Cable Construction**

Cable construction shall be as detailed below:

**Optical Fibre Cables (12 Core Single mode 9/125 µm Core/Cladding) Supplied by Others:**

12 Single mode optical fibre armoured cable suitable for direct buried in the ground or for blowing into ducts or for installation outdoors above ground. The maximum length of the OFC cable will be <800mm.

Service	The full range of communication services including voice, data, image and video.
Construction	Silica based fibre manufactured with a primary protective of UV - cured acrylate of dimensions:
	Secondary protective: - Gel filled loose tubes of high modulus plastic. Each tube shall contain up to specified Fibres.
Fibre and Tube Identification	Fibres in each tube shall be coloured differently for easy identification.  All tubes shall be coloured differently and in the same manner as the fibres,
Laying-up	Tubes stranded around a central strength member of steel or GRP.  The interstices of the cable core inside the core covering shall be filled with a filling compound.

Client : 	<b>TENDER DOCUMENT FOR SUPPLY, INSTALLATION, TESTING &amp; CONFIGURATION OF IT, COMMUNICATION, ACCESS CONTROL &amp; SURVEILLANCE SYSTEM</b>	<b>nne pharmaplan®</b>
Project No : 120310	<b>DOCUMENT NO : NPI-120310-LVS-S1-TD-01</b>	<b>Revision : 02 Date : 2015-10-31</b>



Core Covering	Minimum of one layer of non-hygroscopic, halogen-free, flame retardant (HFFR) tape applied helically or longitudinally with an overlap.
Moisture Barrier	The core shall be completely covered with an aluminium foil coated on one side and applied longitudinally with an overlap. The barrier shall be bonded to the inner sheath.
Inner Sheath/Bedding	The first inner sheath shall be of high density polyethylene compound (black) and bonded to the moisture barrier. A second inner sheath shall be made of polyamide compound (black).
Armouring	Single layer of round galvanized steel wires, diameter 1.25mm, with a counter spiral.
Oversheath	Extruded PVC. Where cables are provided for above ground use the oversheath shall be additionally provided with UV ray protection suitable for direct exposure to sunlight without deterioration.
Oversheath Colour	Grey
Fire Performance	<p>The outer sheath shall be flame retardant according to IEC 60332 and Low Smoke, Low Halogen (LSLH) type in compliance with IEC 61034 and IEC 60754. Characteristics shall be:</p> <p>a) Lowest Oxygen Index (LOI): 32</p> <p>b) HCl emission: less than 5%</p> <p>Where stipulated in the material Requisition, cables shall also be fire resistant to IEC 60331 and type tested for 1000 deg.C for a minimum of 1 hour</p>

- a. Cable fillers shall be solid, non hygroscopic and shall fill the cross section such that the transmission of gas and hydrocarbons along the length of the cable will not occur under normal pressure.
- b. The outer sheath of cables shall be embossed with:

Manufacturer's identification

Number of fibres / type of fibres

The drum progressive length of cable at every metre. (Zero point shall be the cable end at its inner coil on the cable drum).

Client : 	<b>TENDER DOCUMENT FOR SUPPLY, INSTALLATION, TESTING &amp; CONFIGURATION OF IT, COMMUNICATION, ACCESS CONTROL &amp; SURVEILLANCE SYSTEM</b>	
<b>Project No : 120310</b>	<b>DOCUMENT NO : NPI-120310-LVS-S1-TD-01</b>	<b>Revision : 02</b> <b>Date : 2015-10-31</b>

The stock code as stated in the Material Requisition.



- c. Cable shall have uniformity in construction and outer sheath colour.
- d. Cables shall be designed to withstand without fibre elongation or damage a pulling force of not less than 3000N. The pulling force for cables designed specifically for installation by cable blowing shall be clearly stated by the Supplier.
- e. Armoured cables shall have a crush resistance of not less than 5000N applied over 100mm in accordance with BS EN 50289-3-5:2001. The crush resistance for cables designed specifically for installation by cable blowing shall be clearly stated by the Supplier.
- f. Cables shall have a bending radius of not more than 15 x cable diameter (280 mm shall be the minimum bending radius).
- g. All cables shall be provided with a vermin resistant outer sheath
- h. A membrane of bonded aluminum polyamide shall be provided as an inner layer in all underground cables to protect against moisture ingress and attack from hydrocarbons and other chemicals.

➤ **Fire Properties**

- a. **Flame Retardancy:** Where specified, cables shall be of flame retardant construction to minimize flame propagation under fire conditions. Cable flame retardancy shall comply with the applicable standards listed in Standard Tests for cable flame retardancy shall be in accordance with these referenced standards. Seller shall produce copies of type test certificates to prove that cables of the same type comply with the relevant standards. Where type test certification is not available, Seller shall carry out witnessed type tests at the Factory Acceptance Test stage.
- b. **Smoke Emission:** Indoor cables shall be tested for smoke emission in accordance with IEC 61034-1 and IEC 61034-2. The cable light transmittance so determined shall be better than 60%.
- c. **Toxicity:** Indoor cables shall be of Zero Halogen type (i.e. < 0.5% HCL content) and shall be tested in accordance with IEC 60754-1 & 2. Outdoor cables shall be of the low halogen type (i.e. 19% HCL content).
- d. **Fire Resistance:** Where called for in the Material Requisition, above-ground cables shall meet the transmission integrity requirements of IEC60331-25. Tests shall prove circuit integrity for at least one hour at 1000 deg.C.

➤ **Drumming:**


- a. Cables shall be drummed in maximum continuous lengths on non-returnable wooden drums. The manufacturer shall guarantee that drums are of sufficient strength to protect the cable during shipping and handling. The standard drum length shall be not less than 6000m with zero negative tolerance.
- b. Cable ends shall be sealed and fixed to the drum so that both ends are accessible. To protect the cable during shipment battens shall be fitted around the entire periphery of the drum. Drums shall be suitable for long term outdoor storage at site.
- c. All cable drums shall have the Purchase Order Number, Purchase Order Item Number, Drum Number and Stock Code clearly stencilled on the outside of both flanges.
- d. Drum identification labels shall be attached to the outside and inside of the drum flanges. Labels shall be protected by transparent plastic envelopes and shall give the following information:

Client : 	<b>TENDER DOCUMENT FOR SUPPLY, INSTALLATION, TESTING &amp; CONFIGURATION OF IT, COMMUNICATION, ACCESS CONTROL &amp; SURVEILLANCE SYSTEM</b>	
Project No : 120310	<b>DOCUMENT NO : NPI-120310-LVS-S1-TD-01</b>	Revision : 02 Date : 2015-10-31

- Drum identification number
- Cable construction
- Number of fibres & type of fibres
- Cable quantity (metres)
- Purchase order number and item number
- Total weight of cable and drum (kg)
- Manufacturer's name
- Year of manufacture
- Stock code number

➤ **Inspection and Testing**

- a. All cables shall undergo witnessed factory acceptance testing at the manufacturer's works. Both routine & type tests shall be carried out in accordance with the recommendations of the relevant codes and standards.
- b. The Seller shall provide certificates for tests carried out on all cables. Tests shall be those listed in the relevant standard specifications and any additionally specified within the Material Requisition. The Seller shall submit a comprehensive Factory Acceptance Test (FAT) procedure at least 4 weeks prior to the tests. All measurements shall be recorded in an organized and systematic way and logged against the respective cable drum number & stock code.
- c. The Buyer reserves the right to witness all tests specified on completed cables. Details of all test instruments used in the tests shall be declared and the results recorded. These details shall include make/type, year, manufacturer, serial no., calibration date & calibration test body. Witnessed tests shall include the following as a minimum:
  - Visual inspection: Colouring of fibres and tubes, identification.
  - Optical characteristics: Attenuation & chromatic dispersion shall be measured on all fibres end-to-end to ensure the requirements of Section 4.  
Bandwidth performance and macro bending loss shall also be measured.
  - Mechanical characteristics: Fibre geometry, thickness of sheaths, overall diameters.  
Bending tests, tensile strength and stress corrosion susceptibility.
  - Fire Properties: Flame retardancy, smoke emission, toxicity and fire resistance shall be tested as appropriate.
- d. The Supplier shall give two weeks' notice of tests prior to commencement. The FAT procedure shall be reviewed and agreed to by the Purchaser/consultant before the tests commence.
- e. The Purchaser/consultant reserves the right to inspect cables at the supplier's works at any time prior to dispatch to prove compliance with the specifications. Cables shall not be dispatched unless the test certificates have been approved by the Purchaser.
- f. The supplier shall provide for inspection a draft manufacturing record dossier at the time of the tests. The dossier shall include all type test certification and results of the FAT. The supplier shall submit copies of the dossier in the form of a Manufacturing Record Book for formal review by the Purchaser within 2 weeks.

Client : 	<b>TENDER DOCUMENT FOR SUPPLY, INSTALLATION, TESTING &amp; CONFIGURATION OF IT, COMMUNICATION, ACCESS CONTROL &amp; SURVEILLANCE SYSTEM</b>	nne pharmaplan®
Project No : 120310		Revision : 02 Date : 2015-10-31

➤ **Tagging & Labeling**

- a. All equipment cabinets shall be fitted with a large engraved tag label made of plastic laminate material which shall be mechanically affixed to the exterior of the enclosure. Engraving details, size, etc. will be provided in due course.
- b. All patch panels and sub-modules shall be suitably labeled.
- c. All fibre circuits shall be identified with a suitable label carrying the identity of the port and the circuit reference.
- d. All internal fibre connections shall be labeled.
- e. Sample Labeling standard as per below

➤ **Testing and Documentation**

- FTP CAT6A/Cat 3 Cable for C1 Data Centre to test and maintain record for data point as under.

C1 :- Primary data Centre  
C2:- Secondary Data Centre  
C3 :-` Distribution Centre

Cable :Foiled Twisted Pair (AMP FTP Cat 6 or Nexan Cat6A)

FTP cable record to be generate for each Data point

- FTP CAT6A Cable for C1 Data Centre to test and maintain record for voice point as under.

C1 :- Primary data Centre  
C2:- Secondary Data Centre  
C3 :-` Distribution Centre

Cable: Foiled Twisted Pair (AMP FTP Cat 6 or Nexan Cat6A)



FTP cable record to be generate for each Voice point

- FTP Cat6A Cable for Data Centre testing procedure and maintaining record for data/voice point to be done as per Purchaser / consultant approved procedure sample two shall be given for reference

➤ **UPS (Online- Uninterrupted Power Supply)**

**3. Technical Specification of UPS**

➤ **General Specification**

Client : 	<b>TENDER DOCUMENT FOR SUPPLY, INSTALLATION, TESTING &amp; CONFIGURATION OF IT, COMMUNICATION, ACCESS CONTROL &amp; SURVEILLANCE SYSTEM</b>	
<b>Project No : 120310</b>		<b>Revision : 02</b> <b>Date : 2015-10-31</b>

- UPS system shall consist of a standalone UPS cabinet or the appropriate number of UPS cabinets for capacity and/or redundancy. All UPS cabinets are to be operating simultaneously and sharing the load.
- In a non-redundant system, all the UPS cabinets shall be required to supply the full rated load. If a power or control module should malfunction, the load is to be transferred automatically to the bypass line. If a battery module should malfunction, it is to be isolated from the system resulting in reduced back up time.
- For hot redundant operation, the UPS will have one or more UPS cabinets than required to supply the full rated load. The malfunction of one of the UPS cabinet shall cause that UPS cabinet to be isolated from the system and the remaining UPS(s) shall continue to carry the load. Replacement or repair of a UPS cabinet shall be capable without disturbance to the connected load.



#### ➤ **Fabrication Requirements**

- All materials and components making up the UPS shall be new, of current manufacture, and shall not have been in prior service except as required during factory testing. The UPS shall be constructed of replaceable subassemblies.
- Wiring: Wiring practices, materials, and coding shall be in accordance with the requirements of the EN 50091 and other applicable codes and standards.
- UPS Cabinet:-The UPS system enclosure shall and meets the requirements of IP52. The UPS cabinet shall be cleaned, primed, and painted as per requirement.
- Cooling: - The UPS shall be forced air cooled by internally mounted fans.
- The individual vertical UPS panels shall comprise of rigid welded structural frames pressed and shaped CRCA sheet steel not less than 12 SWG. This structure shall house the components contributing to the major weight of the components such as Isolation Transformers, electronic parts and other front mounted accessories, etc.
- Cladding of the frames (Covers) and partitions shall be of minimum 16 SWG 1.6 mm) CRCA sheet, whereas doors shall be of min. 14 SWG (2 mm) sheet.
- All cable gland plates shall be made of 10 SWG (3.15 mm) thick sheet steel. All sheet steel work forming the exterior of UPS panels shall be smoothly finished, leveled and free from flaws. The corners shall be rounded.
- The structure shall be mounted on a rigid channel base frame of minimum ISMC 75. The design shall ensure that the weight of the components is adequately supported without deformation or loss of alignment during transit or during operation.
- All opening covers and doors shall be fitted dust tight neoprene gaskets with operating type fasteners designed to ensure proper compression of the gaskets to make the panel dust and vermin proof. Proof doors construction should be of double bend type. Doors shall be provided with a hinged door interlocked with switch housed inside the compartment so that door cannot be opened unless is in "OFF" position. Hinged shall be concealed and bolted type. Doors shall be provided with right angle turn type door lock.

#### ➤ **Power and Control Wiring**

- The control wiring shall be carried out with 650/1100 V grade Heat shrinkable stranded copper conductor wires of minimum size 2.5 Sqmm. The wiring shall be complete in all respects so as to ensure proper functioning of control, protection and interlocking scheme.




Client : 	<b>TENDER DOCUMENT FOR SUPPLY, INSTALLATION, TESTING &amp; CONFIGURATION OF IT, COMMUNICATION, ACCESS CONTROL &amp; SURVEILLANCE SYSTEM</b>	
<b>Project No : 120310</b>	<b>DOCUMENT NO : NPI-120310-LVS-S1-TD-01</b>	<b>Revision : 02</b> <b>Date : 2015-10-31</b>

- Control & Power wiring within the UPS shall be securely held in position (either loomed or run in conduit/trunking) neatly bunched, adequately supported and properly routed to allow easy access and maintenance. Where wiring enters or passes through compartments it shall be suitably protected mechanically.
- Both control and power wiring shall be brought out at rear side of UPS for external connections, operation and maintenance.
- All wiring for external connections shall be brought out to individual terminals on a readily accessible terminal block at Rear side of UPS without joints or tees in their runs. Generally no more than two wires shall be connected to a terminal.
- Secondary wiring shall be by different colours as per standard.
- Wiring identification shall be by numbered and/or lettered sleeves, of insulating material adjacent to the terminals. Wires within UPS shall be identified by numbered ferrules at each end. The ferrules shall be of the T type and of non-deteriorating material. They shall be firmly located on each wire so as to prevent free movement and they shall be indelibly marked and removal without disconnecting the wire from its terminal shall not be possible.
- Wires for connections to the door shall be flexible. All conductors shall be crimped with solderless sockets at the ends before connections are made to the terminals.
- All wiring shall be colour coded as follows
  - Instrument transformer : Red, Yellow or Blue determined by the AC Circuit's phase with which the wire is associated.
  - AC Phase wire : white
  - AC Neutral : Black
  - DC Circuits : Grey
  - Earth Connection : Green
  - Power Wiring : Phase Colour
  - CT wiring : Phase colour

#### ➤ **Earthing**

- A tinned copper earthing bus shall be provided for the entire length of the UPS and shall be rated to carry maximum fault current. Earth busbar shall be located at the bottom of the UPS. All metallic non-current carrying parts of the UPS shall be bonded together and connected to the UPS earth busbar.
- All doors shall be bonded to the main structure by means of a flexible copper connection arranged so that it cannot be trapped as the door is opened or closed.
- Provision shall be made, for earthing cable screen and armouring to the earth busbar, near the gland.
- Provision shall be made for connection from earth busbar to the main earthing busbar coming from the earth pit on both sides of the UPS.
- All control, instrument and communication cables, if any, shall be earthed suitably to prevent any electromagnetic interference and ensure electromagnetic compatibility
- Each earthing point shall be marked with an E.

Client : 	<b>TENDER DOCUMENT FOR SUPPLY, INSTALLATION, TESTING &amp; CONFIGURATION OF IT, COMMUNICATION, ACCESS CONTROL &amp; SURVEILLANCE SYSTEM</b>	nne pharmaplan®
<b>Project No : 120310</b>		<b>Revision : 02</b> <b>Date : 2015-10-31</b>

➤ **Name Plate**

- UPS and components shall be identified by labels. UPS Cubicle and compartment label designations (located at front and inside of equipment) shall be in accordance with the Drawing.
- A main label (UPS designation) shall be affixed at Rear side of UPS the following information in bold letter:
  - Manufacturers name and type
  - UPS Tag Number
  - System voltage, phases, wires and frequency
  - Rated fault current and duration
  - Switch rating
  - Year of manufacture
  - Purchasers name
  - Order Item No
  - Characters shall be 12 mm high.
- A separate name plate giving equipment details shall be provided.
- Labels shall be affixed by means of self-tapping screws or rivets. Use of adhesives shall not be accepted.
- Labels shall be made out from anodized aluminum and shall have black characters on a white background. Warning / Danger labels shall have White lettering on a red background.
- Engraved name plates shall preferably be of 3 ply, (red-white-red or black - white -black) lamicold sheet. However black engraved perplex sheet nameplates shall also be applicable. Engraving shall be done with square groove cutters.

➤ **Safety Arrangements**



All terminals, connections, relay and other components, which may be “LIVE” when access doors open shall be adequately screened. It shall not be possible to obtain access to an adjacent cubicle or when any door is opened.

➤ **General Requirements**

➤ **Battery**


A set of indoor stationary type normal Valve regulated lead-acid cells battery bank with closed top cells of 2V each with specified capacity/load cycle complete with all accessories and devices conforming to IS including but not limited to the following shall be supplied:-

- Batteries shall be supplied separately to the UPS. Battery type shall be of the valve regulated sealed lead acid (VRLA) type with continuous operational.
- Valve regulated lead-acid cells (also known as sealed cells) shall meet the design, performance, and test requirements of IS and are defined as follows:
- VRLA batteries under normal operating conditions reconstitute the products of electrolysis within each gas tight cell or unit and each cell or unit is fitted with pressure relief valve.

<b>Client :</b> 	<b>TENDER DOCUMENT FOR SUPPLY, INSTALLATION, TESTING &amp; CONFIGURATION OF IT, COMMUNICATION, ACCESS CONTROL &amp; SURVEILLANCE SYSTEM</b>	
<b>Project No : 120310</b>	<b>DOCUMENT NO : NPI-120310-LVS-S1-TD-01</b>	<b>Revision : 02</b> <b>Date : 2015-10-31</b>

- Electrolyte shall be immobilized in each cell through the use of a gelling agent or absorbed in the separators and plates. The cells shall have no residual free or bulk liquid electrolyte.
- Separators shall be porous to electrolyte but electrically insulating. Sufficient overlap of the separator to the edges of the plates shall be provided to prevent short-circuiting of adjacent plates.
- Plates shall be supported from the bottom of the cell container and shall not be hung from the cell cover. Adequate allowance shall be made for the positive grid growth. The grid growth shall not cause any distortion of the container or the cover.
- Cell design shall accommodate the total positive plate growth during the design life of the cell. The plate growth shall not cause cracking, deformation, or failure during the lifetime of the cell under normal operating conditions.
- Cell containers and covers shall be made of a high impact, flame-retardant plastic having a minimum oxygen index of 28%, and shall meet the criteria needed to be rated V-0 when tested in accordance with Underwriters Laboratories Standard UL 94, or FV0 when tested in accordance with IS
- Cell containers and covers shall be designed to minimize flexing of the surface under internal operating pressures. The cover shall be permanently joined to the container to form a leak-proof seal. The complete assembly shall be able to withstand an internal pressure equal to 5 times the normal operating pressure without fracture for 5 hours at 25°C. The complete unit, including the post-to-cover seal, shall remain gas-tight and electrolyte-tight during the design life of the battery.
- Terminal posts shall be cast in lead or lead alloy and have a copper core insert. Covers for the inter-cell connectors and the terminals shall be supplied with the batteries.
- Pressure relief valves shall operate at the pressure limits specified by the Vendor. The valve shall not allow ingress of outside air into the unit. Client shall provide test data showing the hydrogen gas emission rate of the cell type at float and equalize voltages.
- Battery shall have all live surfaces shrouded with transparent full-length insulating cover plates to prevent accidental contact with live cell terminals.
- Battery module assemblies/battery racks for large batteries shall be constructed of welded or bolted structural steel frames with bolted steel runners and braces, and with metallic stands having earthing terminals and adjustable insulated feet for floor leveling.
- Racks shall be designed to allow air circulation between individual cells to maintain uniform cooling of each cell and allow easy installation or removal of individual cells from any module without disturbing the rack assembly.
- Vertically stacked height of valve regulated batteries shall not exceed 1500 mm above floor level.
- All metallic components of battery racks, excluding hardware and grounding connectors, shall be painted with two coats of corrosion resistant paint or coated with an acid resistant baked powder epoxy. Vendor shall supply sufficient quantity of field-applied coating for touching up scratches.
- Each battery set shall be sized to supply the full rated load in accordance with the UPS Load. The nominal ampere-hour capacity of the battery supplied for set of UPS unit shall be determined by vendor and include for all necessary allowances required to compensate for ageing effects that result in the progressive loss of capacity.

Interconnecting cable between battery set and UPS unit shall be designed and supplied by the Vendor.

Client : 	<b>TENDER DOCUMENT FOR SUPPLY, INSTALLATION, TESTING &amp; CONFIGURATION OF IT, COMMUNICATION, ACCESS CONTROL &amp; SURVEILLANCE SYSTEM</b>	nne pharmaplan®
<b>Project No : 120310</b>		<b>Revision : 02</b> <b>Date : 2015-10-31</b>

Battery shall comprise of a group of cells connected in series to give specified nominal voltage. Each cell shall identify the polarity, electrolyte level, manufacturer, type, ampere-hour capacity, hours basis and date of manufacture, all appearing in a plain and durable manner. Wet cells shall have transparent thermoplastic containers to permit easy checking of electrolyte levels and explosion resistant vent caps shall be provided.

The method of earthing shall be as specified on the data sheet.

The battery shall be furnished complete with insulated inter-cell, inter-row and inter-tier connections and hardware as required.

➤ **Battery Charger**

➤ **Float Charger**

- The D.C. output voltage during float charging shall be stabilized within + 1% of the set DC bus voltage for AC input voltage variation of + 10%, frequency variation of + 3% and DC load variation from 0-100%. The voltage regulation shall be achieved by a constant voltage regulator (AVR) having fast response SCR control. The ripple content shall be within 3% of D.C. output nominal voltage. The AVR shall correct the voltage for + 1% of the set value.

- The setting of the output D.C. bus voltage shall be adjustable between +10% of nominal rated voltage.

- There shall be provision for manual control if auto mode fails.

- The load limiting features of the float charger should be designed for adequate short time overload.

➤ **Boost Charger**

- For boost charging the discharged battery after a mains failure, the rectifier shall charge the battery at a high rate limited to the maximum boost charging voltage. After a specified number of hours (adjustable) when the rated cell voltage is reached, the charger shall be returned to float charge status.

- In case of separate boost charger the voltage/current adjustment shall be provided by a series boost transformer with a manually operated variance as well as auto control system to adjust boost charge current/voltage setting.

- The boost charge voltage and current settings shall be adjustable between 70 to 100% of maximum boost charging current.



- During boost charging following emergency measures shall be provided:

- If the AC mains supply fails, an arrangement shall be made to automatically connect the battery directly across the load.
- If the separate or spare float charger supplying D.C. load fails, the load shall be fed from the point of connection at the tapping of the battery via adequately rated blocking diodes.

➤ **Inverters**

Inverters shall be IGBT based feedback control type capable of accepting the output of the battery to provide the desired alternating current output. The output of the inverter shall be given to a filter which besides transforming the square wave to sine wave also regulates the A.C. output voltage.

➤ **Overload**

Client : 	<b>TENDER DOCUMENT FOR SUPPLY, INSTALLATION, TESTING &amp; CONFIGURATION OF IT, COMMUNICATION, ACCESS CONTROL &amp; SURVEILLANCE SYSTEM</b>	
<b>Project No : 120310</b>	<b>DOCUMENT NO : NPI-120310-LVS-S1-TD-01</b>	<b>Revision : 02</b> <b>Date : 2015-10-31</b>

The inverter shall be capable of supplying current and voltage for overloads exceeding 100% and up to 150% of full load current. A visual indicator and audible alarm shall indicate overload operation. For greater currents or longer time duration, the inverter shall have electronic current-limiting protection to prevent damage to components. The inverter shall be self-protecting against any magnitude of connected output overload. Inverter control logic shall sense and disconnect the inverter from the critical AC load without the requirement to clear protective fuses. The load shall be transferred to bypass when any of the above conditions are exceeded.

➤ **Output Frequency**

The output frequency of the inverter shall be controlled by an oscillator. The oscillator shall hold the inverter output frequency to +/- 0.1% for steady state and transient conditions. The inverter shall track the bypass continuously providing the bypass source maintains a frequency within the user selected synchronization range. If the bypass source fails to remain within the selected range, the inverter shall revert to the internal oscillator.

➤ **Output Protection**

The UPS inverter shall employ electronic current limiting.

➤ **Battery over Discharge Protection**

To prevent battery damage from over discharging, the UPS control logic shall control the shutdown voltage set point. This point is dependent on the rate of discharge.

➤ **Display and Controls**



The front door will consist of multiple status LEDs, switches, and LCD display for additional alarm/configuration information. During normal operation (on-line), all mimic display LEDs shall indicate the following:

- AC Input rectifier
- AC Input by-pass
- Battery on Load
- Inverter ON
- Bypass ON

The UPS fault indicator is used with additional indicators and audible alarms to notify the user that a UPS fault condition has occurred, for the following:

- AC Input rectifier
- AC Input by-pass
- Battery on Load
- Inverter ON
- Bypass ON

If there is a fault condition, the UPS shall attempt to maintain conditioned power to the load or at minimum transfer to bypass.

Client : 	<b>TENDER DOCUMENT FOR SUPPLY, INSTALLATION, TESTING &amp; CONFIGURATION OF IT, COMMUNICATION, ACCESS CONTROL &amp; SURVEILLANCE SYSTEM</b>	
<b>Project No : 120310</b>	<b>DOCUMENT NO : NPI-120310-LVS-S1-TD-01</b>	<b>Revision : 02</b> <b>Date : 2015-10-31</b>

In addition to a visual fault signal (alarm), the UPS shall also record fault occurrences in a rolling event log. The user shall have access to the event log through the LCD display. Every alarm and/or event recorded in the event log shall contain a time and date stamp.

#### ➤ Audible Alarms

The volume of all audible alarms shall be at least 65dBA at a distance of one meter. An audible alarm shall be used in conjunction with the LED/LCD indication to indicate a change in UPS status.

The audible alarms shall warn for utility line loss, low battery (while on battery), and all other alarm conditions. For all alarm conditions, the user must look at the display to determine the cause of error/alarm. All alarm tones shall be a continual tone until the condition rectifies itself or the alarm is silenced. Once silenced, the audible alarm shall not sound until a new alarm condition is present, but the LED indication still warning the alarm condition.

#### ➤ Alarm Silence Button

In addition to the double load on/off switch, the user interface shall include an audible 'Reset' switch. If the alarm silence (Reset) switch is pressed for one second, all current audible alarms shall be disabled. If a new alarm occurs, or a cancelled alarm condition disappears and then re-appears, the audible alarm is re-enabled.

#### ➤ LCD Display

The LCD display shall be used to provide information to the user. The display shall be able to provide the following measurements information:

- Input Voltages
- UPS output (Phase 1-2-3/Neutral)
- Battery Voltage
- Current Input/output
- Battery charging/discharging
- Frequency: UPS Input/output
- Battery Remaining back-up time (minutes) and Capacity (%)



#### ➤ Automatic Battery Test

The UPS shall be initiated an automatic battery testing sequence periodically (once a month), at a programmed day and time of day, selectable by the end user. The user will be able to enable and disable the automatic battery test.

If failure of the battery occurs, the UPS will immediately return to normal mode and fault signals (visual, audible, and remote via serial) shall be communicated. No audible or remote (via serial/contact closures) indication of the battery test shall be communicated during the duration of the automatic battery test.

The automatic battery test shall be able to operate only if no alarms conditions affect the UPS and if the battery is at least 90% of its full capacity.

#### ➤ Remote Emergency Power Off (EPO)

Client : 	<b>TENDER DOCUMENT FOR SUPPLY, INSTALLATION, TESTING &amp; CONFIGURATION OF IT, COMMUNICATION, ACCESS CONTROL &amp; SURVEILLANCE SYSTEM</b>	
<b>Project No : 120310</b>		<b>Revision : 02</b> <b>Date : 2015-10-31</b>

The remote emergency power off function (EPO) shall allow the user to disable all UPS outputs in an emergency situation. The EPO shall be able to interface with normally closed (N.C.) systems. The EPO connection shall be through a simple terminal block type connector.

#### ➤ **Bypass**

A bypass circuit shall be provided as an integral part of the UPS. The bypass control logic shall contain an automatic transfer control circuit that senses the status of the inverter logic signals, and operating and alarm conditions.

This control circuit shall be provided a transfer of the load to the bypass source, without exceeding the transient limits specified herein, when an overload or malfunction occurs within the UPS.

#### • **Automatic Transfers**

The transfer control logic shall automatically activate the bypass, transferring the critical AC load to the bypass source, after the transfer logic senses one of the following conditions:

- Inverter overload capacity exceeded
- Inverter over temperature
- UPS fault condition (non redundant configuration)

For inverter overload conditions, the transfer control logic shall inhibit an automatic transfer of the critical load to the bypass source if one of the following conditions exists:

- Inverter/Bypass voltage difference exceeding preset limits (-20/+15 % of nominal load)
- Bypass frequency out of preset limits ( $\pm 4$  % of nominal frequency)

#### • **Automatic Retransfer**

Retransfer of the critical AC load from the bypass source to the inverter output shall be automatically initiated unless inhibited by manual control. The transfer control logic shall be inhibited an automatic retransfer of the critical load to the inverter if one of the following conditions exists:

Bypass out-of-synchronization range with inverter output Overload condition exists in excess of inverter full load rating UPS fault condition present (non redundant configuration)



#### • **Manual Transfer**

In addition to the internal bypass function, the UPS shall have a manual bypass function. The manual bypass function shall be provided via a switch mounted on the UPS. In case of wrong manual by-pass manipulation (transferring the load on manual by-pass when the load is supplied by the inverter (Normal-mode)), the UPS module(s) shall be auto protected avoiding any UPS damage.

The UPS shall initiate an audible alarm upon transfer to manual bypass. The audible alarm shall be capable of being silenced by the user. The alarm shall be continued to sound (unless silenced) while in bypass mode. This shall be provided a reminder to the user that the load continues to be powered from utility supply alone.

#### ➤ **Communications**



Client : 	<b>TENDER DOCUMENT FOR SUPPLY, INSTALLATION, TESTING &amp; CONFIGURATION OF IT, COMMUNICATION, ACCESS CONTROL &amp; SURVEILLANCE SYSTEM</b>	
<b>Project No : 120310</b>	<b>DOCUMENT NO : NPI-120310-LVS-S1-TD-01</b>	<b>Revision : 02</b> <b>Date : 2015-10-31</b>

The UPS shall allow for flexibility in communications. The UPS shall be able to communicate through communications port; the media of either communications port may change without affecting the operation of the UPS. The use of relay contacts shall not affect the operation of the communications port.

➤ **Relay Contacts**

Relay with changeover contacts shall be provided for the following information:

- Mains Failure
- Load on inverter
- Battery low
- Load on mains
- Common alarm

➤ **Serial Communications**

The UPS shall be able to communicate through RS232.

➤ **Network Communications**

The user shall have the option of installing an optional SNMP card to provide SNMP communication over a local area network. 10/100Mbit Ethernet support shall be included.

➤ **UPS Status Information**

The software shall be able to retrieve status information present in the UPS. Retrieval of data shall be through either serial communications or through a network connection.


➤ **Modes of Operation**

The UPS shall be designed to operate as a true on-line, double Conversion, Voltage and Frequency Independent (VFI) system in the following modes:

- Normal - The critical AC load is continuously supplied by the UPS inverter. The input converter derives power from the utility AC source and supplies DC power to the inverter. The battery charger shall maintain a float-charge on the battery.
- Battery - Upon failure of utility AC power the critical AC load is supplied by the inverter, which obtains power from the battery. There shall be no interruption in power to the critical load upon failure or restoration of the utility AC source.
- Recharge - Upon restoration of utility AC power, after a utility AC power outage, the input converter shall automatically restart and resume supplying power to the inverter. Also the battery charger shall recharge the battery.

In addition to the input conversion soft start of each UPS, when a mains recovery occurs, all single input converters shall switch on in a sequential way with a delay of about 10 seconds.



- Automatic Restart - Upon restoration of utility AC power, after a utility AC power outage and complete battery discharge, the UPS shall automatically restart and resume supplying power to the critical load on inverter.

<b>Client :</b> 	<b>TENDER DOCUMENT FOR SUPPLY, INSTALLATION, TESTING &amp; CONFIGURATION OF IT, COMMUNICATION, ACCESS CONTROL &amp; SURVEILLANCE SYSTEM</b>	<b>nne pharmaplan®</b>
<b>Project No : 120310</b>		<b>Revision : 02</b> <b>Date : 2015-10-31</b>

- Bypass - The bypass shall provide an alternate path for power to the critical load that shall be capable of operating in the following manner:
  - Automatic - In the event of an internal failure or should the inverter overload capacity be exceeded, all UPS modules shall perform an automatic transfer of the critical AC load from the inverter to the bypass source.
  - Manual - Should the UPS module(s) need to be taken out of service for limited maintenance or repair, manual activation of the bypass shall cause an immediate transfer of the critical AC load from the inverter to the bypass source.

## ANNEX 6

## DEVIATIONS

Client : 	<b>TENDER DOCUMENT FOR SUPPLY, INSTALLATION, TESTING &amp; CONFIGURATION OF IT, COMMUNICATION, ACCESS CONTROL &amp; SURVEILLANCE SYSTEM</b>	
<b>Project No : 120310</b>	<b>DOCUMENT NO : NPI-120310-LVS-S1-TD-01</b>	<b>Revision : 02</b> <b>Date : 2015-10-31</b>


## 1. DEVIATIONS:

Deviation from above specifications is only acceptable if the contractor has listed them in his technical bid and the Employer has accepted them in writing before the work order is placed. If the contractor also wants to offer alternatives resulting in technical and/or price advantages to the employer he should submit a supplement to the main technical bid.

In the absence of a list of deviations, it will be assumed by the Employer that that the contractor complies fully with this specification.

## 2. PREAMBLE TO SCHEDULE OF QUANTITIES


1. All items of work mentioned in the Schedule of Quantities shall be read and executed strictly in accordance with the description of the item in the Schedule of Quantities, equipment schedule/ Data sheet, drawing and standard specifications read in conjunction with the appropriate IS/IEC/IEEE/ISO and conditions of contract.
2. The rate for each item of work included in the bill of quantities shall unless expressly stated otherwise include costs of:-
  - a) All materials, fixing materials, accessories, hardware, operations, tools, equipment, consumables, civil works wherever involved and incidentals required in preparations for in the full and entire execution and completion of the work called for the item and as per specifications and drawings completely.
  - b) Wastage on materials and labour.
  - c) All taxes, duties, octroi, including works contract tax, sales tax, insurance (except supply & Erection), packing and forwarding charges, loading , transportation, unloading handling, hoisting, to all levels . Setting and fixing in position, disposal of debris and all other labour necessary in accordance with contract documents, good practice and recognized principles.
  - d) Liabilities, obligations and risks arising out of conditions of contract.
  - e) Liaison service charges.
3. All requirements of system whether such of them are mentioned in the item or not the specifications and drawings are to be read as complimentary to and part of the schedule of quantities and any work called for in one shall be taken as required for all.
4. In the event of conflict between the bill of quantities and other documents, the most stringent shall apply and interpretations of the Consultant shall be final and binding.
5. The installation of price of Network rack, Central Console, Mounting Brackets and Cameras, Laying of Data cables and Telephone Cables, any other items any supporting structure required to be paid extra include grouting of the same civil works etc. as required.
6. No change in unit rate shall be allowed for any change in quantity (50% deviation) or for any other reason whatsoever during the execution stage of the contract.
7. Supply of materials shall mean supply of materials at site. The rate for supply shall include all taxes, octroi, and insurance (Except supply & Erection), packing and forwarding charges, transportation, unloading at site.
8. The successful contractors shall submit the Schematic diagrams, fabrication drawings with details of equipment wiring diagrams etc. to Consultants for approval prior to supply/commencement of such

<b>Client :</b> 	<b>TENDER DOCUMENT FOR SUPPLY, INSTALLATION, TESTING &amp; CONFIGURATION OF IT, COMMUNICATION, ACCESS CONTROL &amp; SURVEILLANCE SYSTEM</b>	<b>nne pharmaplan®</b>
<b>Project No : 120310</b>		<b>Revision : 02</b> <b>Date : 2015-10-31</b>

works. The approval of these drawings will by the consultant will not absolve the contractor of the responsibility of the correctness of these drawings. At least four copies of the approved drawings supplied to Consultants for their distribution to various agencies at site at no cost to Purchaser.


9. The tenderers must see the site conditions such as locations, Rooms, Cable Routing, etc. and take all factors into consideration while quoting the rates as no extra cost will be allowed on any ground arising out or relating to the site conditions.
10. Any error in description in quantity or omission of items from the contract shall not vitiate this contract but shall be corrected and deemed to be a variation required by the Consultant/Employer.
11. The Liaison service charges (if any from the respective Regulatory Authority) shall include.
12. All testing and calibration charges for the testing devices shall be included in the installation price.

<b>Important : -</b>	
1.	Please Tick (✓) the make of material considered in tender.
2.	Detail submittals in the form of catalogues specification sheets, and samples were called for, shall be submitted one week from the date of order and approvals shall be obtained on the type of accepted make before procurement are made.
3.	Out of the approved makes of materials mentioned above, the make of materials to be used on the work shall be as decided by the Consultant/Employer jointly.
4.	In respect of materials for which approved makes are not specified above, these will be of makes to be decided by the consultant and as per sample approved before procurement.
5.	Equipments approved and supplied shall have local servicing facilities available in the region.

<b>Client :</b> 	<b>TENDER DOCUMENT FOR SUPPLY, INSTALLATION, TESTING &amp; CONFIGURATION OF IT, COMMUNICATION, ACCESS CONTROL &amp; SURVEILLANCE SYSTEM</b>	<b>nne pharmaplan®</b>
<b>Project No : 120310</b>		<b>Revision : 02 Date : 2015-10-31</b>

## CHAPTER – 2.4

### ERECTION & COMMISSIONING

Client : 	<b>TENDER DOCUMENT FOR SUPPLY, INSTALLATION, TESTING &amp; CONFIGURATION OF IT, COMMUNICATION, ACCESS CONTROL &amp; SURVEILLANCE SYSTEM</b>	<b>nne pharmaplan®</b>
Project No : 120310	DOCUMENT NO : NPI-120310-LVS-S1-TD-01	Revision : 02 Date : 2015-10-31

## **GENERAL SCOPE OF ABOVE SAID SYSTEM INSTALLATION WORK**

### **1. SCOPE**

This specification details the broad guidelines for unload, store, erect, testing and commissioning of all the equipment required for the Networking/IT, Telephone Communication/CCTV/ACS and Security System Installation. The contractor shall furnish all the labour, tools and equipments for the above said works, as shown in the accompanying drawings and in the bill of quantities and specifications hereinafter described and execute the works as directed by the Purchaser / Consultant and completed to their entire satisfaction.

### **2. CONTRACTOR**

The Contractor shall be a licensed Class One or 'A' class Contractor, possessing a valid Contractor's license in the State, employing licensed supervisors and skilled workers having valid permits as per the Regulation of India. He should have executed similar works of this magnitude earlier and shall have qualified engineers to produce execution drawings and to supervise the work at site.

### **3. MINIMUM REQUIREMENT OF TECHNICAL STAFF :-( AT SITE)**


One qualified, and competent experienced Engineer - Minimum 10 years experience in executing similar installations acceptable to the Purchasers/Consultant.

Diploma Holders with at least 15 years site experience also acceptable to the Purchasers/Consultant.

Experienced and certified fiber optic splicing and jointer, Data Cable Crimping and Punching. - Minimum of 1 No.

### **4. MINIMUM EQUIPMENT REQUIRED AT SITE:-**

Multimeter	1 No. Each Duly calibrated and certified by third party agency.
Tool kit containing, Double end spanners, Ring spanners	1 Set for each Technician.
Spanners, Screw Drivers, Hammers, chisels etc. 5 Mtrs. Steel tapes	1 No. for each skilled Technician
30/100 M steel tape for recording measurements	1 No.
Spirit level 450 mm long metal body	1 No. (Per Batch)
Hand Grinder	1 No. (Per Batch)
Hand drilling machine 1" HSS/Masonry	1 No. (Per Batch)
Pedestal drilling machine 5/8"	1 No.
Earthing Tester Fluke 1630	1 No.
Vices fixed to Tables	As required.
H.S.S / Masonry (mm) drill bits up to 25 mm	1 Set (per Building)
Cable crimping device	Size / Quantity (As required)
Any other testing equipment as required	1 Set. Each.
First Aid approved kits	1 Set per Building & additional Quantities as required.

Client : 	<b>TENDER DOCUMENT FOR SUPPLY, INSTALLATION, TESTING &amp; CONFIGURATION OF IT, COMMUNICATION, ACCESS CONTROL &amp; SURVEILLANCE SYSTEM</b>	nne pharmaplan®
Project No : 120310		Revision : 02 Date : 2015-10-31

## 5. DRAWINGS

The drawings and bill of quantities shall be considered as a part of this contract and any work shown on the drawings and not called for in the drawing or vice-versa, shall be executed as if specifically called for it. The Execution drawings indicated the extent and general arrangement of various equipment and its wiring, etc. and are essentially diagrammatic. The drawings broadly suggest the routes to be followed. The work shall be installed as indicated on the drawings. However, any minor change if found essential to co-ordinate the installation of this work with other trades shall be made without any additional cost to the Purchasers. The drawings are for the assistance and guidance of the contractor only and the exact location, distances and levels, etc. will be governed by the space conditions.

The contractor shall examine all Architectural, Structural, Plumbing and Sanitary, Air Conditioning and Cable Routing drawings before starting the work and prepare its own execution drawings containing all details. Any discrepancies which in his opinion appear on them have to be reported to the Consultant/Purchasers and get them clarified. He shall not be entitled to any extras, for omissions or defects in electrical drawings or when they conflict with other work.

## 6. SUBMISSIONS

### Drawings:

Consultant will provide the Architecture Drawing, Cable Routing Drawing and Layout Drawing during execution. Electrical contractor has to develop drawing further up to the equipment termination and submit the same for approval.

The contractor will prepare conduits layout drawing wherever Point wiring is applicable and shall submit to Approval

Above all drawing shall submit within Two week of signing the contract.

### As built drawings/operation and maintenance manual inspection and test report:

The contractor shall submit one complete set of original drawings, soft copy of all as built drawing in CD. Operation and maintenance manual with properly documented shall be submitted in two sets for all equipments supplied and erected by the contractor.

Required software with Soft Key or Hardware key (Dongle ) Shall be provided accordingly.

**NOTE:** Failing to comply with the above, will result in withholding the release of the retention money, and any other payments due to the contractor, and issue of virtual completion certificate.



## 7. SITE ENGINEER

The Contractor shall employ a competent, licensed qualified full time Engineer to direct the work of all installations in accordance with the drawings and specifications. The Engineer shall be available at all times on the site to receive instructions from the Consultant/Purchaser in the day to day activities throughout the duration of the contract. The Engineer shall correlate the progress of the work in conjunction with all the relevant requirements of the supply authority. The skilled workers employed for the work should have requisite qualifications and should possess competency certificate from Local Regulatory Board/Administration.

## 8. GENERAL SCOPE

- The Contractor shall furnish all tools, welding equipment testing equipment, test connections and kits, etc. required for complete installation, testing and commissioning of the items included in the contract work.
- The contractor shall co-operate through the Consultant/Purchaser/Engineer with other contractors at site, in all matters of common interest, so as not to obstruct operation of others and to ensure the safety of all personnel and works covered under this specification.



<b>Client :</b> 	<b>TENDER DOCUMENT FOR SUPPLY, INSTALLATION, TESTING &amp; CONFIGURATION OF IT, COMMUNICATION, ACCESS CONTROL &amp; SURVEILLANCE SYSTEM</b>	
<b>Project No : 120310</b>	<b>DOCUMENT NO : NPI-120310-LVS-S1-TD-01</b>	<b>Revision : 02</b> <b>Date : 2015-10-31</b>

- The work shall be carried out strictly as per the instructions and execution drawings. In case of any doubt/misunderstanding as to correct interpretation of the drawings or instructions, necessary clarifications shall be obtained from the Purchaser/Consultant. This contractor shall be held responsible for any damage to the equipment consequent to not following the Manufacturer's instructions correctly. All necessary drawings, Manufacturer's equipment manuals shall be furnished to the Purchasers and a copy to Consultant.
- All thefts of equipments/component parts, after take over by the Contractor, till the installation & commissioning are handed over to the Purchaser shall be made good by the Contractor.
- The Contractor shall have a separate cleaning gang to clean all equipment under erection and as well as the work area at regular intervals to the satisfaction of the Purchaser/Consultant. In case the cleaning is not to the Purchaser's satisfaction he will have the right to carryout the cleaning operations and any expenditure incurred by the Purchaser in this regard will be to the Contractor's account.
- The Contractor shall carry out touch-up painting on any equipment indicated by the Purchaser / Consultant, if the finish paint on the equipment is soiled or marred during installation handling.
- Equipment shall be installed in a professional manner so that it is novel, plumb, square and properly aligned and oriented. No equipment shall be permanently bolted down to foundation or structure until the alignment has been, checked and found acceptable by the Purchaser/Consultant.

## 9. CONSUMABLES AND HARDWARE



The contractor shall furnish all erection materials, hardware and consumables required for the completion of the installation. The materials shall include but not be limited to the following :

- a) Consumables : cleaning fluids, paints, electrical tape, soldering materials etc.
- b) Hardware : bolts, nuts, washers, screws, cable tag nails etc.
- c) Materials : junction boxes, terminal blocks, connectors, ferrules, lugs, brass glands, rigid/flexible conduits, cables, ground wires etc supplied by Purchasers.

Supply of cement, sand, stone etc. if required for the execution of the contract shall be supplied by Purchaser.

## 10. TOOLS, TACKLES AND OTHER MATERIALS

- The Contractor shall also furnish all necessary consumables like nuts, rawl plugs, hacksaw blades, taps, dies, drills, files, wire brushes, necessary pipe scaffolding, ladders, wooden and consumable material like oxygen, acetylene, greases, cleaning fluids, fasteners, gaskets, temporary supports, cotton waste and all other miscellaneous supplies of every kind required for carrying out the work under the contract.
- The Contractor shall not dispose off transport or withdraw any tools, tackles, equipment and material provided by him for the contract without taking prior written approval from Purchaser/Consultant. Purchaser/Consultant at all times shall have right to refuse permission for disposal, transport or withdrawal of tools, tackles, equipment and material if in his opinion, the same will adversely affect the efficient and expeditious completion of the project.
- The contractor shall provide all tools, tackle, implements, module equipment such as chain pulley block, trailers etc. which are required for transportation, handling and erection of equipment.
- Special erection tools, if any, furnished by the Manufacturer along with the equipment may be used by the contractor. Such tools and equipment, however, shall be returned in good working conditions to the employer on completion of the job.

Client : 	<b>TENDER DOCUMENT FOR SUPPLY, INSTALLATION, TESTING &amp; CONFIGURATION OF IT, COMMUNICATION, ACCESS CONTROL &amp; SURVEILLANCE SYSTEM</b>	
<b>Project No : 120310</b>	<b>DOCUMENT NO : NPI-120310-LVS-S1-TD-01</b>	<b>Revision : 02</b> <b>Date : 2015-10-31</b>

- The contractor shall also arrange for major testing equipment as list below
  - Hand driven earth resistance megger, range 0-1/3/30 ohms.
  - Contact resistance measuring set for micro-ohms.
  - Multi-meters, test lamp, field telephone with buzzer sets, different gauges etc.
  - Chain pulley block, cable jacks & spindle, cable, collars, electrician's tool kit, jointer's tool kit, crimping tool kits.

Other test equipment as required for testing and commissioning of the equipment shall have to be arranged by the contractor.


## 11. TESTING AND COMMISSIONING

- All checks and tests as per the Manufacturer's drawings /manuals relevant code of installation and commissioning for various types of equipments shall be carried out by the contractor as part of installation work.
- Continuity and Customization of Software shall be made at site with Client's Personal.
- The Purchaser may ask for such additional tests/requirement of software on site as in his opinion are necessary to determine that the works comply with the specifications, Manufacturer's guarantee/instructions or the applicable code of installation.
- The contractor shall carry out such additional tests also.
- The Purchaser's authorized representative shall be present during every test as called for by the Purchaser. The Contractor shall record all test values and furnish the required copies of the test data to the Purchaser. Components/Circuits shall be energized or used at nominal operating voltage only after such reports have been accepted as satisfactory by the Purchaser.

## 12. METHOD OF WORKMANSHIP

- All work shall be installed in a first class, neat workman like manner by person skilled in the trade involved.
- The erection work shall be supervised by competent supervisors holding relevant supervisory license from the Government.
- All details on installation shall be electrically and mechanically correct.
- The installation shall be carried out in such a manner as to preserve access to other equipment installed.
- If in the opinion of the contractor any work is insufficiently specified or require modification, the contractor shall refer the same in writing to the employer and obtain his instruction / approval before proceeding with the work.
- If the contractor fails to refer such instances, any excuse for the faulty erection, poor workmanship or delay in completion shall not be entertained.
- Equipment and material, which are wrongly installed shall be removed and re-installed to comply with the design requirement at the contractor's expense, to the satisfaction of the employer/consultant.

## 13. ALLOWABLE WASTAGE

Client : 	<b>TENDER DOCUMENT FOR SUPPLY, INSTALLATION, TESTING &amp; CONFIGURATION OF IT, COMMUNICATION, ACCESS CONTROL &amp; SURVEILLANCE SYSTEM</b>	nne pharmaplan®
<b>Project No : 120310</b>		<b>Revision : 02</b> <b>Date : 2015-10-31</b>

- The erection contractor shall make every effort to minimize wastage during erection work. In any case, the wastage shall not exceed 1%
- Measurement shall be taken at site jointly by contractor and employer's representative.
- If the actual wastage be more than the quoted figure then equivalent price of the balance amount will be deducted from contractor's bills.
- The contractor shall submit a detailed account of materials issued to him after completion of work.
- The excess materials after completion of job shall be returned back to the employer's store.

#### 14. FOUNDATION AND CIVIL WORK

- The contractor shall check the foundations provided by Employer before commencement of erection to ensure their suitability.
- Foundation of Major equipments shall be in scope of Contractor as per BOQ
- All final adjustments shall be carried out by the contractor including minor modification of civil work as may be required for erection.
- Any cutting of masonry work which is necessary shall be done by the Contractor at his own cost and shall be made good to match the original work. The contractor shall obtain approval of employer/ consultant before proceeding with any cutting of masonry / concrete work.

#### 15. EXCAVATION AND BACK FILLING

- The contractor shall perform all excavation and back filling if required for the scope of work specified.
- The contractor shall make his own arrangement for pumping out any water that may accumulate in the excavation.
- All excavation shall be back filled to the original level with good consolidation.

#### 16. STRUCTURAL FABRICATION WORKS



All chequered plate covers, cable racks, trays, supports, hangers and brackets wherever necessary shall be supplied/fabricated by the Contactor. Steel for fabrication shall be straightened and cleaned of rust and grease. All fabrication shall be free of sharp edge.

Every effort shall be made to minimize the wastage of steel as far as practicable during fabrication. The wastage in no case shall exceed as specified elsewhere in this specification.

#### 17. REPAIR OF DAMAGE SUSTAINED DURING TRANSIT

The contractor shall repair minor damages sustained during transit or subsequent storage in purchaser's store. The repair charges shall be paid to the contractor on the basis of extra work.

#### 18. INSPECTION

Client : 	<b>TENDER DOCUMENT FOR SUPPLY, INSTALLATION, TESTING &amp; CONFIGURATION OF IT, COMMUNICATION, ACCESS CONTROL &amp; SURVEILLANCE SYSTEM</b>	
<b>Project No : 120310</b>	<b>DOCUMENT NO : NPI-120310-LVS-S1-TD-01</b>	<b>Revision : 02</b> <b>Date : 2015-10-31</b>

- After completion of erection/installation, each piece of equipment shall be thoroughly tested as per approved procedure and inspected in presence of the employer/consultant for correctness and completeness of erection and acceptability for start up.
- A check list in triplicate will be furnished by the employer/consultant wherein all details to be checked and necessary instruction shall be listed. The inspection and checking shall strictly follow the checklist.
- On completion of the inspection (2) copies of the check list duly filled-in shall be handed over to the Employer/consultant.
- This check list shall be jointly signed by the contractor and the employer/consultant. Such endorsement, however, shall not relieve the contractor of his obligations under the contract.

## 19. HANDING OVER AND TAKING OVER OF WORKS / EQUIPMENT / SYSTEMS

The Contractor shall hand over and the Purchaser shall take over the works / equipments / systems covered under this contract only after they have been completely installed, tested and commissioned in all respects by the Contractor to the entire satisfaction of the Purchaser / Consultant and after the said operation. And all relevant test forms /certificates operation and maintenance manuals, as built drawings, etc. Incomplete / partly commissioned works/equipments/system will not be taken over by the Purchaser. In this regard, the decision of the Purchaser/Consultant will be final and binding on the Contractor.

## 20. CHANGE IN QUANTITY

Purchaser reserves the right to amend the quantities to be supplied and erected as necessary and for any such amendments the unit rates offered by Contractor shall apply.

## 21. ACTUAL QUANTITIES

The Contractor shall verify the exact quantities of materials/equipments cables, etc., required after site measurements as per execution drawings by the engineer before procuring the same.



## 22. SPECIFICATION FOR ERECTION, TESTING & COMMISSIONING OF ELECTRICAL EQUIPMENT DISTRIBUTION SYSTEM, CONDUITS, WIRING & ACCESSORIES

### ✓ GENERAL :

This erection of low Voltage Distribution System shall be applicable for wiring and single phase, 3 wire 230 Volts, 50 Hz, AC supply, OFC Cables, Data Cables and Telephone System cables, and any other cabling system to meet the requirement of the Plant.

### ✓ ERECTION OF CONDUIT:

- The inside surface and ends of conduits and threads and fittings used shall be clean, smooth, cut square and free from burrs and other defects. Powdered soap stone, talc or prepared compounds shall be used as lubricants to facilitate the smooth pulling in of conductors.
- The conduit shall be properly and tightly screwed between the various lengths and to the boxes to which it runs and terminates. No part of the conduit shall be under mechanical stress and the whole conduit system shall be electrically and mechanically continuous throughout.
- All jointing methods shall be subject to the approval of the Engineer in charges. Separate conduits shall run for all power outlet wiring.

Client : 	<b>TENDER DOCUMENT FOR SUPPLY, INSTALLATION, TESTING &amp; CONFIGURATION OF IT, COMMUNICATION, ACCESS CONTROL &amp; SURVEILLANCE SYSTEM</b>	
<b>Project No : 120310</b>	<b>DOCUMENT NO : NPI-120310-LVS-S1-TD-01</b>	<b>Revision : 02</b> <b>Date : 2015-10-31</b>

- Connections between screwed conduit and sheet metal boxes shall be by means of a brass hexagon smooth bore bush, fixed inside the box and connected through a coupler to the conduit. The joints in conduits shall be free of burrs to avoid damage to insulation of conductors while pulling them through the conduits
- Where necessary, bends or diversions may be achieved by means of bends and/or circular inspection boxes with adequate and suitable inlet and outlet screwed joints. In case of recessed system each junction box shall be provided with a cover properly secured and flush with the finished wall surface. No bends shall have radius less than 2-1/2 times the outside diameter of the conduit.

Conduits shall be installed with provision for ventilation self drainage in the event of ingress of moisture due to condensation or any other reason and prevent sweating.

A Suitable drainage hole shall be drilled in the bottom of the lowest conduit box in every 9 Mtrs. of horizontal length.



All conduits shall be installed as to avoid contact with hot surface. After the conduits, junction boxes, outlet boxes and switch boxes are installed in positions, their outlets shall be properly plugged or covered so that water, mortar, insects or any other foreign matter does not enter into the conduit system. Surface conduits shall be fixed by means of space bar saddles at intervals not more than 500 mm.

#### ✓ **INSTALLATION OF RECESSED CONDUIT SYSTEM :**

- The conduits shall be installed in such a manner that running can be carried out from the fittings boxes and switch boxes only.
- Conduits which are to be taken in the ceiling slab shall be laid on the prepared shuttering work of the ceiling slab before concrete is poured, and tied to bars at every 750/900 mm. The conduits shall be made water-tight by using bituminous compound at the screwed ends. The conduits in ceiling slab shall be straight as far as possible.
- Conduits recessed in walls shall be secured rigidly by means of steel hooks/staples at 500 mm intervals. Before conduit is concealed in the walls, all chases, grooves shall be neatly made to proper dimensions to accommodate the required number of conduits.

The outlet boxes, point control boxes, inspection and draw boxes shall be securely fixed by means of counter sunk steel screws and rawl plugs. They shall be firmly grouted in position prior to plastering fixed as and when conduit is being laid. The recessing of conduits in walls shall be so arranged as to allow at least 12 mm plaster cover on the same. All grooves, chases, etc. shall be refilled with cement mortar and finished up to the wall surface before plastering of walls is taken up by the general contractor. The top edge of the conduit shall be at least 25 mm below the finished surface of wall. Wherever conduits terminate into point control boxes, distribution boards, etc. conduits shall be rigidly connected to the boxes, boards, etc. with check nuts on either side of the entry to ensure electrical continuity.

- After conduits, junction boxes, outlet boxes, etc. fixed in position their outlets shall be properly plugged with PVC stoppers or with any other suitable materials so that water, mortar, vermins or any other foreign material do not enter into the conduit system.
- To facilitate easy drawing of wires in conduit necessary GI pull wires of 16 SWG shall be inserted into the conduit immediately after shuttering is removed.
- **The Contractor shall be present during the pouring of concrete to ensure that the conduits and accessories are not displaced or blocked.**
- The conduits shall be swabbed out by drawing dry swabs of rag through the conduit to remove all moisture prior to drawing of wires.

Client : 	<b>TENDER DOCUMENT FOR SUPPLY, INSTALLATION, TESTING &amp; CONFIGURATION OF IT, COMMUNICATION, ACCESS CONTROL &amp; SURVEILLANCE SYSTEM</b>	
Project No : 120310	DOCUMENT NO : NPI-120310-LVS-S1-TD-01	Revision : 02 Date : 2015-10-31

- Where vertical concealed conduits pass through floors or beams and horizontal concealed conduits required to pass through columns or beams, these shall be taken through rigid PVC pipes to be inserted in the floors /columns/beams, etc. during casting for which no extra payment shall be entertained.
- Extension collars of suitable depth shall be used as necessary to leave all boxes absolutely flush with the finished wall or ceiling surface.
- Conduits shall not be buried or plastered etc. unless and until the work has been inspected by the Purchaser/ Consultant.

✓ **INSTALLATION OF SURFACE CONDUIT SYSTEM:**

- Conduits shall run in square and symmetrical lines. Before the conduits are installed, the exact routes shall be marked at site and approval of the Consultant shall be obtained. Conduits shall be fixed by heavy gauge GI base plates, saddles, secured to suitable raw plugs, at an interval of not more than 500 mm. Conduits shall be joined by means of screwed couplers and screwed accessories only. In long distance straight runs of conduit, inspection type couplers or running type couplers or pull boxes shall be provided.
- Bends in conduit runs shall be done by bending conduits by pipe bending machine. Bends which cannot be negotiated by pipe bends, shall be accompanied by introducing inspection boxes or inspection bends. Not more than three equivalent 90 C bends shall be used in a conduit run from outlet to outlet.
- All the conduit openings shall be properly plugged with PVC stoppers/bushes. The conduits shall be adequately protected against rust by applying two coats of approved synthetic enamel paint after the installation is completed.
- Wherever conduits terminate conduits shall be rigidly connected to the box/board with brass hexagonal check nuts with compression washers on either side of the entry to ensure proper electrical and mechanical continuity.
- The crossing of surface conduits shall not be generally permitted and to avoid such crossings, adopter boxes shall be used at junctions/crossings.
- All unused conduit entries shall be blanked off in an approved and where a conduit terminates in adopter boxes. All removable box covers shall be firmly secured to provide complete enclosure.



✓ **CONDUITS ABOVE FALSE CEILING:**

- In the false ceiling area, the conduits shall be run above the false ceiling frame work supported by means of M.S straps secured and fixed to both conduits and structural ceiling, keeping the outlet box as near as possible to the fittings/fans for connections. The conduit boxes for fittings/fans are independently supported by means of separate fixing arrangements to the box and structural ceiling so that the box is held rigidly.

✓ **INSTALLATION OF WIRING:**

- The wiring conductors shall not be drawn into the conduits until all the works of any nature that may cause damage to the wires are completed. The installation and termination of wires shall be carried out with due regard to the followings
  - While drawing the wiring conductors, care shall be taken to avoid scratches and kinks which cause breakage of conductors. There shall be no sharp bends in the conduit system.
  - Insulation shall be shaved of like sharpening of a pencil and it shall not be removed by cutting it. PVC insulated copper conductor shall be soldered at the ends. Strands of wires shall not be cut for connecting



Client : 	<b>TENDER DOCUMENT FOR SUPPLY, INSTALLATION, TESTING &amp; CONFIGURATION OF IT, COMMUNICATION, ACCESS CONTROL &amp; SURVEILLANCE SYSTEM</b>	
<b>Project No : 120310</b>	<b>DOCUMENT NO : NPI-120310-LVS-S1-TD-01</b>	<b>Revision : 02</b> <b>Date : 2015-10-31</b>

terminals. The terminals shall have sufficient cross sectional area to take all strands and shall be soldered.

- Connecting brass screws shall have flat ends.
  - All wires and cables shall bear the manufacturer's label and shall be brought to site in original packing.
  - For all internal wiring, PVC insulated wires of 650/1100 volts grade shall be used.
  - The sub-circuit wiring for point shall be carried out in loop system and no joints shall be allowed in the length of the conductors.
  - Separate conduit shall run for LAN wiring and the same shall not run in parallel to power wiring conduit.
  - Strands of the wires shall not be cut for connecting to the terminals or lugs. The terminals shall have adequate cross section to take all the strands.
- Each circuit main/power wiring/point wiring/looping circuit shall also have its own earth continuity wire as specified.
  - All the wiring shall be carried out in loop-in-loop system only and phase or line conductors shall be looped at switch box and neutral conductor can be looped from light, fan or sockets.
  - The maximum number of various size conductors that could be drawn into various sizes of conduits shall be as per table II of IS: 732 (Latest Edition). The wiring shall be colour coded for easy identification of phases and neutral. The following colour codes shall be adopted.
    - Phases - Red, Yellow and Blue.
    - Neutral - Black.
    - Earth - Green or Bare wire as specified.
  - All circuit wiring/point wiring shall be provided with printed PVC identification ferrules at either end bearing the circuit number and designation.

Maximum permissible numbers of 650/ 1100 volt grade PVC insulated wires may be drawn into rigid conduits are as below:



✓ **INSTALLATION OF SWITCHES, SOCKETS, I/O PLATES, AND ACCESSORIES, ETC.:**

All the switches/socket outlets shall be modular type & wired accordingly. Connections shall be made only after testing the wires for continuity, Tx/Rx, etc. with the help of proper testing devices.

Before fixing these, the contractors shall obtain clearance from the Purchaser/Consultant with regard to their proper locations.

✓ **INSTALLATION OF CABLE TRAYS AND RACKS (Wherever necessary)**



Client : 	<b>TENDER DOCUMENT FOR SUPPLY, INSTALLATION, TESTING &amp; CONFIGURATION OF IT, COMMUNICATION, ACCESS CONTROL &amp; SURVEILLANCE SYSTEM</b>	
<b>Project No : 120310</b>	<b>DOCUMENT NO : NPI-120310-LVS-S1-TD-01</b>	<b>Revision : 02 Date : 2015-10-31</b>

- The contractor shall install the cable racks, trays, risers, shafts and supports. The cable trays shall be of Ladder/perforated/ wire mesh type
- Cable trays and risers shall be aligned and leveled correctly. All runs shall be installed parallel to the trench/building walls and floors except otherwise noted on the drawings.
- The contractor shall provide install steel inserts/supports on wall, ceiling or floor by suitable anchoring & shall secure racks and supports by welding these to inserts.
- Minimum clearance between the top most tray tier and structural member shall be 300 mm.
- The trays in general shall be supported at a distance of 1.00 to 1.20 meters on horizontal and vertical run.
- Cable trays shall be installed as per drawings furnished to the Contractor. Any deviation in routes shall have the prior approval of the Engineer In-charge.
- Cable trays and accessories shall be assembled and erected at site as per instructions of Manufacturer. Alternately, the Contractor shall fabricate and install all cable trays, risers, shafts and supports as agreed upon during finalization of the award.
- All hardware such as bolts, nuts, washers, Anchor fasteners and other consumable required for the fabrication and erection shall be included in the rate quoted by contractor in supply stream and Hardware shall be SS 304 Matt finish.
- Sufficient spacing not less than 250 mm shall be provided between trays and maintained to permit adequate access for installing and maintaining the cables.
- Contractor shall co-ordinate with other contractors (such as for piping etc.) where there is a common support for cable trays and for other services.
- Each continuous length of cable tray shall be earthed at minimum two places.
- All necessary steel & all consumables as specified elsewhere shall be arranged by contractor.
- Plate inserts for cable tray mounting supports shall be provided by Civil Contractor.



✓ **CABLE INSTALLATION**

Approximate lengths of cables runs will be given in the cable schedule. Before commencement of work the Contractor shall take actual measurements and prepare his own cable cutting schedules to reduce wastage to a minimum.

The Contractor shall also maintain and submit when requested, a record of cable insulation value when drawn from store, after laying, before and after termination/jointing.

✓ **CABLES AND CABLE ENTRIES:**

Particular attention is drawn to the Contractor's responsibilities in safeguarding cables installed in outdoor locations and unfinished buildings. Such equipment is particularly vulnerable to damage from water and dust penetration. The Contractor shall ensure that cables are adequately protected in this respect while installation work is proceeding. Covers temporarily removed from trenches/entries for purpose of installation shall be reassembled on completion of the Work and replaced when such work is suspended or otherwise left incomplete. Similarly, all entries shall at times be effectively sealed against ingress of water and dust, eg. Duct entries shall be sealed by the insertion of proprietary stopper plugs or approved means.

Client : 	<b>TENDER DOCUMENT FOR SUPPLY, INSTALLATION, TESTING &amp; CONFIGURATION OF IT, COMMUNICATION, ACCESS CONTROL &amp; SURVEILLANCE SYSTEM</b>	
Project No : 120310		Revision : 02 Date : 2015-10-31

✓ **STORAGE AND HANDLING OF CABLES:**

Storage & handling of cable before and during installation shall be executed with regard to Manufacturers recommendations. Cable drums shall be rotated only in the direction indicated on the drum, and open ends of cable shall be effectively sealed after cutting to prevent ingress of moisture, using heat shrink end caps.

- Cable drums shall be stored on hard and well drained surface so that they may not sink. In no case the drum shall be stored on the flat i.e. with flange horizontal.
- Rolling of drum shall be avoided as far as practicable. For short distance, the drums may be rolled provided they are rolled slowly and in proper direction as marked on the drum.
- In absence of any indication the drums may be rolled in the same direction as it was rolled during taking up the cable.
- For unreeling the cable, the drum shall be mounted on jacks or on cable wheel. The spindle shall be strong enough to carry the weight without bending.
- The drum shall be rolled on the spindle slowly so that cable should come out over the drum and not below the drum.
- While laying cable, cable rollers shall be used at an interval of 2000 mm. The cable shall be pushed over the roller by a gang of people positioned in between rollers.
- Cable shall not be pulled from the end without having intermediate pushing arrangement. Bending radius of the cable shall not be less than that is specified by the manufacturer.
- All possible care shall be taken during unreeling and laying to avoid damage due to twist, kink or sharp bends.

✓ **PROTECTION FROM MOISTURE:**



Each cable system shall be installed either where it will not be exposed to rain, dripping water, steam, condensed water, etc., or be of a type designed to withstand such exposure.

In damp situations and wherever they are exposed to weather, all metal sheaths and armour of cables, metal conduit, ducts, ducting trunking clips and their fixings, shall be of corrosion-resistant material or finish, and shall not be placed in contact with other metal with which they are liable to generate electrolytic action.

For conductors insulated with impregnated paper, exposed conductor & insulation at termination's and cable joints shall be protected from ingress of moisture by being suitably sealed.

✓ **CABLE LAYING**

- Cable shall generally be installed in ladder type / perforated trays in trenches or buried in ground except for some short runs in conduit for protection or crossings the roads etc.
- Each length of run shall be physically measured at site before cutting the cable. Contractor shall furnish cable cutting schedule to engineer in charge with respect to cable drum length available at site and runs of cables & sizes of cables.
- Cable may also be laid through hume pipes/corrugated high density PVC pipes(as approved by the consultant/employer) in road crossings etc. The pipes shall be supplied and placed in position by the Contractor.
- Cable laid on trays and risers shall be neatly dressed and clamped at an interval of 2000 mm and 500 mm for horizontal and vertical cable run respectively and at each bend of cable.
- All power cables shall be clamped individually and control cables shall be clamped in groups of three or four cables.
- Single core power cables shall be laid in trefoil formation and clamped with trefoil clamps made of Fiber glass/PVC.


Client : 	<b>TENDER DOCUMENT FOR SUPPLY, INSTALLATION, TESTING &amp; CONFIGURATION OF IT, COMMUNICATION, ACCESS CONTROL &amp; SURVEILLANCE SYSTEM</b>	
<b>Project No : 120310</b>	<b>DOCUMENT NO : NPI-120310-LVS-S1-TD-01</b>	<b>Revision : 02</b> <b>Date : 2015-10-31</b>

- Cable openings etc. in walls/floor made by the Contractor or by others shall be sealed by the Contractor suitably by Hessian tape and bitumen compound or by any other proven method to prevent ingress of water.
- Directly buried cables shall be laid as per detail shown in drawing. These cables shall be laid on and covered with sand / raddle earth and protected by brick barriers as sides and pre cast concrete slab brick on top. Job also involves digging/excavation of earth and refilling the same after laying of cables. For cables laid underground a loop of diameter of 3 meters shall be provided near each terminating ends.
- Laying cost shall include all above activities excluding supply of clamps but including cable tag at every 20 meter interval etc.
- Cables for machines in clean area shall be laid in suitable size of stainless steel pipe/tray.

✓ **CABLE TERMINATION:**

- All work on the termination of cables shall be executed by fully trained & competent tradesmen who have passed an approved course of instruction in such work for the operating level concerned. Written confirmation in this respect shall be furnished to The Company Site Representative by the Contractor.
- The cable termination includes drilling of Gland plate as require size of the cable and no. of cables in each section/cable alley.
- The termination, Joints and connections of cables shall be done by qualified jointers strictly in accordance with manufacturer's instruction drawings and/or as directed by the Engineer. The cost of end termination of all the cables shall be excluded in the quoted price for laying of the cables and extra payment on this will be quote.
- The work shall include all clamping, fittings, fixing, plumbing, soldering, taping, compound filling, epoxy cable jointing, crimping, connecting, shorting and earthing as required for all such operations should be available with concerned contractor.
- The equipment will be generally provided with blank plates for cable/conduit entry and cable end box for power cables.
- The Contractor shall perform all drilling, cutting on the blank plates and any minor modification work required to complete the job.
- If the cable-end box or terminal enclosure provided on the equipment is found unsuitable and requires major modification, the same shall be carried out by the Contractor as extra work item.
- Spare cores shall be similarly tagged, crimped with lug and taped on the ends. Spare cores shall be tagged with individual cable number.
- Terminations and connections shall be carried out in such a manner as to avoid strain on the terminal/
- All cable entry points shall be sealed and made vermin and dust proof. Unused opening, if any shall be effectively closed.
- All connections at a cable termination shall be mechanically & electrically sound and shall be protected against mechanical damage or any vibration liable to occur. They shall not impose any appreciable mechanical strain on fixing of the connection and shall not cause any harmful mechanical damage to the cable conductor or equipment. Conductors of cables shall be terminated in a manner suitable for the terminal arrangement of the equipment concerned.

✓ **TERMINAL CONNECTING LUGs :**

Client : 	<b>TENDER DOCUMENT FOR SUPPLY, INSTALLATION, TESTING &amp; CONFIGURATION OF IT, COMMUNICATION, ACCESS CONTROL &amp; SURVEILLANCE SYSTEM</b>	nne pharmaplan®
Project No : 120310		Revision : 02 Date : 2015-10-31

- Cable tails of conductors shall be fitted with compression-type terminal connection lugs, using tools specially designed for use with such lugs.
- At all terminal connections, cable conductors shall be fitted with correctly sized cable sockets of the crimped compression type. Soldered connections shall be employed only where their use is unavoidable. Solder used shall have a melting point of not less than 185 ° C, and cable lugs or thimbles shall be the correct type and size for each conductor. Packing of oversized lugs shall not be permitted.
- Compression joints shall be made using proprietary sets of lugs and indent dies, correctly sized and shaped for each specified conductor concerned. Use of mixed lugs and dies of different manufacture or systems shall not be permitted.

✓ **SEALING OF CABLE TRANSITS:**


- Openings made or provided in or through building walls, floors, etc., shall be effectively sealed.
- Cable entries into trenches (in switch rooms, etc) shall be effectively sealed after cables have been laid. Unused cable entries and cable entries in equipment also shall be effectively sealed.
- Openings through roofs and external walls shall be made weatherproof, including installation of flashing and / or rain hoods to prevent the entry of driving rain, seepage of water, dust, etc.

✓ **CABLE SUPPORTS**


- Every cable and conductor used as fixed wiring shall be supported in such a way that it is not exposed to undue mechanical strain and so that there is no appreciable mechanical strain on the termination's of the conductor. Account shall be taken of the mechanical strain imposed by the supported mass of the cable or conductor.
- Conduit, ducting and trunking shall be properly supported and of a type that is either suitable for any risk of mechanical damage which may be met in normal conditions of service, or adequately protected against such damage.
- Installation shall take into account longitudinal expansion and contraction that may occur with variation of temperature under normal operating conditions.

✓ **CABLE TAG AND MARKERS**

- Cable tags & markers in accordance with Standard drawing.
- Each cables and conduit run shall be tagged with numbers that appear in the cable schedules. Cables and conduits shall be tagged at every twenty (20) meters. Cables and conduits shall also be tagged on either side of a floor/wall passage.
- The tags shall be of SS304 with the number engraved on it and securely attached to the cable by not less than two turns of PVC tie.
- Location of cables laid directly underground shall be indicated clearly by cable marker made of cast iron.
- The marker shall project 200 mm above ground and shall be spaced at an interval of 20 meters at every change of direction.


<b>Client :</b> 	<b>TENDER DOCUMENT FOR SUPPLY, INSTALLATION, TESTING &amp; CONFIGURATION OF IT, COMMUNICATION, ACCESS CONTROL &amp; SURVEILLANCE SYSTEM</b>	<b>nne pharmaplan®</b>
<b>Project No : 120310</b>		<b>Revision : 02</b> <b>Date : 2015-10-31</b>

- Cost of laying shall also include supply and fixing of tags, cable ties , markers etc.

<b>Client :</b> 	<b>TENDER DOCUMENT FOR SUPPLY, INSTALLATION, TESTING &amp; CONFIGURATION OF IT, COMMUNICATION, ACCESS CONTROL &amp; SURVEILLANCE SYSTEM</b>	<b>nne pharmaplan®</b>
<b>Project No : 120310</b>		<b>Revision : 02 Date : 2015-10-31</b>

## CHAPTER – 2.5


### TECHNICAL DATA SHEETS

Client : 	<b>TENDER DOCUMENT FOR SUPPLY, INSTALLATION, TESTING &amp; CONFIGURATION OF IT, COMMUNICATION, ACCESS CONTROL &amp; SURVEILLANCE SYSTEM</b>	<b>nne pharmaplan®</b>
Project No : 120310	DOCUMENT NO : NPI-120310-LVS-S1-TD-01	Revision : 02 Date : 2015-10-31


### **TECHNICAL PARTICULARS (to be filled in by Bidder)**

Sl. No	DECSRIPTION	TECHNICAL PARTICULARS
<b>A</b>	Networking and IT System	
<b>I</b>	<b>Active Directory Services Server</b>	
1.	Processor	
2.	Smart Cache	
3.	Memory (RAM)	
4.	Chipset	
5.	Slots	
6.	Connectors	
7.	Hard Disk	
8.	Disk Controller	
9.	Optical Driver	
10.	Network Interface	
11.	Supported OS	
12.	10G NIC	
13.	Certification	
14.	Bench Mark	
15.	Energy Saving	
16.	RFK & RPS	
17.	Operating Temperature	
18.	Storage Temperature	
19.	Form Factor	
20.	Management	
21.	Warranty	
22.	Make / Type	
23.	Functional / Application and Operational Software with Hard Key/Soft Keys/Online Up gradation features, etc	




Client : 	<b>TENDER DOCUMENT FOR SUPPLY, INSTALLATION, TESTING &amp; CONFIGURATION OF IT, COMMUNICATION, ACCESS CONTROL &amp; SURVEILLANCE SYSTEM</b>	<b>nne pharmaplan®</b>
Project No : 120310	<b>DOCUMENT NO : NPI-120310-LVS-S1-TD-01</b>	Revision : 02 Date : 2015-10-31


Sl. No	DECSRIPTION	TECHNICAL PARTICULARS
<b>B.</b>	<b>SERVER - (SAP Business One)</b>	
1.	Processor	
2.	Smart Cache	
3.	Memory (RAM)	
4.	Chipset	
5.	Slots	
6.	Connectors	
7.	Hard Disk	
8.	Disk Controller	
9.	Optical Driver	
10.	Network Interface	
11.	Supported OS	
12.	10G NIC	
13.	Certification	
14.	Bench Mark	
15.	Energy Saving	
16.	RFK & RPS	
17.	Management	
18.	L2 cache	
19.	Chipset	
20.	Memory	
21.	I/O Channels	
22.	Drive bays	
23.	Operating Temperature	
24.	Storage Temperature	
25.	Maximum internal storage	
26.	External Storage	
27.	Power	

Client : 	<b>TENDER DOCUMENT FOR SUPPLY, INSTALLATION, TESTING &amp; CONFIGURATION OF IT, COMMUNICATION, ACCESS CONTROL &amp; SURVEILLANCE SYSTEM</b>	<b>nne pharmaplan®</b>
Project No : 120310	DOCUMENT NO : NPI-120310-LVS-S1-TD-01	Revision : 02 Date : 2015-10-31


Sl. No	DECSRIPTION	TECHNICAL PARTICULARS
28.	Form Factor	
29.	Warranty	
<b>C</b>	<b>Tape Library</b>	
1.	Form Factor	
2.	Capacity	
3.	Speed Offered	
4.	Connectivity Offered	
5.	Partitioning Offered	
6.	Management	
7.	Operating Temperature	
8.	Storage Temperature	
9.	Front Panel	
10.	GUI	
11.	Notification	
12.	Barcode Reader and Mail slots	
13.	Warranty	
<b>D</b>	<b>SERVER - (VM) (Anti-Virus and Visitor Management)</b>	
1.	Features	
2.	Application Software	
3.	OS	
4.	Customization Features	
5.	Third Party Integration Features	
<b>E</b>	<b>SERVER - (Backup Server)</b>	
1.	Processor	
2.	Smart Cache	
3.	Memory (RAM)	
4.	Chipset	

Client : 	<b>TENDER DOCUMENT FOR SUPPLY, INSTALLATION, TESTING &amp; CONFIGURATION OF IT, COMMUNICATION, ACCESS CONTROL &amp; SURVEILLANCE SYSTEM</b>	<b>nne pharmaplan®</b>
Project No : 120310	<b>DOCUMENT NO : NPI-120310-LVS-S1-TD-01</b>	Revision : 02 Date : 2015-10-31


Sl. No	DECSRIPTION	TECHNICAL PARTICULARS
5.	Slots	
6.	Connectors	
7.	Hard Disk	
8.	Disk Controller	
9.	Optical Driver	
10.	Network Interface	
11.	Supported OS	
12.	10G NIC	
13.	Certification	
14.	Bench Mark	
15.	Energy Saving	
16.	RFK & RPS	
17.	Management	
18.	L2 cache	
19.	Chipset	
20.	Memory	
21.	I/O Channels	
22.	Drive bays	
23.	Maximum internal storage	
24.	External Storage	
25.	Operating Temperature	
26.	Storage Temperature	
27.	Power	
28.	Form Factor	
29.	Warranty	
30.	Software with Functional Requirement Features at Mentioned in the Technical Specification	
<b>F</b>	<b>SERVER - Terminal Server (s)</b>	

<b>Client :</b> 	<b>TENDER DOCUMENT FOR SUPPLY, INSTALLATION, TESTING &amp; CONFIGURATION OF IT, COMMUNICATION, ACCESS CONTROL &amp; SURVEILLANCE SYSTEM</b>	<b>nne pharmaplan®</b>
<b>Project No : 120310</b>		<b>Revision : 02</b> <b>Date : 2015-10-31</b>


Sl. No	DECSRIPTION	TECHNICAL PARTICULARS
1.	Processor	
2.	Smart Cache	
3.	Memory (RAM)	
4.	Chipset	
5.	Slots	
6.	Connectors	
7.	Hard Disk	
8.	Disk Controller	
9.	Optical Driver	
10.	Network Interface	
11.	Supported OS	
12.	10G NIC	
13.	Certification	
14.	Bench Mark	
15.	Energy Saving	
16.	RFK & RPS	
17.	Management	
18.	L2 cache	
19.	Chipset	
20.	Memory	
21.	I/O Channels	
22.	Drive bays	
23.	Maximum internal storage	
24.	External Storage	
25.	Power	
26.	Operating Temperature	
27.	Storage Temperature	
28.	Form Factor	

Client : 	<b>TENDER DOCUMENT FOR SUPPLY, INSTALLATION, TESTING &amp; CONFIGURATION OF IT, COMMUNICATION, ACCESS CONTROL &amp; SURVEILLANCE SYSTEM</b>	<b>nne pharmaplan®</b>
Project No : 120310	<b>DOCUMENT NO : NPI-120310-LVS-S1-TD-01</b>	Revision : 02 Date : 2015-10-31

Sl. No	DECSRIPTION	TECHNICAL PARTICULARS
29.	Warranty	
30.	Software with Functional Requirement Features at Mentioned in the Technical Specification	
<b>G</b>	<b>SERVER - Mail Server (s)</b>	
1.	Processor	
2.	Smart Cache	
3.	Memory (RAM)	
4.	Chipset	
5.	Slots	
6.	Connectors	
7.	Hard Disk	
8.	Disk Controller	
9.	Optical Driver	
10.	Network Interface	
11.	Supported OS	
12.	10G NIC	
13.	Certification	
14.	Bench Mark	
15.	Energy Saving	
16.	RFK & RPS	
17.	Management	
18.	L2 cache	
19.	Chipset	
20.	Memory	
21.	I/O Channels	
22.	Drive bays	
23.	Maximum internal storage	
24.	External Storage	


Client : 	<b>TENDER DOCUMENT FOR SUPPLY, INSTALLATION, TESTING &amp; CONFIGURATION OF IT, COMMUNICATION, ACCESS CONTROL &amp; SURVEILLANCE SYSTEM</b>	<b>nne pharmaplan®</b>
Project No : 120310	<b>DOCUMENT NO : NPI-120310-LVS-S1-TD-01</b>	Revision : 02 Date : 2015-10-31

Sl. No	DECSRIPTION	TECHNICAL PARTICULARS
25.	Operating Temperature	
26.	Storage Temperature	
27.	Power	
28.	Form Factor	
29.	Warranty	
30.	Software with Functional Requirement Features at Mentioned in the Technical Specification	
<b>H</b>	<b>LED Console</b>	
1.	Size	
2.	Form Factor	
3.	Display Type	
4.	Display Size	
5.	Video Input	
6.	Contrast Ratio	
7.	Display Colors	
8.	Maximum Resolution	
9.	Keyboard	
10.	Number of Keys	
11.	Pointing Device	
12.	Operating Temperature	
13.	Storage Temperature	
14.	Humidity	
15.	Power	
16.	Form Factor	
17.	Warranty	
17.	Software with Functional Requirement Features at Mentioned in the Technical Specification	
<b>I</b>	<b>KVM SWITCH</b>	
1.	PC Port	



Client : 	<b>TENDER DOCUMENT FOR SUPPLY, INSTALLATION, TESTING &amp; CONFIGURATION OF IT, COMMUNICATION, ACCESS CONTROL &amp; SURVEILLANCE SYSTEM</b>	<b>nne pharmaplan®</b>
Project No : 120310	<b>DOCUMENT NO : NPI-120310-LVS-S1-TD-01</b>	Revision : 02 Date : 2015-10-31

Sl. No	DECSRIPTION	TECHNICAL PARTICULARS
2.	Form Factor	
3.	Console Port	
4.	Max PC Connection	
5.	LED Indication	
6.	PC Port Connector Type (All female Type)	
7.	Console port connector(All Female Type)	
8.	Operating Temperature	
9.	Storage Temperature	
10.	Humidity	
11.	Power	
12.	Form Factor	
13.	Warranty	
14.	Software with Functional Requirement Features at Mentioned in the Technical Specification	
<b>J</b>	<b>LOAD BALANCER</b>	
1.	Performance	
2.	Hardware appliance	
3.	Minimum Number of Interfaces	
4.	Balancing Functions	
5.	Architecture	
6.	Features	
7.	Persistency	
8.	Operating Temperature	
9.	Storage Temperature	
10.	Modification	
11.	Application Acceleration	
12.	Security	




Client : 	<b>TENDER DOCUMENT FOR SUPPLY, INSTALLATION, TESTING &amp; CONFIGURATION OF IT, COMMUNICATION, ACCESS CONTROL &amp; SURVEILLANCE SYSTEM</b>	<b>nne pharmaplan®</b>
Project No : 120310	<b>DOCUMENT NO : NPI-120310-LVS-S1-TD-01</b>	Revision : 02 Date : 2015-10-31


Sl. No	DECSRIPTION	TECHNICAL PARTICULARS
13.	Software with Functional Requirement Features at Mentioned in the Technical Specification	
<b>K</b>	<b>Data Storage System – Primary/Secondary</b>	
1.	Storage Controller Architecture	
2.	Processor	
3.	Storage Cache	
4.	Operating System	
5.	Data Protection	
6.	Disk Support	
7.	Storage Capacity Required – Primary/Secondary	
8.	Storage Scalability	
9.	Hot Spare	
10.	RAID Configuration	
11.	Enclosure Specifications	
12.	Protocols Supported	
13.	Front-end GbE/FC ports	
14.	Back-end ports (expansion)	
15.	RAID Virtualization	
16.	Power Management	
17.	Remote Replication	
18.	Data Protection	
19.	OS Support	
20.	System Management	
21.	Capacity Management	
22.	Licensing	
23.	Operating Temperature	
24.	Storage Temperature	
25.	Load Balancing	

Client : 	<b>TENDER DOCUMENT FOR SUPPLY, INSTALLATION, TESTING &amp; CONFIGURATION OF IT, COMMUNICATION, ACCESS CONTROL &amp; SURVEILLANCE SYSTEM</b>	
<b>Project No : 120310</b>		<b>Revision : 02</b> <b>Date : 2015-10-31</b>


Sl. No	DECSRIPTION	TECHNICAL PARTICULARS
26.	Multipath Software	
27.	Third Party Storage Virtualization	
28.	Form Factor	
29.	Warranty	
30.	Software with Functional Requirement Features at Mentioned in the Technical Specification	
<b>L</b>	<b>Thin Clients</b>	
1.	Flash Memory	
2.	Main Memory	
3.	Chassis	
4.	Processor	
5.	BIOS	
6.	Peripherals	
7.	Network Interface	
8.	Graphics	
9.	Ports/Slots	
10.	Security	
11.	Display	
12.	OS Installed	
13.	OS Security Feature	
14.	Emulation/Protocol support	
15.	Network	
16.	Operating Temperature	
17.	Storage Temperature	
18.	Manageability	
19.	Network	
20.	Manageability	
21.	Warranty	

Client : 	<b>TENDER DOCUMENT FOR SUPPLY, INSTALLATION, TESTING &amp; CONFIGURATION OF IT, COMMUNICATION, ACCESS CONTROL &amp; SURVEILLANCE SYSTEM</b>	<b>nne pharmaplan®</b>
Project No : 120310	<b>DOCUMENT NO : NPI-120310-LVS-S1-TD-01</b>	Revision : 02 Date : 2015-10-31


Sl. No	DECSRIPTION	TECHNICAL PARTICULARS
22.	Software with Functional Requirement Features at Mentioned in the Technical Specification, also with Application Software with required licenses.	
<b>M</b>	<b>FIRE WALL</b>	
1.	Form Factor	
2.	Stateful throughput	
3.	GAV Performance	
4.	IPS Performance	
5.	Full DPI Performance	
6.	Maximum Connections	
7.	New Connection per sec	
8.	Nodes Supported	
9.	RJ-45 Ports	
10.	RJ-45 ports	
11.	Redundancy VPN Gateway	
12.	Deep packet Inspection Service	
13.	Comprehensive Anti-Span supported	
14.	Zone Security	
15.	Object Based – Group Management	
16.	DDNS	
17.	Operating Temperature	
18.	Storage Temperature	
19.	Logging and Reporting	
20.	Standards	
21.	Wireless Standards	
22.	Power Supply	
<b>N</b>	<b>CORE SWITCH</b>	
1.	Wireless network management	
2.	User management	

Client : 	<b>TENDER DOCUMENT FOR SUPPLY, INSTALLATION, TESTING &amp; CONFIGURATION OF IT, COMMUNICATION, ACCESS CONTROL &amp; SURVEILLANCE SYSTEM</b>	<b>nne pharmaplan®</b>
Project No : 120310	<b>DOCUMENT NO : NPI-120310-LVS-S1-TD-01</b>	Revision : 02 Date : 2015-10-31


Sl. No	DECSRIPTION	TECHNICAL PARTICULARS
3.	Switching capacity	
4.	Packet forwarding rate	
5.	Service slots	
6.	iPCA quality awareness	
7.	SVF virtualization	
8.	VLAN	
9.	MAC address	
10.	STP/ERPS	
11.	Multicast	
12.	MPLS	
13.	Reliability	
14.	QoS	
15.	Configuration and maintenance	
16.	Security and management	
17.	Value-added services	
18.	No. of Optical Ports on Multimode	
19.	Number of RJ45 Ports	
20.	Uplink Capacity	
21.	Downlink Capacity	
22.	Operating Temperature	
23.	Storage Temperature	
24.	Interoperability	
25.	Energy saving	
26.	Dimensions (W x D x H)	
27.	Chassis weight	
28.	Form factor	
29.	Warranty	
<b>O</b>	<b>EDGE/DISTRIBUTION SWITCHES</b>	

Client : 	<b>TENDER DOCUMENT FOR SUPPLY, INSTALLATION, TESTING &amp; CONFIGURATION OF IT, COMMUNICATION, ACCESS CONTROL &amp; SURVEILLANCE SYSTEM</b>	<b>nne pharmaplan®</b>
Project No : 120310	<b>DOCUMENT NO : NPI-120310-LVS-S1-TD-01</b>	Revision : 02 Date : 2015-10-31

Sl. No	DECSRIPTION	TECHNICAL PARTICULARS
1.	Form Factor	
2.	Number of Ports	
3.	Uplink Ports and Capacity	
4.	Downlink Ports and Capacity	
5.	Stackable Chassis Throughput	
6.	CPU Speed	
7.	System memory	
8.	Switch Capacity and forwarding rate	
9.	MTBF	
10.	Operating Temperature	
11.	Storage Temperature	
12.	Standards	
13.	Power Supply	
14.	Dimensions (W x D x H)	
15.	Chassis weight	
16.	Form factor	
17.	Warranty	
18.	Power Requirement	
<b>P</b>	<b>WIRELESS ACCESS POINT</b>	
1.	802.11a/b/g/n radio	
2.	Industry-leading radio design	
3.	Power over Ethernet (IEEE 802.3af)	
4.	Multipurpose and lockable mounting bracket	
5.	Operating Temperature	
6.	Storage Temperature	
7.	Data rates supported	
8.	Uplink	


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Project No : 120310	DOCUMENT NO : NPI-120310-LVS-S1-TD-01	Revision : 02 Date : 2015-10-31

Sl. No	DECSRIPTION	TECHNICAL PARTICULARS
9.	Status LEDs	
10.	Security	
<b>Q</b>	<b>SMART BOARD</b>	
1.	Size	
2.	Software	
3.	Pen Tray	
4.	Pens and Eraser	
5.	Resolution	
6.	Operating Temperature	
7.	Storage Temperature	
8.	Screen Surface	
9.	Digitizing Technology	
<b>R</b>	<b>PDU-IP (Power Distribution Unit)</b>	
1.	Support	
2.	Controller	
3.	Alarms	
4.	Integration	
5.	Quality	
6.	Circuit Breaker	
7.	Power Source	
8.	Sensors	
9.	Operating Temperature	
10.	Storage Temperature	
11.	Outlet Sockets	
12.	Form Factor	
13.	Warranty	
<b>S</b>	<b>PRINTERS</b>	
1.	Printing Size	


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Project No : 120310	<b>DOCUMENT NO : NPI-120310-LVS-S1-TD-01</b>	Revision : 02 Date : 2015-10-31

Sl. No	DECSRIPTION	TECHNICAL PARTICULARS
2.	Printing Speed	
3.	Printing Method	
4.	Fixing Method	
5.	Resolution	
6.	First Print Out time	
7.	Toner Cartridges	
8.	Drum Cartridge	
9.	Paper Input	
10.	Paper Input (MP)	
11.	Paper Input (Tray)	
12.	Paper Size	
13.	Custom Sizes (Tray)	
14.	When loading paper in portrait orientation	
15.	Duplex Printing	
16.	Operating Temperature	
17.	Storage Temperature	
18.	CPU	
19.	RAM (Standard)	
20.	Interface (Standard)	
21.	Power Supply	
<b>T</b>	<b>VoIP Communication System</b>	
	<b>VoIP Server/Service</b>	
1.	Processor	
2.	Smart Cache	
3.	Memory (RAM)	
4.	Chipset	
5.	Connectors	
6.	Hard Disk	




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<b>Project No : 120310</b>		<b>Revision : 02</b> <b>Date : 2015-10-31</b>


Sl. No	DECSRIPTION	TECHNICAL PARTICULARS
7.	Optical Driver	
8.	Network Interface	
9.	Supported OS/ Application	
10.	10G NIC	
11.	Certification	
12.	Capacity	
13.	Energy Saving	
14.	Operating Temperature	
15.	Storage Temperature	
16.	RFK & RPS	
17.	Form Factor	
18.	Management	
19.	Warranty	
<b>U</b>	<b>VoIP Telephone System</b>	
1.	Compatible with Server/Exchange	
2.	Hands free dialing	
3.	Pushbutton Dialing	
4.	Duplex speaker phone with echo cancellation	
5.	Nos. of RJ-45 Port	
6.	DHCP support	
7.	LCD Display size	
8.	Cold Test	
9.	Warm Test	
10.	PoE Feature	
11.	Operating Temperature	
12.	Storage Temperature	
13.	Audio Path Test	
14.	Commercial Certification	

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Project No : 120310	DOCUMENT NO : NPI-120310-LVS-S1-TD-01	Revision : 02 Date : 2015-10-31


Sl. No	DECSRIPTION	TECHNICAL PARTICULARS
15.	Warranty	
<b>V</b>	<b>VoIP Telephone System (Clean Room)</b>	
1.	Compatible with Server/Exchange-SIP Compatible	
2.	Automatic call divert (memory list)	
3.	Real-Time alarm reporting via email , syslog or TMA software	
4.	Duplex speaker phone with echo cancellation	
5.	Configurable via webpage, serial link or download	
6.	Multicast capability, up to eight addresses.	
7.	Operating Temperature	
8.	Storage Temperature	
9.	PoE Feature	
10.	Commercial Certification	
11.	Warranty	
<b>W</b>	<b>Access Control and Security System</b>	
	<b>ACS DATA BASE</b>	
1.	Cardholder capacity	
2.	Transaction storage	
3.	Flash programming for firmware revision updates	
4.	Access level	
5.	Holidays	
6.	Time zone	
7.	Card reader formats	
8.	Credential facility codes	
9.	Dedicated tamper alarm	
10.	Dedicated power fail alarm	
11.	Real time clock:	
12.	Geographic time zone support	
13.	Leap year support	

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Project No : 120310	<b>DOCUMENT NO : NPI-120310-LVS-S1-TD-01</b>	Revision : 02 Date : 2015-10-31


Sl. No	DECSRIPTION	TECHNICAL PARTICULARS
14.	Embedded web server to configure network attributes	
15.	Interfacing with FAS System	
<b>X</b>	<b>SMART CARDS</b>	
1.	Read Range	
2.	Dimensions	
3.	Min Operating Temp	
4.	Frequency	
5.	Certification	
<b>Y</b>	<b>CARD READER</b>	
1.	Interfacing with Access Control	
2.	Read Ranges	
3.	Power Consumption	
4.	Multi Colour LED	
5.	Enclosure	
6.	Processor	
7.	Communication Ports	
<b>Z</b>	<b>DOOR CONTROL SYSTEM</b>	
1.	Control Philosophy	
2.	Bio Metrix System	
3.	Reader System	
4.	Key Pad System	
5.	Push Button System	
6.	Communication Port	
7.	Interlock with FAS System	
<b>AA</b>	<b>ELECTRO MAGNETIC LOCK</b>	
1.	Locking Mechanism	
2.	Brackets for Glass door	
3.	Voltage /Power	

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Project No : 120310	<b>DOCUMENT NO : NPI-120310-LVS-S1-TD-01</b>	Revision : 02 Date : 2015-10-31


Sl. No	DECSRIPTION	TECHNICAL PARTICULARS
4.	Holding Force	
5.	Fail Safe Mechanism	
6.	LED Indication	
<b>BB</b>	<b>BOOM BARRIER</b>	
1.	Type of Control	
2.	Opening Time	
3.	Close Time	
4.	MoC (Material of Construction)	
5.	Weight	
6.	Power Consumption	
7.	Power Supply	
8.	Limit Switches for Feed back	
9.	Sensors for Pass-by detection	
10.	Housing	
11.	Controllers	
12.	Communication Ports	
13.	Make / Type	
14.	Reference Standard	
<b>CC</b>	<b>FLAP BARRIERS</b>	
1.	MoC	
2.	Visual Indication	
3.	Audible Alarm	
4.	Access Control Inputs	
5.	Power Requirement	
6.	Type of Motor	
7.	Make/Model	
<b>DD</b>	<b>CCTV / Surveillance System</b>	
<b>i.</b>	<b>NVR RECORDER DATASHEET</b>	

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Project No : 120310	<b>DOCUMENT NO : NPI-120310-LVS-S1-TD-01</b>	Revision : 02 Date : 2015-10-31

Sl. No	DECSRIPTION	TECHNICAL PARTICULARS
1.	Centralized management architecture.	
2.	Minimum no. of channels from IP cameras and video encoders to display on clients	
3.	Resolution in full frame	
4.	Video Streams available	
5.	Internal Storage and External Storage	
6.	Operating System	
7.	Size of the Server PC	
8.	Make / Type	
9.	Features of Server – PC	
10.	Interface facility with ACS and IT System	
11.	Certification	
12.	Client WorkStation PC Description	
13.	No. of Monitor	
14.	Selection of Monitors	
15.	Type and Size of Monitors	
16.	Console for Monitors	
<b>EE</b>	<b>Video Management Software</b>	
1.	Device recovery	
2.	Rule Engine/Alternative View	
3.		
4.	Digital Zoom In/Out	
5.		
6.	Multi-Monitor Layout	
7.	Search by time	
8.	Search by Event/Thumbnail	


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Project No : 120310	<b>DOCUMENT NO : NPI-120310-LVS-S1-TD-01</b>	Revision : 02 Date : 2015-10-31

Sl. No	DECSRIPTION	TECHNICAL PARTICULARS
9.	Multiple Speed Playback	
10.		
11.	Backward/Forward Recording	
12.	Export Video with Player	
13.	Health Status Monitor	
14.	Trigger Status	
FF	<b>CAMERA DATA SHEET (VENDOR SHALL PREPARE SEPARATELY FOR DIFFERENT CAMERAS)</b>	
1.	Sensor	
2.	Effective Pixels	
3.	Compression	
4.	Dual Streaming	
5.	Resolution	
6.	Image Frame Rate	
7.	Sensitivity	
8.	Automatic Lens Control	
9.	Lens	
10.	WDR	
11.	Sync System	
12.	User	
13.	Security	
14.	Data Storage	
15.	White Balance	
16.	Electric Shutter	
17.	Bit Rate	
18.	Audio Compression	


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Project No : 120310	<b>DOCUMENT NO : NPI-120310-LVS-S1-TD-01</b>	Revision : 02 Date : 2015-10-31

Sl. No	DECSRIPTION	TECHNICAL PARTICULARS
19.	Motion Detection	
20.	Alarm Trigger	
21.	Supported Protocol	
22.	Network Video Interface	
23.		
24.	Local Storage	
25.	Power Supply	
26.	PoE	
27.	Operating Temperature	
28.	Operating Humidity	
29.	Power Consumption	
30.	Certification	
31.	Sensor	
32.	Effective Pixels	
33.	Compression	
34.	Dual Streaming	
35.	Resolution	
36.	Image Frame Rate	
37.	Sensitivity	
38.	Automatic Lens Control	
39.	Lens	
40.	WDR	
41.	Sync System	
42.	User	
43.	Security	




Client : 	<b>TENDER DOCUMENT FOR SUPPLY, INSTALLATION, TESTING &amp; CONFIGURATION OF IT, COMMUNICATION, ACCESS CONTROL &amp; SURVEILLANCE SYSTEM</b>	<b>nne pharmaplan®</b>
Project No : 120310	<b>DOCUMENT NO : NPI-120310-LVS-S1-TD-01</b>	Revision : 02 Date : 2015-10-31

Sl. No	DECSRIPTION	TECHNICAL PARTICULARS
44.	Data Storage	
45.	White Balance	
46.	Electric Shutter	
47.	Bit Rate	
48.	Audio Compression	
49.	Motion Detection	
50.	Alarm Trigger	
51.	Supported Protocol	
52.	Network Video Interface	
53.		
54.	Local Storage	
55.	Power Supply	
56.	PoE	
57.	Operating Temperature	
58.	Operating Humidity	
59.	Power Consumption	
60.	Certification	

<b>Client :</b> 	<b>TENDER DOCUMENT FOR SUPPLY, INSTALLATION, TESTING &amp; CONFIGURATION OF IT, COMMUNICATION, ACCESS CONTROL &amp; SURVEILLANCE SYSTEM</b>	<b>nne pharmaplan®</b>
<b>Project No : 120310</b>		<b>Revision : 02 Date : 2015-10-31</b>


## CHAPTER– 2.6

### PREAMBLE TO SCHEDULE OF QUANTITIES

<b>Client :</b> 	<b>TENDER DOCUMENT FOR SUPPLY, INSTALLATION, TESTING &amp; CONFIGURATION OF IT, COMMUNICATION, ACCESS CONTROL &amp; SURVEILLANCE SYSTEM</b>	<b>nne pharmaplan®</b>
<b>Project No : 120310</b>		<b>Revision : 02</b> <b>Date : 2015-10-31</b>

## 2.6 GENERAL NOTES:

- 2.6.1 All items of work mentioned in the Schedule of Quantities shall be read and executed strictly in accordance with the description of the item in the Schedule of Quantities, equipment schedule/ Data sheet, drawing and standard specifications read in conjunction with the appropriate IS/IEC/ISO/IEEE and conditions of contract.
- 2.6.2 The rate for each item of work included in the bill of quantities shall unless expressly stated otherwise include cost of:-
- All materials, fixing materials, accessories, hardware, operations, tools, equipment, consumables, civil works wherever involved and incidentals required in preparations for in the full and entire execution and completion of the work called for the item and as per specifications and drawings completely.
- a) Wastage on materials and labour.
  - b) All taxes, duties., including, sales tax, insurance (except supply and installation), packing and forwarding charges, loading , transportation at site in supplier scope as per good manufacturing practice and recognized principles.
  - c) Octroi if any, receiving, unloading handling, hoisting, to all levels. setting and fixing in position, disposal of debris and all other labour necessary in accordance with Purchaser scope as per good practice and recognized principles.
  - d) Liabilities, obligations and risks arising out of conditions of contract.
- 2.6.3 All requirements of system whether such of them are mentioned in the item or not the specifications and drawings are to be read as complimentary to and part of the schedule or quantities and any work called for in one shall be taken as required for all.
- 2.6.4 In the event of conflict between the bill of quantities and other documents, the most stringent shall apply and interpretations of the Architect shall be final and binding.
- 2.6.5 No change in unit rate shall be allowed for any change in quantity or for any other reason whatsoever.
- 2.6.6 Supply of materials shall mean supply of materials at site. The rate for supply shall include all taxes, insurance (except supply & installation), packing and forwarding charges, transportation at site.
- 2.6.7 The supplier shall submit the Schematic diagrams, fabrication drawings with details of equipment wiring diagrams etc. to Purchaser / Consultant for approval prior to supply / commencement of such works. The approval of these drawings will be general and will not absolve to supplier of the responsibility of the correctness of these drawings. At least four copies of the approved drawings supplied to Purchaser/Consultant for their distribution to various agencies at site at no cost to Purchaser.
- 2.6.8 Any error in description if in quantity or omission of items from the supplier shall not vitiate this contract but shall be corrected and deemed to be a variation required by Purchaser/consultants.
- 2.6.9 The tender shall take into account The expenses of pre-commissioning tests to be conducted as per specification of the complete installation with Purchasers licensed agencies.

Client : 	TENDER DOCUMENT FOR SUPPLY, INSTALLATION, TESTING & CONFIGURATION OF IT, COMMUNICATION, ACCESS CONTROL & SURVEILLANCE SYSTEM	nne pharmaplan®
Project No : 120310	DOCUMENT NO : NPI-120310-LVS-S1-TD-01	Revision : 02 Date : 2015-10-31

## CHAPTER– 2.7

### BILL OF QUANTITIES

**NOTE:** Vendors are requested to read all tender clauses applicable for the rates quoted. Vendors are given provision to quote separately for i) supply and ii) installation, in which the installation part implicitly means the net rate for installation, testing and commissioning.

**The BOQ is combined BOQ for following block, Individual block BOQ will be provided to successful bidder after order finalization**

1. Viral Vaccine Formulation block (F1)
2. Bacterial Vaccine Formulation Block (F2)
3. Anti-Rabies Vaccine Bulk Block (B4)
4. Secondary packaging block (P1)
5. QA & QC and Admin Block (Q1)
6. Utility Block (U1)
7. Raw water and Fire Tank (G7)
8. Gate Office-1 (G3)
9. Gate Office-2(G4)
10. Animal House
11. Central Laundry
12. Gate Office
13. Ware House
14. Multiple Bacterial Block
15. BCG Bulk and Formulation Block


Formatted for BOQ as under

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Project No : 120310	DOCUMENT NO : NPI-120310-LVS-S1-TD-01	Revision : 02 Date : 2015-10-27

S No.	DESCRIPTION OF WORK	UNIT	QTY.	ALL PRICES INCLUSIVE OF ALL TAXES (In Rs)				TOTAL AMOUNT (A+B) Rs.
				SUPPLY		INSTALLATION		
				UNIT RATE	TOTAL AMOUNT (A) Rs.	UNIT RATE	TOTAL AMOUNT (B) Rs.	
1	TOTAL (IN Rs. IN FIGURES)							
2	TOTAL (IN Rs. IN WORDS)							
3	GRAND TOTAL - (SUPPLY + INSTALLATION) (IN Rs. IN FIGURES)							
4	GRAND TOTAL -(SUPPLY + INSTALLATION) (IN Rs. IN WORDS)							


Client : 	TENDER DOCUMENT FOR SUPPLY, INSTALLATION, TESTING & COMMISSIONING OF IT, COMMUNICATION, ACCESS CONTROL & SURVEILLANCE SYSTEM	nne pharmaplan®
Project No : 120310	DOCUMENT NO : NPI-120310-LVS-S1-TD-01	Revision : 02 Date : 2015-10-27

Sl. No.	DESCRIPTION OF WORK	UNIT	Total Qty.	SUPPLY		INSTALLATION		TOTAL AMOUNT
				UNIT RATE	AMOUNT	UNIT RATE	AMOUNT	
				Rs.	Rs.	Rs.	Rs.	Rs.
1	<b>Data and IT System</b>							
1.1	<b>Terminal Server/Activer Directory SERVER (RACK TYPE) : Supply, Installation, configuration to meet the Functional Requirement with features covered in the TS Section :-4.1. Annex-1</b> Processor :- 2 Nos of Intel Xeon Processor Cache:- 30 MB Cache Ram 128 GB HDD - 2*600 GB Form Factor:2U	Nos.	4					
1.2	<b>Backup Server (RACK TYPE) : Supply, Installation, configuration to meet the Functional Requirement with features covered in the TS Section :-4.5. Annex-1</b> Processor :- 2 Nos of Intel Xeon Processor Cache:- 30 MB Cache Ram 128 GB HDD - 2*600 GB Form Factor:2U	Nos.	1					


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Project No : 120310		Revision : 02 Date : 2015-10-27

Sl. No.	DESCRIPTION OF WORK	UNIT	Total Qty.	SUPPLY		INSTALLATION		TOTAL AMOUNT
				UNIT RATE	AMOUNT	UNIT RATE	AMOUNT	
				Rs.	Rs.	Rs.	Rs.	Rs.
1.3	<b>Mail SERVER (RACK TYPE) : Supply, Installation, configuration to meet the Functional Requirement with features covered in the TS Section :-4.5. Annex-1</b> Processor :- 2 Nos of Intel Xeon Processor Cache:- 30 MB Cache Ram 128 GB HDD - 2*600 GB Form Factor:2U	Nos.	2					
1.4	<b>SAP SERVER (RACK TYPE) : Supply, Installation, configuration to meet the Functional Requirement with features covered in the TS Section :-4.2. Annex-1</b> Processor :- 2 Nos of Intel Xeon Processor Cache:- 30 MB Cache Ram 128 GB HDD - 2*600 GB Form Factor:2U	Nos.	2					



Client : 	TENDER DOCUMENT FOR SUPPLY, INSTALLATION, TESTING & COMMISSIONING OF IT, COMMUNICATION, ACCESS CONTROL & SURVEILLANCE SYSTEM	nne pharmaplan®
Project No : 120310	DOCUMENT NO : NPI-120310-LVS-S1-TD-01	Revision : 02 Date : 2015-10-27


Sl. No.	DESCRIPTION OF WORK	UNIT	Total Qty.	SUPPLY		INSTALLATION		TOTAL AMOUNT
				UNIT RATE	AMOUNT	UNIT RATE	AMOUNT	
				Rs.	Rs.	Rs.	Rs.	Rs.
1.5	<b>PRIMARY STORAGE DEVICE : Supply, Installation, including to Configuration to meet the Functional Requirement with following features.</b> PRIMARY STORAGE DEVICE : Supply, Installation, including to Configuration to meet the Functional Requirement with following features.Disk Support : 300 GB, 600 GB 15K RPM SAS, 300 GB / 600 GB / 900GB / 1.2TB 10K RPM SAS, 200 GB SSD SLC, 400 GB/ 600GB/ 800GB SSD eMLC, 2 TB/ 3TB/ 4TB/ 6TB 7.2K RPM NL-SAS.Storage Capacity Required : :40 TB of useable space, post RAID 6 using 10K RPM SAS disk drives and 10TB of useable space, post RAID 6 using SSD eMLC disk driveRefer Technical Specification : - <b>TS Section :-4.10. Annex-1</b>	Nos.	1					
1.6	<b>BACKUP DATA STORAGE DEVICE : Supply, Installation, including to Configuration to meet the Functional Requirement with following features.</b> Disk Support : 300 GB, 600 GB 15K RPM SAS, 300 GB / 600 GB / 900GB / 1.2TB 10K RPM SAS, 200 GB SSD SLC, 400 GB/ 600GB/ 800GB SSD eMLC, 2 TB/ 3TB/ 4TB/ 6TB 7.2K RPM NL-SAS.Storage Capacity Required : :100 TB of useable space, post RAID 6 using 2TB 10K RPM	Nos.	1					

Client : 	TENDER DOCUMENT FOR SUPPLY, INSTALLATION, TESTING & COMMISSIONING OF IT, COMMUNICATION, ACCESS CONTROL & SURVEILLANCE SYSTEM	nne pharmaplan®
Project No : 120310	DOCUMENT NO : NPI-120310-LVS-S1-TD-01	Revision : 02 Date : 2015-10-27


Sl. No.	DESCRIPTION OF WORK	UNIT	Total Qty.	SUPPLY		INSTALLATION		TOTAL AMOUNT
				UNIT RATE	AMOUNT	UNIT RATE	AMOUNT	
				Rs.	Rs.	Rs.	Rs.	Rs.
	SAS disk drives and 10TB of useable space, post RAID 6 using SSD eMLC disk drive.Refer Technical Specification : -TS Section :-4.10. Annex-1							
1.7	<b>TAPE LIBRARY : Supply, Installation, including to Configuration to meet the Functional Requirement with following features.</b> Capacity : Native Data Capacity - 60TB2. Shall have min two LTO6Form Factor - 2URefer Technical Specification : -TS Section :-4.10. Annex-1	Nos.	1					
1.8	<b>Thin Client- Supply, Installation, including to Configuration to meet the Functional Requirement.(Keyboard, Mouse. Etc.)</b> Refer Technical Specification : -TS Section :-4.11 - Annex 1	Nos.	150					
1.9	<b>Surveillance Monitoring Workstation- Supply, Installation, including to Configuration to meet the Functional Requirement.(Keyboard, Mouse. Etc.)</b> Refer Technical Specification : -TS Section :-4.11 - Annex 1	Nos.	1					

Client : 	TENDER DOCUMENT FOR SUPPLY, INSTALLATION, TESTING & COMMISSIONING OF IT, COMMUNICATION, ACCESS CONTROL & SURVEILLANCE SYSTEM	nne pharmaplan®
Project No : 120310	DOCUMENT NO : NPI-120310-LVS-S1-TD-01	Revision : 02 Date : 2015-10-27


Sl. No.	DESCRIPTION OF WORK	UNIT	Total Qty.	SUPPLY		INSTALLATION		TOTAL AMOUNT
				UNIT RATE	AMOUNT	UNIT RATE	AMOUNT	
				Rs.	Rs.	Rs.	Rs.	Rs.
1.10	Surveillance Monitoring Desktop- Supply, Installation, including to Configuration to meet the Functional Requirement.(Keyboard, Mouse. Etc.) Refer Technical Specification : -TS Section :-4.11 - Annex 1	Nos.	4					
1.11	<b>FIREWALL</b> Unified Threat Management System Refer Technical Specification : -TS Section :-4.13 - Annex -1.	Nos.	2					
1.12	ADC - Application Delivery Controller -Supply, Installation, including to Configuration to meet the Functional Requirement. Refer Technical Specification : -TS Section :-4.9 - Annex -1.	Nos.	2					
1.13	Note:- All the above Items to be supplied, Installed and Configured to meet the functional requirement of the Client and Putting in to successful operation							

Client : 	<b>TENDER DOCUMENT FOR SUPPLY, INSTALLATION, TESTING &amp; COMMISSIONING OF IT, COMMUNICATION, ACCESS CONTROL &amp; SURVEILLANCE SYSTEM</b>	nne pharmaplan®
Project No : 120310	<b>DOCUMENT NO : NPI-120310-LVS-S1-TD-01</b>	Revision : 02 Date : 2015-10-27


Sl. No.	DESCRIPTION OF WORK	UNIT	Total Qty.	SUPPLY		INSTALLATION		TOTAL AMOUNT
				UNIT RATE	AMOUNT	UNIT RATE	AMOUNT	
				Rs.	Rs.	Rs.	Rs.	Rs.
2	<b>Softwares</b>							
2.1	Desktop Virtualization Solution (Software including Software Maintenance.)- Supply, Installation, including to Configuration to meet the Functional Requirement for Desktop, Laptops, Thin Clients, iPad/Tablets, Mobile Clients. Refer Technical Specification : -TS Section :-4.12 - Annex -1.	Nos.	160					
2.2	<b>Email Solution Features (Software)- Supply, Installation, including to Configuration</b> It shall also comprise pin providing technical solution including all module and features. Anti Virus and Antispam software to be used in email system. and to be specified for approval. <b>Refer Technical Specification : -TS Section :-4.6 - Annex -1.</b>	Nos.	150					
2.3	Microsoft®Windows®ServerStandard 2012R2 Single OLP 1License No Level 2Proc Part No. P73-06285	Nos.	11					
2.4	Microsoft®Windows®ServerCAL 2012 Single OLP 1License No Level DvcCAL Part No. R18-04277	Nos.	160					
2.5	Microsoft®WinRmtDsktpSvcCAL 2012 Single OLP 1License No Level DvcCAL Part No. 6VC-02071	Nos.	160					

Client : 	TENDER DOCUMENT FOR SUPPLY, INSTALLATION, TESTING & COMMISSIONING OF IT, COMMUNICATION, ACCESS CONTROL & SURVEILLANCE SYSTEM	nne pharmaplan®
Project No : 120310	DOCUMENT NO : NPI-120310-LVS-S1-TD-01	Revision : 02 Date : 2015-10-27

Sl. No.	DESCRIPTION OF WORK	UNIT	Total Qty.	SUPPLY		INSTALLATION		TOTAL AMOUNT
				UNIT RATE	AMOUNT	UNIT RATE	AMOUNT	
				Rs.	Rs.	Rs.	Rs.	Rs.
2.6	Microsoft®Office 2013 Single OLP 1License No Level Part No. 021-10257	Nos.	150					
2.7	Microsoft SysCtrStd SNGL LicSAPk OLP NL 2Proc Qlfd	Nos.	11					
2.8	Microsoft SysCtrCnfgMgrCltML SNGL LicSAPk OLP NL PerOSE	Nos.	200					
2.9	VMware vSphere 6 Essentials Plus Kit for 3 hosts (Max 2 Processor per host) Sns is required. Features- Update Manager, Data Protection and High Availability. Part No. VS6-ESP-KIT-C	Nos.	1					
2.10	VMware vSphere 6 Essentials Plus Kit Product Support for 3 years Part No. VS6-Esp-KIT-3P-SSS-C	Nos.	1					
2.11	SYMC Endpoint Protection 12.1 Per user BNDL STD LIC ACAD BAND A ESSENTIAL 36 Months	Nos.	50					
2.12	<b>Backup Software :</b> It shall be available on various OS Platform such as Windows, Linux and UNIX Platforms. IT support industry leading cluster solution such as MSCS, MC Service Guard, Veritas Cluster <b>Refer Technical Specification : -TS Section :-4.6 - Annex -1.</b>	Nos.	1					


Client : 	TENDER DOCUMENT FOR SUPPLY, INSTALLATION, TESTING & COMMISSIONING OF IT, COMMUNICATION, ACCESS CONTROL & SURVEILLANCE SYSTEM	nne pharmaplan®
Project No : 120310	DOCUMENT NO : NPI-120310-LVS-S1-TD-01	Revision : 02 Date : 2015-10-27

Sl. No.	DESCRIPTION OF WORK	UNIT	Total Qty.	SUPPLY		INSTALLATION		TOTAL AMOUNT
				UNIT RATE	AMOUNT	UNIT RATE	AMOUNT	
				Rs.	Rs.	Rs.	Rs.	Rs.
2.13	<b>Note:-</b> All the above Items to be supplied, Installed and Configured to meet the functional requirement of the Client and Putting in to successful operation							
3	<b>Networking Active Components</b>							
3.1	CORE - ETHERNET SWITCHES -Supply, Installtion and Configuration (Along with required Accessories) Refer Technical Specification : -TS Section :-4.14 - Annex -1.	Nos.	2					
3.2	<b>EDGE/DISTRIBUTION SWITCHES</b> -Supply, Installation, Erection and Commissioning including all installation accessories. - 24 PORT; The Technical details are mentioned in the technical specification along with Optical Module. <b>Refer Technical Specification : -TS Section :-4.14 - Annex -1.</b>	Nos.	5					
3.3	<b>EDGE/DISTRIBUTION SWITCHES</b> -SSupply, Installation, Erection and Commissioning including all installation accessories. - 48 PORT; The Technical details are mentioned in the technical specification along with Optical Module. <b>Refer Technical Specification : -TS Section :-4.14 - Annex -1.</b>	Nos.	15					


Client : 	TENDER DOCUMENT FOR SUPPLY, INSTALLATION, TESTING & COMMISSIONING OF IT, COMMUNICATION, ACCESS CONTROL & SURVEILLANCE SYSTEM	nne pharmaplan®
Project No : 120310	DOCUMENT NO : NPI-120310-LVS-S1-TD-01	Revision : 02 Date : 2015-10-27

Sl. No.	DESCRIPTION OF WORK	UNIT	Total Qty.	SUPPLY		INSTALLATION		TOTAL AMOUNT
				UNIT RATE	AMOUNT	UNIT RATE	AMOUNT	
				Rs.	Rs.	Rs.	Rs.	Rs.
3.4	<b>EDGE/DISTRIBUTION SWITCHES</b> -Supply, Installation, Erection and Commissioning including all installation accessories. Supply, Installation, Erection and Commissioning including all installation accessories. 24PORT- PoE; The Technical details are mentioned in the technical specification along with Optical Module. <b>cation : -TS Section :-4.14 - Annex -1.</b>	Nos.	17					
3.5	<b>EDGE/DISTRIBUTION SWITCHES</b> -Supply, Installation, Erection and Commissioning including all installation accessories. 48PORT- PoE; The Technical details are mentioned in the technical specification along with Optical Module. <b>Refer Technical Specification : -TS Section :-4.14 - Annex -1.</b>	Nos.	7					
3.6	<b>Authentication Application-Supply, Installation, including to Configuration</b> Authentication application for (802.1x, MAC & portal based) supporting 1000 user concurrency for wired, wireless or VPN networks users. Any additional operating system and database software should be quoted as per requirement 9 x 5, 3 Years Onsite/Parts/Labour Warranty	Nos.	1					
3.7	<b>Networking Monitoring Software- Supply, Installation, including to Configuration</b> NMS supporting 80 nodes management. Any additional operating system and database software should be quoted as per requirement.	Nos.	1					



Client : 	TENDER DOCUMENT FOR SUPPLY, INSTALLATION, TESTING & COMMISSIONING OF IT, COMMUNICATION, ACCESS CONTROL & SURVEILLANCE SYSTEM	nne pharmaplan®
Project No : 120310	DOCUMENT NO : NPI-120310-LVS-S1-TD-01	Revision : 02 Date : 2015-10-27


Sl. No.	DESCRIPTION OF WORK	UNIT	Total Qty.	SUPPLY		INSTALLATION		TOTAL AMOUNT
				UNIT RATE	AMOUNT	UNIT RATE	AMOUNT	
				Rs.	Rs.	Rs.	Rs.	Rs.
	9 x 5, 3 Years Onsite/Parts/Labour Warranty							
3.8	<b>Optical Module- Supply and Installation</b> Optical Module, SFP+, 10G, Single-Mode Module (1310 nm, 10 Km, LC). With - 9 x 5, 3 Years Onsite/Parts/Labour Warranty	Nos.	150					
3.9	<b>Optical Module- Supply and Installation</b> Optical Module, SFP+, 10G, Multi-Mode Module (850 nm, 300 mtr, LC). With- 9 x 5, 3 Years Onsite/Parts/Labour Warranty	Nos.	150					
3.10	Indoor Wireless Access Point Technical Specification : -TS Section :-4.15, Annex-1.	Nos.	25					
3.11	Radio Communication System: Point to Multipoint Base Station Radio Technical Specification : -TS Section :-4.15, Annex-1.	Nos.	2					
3.12	Radio Communication System: Point to Multipoint CPE and Point-to-Point Radio Technical Specification : -TS Section :-4.15, Annex-1.	Nos.	6					

Client : 	<b>TENDER DOCUMENT FOR SUPPLY, INSTALLATION, TESTING &amp; COMMISSIONING OF IT, COMMUNICATION, ACCESS CONTROL &amp; SURVEILLANCE SYSTEM</b>	nne pharmaplan®
Project No : 120310	<b>DOCUMENT NO : NPI-120310-LVS-S1-TD-01</b>	Revision : 02 Date : 2015-10-27

Sl. No.	DESCRIPTION OF WORK	UNIT	Total Qty.	SUPPLY		INSTALLATION		TOTAL AMOUNT
				UNIT RATE	AMOUNT	UNIT RATE	AMOUNT	
				Rs.	Rs.	Rs.	Rs.	Rs.
3.13	Note:- All the above Items to be supplied, Installed and Configured to meet the functional requirement of the Client and Putting in to successful operation							
<b>4</b>	<b>DISPLAY UNITS</b>							
4.1	SMART BOARD - Supply and Installation along with required Installtion Accessories. Technical Specification : -TS Section :-4.16, Annex-1.	Nos.	3					
4.2	LFD - Large Format Display for Training Hall (QA&QC) - Supply and Installation Size : 65 Inch Technical Specification : -TS Section :-4.16, Annex-1.	Nos.	1					
4.3	LFD - Large Format Display BMS Room (QA&QC) - Supply and Installation Size : 43 Inch (For CCTV) <b>Technical Specification : -TS Section :-4.16, Annex-1.</b>	Nos.	2					
4.4	LFD - Large Format Display at Reception (QA&QC) - Supply and Installation Size : 55 Inch (At Reception - General Display, Such as Company Info, HSE, etc) <b>Technical Specification : -TS Section :-4.16, Annex-1.</b>	Nos.	1					

Client : 	TENDER DOCUMENT FOR SUPPLY, INSTALLATION, TESTING & COMMISSIONING OF IT, COMMUNICATION, ACCESS CONTROL & SURVEILLANCE SYSTEM	nne pharmaplan®
Project No : 120310	DOCUMENT NO : NPI-120310-LVS-S1-TD-01	Revision : 02 Date : 2015-10-27


Sl. No.	DESCRIPTION OF WORK	UNIT	Total Qty.	SUPPLY		INSTALLATION		TOTAL AMOUNT
				UNIT RATE	AMOUNT	UNIT RATE	AMOUNT	
				Rs.	Rs.	Rs.	Rs.	Rs.
4.5	<b>LFD - Large Format Display</b> at Canteen - Supply and Installation Size : 43 Inch (At Canteen - General Display, Such as Company Info, HSE, etc) <b>Technical Specification : -TS Section :-4.16, Annex-1.</b>	Nos.	1					
4.6	<b>LFD - Large Format Display</b> at Security Office (Near Gates) - Supply and Installation Size : 43 Inch (At Security Office- General Display, CCTV, Display, Such as Company Info, HSE, etc) <b>Technical Specification : -TS Section :-4.16, Annex-1.</b>	Nos.	4					
4.6	<b>Note:- All the above Items to be supplied, Installed and Configured to meet the functional requirement of the Client and Putting in to successful operation</b>							
<b>5</b>	<b>PASSIVE COMPONENTS</b>							
5.1	<b>Single Mode Connectivity</b>	Nos.	5					
5.1.1	TeraSPEED® MPO (female) to MPO (female), InstaPATCH® 360 Pre-terminated Trunk Cable, 12-Fiber, Plenum, aqua jacket, standard breakout without gland, 15 m	Nos	8					
5.1.2	TeraSPEED® MPO (female) to MPO (female), InstaPATCH® 360 Pre-terminated Trunk Cable, 12-Fiber, Plenum, aqua jacket, standard breakout without gland, 15 m	Nos	8					

Client : 	<b>TENDER DOCUMENT FOR SUPPLY, INSTALLATION, TESTING &amp; COMMISSIONING OF IT, COMMUNICATION, ACCESS CONTROL &amp; SURVEILLANCE SYSTEM</b>  <b>DOCUMENT NO : NPI-120310-LVS-S1-TD-01</b>	nne pharmaplan®
Project No : 120310		Revision : 02 Date : 2015-10-27

Sl. No.	DESCRIPTION OF WORK	UNIT	Total Qty.	SUPPLY		INSTALLATION		TOTAL AMOUNT
				UNIT RATE	AMOUNT	UNIT RATE	AMOUNT	
				Rs.	Rs.	Rs.	Rs.	Rs.
5.1.3	SYSTIMAX 360™ MP-1U Panel, accepts four InstaPATCH® 360 data modules or 360DP panels with fiber management trough	Nos	4					
5.1.4	InstaPATCH® 360 TeraSPEED® Standard Module, 24 LC ports	Nos	16					
5.1.5	LC-LC Duplex Singlemode Patch Cord, 10Feet	Nos	192					
5.2	<b>Multimode Connectivity</b>							
5.2.1	LazrSPEED® 300 MPO (female) to MPO (female), InstaPATCH® 360 Pre-terminated Trunk Cable, 12-Fiber, Plenum, aqua jacket, standard breakout without gland, 12 m	Nos	2					
5.2.2	LazrSPEED® 300 MPO (female) to MPO (female), InstaPATCH® 360 Pre-terminated Trunk Cable, 12-Fiber, Plenum, aqua jacket, standard breakout without gland, 15 m	Nos	2					
5.2.3	LazrSPEED® 300 MPO (female) to MPO (female), InstaPATCH® 360 Pre-terminated Trunk Cable, 12-Fiber, Plenum, aqua jacket, standard breakout without gland, 12 m	Nos	5					

Client : 	<b>TENDER DOCUMENT FOR SUPPLY, INSTALLATION, TESTING &amp; COMMISSIONING OF IT, COMMUNICATION, ACCESS CONTROL &amp; SURVEILLANCE SYSTEM</b>  <b>DOCUMENT NO : NPI-120310-LVS-S1-TD-01</b>	nne pharmaplan®
Project No : 120310		Revision : 02 Date : 2015-10-27

Sl. No.	DESCRIPTION OF WORK	UNIT	Total Qty.	SUPPLY		INSTALLATION		TOTAL AMOUNT
				UNIT RATE	AMOUNT	UNIT RATE	AMOUNT	
				Rs.	Rs.	Rs.	Rs.	Rs.
5.2.4	LazrSPEED® 300 MPO (female) to MPO (female), InstaPATCH® 360 Pre-terminated Trunk Cable, 12-Fiber, Plenum, aqua jacket, standard breakout without gland, 15 m	Nos	5					
5.2.5	LazrSPEED® 300 MPO (female) to MPO (female), InstaPATCH® 360 Pre-terminated Trunk Cable, 12-Fiber, Plenum, aqua jacket, standard breakout without gland, 10 m	Nos	6					
5.2.6	SYSTIMAX 360™ MP-1U Panel, accepts four InstaPATCH® 360 data modules or 360DP panels with fiber management trough	Nos	7					
5.2.7	InstaPATCH® 360 LazrSPEED® Standard Module, 24 LC ports	Nos	19					
5.2.8	InstaPATCH® 360 LazrSPEED® Standard Module, 12 LC ports	Nos	2					
5.2.9	SYSTIMAX 360™ MP-1U Panel, accepts four InstaPATCH® 360 data modules or 360DP panels with fiber management trough	Nos	2					
5.2.10	LC-LC Duplex Multimode Patch Cord, 10Feet	Nos	240					

Client : 	<b>TENDER DOCUMENT FOR SUPPLY, INSTALLATION, TESTING &amp; COMMISSIONING OF IT, COMMUNICATION, ACCESS CONTROL &amp; SURVEILLANCE SYSTEM</b>  <b>DOCUMENT NO : NPI-120310-LVS-S1-TD-01</b>	nne pharmaplan®
Project No : 120310		Revision : 02 Date : 2015-10-27

Sl. No.	DESCRIPTION OF WORK	UNIT	Total Qty.	SUPPLY		INSTALLATION		TOTAL AMOUNT
				UNIT RATE	AMOUNT	UNIT RATE	AMOUNT	
				Rs.	Rs.	Rs.	Rs.	Rs.
5.3	<b>Cat6A Copper Connectivity (Horizontal Cabling - Cross Connect)</b>							
5.3.1	Commscope GigaSPEED® X10D RJ45-RJ45 Patch Cord(To be cut in 2Pieces, used as Single Ended RJ45 Patch cord)	Nos	72					
5.3.2	CommScope M2000 U/UTP Modular Panel 1U, 24 port	Nos	6					
5.3.3	GigaSPEED® X10D MGS600 Series Information Outlet, Gray for Patch panel	Nos	144					
5.3.4	Cat 6A-360-GS10E Patch Cords 7 ft,Gray	Nos	144					
5.3.5	Cat 6 Patch Cords 7 Ft, Yellow	Nos	140					
5.4	<b>Cat6A Copper Connectivity</b>							
5.4.1	GigaSPEED® X10D 1091B ETL Verified Category 6A U/UTP Cable, slate jacket, 4 pair count, 1000 ft (305 m) length, WE TOTE® box	Nos	7					
5.4.2	CommScope M2000 U/UTP Modular Panel 1U, 24 port	Nos	9					
5.4.3	GigaSPEED® X10D MGS600 Series Information Outlet, Gray for Patch panel	Nos	192					
5.4.4	Cat 6A-360-GS10E Patch Cords 7 ft,Gray	Nos	192					


Client : 	TENDER DOCUMENT FOR SUPPLY, INSTALLATION, TESTING & COMMISSIONING OF IT, COMMUNICATION, ACCESS CONTROL & SURVEILLANCE SYSTEM	nne pharmaplan®
Project No : 120310	DOCUMENT NO : NPI-120310-LVS-S1-TD-01	Revision : 02 Date : 2015-10-27

Sl. No.	DESCRIPTION OF WORK	UNIT	Total Qty.	SUPPLY		INSTALLATION		TOTAL AMOUNT
				UNIT RATE	AMOUNT	UNIT RATE	AMOUNT	
				Rs.	Rs.	Rs.	Rs.	Rs.
5.5	<b>Miscellaneous</b>							
5.5.1	50 Port Voice Resources Panel	Nos	12					
5.5.2	50 x 50 MDF with Mounting Strip	Nos	12					
5.5.3	Accessories such as cable tie, Velcro tie, ferrules, pipes, casing and any other needed to do the structured cabling.	Lot	1					
5.5.4	Installation, Testing and Handover of the structured cabling to suite HBL Requirement, industry standards and best practices.	Lot	1					
5.6	<b>Note:-</b> All the above Items to be supplied, Installed and Configured to meet the functional requirement of the Client and Putting in to successful operation. The Cable Conduit, Tray will be supplied and erected by others, Contractors shall make use of the conduits and Tray to lay and Terminate the cable accordingly.							
<b>6</b>	<b>IT AUXILIARY SYSTEM</b>							
6.1	<b>IP - KVM SWITCH</b> : Supply, Installation and Configuration including required installation accessories. <b>Technical Specification : -TS Section :-4.8, Annex-1.</b>	Nos.	2					


Client : 	TENDER DOCUMENT FOR SUPPLY, INSTALLATION, TESTING & COMMISSIONING OF IT, COMMUNICATION, ACCESS CONTROL & SURVEILLANCE SYSTEM	nne pharmaplan®
Project No : 120310	DOCUMENT NO : NPI-120310-LVS-S1-TD-01	Revision : 02 Date : 2015-10-27

Sl. No.	DESCRIPTION OF WORK	UNIT	Total Qty.	SUPPLY		INSTALLATION		TOTAL AMOUNT
				UNIT RATE	AMOUNT	UNIT RATE	AMOUNT	
				Rs.	Rs.	Rs.	Rs.	Rs.
6.2	<b>RACK MONITOR/CONSOLE</b> : Supply, Installation and Configuration including required installation accessories. Form Factor - 1U <b>Technical Specification : -TS Section :-4.8, Annex-1.</b>	Nos.	1					
6.3	<b>IP-PDU</b> : Supply, Installation and Configuration including required installation accessories. Technical Specification : -TS Section :-4.8, Annex-1.	Nos.	8					
6.4	Supply and installation of Server Rack :- Floor Mounting type 42U - Close Type <b>Technical Specification : -TS Section :-4.8, Annex-1.</b>	Nos.	1					
6.5	Supply and installation of Storage Rack :- Floor Mounting type 42U - Close Type <b>Technical Specification : -TS Section :-4.8, Annex-1.</b>	Nos.	1					




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Project No : 120310	DOCUMENT NO : NPI-120310-LVS-S1-TD-01	Revision : 02 Date : 2015-10-27

Sl. No.	DESCRIPTION OF WORK	UNIT	Total Qty.	SUPPLY		INSTALLATION		TOTAL AMOUNT
				UNIT RATE	AMOUNT	UNIT RATE	AMOUNT	
				Rs.	Rs.	Rs.	Rs.	Rs.
6.6	Supply and installation of Network Rack (Primary System) :- Floor Mounting type 42U w750 * d1070mm with 42U Glass door , along with above PDU, With required mounting Hardware. Cable entry Top or Botton (to suite Site Condition). Technical Specification : -TS Section :-XXXXXX. (Fiber Connectivity Shall be from Network Rack with LIU Units supplied by others. The Contactor shall terminate respective FO Patch Cords to supplied Active Devices or Components) <b>Technical Specification : -TS Section :-4.8, Annex-1.</b>	Nos.	1					
6.7	Supply and installation of Network Rack (Secondary System) :- Floor Mounting type 42U w750 * d1070mm with 42U Glass door , along with above PDU, With required mounting Hardware. Cable entry Top or Botton (to suite Site Condition). Technical Specification : -TS Section :-XXXXXX. (Fiber Connectivity Shall be from Network Rack with LIU Units supplied by others. The Contactor shall terminate respective FO Patch Cords to supplied Active Devices or Components) <b>Technical Specification : -TS Section :-4.8, Annex-1.</b>	Nos.	1					

Client : 	TENDER DOCUMENT FOR SUPPLY, INSTALLATION, TESTING & COMMISSIONING OF IT, COMMUNICATION, ACCESS CONTROL & SURVEILLANCE SYSTEM	nne pharmaplan®
Project No : 120310	DOCUMENT NO : NPI-120310-LVS-S1-TD-01	Revision : 02 Date : 2015-10-27


Sl. No.	DESCRIPTION OF WORK	UNIT	Total Qty.	SUPPLY		INSTALLATION		TOTAL AMOUNT
				UNIT RATE	AMOUNT	UNIT RATE	AMOUNT	
				Rs.	Rs.	Rs.	Rs.	Rs.
6.8	Power Cords, VGA Cables, DVI Cables, HDMI Cables, any other accessories to meet the requirements.	Mtr.	LOT					
6.9	<b>Note:-</b> All the above Items to be supplied, Installed and Configured to meet the functional requirement of the Client and Putting in to successful operation							
<b>7</b>	<b>PRINTERS</b>							
7.1	Supply and installation of Laserjet Multifunction Printer. <b>Technical Specification : -TS Section :-4.17, Annex-1.</b>	Nos.	4					
7.2	Supply and installation of Laserjet Multifunction Printer. <b>Technical Specification : -TS Section :-4.17, Annex-1.</b>	Nos.	10					
<b>8</b>	<b>SURVEILLANCE / CCTV SYSTEM</b>							
8.1	Supply, Installation, Testing & Commissioning of Fixed Dome Camera, Vari-focal 3-9 mm Remote Focus & Zoom , 3 Mega Pixel Resolution, H.264,True Day Night, support local storage with Sd card, PoE, DC12V/AC24V, ONVIF with all accessories like tamper proof screws, clamps, wiring etc. complete as required.Make :AXIS	Nos.	100					

Client : 	TENDER DOCUMENT FOR SUPPLY, INSTALLATION, TESTING & COMMISSIONING OF IT, COMMUNICATION, ACCESS CONTROL & SURVEILLANCE SYSTEM	nne pharmaplan®
Project No : 120310	DOCUMENT NO : NPI-120310-LVS-S1-TD-01	Revision : 02 Date : 2015-10-27


Sl. No.	DESCRIPTION OF WORK	UNIT	Total Qty.	SUPPLY		INSTALLATION		TOTAL AMOUNT
				UNIT RATE	AMOUNT	UNIT RATE	AMOUNT	
				Rs.	Rs.	Rs.	Rs.	Rs.
	/AVIGILON/PELCO Technical Specification : -TS Section :-2, Annex-4.							
8.2	Supply, Installation, Testing & Commissioning of Fixed Dome Camera, Vari-focal 9-22 mm Remote Focus & Zoom , 3 Mega Pixel Resolution, H.264,True Day Night, support local storage with Sd card, PoE, DC12V/AC24V, ONVIF with all accessories like tamper proof screws, clamps, wiring etc. complete as required. Make :AXIS /AVIGILON/PELCO <b>Technical Specification : -TS Section :-2, Annex-4.</b>	Nos.	45					
8.3	Supply, Installation, Testing & Commissioning of 2MP 25/20fps, True Day Night, HD Bullet Camera , Vari-focal 5 -50 mm Remote Focus & Zoom, H.264, PoE, DC12V/AC24V, ONVIF with all accessories like IP 66 rated Housing suitable for indoor application, brackets, tamper proof screws, clamps, wiring etc. complete as required. Make :AXIS /AVIGILON/PELCO <b>Technical Specification : -TS Section :-2, Annex-4.</b>	Nos.	17					
8.4	IP based PTZ Camera,20X Optical Zoom ,12X Digital Zoom for outdoor application including Power supply unit and other mounting accessories. The scope also includes to supply all requisite hardware to mount in all respect under the supervision of Engineer in-charge. Make :AXIS /AVIGILON/PELCO <b>Technical Specification : -TS Section :-2, Annex-4.</b>		8					

Client : 	TENDER DOCUMENT FOR SUPPLY, INSTALLATION, TESTING & COMMISSIONING OF IT, COMMUNICATION, ACCESS CONTROL & SURVEILLANCE SYSTEM	nne pharmaplan®
Project No : 120310	DOCUMENT NO : NPI-120310-LVS-S1-TD-01	Revision : 02 Date : 2015-10-27


Sl. No.	DESCRIPTION OF WORK	UNIT	Total Qty.	SUPPLY		INSTALLATION		TOTAL AMOUNT
				UNIT RATE	AMOUNT	UNIT RATE	AMOUNT	
				Rs.	Rs.	Rs.	Rs.	Rs.
8.5	Supply, Installation, Testing & Commissioning of Fixed Multisensor Dome Camera 3 Mega Pixel X 3 Sensor or higher, WDR, H.264, True Day Night, support local storage with SD card, PoE, DC12V/AC24V, ONVIF, UL, CE/EN/FCC Certified with all accessories like tamper proof screws, clamps, wiring etc. complete as required. 3 Years Warranty. Make : AXIS /AVIGILON/PELCO		1					
8.6	Video Management Server with Direct Attach Storage (Hardware) - To meet the functional requirement with 20% Additional Camera Integration <b>Technical Specification : -TS Section :-2, Annex-4.</b>	Nos.	Lot					
8.7	Video Management Server- License - Expand upto Virtually unlimited number of Cameras. Should support minimum of 140 number of Cameras. Shall be ;licensed to support unlimited Client's. <b>Technical Specification : -TS Section :-2, Annex-4.</b>	Mtr.	Lot					
8.8	VMS Software Make :AXIS /AVIGILON/PELCO <b>As per Technical Specification : -TS Section :-2, Annex-4.</b>	Lot	1					

Client : 	TENDER DOCUMENT FOR SUPPLY, INSTALLATION, TESTING & COMMISSIONING OF IT, COMMUNICATION, ACCESS CONTROL & SURVEILLANCE SYSTEM	nne pharmaplan®
Project No : 120310	DOCUMENT NO : NPI-120310-LVS-S1-TD-01	Revision : 02 Date : 2015-10-27

Sl. No.	DESCRIPTION OF WORK	UNIT	Total Qty.	SUPPLY		INSTALLATION		TOTAL AMOUNT
				UNIT RATE	AMOUNT	UNIT RATE	AMOUNT	
				Rs.	Rs.	Rs.	Rs.	Rs.
8.9	Network Video Recorder Server- License - Should support minimum of 128 number of Cameras. Support 30 days Storage, RAID5 Storage to optimize reliability. <b>Technical Specification : -TS Section :-2, Annex-4.</b>	Lot	1					
8.10	<b>Note:-All the above Items to be supplied, Installed and Configured to meet the functional requirement of the Client and Putting in to successful operation . For monitoring Work Station and Display Unit , Contractor shall refer above.</b>							
<b>9</b>	<b>VoIP and Digital TelePhone System</b>							
9.1	Unified Voice Gateway <b>Technical Specification : -TS Section :-4, Annex-2.</b>	Nos.	2					
9.2	Integrated Access Device User Port 32 FXS <b>Technical Specification : -TS Section :-4, Annex-2.</b>	Nos.	17					
9.3	Digital Telephone <b>Technical Specification : -TS Section :-4, Annex-2.</b>	Nos.	300					
9.4	Operator VoIP Phone with Expansion module <b>Technical Specification : -TS Section :-4, Annex-2.</b>	Nos.	1					
9.5	User VoIP Phone <b>Technical Specification : -TS Section :-4, Annex-2.</b>	Nos.	220					

Client : 	TENDER DOCUMENT FOR SUPPLY, INSTALLATION, TESTING & COMMISSIONING OF IT, COMMUNICATION, ACCESS CONTROL & SURVEILLANCE SYSTEM	nne pharmaplan®
Project No : 120310	DOCUMENT NO : NPI-120310-LVS-S1-TD-01	Revision : 02 Date : 2015-10-27

Sl. No.	DESCRIPTION OF WORK	UNIT	Total Qty.	SUPPLY		INSTALLATION		TOTAL AMOUNT
				UNIT RATE	AMOUNT	UNIT RATE	AMOUNT	
				Rs.	Rs.	Rs.	Rs.	Rs.
9.6	<b>Note:-</b> All the above Items to be supplied, Installed and Configured to meet the functional requirement of the Client and Putting in to successful operation . For IAD units, Contractor shall supply required number of MDF Units, JackPanel and its connecting cable and accessories. Patch Panel to End devices Telephone units cabling, Lying and End Termination will be provided by others. From IAD to respective Switches, MDFs, Jack Panel and Jack Panel to Patch Panel, Cable Lying, End Termination in in the scope of Contractor							
<b>10</b>	<b>ACCESS CONTROL AND SECURITY SYSTEM</b>							
10.1	Visitor Management System Software <b>Technical Specification : -TS Section :-3, Annex-3.</b>	Nos.	1					
10.2	Access Control and Time Attendance Application Software <b>Technical Specification : -TS Section :-6, Annex-3.</b>	Nos.	1					
10.3	High performance Access controller <b>Technical Specification : -TS Section :-6, Annex-3.</b>	Nos.	4					
10.4	UHF Reader <b>Technical Specification : -TS Section :-6, Annex-3.</b>	Nos.	8					
10.5	BOOM BARRIER <b>Technical Specification : -TS Section :-6, Annex-3.</b>	Nos.	8					


Client : 	TENDER DOCUMENT FOR SUPPLY, INSTALLATION, TESTING & COMMISSIONING OF IT, COMMUNICATION, ACCESS CONTROL & SURVEILLANCE SYSTEM	nne pharmaplan®
Project No : 120310	DOCUMENT NO : NPI-120310-LVS-S1-TD-01	Revision : 02 Date : 2015-10-27

Sl. No.	DESCRIPTION OF WORK	UNIT	Total Qty.	SUPPLY		INSTALLATION		TOTAL AMOUNT
				UNIT RATE	AMOUNT	UNIT RATE	AMOUNT	
				Rs.	Rs.	Rs.	Rs.	Rs.
10.6	Tripod <b>Technical Specification : -TS Section :-6, Annex-3.</b>	Nos.	2					
10.7	Networked Access controller for Finger Print Reader, Proximity Card Reader, Keypad Access, with 8/12 supervised inputs (Pushbutton, Emergency Break Glass, etc.) 2 Nos of Relay Input/Output (FAS & Door Interlock) and 4 Nos of relay outputs (EM locks, etc.) for easy and reliable interface with the 3rd party systems. Complete with in built Digital Power supply (12V/24V SMPS DC Power Supply) etc. as required. <b>Technical Specification : -TS Section :-6, Annex-3.</b>	Nos	52					
10.8	Supply, Installation, Testing and commissioning of Finger Print Readers .(Entry Level and Exit Level ) <b>Technical Specification : -TS Section :-6, Annex-3.</b>	Nos	5					
10.9	Supply, Installation, Testing and commissioning of Proximity Card Readers.(Entry Level and Exit Level ) <b>Technical Specification : -TS Section :-6, Annex-3.</b>	Nos	90					
10.10	Supply, Installation, Testing and commissioning of Keypad Type Access Control.(Entry Level and Exit Level ) <b>Technical Specification : -TS Section :-6, Annex-3.</b>	Nos	50					
10.11	Supplying & laying of 8 core x 1.0 Sqmm PVC insulated/FRLS shielded copper conductor cable ( in PVC conduit / on Cable Tray) , PVC conduit supply , installation and commission along with suitable PVC Cable gland at each termination in the scope of this contractor.	Mtr.	7,000					


Client : 	<b>TENDER DOCUMENT FOR SUPPLY, INSTALLATION, TESTING &amp; COMMISSIONING OF IT, COMMUNICATION, ACCESS CONTROL &amp; SURVEILLANCE SYSTEM</b>	nne pharmaplan®
Project No : 120310	<b>DOCUMENT NO : NPI-120310-LVS-S1-TD-01</b>	Revision : 02 Date : 2015-10-27

Sl. No.	DESCRIPTION OF WORK	UNIT	Total Qty.	SUPPLY		INSTALLATION		TOTAL AMOUNT
				UNIT RATE	AMOUNT	UNIT RATE	AMOUNT	
				Rs.	Rs.	Rs.	Rs.	Rs.
10.12	Supplying & Installation (2Cx1.5 sq.mm) PVC insulated/FRLS shielded copper conductor cable for Push Button Station and Emergency Break Glass Unit (Fail Safe Mode) along with suitable PVC Cable gland at each termination. Cable will be laid on Cable Tray and Conduit. Conduit is in the scope of this Contractor, However Cable Tray will be a third party supply to this contractor	Mtr.	4,200					
10.13	Supplying & Installation (4Cx1.5 sq.mm) PVC insulated/FRLS shielded copper conductor cable for Magnetic locks (Heavy Duty) along with suitable PVC Cable gland at each termination . Cable will be laid on Cable Tray and Conduit. Conduit is in the scope of this Contractor, However Cable Tray will be a third party supply to this contractor	Mtr.	3,300					
10.14	Supplying & Installation (2Cx0.5 sq.mm) PVC insulated/FRLS shielded copper conductor cable for Door Interlocking System along with suitable PVC Cable gland at each termination . Cable will be laid on Cable Tray and Conduit. Conduit is in the scope of this Contractor,	Mtr.	2,500					
10.15	Supply, Installation, Testing and commissioning of Push Buttons (For Clean Rooms, It shall be with back box, SS Mounting Plates)	Nos.	45					




Client : 	TENDER DOCUMENT FOR SUPPLY, INSTALLATION, TESTING & COMMISSIONING OF IT, COMMUNICATION, ACCESS CONTROL & SURVEILLANCE SYSTEM	nne pharmaplan®
Project No : 120310	DOCUMENT NO : NPI-120310-LVS-S1-TD-01	Revision : 02 Date : 2015-10-27

Sl. No.	DESCRIPTION OF WORK	UNIT	Total Qty.	SUPPLY		INSTALLATION		TOTAL AMOUNT
				UNIT RATE	AMOUNT	UNIT RATE	AMOUNT	
				Rs.	Rs.	Rs.	Rs.	Rs.
10.16	Emergency break glass unit (Each emergency door shall be provided with Emergency Break glass unit ) along with supply, installation , erection & commissioning. (For Clean Rooms, It shall be with back box, SS Mounting Plates- Clean Rooms, it shall be Emergency Pushbutton Unit)		25					
10.17	Supply, Installation, Testing and commissioning of High performance Static Electro Magnetic Lock, Fail safe, Mounting support, L-Z / L-U brackets (Exquisite finish- Imported) for installation of Lock on Glass/Wooded door & 600 LBS force Single side in following sizes.							
10.17.1	Single Door Magnetic Lock <b>Technical Specification : -TS Section :-6, Annex-3.</b>	Nos.	3					
10.17.2	Single Door Magnetic Lock <b>Technical Specification : -TS Section :-6, Annex-3.</b>	Nos.	17					
10.18	<b>Note:-</b> All the above Items to be supplied, Installed and Configured to meet the functional requirement of the Client and Putting in to successful operation . Contractor shall lay Weigand Cable, Signal Cable, Power Cable (For Locks) through the avilable Cable Tray and Conduit at Site. However, Minor Civil Works, Backfilling, along with Mounting Accessories for Access Controller, Tripod, Boom Barrier, Readers,							


Client : 	TENDER DOCUMENT FOR SUPPLY, INSTALLATION, TESTING & COMMISSIONING OF IT, COMMUNICATION, ACCESS CONTROL & SURVEILLANCE SYSTEM	nne pharmaplan®
Project No : 120310	DOCUMENT NO : NPI-120310-LVS-S1-TD-01	Revision : 02 Date : 2015-10-27

Sl. No.	DESCRIPTION OF WORK	UNIT	Total Qty.	SUPPLY		INSTALLATION		TOTAL AMOUNT
				UNIT RATE	AMOUNT	UNIT RATE	AMOUNT	
				Rs.	Rs.	Rs.	Rs.	Rs.
	Magnetic Locks,, etc are in the scope of this Contractor							
11	UPS SYSTEM							
11.1	10 KVA Online UPS Technical Specification : -TS Section , Annex-5.	Nos.	2					
12	ANY OTHER ITEMS REQUIRE FOR INSTALLATION AND EXECUTION OF ABOVE SAID ALL ITEMS TO MEET THE FUNCTIONAL REQUIREMENT	LOT						

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<b>Project No : 120310</b>		<b>Revision : 02 Date : 2015-10-31</b>

## CHAPTER– 2.8


### LIST OF DRAWINGS

<b>Client :</b> 	<b>TENDER DOCUMENT FOR SUPPLY, INSTALLATION, TESTING &amp; COMMISSIONING OF IT, COMMUNICATION, ACCESS CONTROL &amp; SURVEILLANCE SYSTEM</b>	<b>nne pharmaplan®</b>
<b>Project No : 120310</b>		<b>Revision : 02</b> <b>Date : 2015-10-31</b>

#### LIST OF DRAWINGS



Sl. No.	Title	Drawing No.	Rev.
<b>Standard Drawings:</b>			
1	NETWORKING AND IT SYSTEM ARCHITECTURE	NPI/120310/LVS/DET/S1/001	01
2	TELEPHONE COMMUNICATION SYSTEM ARCHITECTURE	NPI/120310/LVS/DET/S1/002	01
3	ACCESS CONTROL AND SECURITY SYSTEM ARCHITECTURE	NPI/120310/LVS/DET/S1/003	01
4	SURVEILLANCE AND CCTV SYSTEM ARCHITECTURE	NPI/120310/LVS/DET/S1/004	01

**PROVIDED AS ANNEXURE TO THE TENDER DOCUMENT**

<b>Client :</b> 	<b>TENDER DOCUMENT FOR SUPPLY, INSTALLATION, TESTING &amp; COMMISSIONING OF IT, COMMUNICATION, ACCESS CONTROL &amp; SURVEILLANCE SYSTEM</b>	<b>nne pharmaplan®</b>
<b>Project No : 120310</b>		<b>Revision : 02 Date : 2015-10-31</b>



## CHAPTER – 2.9

### LIST OF APPROVED MAKES

<b>Client :</b> 	<b>TENDER DOCUMENT FOR SUPPLY, INSTALLATION, TESTING &amp; COMMISSIONING OF IT, COMMUNICATION, ACCESS CONTROL &amp; SURVEILLANCE SYSTEM</b>	
<b>Project No : 120310</b>		<b>Revision : 02</b> <b>Date : 2015-10-31</b>

**LIST OF APPROVED MAKE FOR MATERIALS**


S No.	Description	Recommended List of makes		
1.	PC- SERVER	HP	DELL	HUAWEI
2.	THIN CLIENT / WORKSTATION / DESKTOP	HP	DELL	
3.	STORAGE DEVICE	HP	DELL	HUAWEI
4.	BACKUP DEVICE	HP	DELL	HUAWEI
5.	TAPEDRIVE	QUANTUM	HP	TANDBERG
6.	FIREWALL	FORTINET	CHECKPOINT	PALO ALTO
7.	ADC	RADWARE	CITRIX	F5
8.	KVM SWITCH-IP	RARITAN	APC	AVOCENT
9.	IP-PDU	RARITAN	APC	AVOCENT
10.	CONSOLE	RARITAN	APC	AVOCENT
11.	RACK	APC	RITTAL	PANDIUT
12.	CORE & EDGE SWITCHES / OPTICAL MODULE & INDOOR ACCESS POINTS	CISCO	JUNIPER	HUAWEI
13.	AUTHENTICATION APPLICATION/ NETWORK MONITORING SOFTWARE	CISCO	JUNIPER	HUAWEI
14.	RADIO WIRELESS BASE AND POINT STATION	CAMBIUM	MOTOROLA	RUCKUS
15.	LARGE FORMAT DISPLAY (LFD)	PANASONIC	SAMSUNG	LG
16.	PASSIVE COMPONENTS	SYSTIMAX	EQUIVALENT	
17.	MASERJECT MFM & A4 PRINTERS	HP	CANON	KONICA MINOLTA
18.	TELEPHONE SYSTEM – GATEWAY , IAD, VoIP PHONE	CISCO	AVAYA	HUAWEI
19.	DIGITAL PHONES	PANASONIC	SIEMENS	NEC
20.	LFD	SAMSUNG	LG	PANASONIC
21.	SMART BOARD	SMARTBOARD	LG	PANASONIC
22.	CCTV IP CAMERAS	AXIS	AVIGILON	PELCO
23.	NVR	AXIS / AVIGILON / PELCO / HP/ HUAWEI		

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<b>Project No : 120310</b>		<b>Revision : 02</b> <b>Date : 2015-10-31</b>

S No.	Description	Recommended List of makes		
24.	VMS SERVER HARDWARE	AXIS / AVIGILON / PELCO / HP/ HUAWEI		
25.	VMS SOFTWARE	AXIS / AVIGILON / PELCO / MILESTONE/ EQUIVALENT		
26.	ACCESS CONTROL SYSTEM	HID	EQUIVALENT	
27.	TRIPOD	MAGNETIC AUTO CONTROL	EQUIVALENT	
28.	BOOM BARRIER	MAGNETIC AUTO CONTROL	EQUIVALENT	
29.	ELECTRO MAGNETIC LOCK AND MAGNETIC CONTACT	EBELCO	EQUIVALENT	
30.	E-MAIL SOFTWARE	MICROSOFT EXCHANGE	ICEWARP	
31.	VIRTUALISATION SOFTWARE	CITRIX		
32.	PRODUCTIVITY SOFTWARES	MICROSOFT		
33.	OPERATING SYSTEM	MICROSOFT		
34.	BACKUP SOFTWARE	HP DATA PRTECTOR	COMMVault	
35.	ANTIVIRUS	SYMANTEC		
36.	UPS	NUMERIC	APC	

# **1 Important: -**


1. Please Tick (♦) the make of material considered in tender.
2. Detail submittals in the form of catalogues specification sheets, and samples wherever called for, shall be submitted within one week from the date of order and approvals shall be obtained on the type of accepted make before procurement is made.
3. Out of the approved makes of materials mentioned above, the make of materials to be used on the work shall be as decided by the Consultant/Employer jointly.
4. In respect of materials for which approved makes are not specified above, these will be of makes to be decided by the consultant and as per sample approved before procurement.
5. Equipments approved and supplied shall have local servicing facilities available in the region.

<b>Client :</b> 	<b>TENDER DOCUMENT FOR SUPPLY, INSTALLATION, TESTING &amp; COMMISSIONING OF IT, COMMUNICATION, ACCESS CONTROL &amp; SURVEILLANCE SYSTEM</b>	<b>nne pharmaplan®</b>
<b>Project No : 120310</b>	<b>DOCUMENT NO : NPI-120310-LVS-S1-TD-01</b>	<b>Revision : 02 Date : 2015-10-31</b>

## CHAPTER 3.1

# GENERAL CONDITIONS OF CONTRACT



<b>Client :</b> 	<b>TENDER DOCUMENT FOR SUPPLY, INSTALLATION, TESTING &amp; COMMISSIONING OF IT, COMMUNICATION, ACCESS CONTROL &amp; SURVEILLANCE SYSTEM</b>	<b>nne pharmaplan®</b>
<b>Project No : 120310</b>	<b>DOCUMENT NO : NPI-120310-LVS-S1-TD-01</b>	<b>Revision : 02 Date : 2015-10-31</b>

## CONTENTS

### 1. THE CONTRACT

- 1.1 Definitions
- 1.2 Headings and Marginal Notes
- 1.3 Interpretation
- 1.4 Law and Language
- 1.5 Contract Agreement
- 1.6 Priority of Documents
- 1.7 Documents on Site
- 1.8 Communications
- 1.9 Provision of Construction Documents
- 1.10 Employer's use of contractor's Documents
- 1.11 Contractor's Use of Employer's documents
- 1.12 Confidential details
- 1.13 Compliance with Statutes, regulations and Laws
- 1.14 Joint and several Liability

### 2. THE EMPLOYER

- 2.1 General Obligations
- 2.2 Access to and Possession of the Site
- 2.3 Permits, Licences or Approvals
- 2.4 Employer's Entitlement to terminate

### 3. THE EMPLOYER'S REPRESENTATIVE


- 3.1 Employer's Representative's Duties and Authority
- 3.2 Requirements for Employer's Representative
- 3.3 Employer's Representative's Authority to Delegate
- 3.4 Employer's Representative's Instructions
- 3.5 Employer's Representative to attempt Agreement

### 4. THE CONTRACTOR

- 4.1 General Obligations
- 4.2 Performance Security
- 4.3 Contractor's Representative
- 4.4 Co-ordination of the Works
- 4.5 Subcontractors
- 4.6 Assignment of Subcontractor's Obligations
- 4.7 Setting Out
- 4.8 Quality Assurance
- 4.9 Site Data
- 4.10 Matters Affecting the Execution of the Works
- 4.11 Unforeseeable Sub-Surface Conditions
- 4.12 Access Route
- 4.13 Rights of Way and facilities
- 4.14 Programme
- 4.15 Progress Reports
- 4.16 Contractor's Equipment
- 4.17 Safety Precautions
- 4.18 Protection of the Environment
- 4.19 Electricity, Water and Gas
- 4.20 Employer Supplied Machinery and Materials
- 4.21 Clearance of Site
- 4.22 Security of the Site
- 4.23 Contractor's Operations on site

### 5. DESIGN

- 5.1 General Obligations

<b>Client :</b> 	<b>TENDER DOCUMENT FOR SUPPLY, INSTALLATION, TESTING &amp; COMMISSIONING OF IT, COMMUNICATION, ACCESS CONTROL &amp; SURVEILLANCE SYSTEM</b>	<b>nne pharmaplan®</b>
<b>Project No : 120310</b>		<b>Revision : 02 Date : 2015-10-31</b>

- 5.2 Construction Documents
- 5.3 Contractor's Undertaking
- 5.4 Technical Standards and Regulations
- 5.5 Samples
- 5.6 As-Built Drawings
- 5.7 Operation and Maintenance Manuals
- 5.8 Error by Contractor
- 5.9 Patent Rights

## 6. STAFF AND LABOUR

- 6.1 Engagement of Staff and Labour
- 6.2 Rates of Wages and Conditions of Labour
- 6.3 Persons in the Service of Others
- 6.4 Labour Laws
- 6.5 Working Hours
- 6.6 Facilities for Staff and Labour
- 6.7 Health and Safety
- 6.8 Contractor's Superintendence
- 6.9 Contractor's Personnel
- 6.10 Disorderly Conduct

## 7. PLANT, MATERIALS AND WORKMANSHIP

- 7.1 Manner of Execution
- 7.2 Delivery to site
- 7.3 Inspection
- 7.4 Testing
- 7.5 Rejection
- 7.6 Employership of Plant and Materials

## 8. COMMENCEMENT, DELAYS AND SUSPENSION

- 8.1 Commencement of Works
- 8.2 Time for Completion
- 8.3 Extension of Time for Completion
- 8.4 Delays Caused by Authorities
- 8.5 Rate of Progress
- 8.6 Liquidated Damages for Delay
- 8.7 Suspension of Work
- 8.8 Consequences of suspension
- 8.9 Payment for Plant and Materials in Event of Suspension
- 8.10 Prolonged Suspension
- 8.11 Resumption of Work

## 9. TESTS ON COMPLETION


- 9.1 Contractor's Obligations
- 9.2 Delayed Tests
- 9.3 Retesting
- 9.4 Failure to Pass Tests on Completion

## 10. EMPLOYER'S TAKING OVER

- 10.1 Taking-Over certificate
- 10.2 Use by the Employer
- 10.3 Interference with Tests on Completion

## 11. PERFORMANCE TESTS

- 11.1 Employer's Obligations
- 11.2 Delayed Tests
- 11.3 Retesting

<b>Client :</b> 	<b>TENDER DOCUMENT FOR SUPPLY, INSTALLATION, TESTING &amp; COMMISSIONING OF IT, COMMUNICATION, ACCESS CONTROL &amp; SURVEILLANCE SYSTEM</b>	<b>nne pharmaplan®</b>
<b>Project No : 120310</b>		<b>Revision : 02 Date : 2015-10-31</b>

#### 11.4 Failure to Pass Performance Tests

### 12. DEFECTS LIABILITY

- 12.1 Completion of Outstanding Work and Remedying defects
- 12.2 Cost of remedying Defects
- 12.3 Extension of Contract Period
- 12.4 Failure to remedy Defects
- 12.5 Removal of Defective Work
- 12.6 Further Tests
- 12.7 Right of Access
- 12.8 Contractor to search
- 12.9 Performance Certificate
- 12.10 Unfulfilled Obligations

### 13. CONTRACT PRICE AND PAYMENT

- 13.1 The Contract Price
- 13.2 Advance Payments
- 13.3 Application for Interim Payment certificates
- 13.4 Schedule of Payments
- 13.5 Plant and Materials for the Permanent Works
- 13.6 Issue of Interim Payment Certificate
- 13.7 Payment
- 13.8 Delayed Payment
- 13.9 DELETED
- 13.10 Statement at Completion
- 13.11 Application for Final Payment Certificate
- 13.12 Discharge
- 13.13 Issue of Final Payment Certificate
- 13.14 Cessation of Employer's Liability
- 13.15 Calculation of Payments in Foreign Currency
- 13.16 Changes in Legislation

### 14. VARIATIONS

- 14.1 Right to vary
- 14.2 Value Engineering
- 14.3 Variation Procedure
- 14.4 Payment in Applicable Currencies
- 14.5 Provisional Sums

### 15. DEFAULT OF CONTRACTOR


- 15.1 Notice to Correct
- 15.2 Termination
- 15.3 Valuation at Date of Termination
- 15.4 Payment after Termination
- 15.5 Bribes

### 16. DEFAULT OF EMPLOYER

- 16.1 Contractor's Entitlement to Suspend work
- 16.2 Termination
- 16.3 Cessation of Work and Removal of Contractor's equipment
- 16.4 Payment on Termination

### 17. RISK AND RESPONSIBILITY

- 17.1 Indemnity
- 17.2 Contractor's Care of the Works
- 17.3 Employer's Risks
- 17.4 Consequences of Employer's Risks

<b>Client :</b> 	<b>TENDER DOCUMENT FOR SUPPLY, INSTALLATION, TESTING &amp; COMMISSIONING OF IT, COMMUNICATION, ACCESS CONTROL &amp; SURVEILLANCE SYSTEM</b>	<b>nne pharmaplan®</b>
<b>Project No : 120310</b>		<b>Revision : 02</b> <b>Date : 2015-10-31</b>

#### 17.5 Contractor's Risks

### 18. INSURANCE



- 18.1 Insurance for Design
- 18.2 Insurance for Works and Contractor's Equipment
- 18.3 Insurance against Injury to Persons and Damage to Property
- 18.4 Insurance for Workers
- 18.5 General Requirements for Insurance's

### 19. FORCE MAJEURE

- 19.1 Definition of Force Majeure
- 19.2 Effect of Force Majeure event
- 19.3 Contractor's Responsibility
- 19.4 Employer's Responsibility
- 19.5 Payment to Contractor
- 19.6 Optional Termination, Payment and Release
- 19.7 Release from Performance under the Law

### 20. CLAIMS, DISPUTES AND ARBITRATION

- 20.1 Procedure for Claims
- 20.2 Payment of claims
- 20.3 Expert
- 20.4 Procedure for Obtaining Expert's Decision
- 20.5 Amicable Settlement
- 20.6 Arbitration
- 20.7 Failure to Comply with Expert's decision
- 20.8 Expiry of Expert's appointment

Client : 	<b>TENDER DOCUMENT FOR SUPPLY, INSTALLATION, TESTING &amp; COMMISSIONING OF IT, COMMUNICATION, ACCESS CONTROL &amp; SURVEILLANCE SYSTEM</b>	
<b>Project No : 120310</b>		<b>Revision : 02</b> <b>Date : 2015-10-31</b>

## GENERAL CONDITIONS

### 1 The Contract

#### 1.1 Definitions



In the Contract the words and expressions defined below shall have the meanings assigned to them, except where the context requires otherwise:

##### 1.1.1 Documents

- 1.1.1.1 “Contract means these Conditions of Contract (Parts I and II), the Employer’s Requirements, the Tender, the Contractor’s Proposal, the Schedules, the Letter of Acceptance, the Contract Agreement (if completed) and such further documents as may be expressly incorporated in the Letter of Acceptance or Contract Agreement (if completed).
- 1.1.1.2 “Employer’s Requirements” means the description of the scope, standard, design criteria (if any) and programme of work as issued by the Employer and included in the Contract, and any Variations thereto.
- 1.1.1.3 “Tender” means the Contractor’s priced offer to the Employer for the works, as accepted by the Letter of Acceptance.
- 1.1.1.4 Deleted
- 1.1.1.5 “Contractor’s Proposal” means the preliminary design submitted by the Contractor with his Tender and included in the Contract.
- 1.1.1.6 “Schedules” means the information and data submitted by the Contractor with his Tender and included in the Contract.
- 1.1.1.7 “Schedule of Payments” means the Schedule designated as such (if any), referred to in Sub-Clause 13.4.
- 1.1.1.8 “Letter of Acceptance” means the formal acceptance by the Employer of the Tender.
- 1.1.1.9 “Contract Agreement” means the contract agreement (if any) referred to in Sub-Clause 1.5.

##### 1.1.2 Persons

- 1.1.2.1 “Employer” means the person named as such in the Special conditions of contract and the legal successors in title to such person, but not (except with the consent of the Contractor) any assignee of such person.
- 1.1.2.2 “Contractor” means the person who’s Tender has been accepted by the employer and the legal successors in title to such person, but not (except with the consent of the Employer) any assignee of such person.
- 1.1.2.3 “Employer’s Representative” means the person appointed by the Employer to act as Employer’s Representative for the purposes of the Contract and named as such in the Special conditions of contract, or other person appointed from time to time by the Employer and notified as such to the Contractor.
- 1.1.2.4 “Contractor’s Representative” means the person (if any) named as such in the Contract or other person appointed from time to time by the Contractor under Sub-Clause 4.3.
- 1.1.2.5 “Subcontractor” means any person named in the Contract as a subcontractor, manufacturer or supplier for a part of the Works or any person to whom a part of the Works has been subcontracted in accordance with sub-Clause 4.5, and the legal successors in title to such person, but not any assignee of such person.

Client : 	<b>TENDER DOCUMENT FOR SUPPLY, INSTALLATION, TESTING &amp; COMMISSIONING OF IT, COMMUNICATION, ACCESS CONTROL &amp; SURVEILLANCE SYSTEM</b>	
<b>Project No : 120310</b>		<b>Revision : 02 Date : 2015-10-31</b>

1.1.2.6 “Expert” means the person mutually agreed upon by the Employer and the Contractor and named as such in the Contract or other person appointed from time to time under Sub-Clause 20.3.

1.1.2.7 “Purchaser” means the ultimate end user.

1.1.2.8 “Consultant” means engineering consultant appointed by the employer.

### **1.1.3 Dates, Times and periods**

1.1.3.1 “Effective date” means the date on which the Contract entered into legal force and effect...

1.1.3.2 “Commencement Date” means the date on which the Contractor receives the notice to commence issued by the Employer’s Representative under Sub-Clause 8.1.

1.1.3.3 “Time for Completion” means the time for completing the execution of, and passing the Tests on completion of, the Works or a Section (as the case may be), as stated in the Special conditions of contract (or as extended under Sub-Clause 8.3) calculated from the Commencement Date.

1.1.3.4 **“Defects Liability Period** “means the period 365 days after the date on which the whole of the Works shall have been completed as certified by the Engineer in Charge under Clause 10 (or as extended under Sub-Clause 12).

1.1.3.5 “Day” means a calendar day and “year” means 365 days.

### **1.1.4 Tests and Completion**

1.1.4.1 “Tests on Completion” means the tests specified in the Contract and designated as such, and any other such tests as may be agreed by the Employer’s representative and the Contractor or instructed as a Variation, which are to be carried out before the Works or any section are taken over by the Employer.

1.1.4.2 “Taking-over certificate” means a certificate issued Clause 10.

1.1.4.3 “Performance Tests” means the tests specified in the Contract and designated as such, which are to be carried out to verify that the works fulfil the performance requirements of the Contract.

1.1.4.4 “Performance Certificate” means the certificate issued by the Employer’s representative under Sub-Clause 12.9.

### **1.1.5 Money and Payments**



1.1.5.1 “Contract Price” means the sum stated in the Letter of acceptance as payable to the Contractor for the design, execution and completion of the works and the remedying of any defects in accordance with the provisions of the contract.

1.1.5.2 “Local Currency” means the currency of the Country.i.e, INR

1.1.5.3 “Foreign Currency” means a freely convertible currency, named in the Special conditions of contract as a currency in which part of the Contract Price is payable, but not the Local Currency.

1.1.5.4 “Retention Money” means the accumulated retention monies retained by the employer under Sub-Clause 13.2.

1.1.5.5 “Provisional Sum “ means a sum (if any) specified in the contract and designated as such, for the execution of any part of the works or for the supply of Plant, Materials, or services.

<b>Client :</b> 	<b>TENDER DOCUMENT FOR SUPPLY, INSTALLATION, TESTING &amp; COMMISSIONING OF IT, COMMUNICATION, ACCESS CONTROL &amp; SURVEILLANCE SYSTEM</b>	
<b>Project No : 120310</b>	<b>DOCUMENT NO : NPI-120310-LVS-S1-TD-01</b>	<b>Revision : 02</b> <b>Date : 2015-10-31</b>

- 1.1.5.6 “Cost” means all expenditure properly incurred (or to be incurred) by the Contractor, whether on or off the site, including overhead and similar charges, but does not include profit.
- 1.1.5.7 “Interim Payment Certificate” means any payment certificate issued by the employer’s representative under Clause 13, other than the Final Payment Certificate.
- 1.1.5.8 “Final payment Certificate” means the payment certificate issued by the Employer’s Representative under sub-Clause 13.13.
- 1.1.5.9 “Final Statement” means the agreed statement defined in Sub-Clause 13.11.

#### **1.1.6 Other Definitions**



- 1.1.6.1 “Construction Documents” means all drawings, calculations, computer software (programs), samples, patterns, models, operation and maintenance manuals, and other manuals and information of a similar nature, submitted by the Contractor and approved by the employer’s Representative.
- 1.1.6.2 “Variation” means any alteration and/or modification to the works, which is instructed by the Employer’s Representative or approved as a variation by the Employer’s representative, in accordance with Clause 14.
- 1.1.6.3 “Works” means the Permanent works and the temporary works or either of them as appropriate.
- 1.1.6.4 “Permanent works,” means the permanent works to be designed and executed in accordance with the Contract.
- 1.1.6.5 “Temporary Works” means all temporary works of every kind (other than Contractor’s Equipment) required for the execution and completion of the Works and the remedying of any defects.
- 1.1.6.6 “Plant” means machinery and apparatus intended to form or forming part of the Permanent Works, including the supply-only items (if any), which are to be supplied by the Contractor as specified in the contract.
- 1.1.6.7 “Materials” means things of all kinds (other than Plant) to be provided and incorporated in the Permanent Works by the Contractor, including the supply-only items (if any), which are to be supplied by the Contractor as specified in the Contract.
- 1.1.6.8 “Contractor’s Equipment” means all machinery, apparatus and other things (other than Temporary Works) required for the execution and completion of the Works and the remedying of any defects, but does not include Plant, Materials, or other things intended to form or forming part of the Permanent works.
- 1.1.6.9 “Section” means a part of the Works specifically defined in the Special conditions of contract as a Section (if any).
- 1.1.6.10 “Site” means the places provided by the Employer where the works are to be executed and to which Plant and Materials are to be delivered and any other places as may be specifically designated in the Contract as forming part of the Site.
- 1.1.6.11 “Country” means the country in which the Works are to be executed and to which Plant and Materials are to be delivered.

#### **1.2 Headings and Marginal Notes**

The headings and marginal notes are not part of these Conditions, and shall not be taken into consideration in their interpretation.

#### **1.3 Interpretation**



Client : 	<b>TENDER DOCUMENT FOR SUPPLY, INSTALLATION, TESTING &amp; COMMISSIONING OF IT, COMMUNICATION, ACCESS CONTROL &amp; SURVEILLANCE SYSTEM</b>	
<b>Project No : 120310</b>		<b>Revision : 02</b> <b>Date : 2015-10-31</b>

Words importing persons or parties shall include firms and corporations and any organisation having legal capacity. Words importing the singular also include the plural and vice versa where the context requires. Words importing one gender also include other genders.

#### **1.4 Law and Language**

The law of the Contract is named in the Special conditions of contract.

Where versions of the Contract are prepared in different languages, the version which is in the ruling language named in the Special conditions of contract shall prevail. The language for day-to-day communications shall be as stated in the Special conditions of contract.

#### **1.5 Contract Agreement**

Either party shall, if requested by the other party, execute a Contract Agreement, in the form annexed with such modifications as may be necessary to record the Contract. The format for Contract Agreement is given as **Annexure-I**.

#### **1.6 Priority of Documents**

The documents forming the Contract are to be taken as mutually explanatory of one another. If there is an ambiguity or discrepancy in the documents, the Employer's Representative shall issue any necessary clarification or instruction to the contractor, and the priority of the documents shall be as follows:

- (a) The Contract Agreement;
- (b) The Letter of acceptance/ Work order;
- (c) The employer's Requirements;
- (d) The Tender;
- (e) The special conditions of contract,
- (f) The general conditions of Contract,;
- (g) The Schedules; and
- (h) The contractor's Proposal

#### **1.7 Documents on Site**

The Contractor shall keep on the Site one complete set of the documents forming the Contract, the Construction Documents, Variations, communications given or issued under Sub-Clause 1.8 and the documents mentioned in Sub-Clause 5.4. The employer, the Employer's Representative, and all persons authorised by either of them shall have the right to use such documents at all reasonable times.

#### **1.8 Communications**



Wherever provision is made for the giving or issue of any notice, instruction, consent, approval, certificate or determination by any person, unless otherwise specified such communication shall be in writing and shall not be unreasonably withheld or delayed.

Wherever provision is made for a communication to be "written" or "in writing", this means any hand-written, type-written or printed communication, including the agreed systems of electronic transmission stated in the Special conditions of contract.

All certificates, notices or written orders to be given to the Contractor by the Employer or the Employer's Representative, and all notices to be given to the employer or to the Employer's representative by the Contractor, shall either be delivered by hand against written acknowledgement of receipt, or be sent by post or one of the agreed systems of electronic transmission. The addresses for the receipt of such communications shall be as stated in the Special conditions of contract.

#### **1.9 Provision of Construction Documents**



Client : 	<b>TENDER DOCUMENT FOR SUPPLY, INSTALLATION, TESTING &amp; COMMISSIONING OF IT, COMMUNICATION, ACCESS CONTROL &amp; SURVEILLANCE SYSTEM</b>	
<b>Project No : 120310</b>	<b>DOCUMENT NO : NPI-120310-LVS-S1-TD-01</b>	<b>Revision : 02</b> <b>Date : 2015-10-31</b>

The Construction Documents shall be in the custody and care of the contractor. The Contractor shall provide a sufficient number for the use of the Employer's Representative, or as specified in the Employer's Requirements.

#### **1.10 Employer's Use of Contractor's Documents**

Copyright in the construction Documents and other design documents made by or on behalf of the Contractor shall (as between the parties) remain the property of the Contractor. The employer may, at his cost, copy, use and communicate any such documents (including making and using modification) for the purposes of completing, operating, maintaining, altering, adjusting and repairing the works. They shall not, without the Contractor's consent, be used, copied or communicated to a third party by the Employer or the Employer's Representative for other purposes.

#### **1.11 Contractor's Use of Employer's Documents**

Copyright in the Employer's Requirements and other documents issued by the Employer or the Employer's representative to the Contractor shall (as between the parties) remain the property of the Employer. The Contractor may, at his cost, copy, use and communicate any such documents for the purposes of the Contract. They shall not, without the Employer's consent, be used, copied or communicated to a third party by the Contractor, except as necessary for the purposes of the Contract.

#### **1.12 Confidential Details**

The Contractor shall not be required to disclose, to the Employer or the Employer's Representative, the confidential details listed in the Special conditions of contract.

#### **1.13 Compliance with Statutes, Regulations and Laws**

The Contractor shall, in all matters arising in the performance of the Contract, comply with, give all notices under, and pay all fees required by, the provisions of any national or state statute, ordinance or other law, or any regulation of any legally constituted public authority having jurisdiction over the works. The Contractor shall obtain all permits, licenses or approvals required for any part of the works, in reasonable time taking account of the times for delivery of the plant and materials and for completion of the Works. The Employer and the Contractor shall comply with the laws of each country where activities are performed.

#### **1.14 Joint and Several Liability**

Deleted.

### **2 The Employer**

#### **2.1 General Obligations**



The Employer shall provide the Site and shall pay the Contractor in accordance with Clause 13.

#### **2.2 Access to and Possession of the Site**

The employer shall grant the Contractor right of access to, and possession of, the Site within the time stated in the Special conditions of contract. Such right and possession may not be exclusive to the Contractor.

If the Contractor suffers delay and/or incurs Cost from failure on the part of the Employer to grant right of access to or possession of the site, the Contractor shall give notice to the Employer's Representative. After receipt of such notice the Employer's Representative shall proceed in accordance with Sub-Clause 3.5 to agree or determine:

- (a) any extension of time to which the Contractor is entitled under Sub-Clause 8.3, and

Client : 	<b>TENDER DOCUMENT FOR SUPPLY, INSTALLATION, TESTING &amp; COMMISSIONING OF IT, COMMUNICATION, ACCESS CONTROL &amp; SURVEILLANCE SYSTEM</b>	
Project No : 120310		Revision : 02 Date : 2015-10-31

(b) **Deleted**

**And shall notify the Contractor accordingly.**

### **2.3 *Permits, Licenses or approvals***

The Employer shall, at the request and cost of the Contractor, assist him in applying for permits, licenses or approvals, which are required for any part of the Works, for delivery (including clearance through customs) of Plant, Materials and Contractor's Equipment, and for the completion of the Works. Such requests may also include requests for the Employer's assistance in procuring any necessary government consent to the export of Contractor's Equipment when it is removed from the Site.

### **2.4 *Employer's Entitlement to Terminate***

The Employer shall be entitled to terminate contract, at the Employer's convenience, at any time after giving prior notice to the Contractor, with a copy to the Employer's Representative, and returning the performance security. In the event of such termination, the Contractor:

- (a) shall proceed in accordance with Sub-Clause 16.3, and
- (b) Shall be paid by the Employer in accordance with Sub-Clause 19.6.

## **3 The Employer's Representative**

### **3.1 *Employer's Representative's Duties and Authority***

The Employer's Representative shall carry out the duties specified in the Contract. The employer's Representative shall have no authority to amend the Contract.

The Employer's Representative may exercise the authority specified in or necessarily to be implied from the Contract. If the Employer's Representative is required, under the terms of his appointment by the Employer, to obtain the specific approval of the Employer before exercising such authority. Any requisite approval shall be deemed to have been given by the Employer for any such authority exercised by the Employer's Representative.

Except as expressly stated in the conditions of Contract, the Employer's Representative shall have no authority to relieve the Contractor of any of his duties, obligations or responsibilities under the Contract. Any proposal, inspection, examination, testing, consent, approval or similar act by the Employer's Representative (including absence of disapproval) shall not relieve the Contractor from any responsibility, including responsibility for his errors, omissions, discrepancies, and non-compliance with Sub-clauses 5.3 and 5.4.



The Employer's Representative shall copy to the Employer all communications given or received by him in accordance with the Contract.

### **3.2 *Requirements for Employer's Representative***

If the Employer's Representative is not a suitably qualified engineer or other professional, having the experience and capability necessary for compliance with this clause, the Employer's Representative shall employ such suitably qualified engineers and / or other professionals, and make them available for the Contract.

### **3.3 *Employer's Representative's Authority to Delegate***

The Employer's Representative may from time to time delegate any of his duties to assistants, and may at any time revoke any such delegation. Any such delegation or revocation shall be in writing and shall not take effect until a copy has been delivered to the Employer and the Contractor.

Client : 	<b>TENDER DOCUMENT FOR SUPPLY, INSTALLATION, TESTING &amp; COMMISSIONING OF IT, COMMUNICATION, ACCESS CONTROL &amp; SURVEILLANCE SYSTEM</b>	
<b>Project No : 120310</b>	<b>DOCUMENT NO : NPI-120310-LVS-S1-TD-01</b>	<b>Revision : 02</b> <b>Date : 2015-10-31</b>

Any determination, instruction, inspection, examination, testing, consent, approval or similar act by any such assistant of the Employer's Representative, in accordance with the delegation, shall have the same effect as though it had been an act of the Employer's Representative. However:

- (a) any failure to disapprove any Plant, Materials, design or workmanship shall not prejudice the right of the Employer's Representative to reject such Plant, Materials, design or workmanship ;
- (b) if the Contractor questions any determination or instruction of an assistant of the Employer's Representative, the Contractor may refer the matter to the Employer's Representative, who shall confirm, reverse or vary such determination or instruction.

### **3.4 Employer's Representative's Instructions**

Unless it is legally or physically impossible, the Contractor shall comply with instructions given by the Employer's Representative in accordance with the Contract.

### **3.5 Employer's Representative to attempt agreement**

When the Employer's Representative is required to determine value, Cost or extension of time, he shall consult with the Contractor in an endeavour to reach agreement. If agreement is not achieved, the employer's Representative shall determine the matter in accordance with the Contract.

## **4 The Contractor**

### **4.1 General Obligations**

The works as completed by the Contractor shall be wholly in accordance with the Contract and fit for the purposes for which they are intended, as defined in the Contract. The works shall include any work which is necessary to satisfy the Employer's requirements. Contractor's proposal and schedules, or is implied by the Contract, or arises from any obligation of the Contractor, and all works not mentioned in the Contract but which may be inferred to be necessary for stability or completion or the safe, reliable and efficient operation of the works.

The contractor shall design, execute and complete the works, including providing construction Documents, within the time for Completion, and shall remedy any defects within the Contract Period. The Contractor shall provide all superintendence, labour, plant, Materials, Contractor's Equipment, Temporary Works and all other things, whether of a temporary or permanent nature, required in and for such design, execution, completion and remedying of defects.



Before commencing design, the Contractor shall satisfy himself regarding the design criteria (if any) included in the Employer's requirements and the accuracy of any setting-out points, lines and levels of reference specified in Employer's Requirements. The Contractor shall give notice to the Employer's Representative, and the employer's representative shall determine whether Clause 14 shall be applied, and shall notify the contractor accordingly.

The Contractor shall take full responsibility for the adequacy, stability and safety of all Site operations, of all methods of construction and of all the Works, irrespective of any approval or consent by the Employer's Representative.

### **4.2 Performance Security/ Security Deposit**

The Contractor shall submit an irrevocable performance security of **5 %** of the contract value in addition to other deposits mentioned else-where in the contract for his proper performance of the contract agreement (not with-standing and/or without prejudice to any other provisions in the contract) with-in a period of ten days from the date of issue of Work Order . The performance security/ security deposit shall be in the form of a Bank Guarantee from a Scheduled commercial bank and shall be valid till the completion of Defects Liability Period (DLP). The format for Performance Guarantee is given as **Annexure-II**

### **4.3 Contractor's Representative**

Client : 	<b>TENDER DOCUMENT FOR SUPPLY, INSTALLATION, TESTING &amp; COMMISSIONING OF IT, COMMUNICATION, ACCESS CONTROL &amp; SURVEILLANCE SYSTEM</b>	
<b>Project No : 120310</b>	<b>DOCUMENT NO : NPI-120310-LVS-S1-TD-01</b>	<b>Revision : 02</b> <b>Date : 2015-10-31</b>

Unless the Contractor's Representative is named in the Contract, the Contractor shall, within 14 days of the Effective date, submit to the Employer's Representative for consent the name and particulars of the person the Contractor proposes to appoint. The Contractor shall not revoke the appointment of the Contractor's Representative without the prior consent of the Employer's Representative.

The Contractor's Representative shall give his whole time to directing the preparation of the Construction Documents and the execution of the Works. Except as otherwise stated in the Contract, the Contractor's representative shall receive (on behalf of the Contractor) all notices, instructions, consents, approvals, certificates, determinations and other communications under the Contract. Whenever the Contractor's Representative is to be absent from the Site, a suitable replacement person shall be appointed, and the employer's representative shall be notified accordingly.

The Contractor's Representative may delegate, to any person, any of his powers, functions and authorities, and may at any time revoke any such delegation. Any such delegation or revocation shall be in writing and shall not take effect until the Employer's Representative has received prior notice signed by the Contractor's Representative, specifying the powers, functions and authorities being delegated or revoked. The Contractor's Representative and such persons shall be fluent in the language for day to day communications defined in sub-Clause 1.4.

#### **4.4 Co-ordination of the Works**

The Contractor shall be responsible for the co-ordination and proper execution of the works, including co-ordination of other contractors to the extent specified in the Employer's requirements. The Contractor shall, as specified in the Employer's requirements, afford all reasonable opportunities for carrying out their work to:

- (a) any other contractors employed by the employer and their workmen,
- (b) the workmen of the employer , and
- (c) the workmen of any legally constituted public authorities who may be employed in the execution on or near the site of any work not included in the Contract, which the employer may require.

The contractor shall obtain, co-ordinate and submit to the employer's representative for his information all details (including details of work to be carried out off the site) from subcontractors and suppliers. The contractor shall be responsible for the locations of their work or materials, in order to ensure that there is no conflict with the work or materials, in order to ensure that there is no conflict with the work of other subcontractors, the contractor or other contractors.



#### **4.5 Subcontractors**

The contractor shall not subcontract the whole/any part of the Works unless otherwise stated in Part II (Special Conditions):

- (a) the Contractor shall not be required to obtain consent for purchases of Materials or for subcontracts for which the Subcontractor is named in the Contract ;
- (b) the prior consent of the Employer's Representative shall be obtained to other proposed Subcontractors :
- (c) the Contractor shall notify the employer's Representative of each proposed Subcontractor not less than 28 days before the intended date of such Subcontractor commencing work on the Site; and
- (d) Where practicable, the Contractor shall give a fair and reasonable opportunity for contractors from the Country to be appointed as subcontractors.

The contractor shall be responsible for observance by all Subcontractors of all the provisions of the Contract. The Contractor shall be responsible for the acts or defaults of any Subcontractor, his agents or employees, as fully as if they were the acts or defaults of the Contractor, his agents or employees.

#### **4.6 Assignment of Subcontractor's Obligations**

Client : 	<b>TENDER DOCUMENT FOR SUPPLY, INSTALLATION, TESTING &amp; COMMISSIONING OF IT, COMMUNICATION, ACCESS CONTROL &amp; SURVEILLANCE SYSTEM</b>	
<b>Project No : 120310</b>		<b>Revision : 02</b> <b>Date : 2015-10-31</b>

If a Subcontractor has undertaken a continuing and assignable obligation to the Contractor for the work designed or executed, or Plant, Materials or services supplied, by such subcontractor, and if such obligation extends beyond the expiry of the Contract Period, the Contractor shall, upon the expiry of the Contract Period, assign the benefit of such obligation to the Employer for its unexpired duration, at the request and cost of the Employer.

#### **4.7 Setting out**

The Contractor shall set out the Works in relation to original points, lines and levels of reference specified in the Employer's Requirements or, if not specified, given by the Employer's Representative in writing. The Contractor shall rectify, at his cost, any error in the positions, levels, dimensions or alignment of the works.

#### **4.8 Quality assurance**

Unless otherwise stated in Part II (Special Conditions), the contractor shall institute a quality assurance system to demonstrate compliance with the requirements of the Contract. Such system shall be in accordance with the details stated in the Contract.

Compliance with the quality assurance system shall not relieve the Contractor of his duties, obligations or responsibilities.

Details of all procedures and compliance documents shall be submitted to the Employer's Representative for his information before each design and execution stage is commenced. When any document is issued to the Employer's representative, it shall be accompanied by the signed quality statements for such document, in accordance with the details stated in the Contract. The Employer's representative shall be entitled to audit any aspect of the system and require corrective action to be taken.

#### **4.9 Site Data**

The Employer shall have made available to the Contractor, prior to the Base date, all the data on hydrological and sub-surface conditions at the site, and studies on environmental impact, if any which have been obtained by or on behalf of the Employer from investigations for the works. The Contractor shall be responsible for interpreting all data.

The contractor shall be deemed to have inspected and examined the site, its surroundings, the above data and other available information, and to have satisfied himself (so far as is practicable, taking account of cost and time) before submitting the Tender, as to:



- (a) the form and nature of the Site, including the sub-surface conditions,
- (b) the hydrological and climatic conditions,
- (c) the extent and nature of the work and Materials necessary for the execution and completion of the works, and the remedying of any defects, and
- (d) the means of access to the Site and the accommodation he may require.

The contractor shall be deemed to have obtained all necessary information as to risks, contingencies and all other circumstances which may influence or affect the tender.

#### **4.10 Matters Affecting the execution of the works**

The contractor shall be deemed to have satisfied himself as to the correctness and sufficiency of the Contract price. Unless otherwise stated in the contract, the contract price shall cover all his obligations under the Contract (including those under provisional sums, if any) and all things necessary for the proper design, execution and completion of the works and the remedying of any defects.

#### **4.11 Unforeseeable by sub-surface conditions**

Client : 	<b>TENDER DOCUMENT FOR SUPPLY, INSTALLATION, TESTING &amp; COMMISSIONING OF IT, COMMUNICATION, ACCESS CONTROL &amp; SURVEILLANCE SYSTEM</b>	
<b>Project No : 120310</b>		<b>Revision : 02</b> <b>Date : 2015-10-31</b>

If sub-surface conditions are encountered by the Contractor which in his opinion were not foreseeable by an experienced contractor, the contractor shall give notice to the employer's representative so that the employer's representative can inspect such conditions. After receipt of such notice and after his inspection and investigation, the employer's representative shall, if such conditions were not (by the effective date) foreseeable by an experienced contractor, proceed in accordance with sub-Clause 3.5 to agree or determine.

- (a) any extension of time to which the Contractor is entitled under Sub-Clause 8.3, and
- (b) the additional cost, which shall be added to the contract price, and shall notify the Contractor accordingly.

#### **4.12 Access Route**

The Contractor shall be deemed to have satisfied himself as to the suitability and availability of the access routes he chooses to use. As between the parties, the contractor shall be responsible for the maintenance of access routes. The contractor shall provide any signs or directions, which he may consider necessary for the guidance of his staff, labour and others. The contractor shall obtain any permission that may be required from the relevant authorities for the use of such routes, signs and directions.

The employer will not be responsible for any claims which may arise from the use or otherwise of any access route. The employer does not guarantee the suitability or availability of any particular access route, and will not entertain any claim for any non-suitability or un-availability for continuous use during construction of any such route.

#### **4.13 Rights of way and Facilities**

The contractor shall bear all costs and charges for special or temporary rights-of-way required by him for access to the site. The contractor shall also provide, at his own cost, any additional facilities outside the site required by him for the purposes of the works.

#### **4.14 Programme**

Within the time stated in the Special Conditions of Contract, the Contractor shall submit to the Employer's Representative, for information, a programme which shall contain the following:



- (a) the order in which the contractor proposes to carry out the works (including each stage of design, procurement, manufacture, delivery to Site, construction, erection, testing and commissioning),
- (b) the times when submissions and approvals or consents are required, and
- (c) the sequence of Tests on Completion.

The programme shall include all major events and activities in the production of Construction Documents and the periods for the employer's representative's approval or consent, as indicated in the employer's requirements. Unless otherwise stated in the contract, the programme shall be developed using precedence networking techniques, showing early start, late start, early finish and late finish dates. No work shall be programmed to begin on site before the relevant late finish date of the periods for the employer's representative's approval or consent.

The contractor shall, whenever required by the employer's representative, provide in writing, for information, a general description of the arrangements and methods which the contractor proposes to adopt for the execution of the works. No significant alteration to the programme, or to such arrangements and methods, shall be made without informing the employer's representative. If the progress of the works does not conform to the programme, the employer's representative may instruct the contractor to revise the programme, showing the modifications necessary to achieve completion within the time for completion.

#### **4.15 Progress reports**



Client : 	<b>TENDER DOCUMENT FOR SUPPLY, INSTALLATION, TESTING &amp; COMMISSIONING OF IT, COMMUNICATION, ACCESS CONTROL &amp; SURVEILLANCE SYSTEM</b>	
<b>Project No : 120310</b>		<b>Revision : 02</b> <b>Date : 2015-10-31</b>

Monthly progress reports shall be prepared by the contractor and submitted to the employer's representative in six copies. The first report shall cover the period up to the end of the calendar month after that in which the commencement date occurred; reports shall be submitted monthly thereafter, each within 14 days of the last day of the period to which it relates. Reporting shall continue until the contractor has completed all work, which is known to be outstanding at the completion date stated in the taking-over certificate for works. Each report shall include:

- (a) photographs and detailed descriptions of progress, including each stage of design, procurement, manufacture, delivery to site, construction, erection, testing and commissioning;
- (b) charts showing the status of construction documents, purchase orders, manufacture and construction;
- (c) for the manufacture of each main item of plant and materials, the name of manufacturer, manufacture location, percentage progress and the actual or expected dates of commencement of manufacture, contractor's inspections, tests and delivery;
- (d) records of personnel and contractor's equipment on site;
- (e) copies of quality assurance documents, test results and certificates of materials;
- (f) safety statistics, including details of any hazardous incidents and activities relating to environmental aspects and public relations; and
- (g) Comparisons of actual and planned progress, with details of any aspects which may jeopardise the completion in accordance with the Contract, and the measures being (or to be) adopted to overcome such aspects.

#### ***4.16 Contractor's Equipment***

Unless otherwise stated in Part II (Special conditions), the contractor shall provide all contractor's equipment necessary to complete the works. All contractors' equipment shall, when brought on to the site, be deemed to be exclusively intended for the execution of the works. The contractor shall not remove from the site any such contractor's equipment without the consent of the employer's representative.

#### ***4.17 Safety precautions***



The contractor shall comply with all applicable safety regulations in his design, access arrangements and operations on site. Unless otherwise stated in Part II (Special conditions), the contractor shall, from the commencement of work on site until taking-over by the employer, provide:

- (a) fencing, lighting, guarding and watching of the works, and
- (b) Temporary roadways, footways, guards and fences which may be necessary for the accommodation and protection of employers and occupiers of adjacent land, the public and others.
- (c) **The contractor will place necessary warning boards, signals and protective measures as required by any law or rules applicable to the specific work or location or as required to prevent loss or damage to properties and general public.**

#### ***4.18 Protection of the environment***

During construction, the contractor shall take all reasonable steps to protect the environment (both on and off the site) and to limit damage and nuisance to people and property resulting from pollution, noise and other results of his operations. The contractor shall ensure that air emissions, surface discharges and effluent from the site during the contract period shall not exceed the values indicated in the employer's requirements, and shall not exceed the values prescribed by law.

#### ***4.19 Electricity, Water and Gas***

Client : 	<b>TENDER DOCUMENT FOR SUPPLY, INSTALLATION, TESTING &amp; COMMISSIONING OF IT, COMMUNICATION, ACCESS CONTROL &amp; SURVEILLANCE SYSTEM</b>	
<b>Project No : 120310</b>		<b>Revision : 02</b> <b>Date : 2015-10-31</b>

The electricity, (if available) at site will be provided to the contractor at a single point on a chargeable basis. The quantities consumed shall be determined by the Employer's representative, who shall include the amounts due as deductions in Interim and final payment certificates. The contractor shall, at his risk and cost, provide any apparatus necessary for such determination and for his use of these services. **The contractor should make his own arrangements for providing the backup power supply (like D.G sets of required capacity) during the work.**

*However, water required for any purposes has to be arranged by Contractor at his own cost.*

#### **4.20 Employer supplied Machinery and Materials**

The employer undertakes to provide the items of machinery and materials (if any) in accordance with the details given in the employer's requirements. The employer shall, at his risk and cost, transport such machinery and materials to the Contractor, at the time and place specified in the contract.

The contractor shall visually inspect the machinery and materials upon receipt at such place, and shall notify the employer and the employer's representative of any shortage, defect or default; then, either the employer shall immediately rectify any shortage, defect or default, or the contractor (if the contractor and the employer's representative so agree) shall carry out such rectification as a variation. After visual inspection, this machinery and materials shall come under the care, custody and control of the contractor. The contractor's obligations of inspection, care, custody and control shall not relieve the employer of liability for any undetectable shortage, defect or default to this machinery or materials.

The employer also undertakes to operate the items of machinery and equipment in accordance with the details, arrangements and charges given in the employer's requirements. The contractor shall pay such charges to the employer; the amounts due shall be determined by the employer's representative and included as deductions in interim and final payment certificates.

#### **4.21 Clearance of site**

During the execution of the works, the contractor shall keep the site free from all unnecessary obstruction, and shall store or dispose of any contractor's equipment or surplus materials. The Contractor shall clear away and remove from the site any wreckage, rubbish or temporary works no longer required.

Upon the issue of any taking-over certificate, the contractor shall clear away and remove, from the part of the site and works to which such taking-over certificate refers, all contractor's equipment, surplus material, wreckage, rubbish and temporary works. The Contractor shall leave such part of the site and the works in a clean and safe condition to the satisfaction of the employer's representative. Except that, the contractor shall be entitled to retain on site, until the expiry of the contract period, such contractor's equipment, materials and temporary works as required by him for the purpose of fulfilling his obligations under the contract.



If the contractor fails to remove any remaining contractor's equipment, surplus material, wreckage, rubbish and temporary works, by 28 days after the issue of the performance certificate, the employer may sell or otherwise dispose of such items. The employer shall be entitled to retain, from the proceeds of such sale, a sum sufficient to meet the costs incurred in connection with the sale or disposal, and in restoring the site. Any balance of the proceeds shall be paid to the contractor. If the proceeds of the sale are insufficient to meet the employer's costs, the outstanding balance shall be recoverable from the contractor by the employer.

#### **4.22 Security of the site**

Unless otherwise stated in Part II (Special Conditions):

- (a) the contractor shall be responsible for keeping unauthorised persons off the site, and



Client : 	<b>TENDER DOCUMENT FOR SUPPLY, INSTALLATION, TESTING &amp; COMMISSIONING OF IT, COMMUNICATION, ACCESS CONTROL &amp; SURVEILLANCE SYSTEM</b>	
<b>Project No : 120310</b>		<b>Revision : 02</b> <b>Date : 2015-10-31</b>

- (b) Authorised persons shall be limited to the employees of the contractor, employees of his subcontractors and persons authorised by the employer or the employer's representative.

#### **4.23 Contractor's operations on site**

The contractor shall confine his operations to the site and any additional areas, which may be provided by the contractor and agreed by the employer as forming part of the site. The contractor shall take all necessary precautions to keep his personnel and equipment within the site and such additional areas, and to keep and prohibit them from encroaching on adjacent land.

## **5 Design**

### **5.1 General Obligations**

The contractor shall carry out, and be responsible for, the design of the works. Design shall be prepared by qualified designers who are engineers or other professionals who comply with the criteria (if any) stated in the employer's requirements. For each part of the works, the prior consent of the employer's representative shall be obtained to the designer and design subcontractor, if they are not named as such in the contract. The obligations of designers and design subcontractors shall be undertaken and performed on behalf of the contractor in accordance with the contract. Nothing contained in the contract shall create any contractual relationship or professional obligations between any designer, or a design subcontractor, and the employer.

The contractor holds himself, his designers and design subcontractors as having the experience and capability necessary for the design. The contractor undertakes that the designers shall be available to attend discussions with the employer's representative, at all reasonable times during the contract period.

### **5.2 Construction Documents**

The contractor shall prepare construction documents in sufficient detail to satisfy all regulatory approvals, to provide suppliers and construction personnel sufficient instruction to execute the works, and to describe the operation of the completed works. The employer's representative shall have the right to review and inspect the preparation of construction documents, wherever they are being prepared.

In accordance with the details (if any) specified in the employer's requirements, the contractor shall submit his proposed construction documents for the employer's representative's approval. For each part of the works, construction shall not commence prior to receipt of such approval to the relevant proposed construction documents, and shall be in accordance with such construction documents.



The contractor shall notify the employer's representative if the contractor wishes to modify any design or document to which approval has previously been given, and shall submit revised documents to the employer's representative for further approval.

If the employer's representative instructs that further construction documents are necessary for carrying out the works, the contractor shall upon receiving the employer's representative's instructions prepare such construction documents. Errors, omissions, ambiguities, inconsistencies, inadequacies and other defects shall be rectified by the Contractor at his cost.

### **5.3 Contractor's Undertaking**

The contractor undertakes that, if legally and physically possible, the design, the construction documents, the execution and the completed works will be in accordance with the following, in order of priority:

- (a) the law in the country, and
- (b) The documents forming the contract, as altered or modified by variations.

Client : 	<b>TENDER DOCUMENT FOR SUPPLY, INSTALLATION, TESTING &amp; COMMISSIONING OF IT, COMMUNICATION, ACCESS CONTROL &amp; SURVEILLANCE SYSTEM</b>	
<b>Project No : 120310</b>		<b>Revision : 02</b> <b>Date : 2015-10-31</b>

#### 5.4 *Technical standards and Regulations*

The design, construction documents, execution and completed works shall comply with the country's national specifications, technical standards, building, construction and environmental regulations, regulations applicable to the product being produced from the works and the standards specified in the employer's requirements, applicable to the contractor's proposal and schedules, or defined by law. References in the contract to such specifications and other matters shall be understood to be references to the edition applicable on the base date, unless stated otherwise. If substantially changed or new applicable national specifications, technical standards or regulations come into force after the Base Date, the Contractor shall submit proposals for compliance to the employer's representative. In the event that the employer's representative determines that such proposals constitute a variation, he shall then initiate a variation in accordance with Clause 14.

#### 5.5 *Samples*

In accordance with the details specified in the employer's requirements, the contractor shall submit his proposed samples for the employer's representative's approval, together with any relevant information. The contractor shall also submit, for the employer's representative's approval, manufacturer's standard samples of materials (with relevant information) and any additional samples instructed by the employer's representative under Clause 14. All these samples shall be labelled as to origin and intended use in the works. For each part of the works, construction shall not commence prior to receipt of such approval to the relevant samples.

#### 5.6 *As-Built drawings*

The contractor shall prepare, and keep up-to-date, a complete set of "as-built" records of the execution of the works, showing the exact "as-built" locations, sizes and details of the work as executed, with cross references to relevant specifications and data sheets. These records shall be kept on the site and shall be used exclusively for this purpose. Two copies shall be submitted to the employer's representative prior to the commencement of the Tests on completion.

In addition, the contractor shall prepare and submit to the employer's representative "as built drawings" of the works, showing all works as executed. The drawings shall be prepared as the works proceed, and shall be submitted to the employer's representative for his inspection. The contractor shall obtain the consent of the employer's representative as to their size, the referencing system, and other pertinent details.

Prior to the issue of any taking-over certificate, the contractor shall submit to the employer's representative one microfiche copy, one full-size original copy and six printed copies of the relevant "as built drawings", and any further construction documents specified in the employer's requirements. The works shall not be considered to be completed for the purposes of taking-over under sub-Clause 10.1 until such documents have been submitted to the employer's representative.



#### 5.7 *Operation and Maintenance Manuals*

Prior to commencement of the tests on Completion, the Contractor shall prepare, and submit to the employer's representative, operation and maintenance manuals in accordance with the employer's requirement and in sufficient detail for the employer to operate, maintain, dismantle, reassemble, adjust and repair the works. The works shall not be considered to be completed for the purposes of taking-over under sub-Clause 10.1 until such operation and maintenance manuals have been submitted to the employer's representative.

#### 5.8 *Error by contractor*

If errors are found in the construction documents, the works and the construction documents shall be corrected at the contractor's cost.

#### 5.9 *Patent Rights*

Client : 	<b>TENDER DOCUMENT FOR SUPPLY, INSTALLATION, TESTING &amp; COMMISSIONING OF IT, COMMUNICATION, ACCESS CONTROL &amp; SURVEILLANCE SYSTEM</b>	
<b>Project No : 120310</b>		<b>Revision : 02</b> <b>Date : 2015-10-31</b>

The contractor shall indemnify the employer against all claims of infringement of any patent, registered design, copyright, trademark or trade name, or other intellectual property right, if:

- (a) the claim or proceedings arise out of the design, construction, manufacture or use of the works;
- (b) the infringement (or allegation of infringement) was not the result of part (or all) of the works being used for a purpose other than that indicated by, or reasonably to be inferred from, the contract;
- (c) the infringement (or allegation of infringement) was not the result of part (or all) of the works being used in association or combination with any thing not supplied by the contractor, unless such association or combination was disclosed to the contractor prior to the Base Date or is stated in the contract; and
- (d) the infringement (or allegation of infringement) was not the unavoidable result of the contractor's compliance with the employer's requirements.

The contractor shall be promptly notified of any claim under this sub-clause made against the employer. The contractor may, at his cost, conduct negotiations for the settlement of such claim, and any litigation or arbitration that may arise from it. The employer or the employer's representative shall not make any admission which might be prejudicial to the contractor, unless the contractor has failed to take over the conduct of the negotiations, litigation or arbitration within a reasonable time after having been so requested.

Except to the extent that the employer agrees otherwise, the contractor shall not make any admission which might be prejudicial to the employer, until the contractor has given the employer such reasonable security as the employer may require. The security shall be for an amount, which is an assessment of the compensation, damages, charges and costs for which the employer may become liable, and to which the indemnity under this sub-clause applies.

The employer shall, at the request and cost of the contractor, assist him in contesting any such claim or action, and shall be repaid all reasonable costs incurred.

## **6 Staff and Labour**

### **6.1 Engagement of staff and Labour**

The contractor shall make his own arrangements for the engagement of all staff and labour, local or otherwise, and for their payment, housing, feeding and transport.

### **6.2 Rates of Wages and conditions of Labour**

The Contractor shall pay rates of conditions of wages, and observe labour, as favourable as those established for the trade or industry where the work is carried out. If no such established rates or conditions are applicable, the contractor shall pay rates of wages and observe conditions as favourable as the general level of wages and conditions observed by employers whose trade or industry is similar to that of the contractor. While doing so, the contractor shall comply with the labour laws of the Country and ensure that minimum wages prescribed there in, the labor welfare measures and non engagement of child labor.



### **6.3 Persons in the Service of others**

The contractor shall not recruit, attempt to recruit his staff and labour from amongst persons in the service of the employer or the employer's representative.

### **6.4 Labour Laws**

The contractor shall comply with all the relevant labour laws applying to his employees, and shall duly pay and afford to them all their legal rights. The contractor shall require all such employees to obey all applicable laws and regulations concerning safety at work.

### **6.5 Working Hours**

Client : 	<b>TENDER DOCUMENT FOR SUPPLY, INSTALLATION, TESTING &amp; COMMISSIONING OF IT, COMMUNICATION, ACCESS CONTROL &amp; SURVEILLANCE SYSTEM</b>	
<b>Project No : 120310</b>		<b>Revision : 02</b> <b>Date : 2015-10-31</b>

No work shall be carried out on the Site apart from the normal working hours stated in the Special conditions of contract, or on the locally recognised days of rest, unless:

- (a) the contract so provides,
- (b) the work is unavoidable, or necessary for the saving of life or property or for the safety of the works, in which case the contractor shall immediately advise the employer's representative, or
- (c) the employer's representative gives his consent.

## 6.6 Facilities for staff and Labour

Unless otherwise stated in Part II (Special Conditions), contractor shall provide and maintain all necessary accommodation and welfare facilities for his (and his subcontractor's) staff and labour. The contractor shall also provide the facilities specified in the employer's requirements, for the employer's and employer's representative's personnel. The Contractor shall not permit any of his employees to maintain any temporary or permanent living quarters within the structures forming part of the works.

## 6.7 Health and Safety

Precautions shall be taken by the Contractor to ensure the health and safety of his staff and labour. The Contractor shall, in collaboration with and to the requirements of the local health authorities, ensure that medical staff, first aid facilities, sick bay and ambulance service are available at the accommodation and on the site at all times, and that suitable arrangements are made for all necessary welfare and hygiene requirements and for the prevention of epidemics. The contractor shall maintain records and make reports concerning health, safety and welfare of persons, and damage to property, as the employer's representative may reasonably require.

The contractor shall appoint a member of his staff at the site to be responsible for maintaining the safety, and protection against accidents, of personnel on the site. This person shall be qualified for his work and shall have the authority to issue instructions and take protective measures to prevent accidents. The contractor shall send, to the employer's representative, details of any accident as soon as possible after its occurrence.

## 6.8 Contractor's Superintendence


The contractor shall provide all necessary superintendence during the design and execution of the works, and as long thereafter as the employer's representative may consider necessary for the proper fulfilling of the contractor's obligations under the contract. Such superintendence shall be given by sufficient persons having adequate knowledge of the operations to be carried out (including the methods and techniques required, the hazards likely to be encountered and methods of preventing accidents) for the satisfactory and safe execution of the works.

## 6.9 Contractor's personnel

The Contractor shall employ (or cause to be employed) only persons who are careful and appropriately qualified, skilled and experienced in their respective trades or occupations. The employer's representative may require the contractor to remove (or cause to be removed) any person employed on the site or works, including the Contractor's representative, who in the opinion of the employer's representative:

- (a) persists in any misconduct,
- (b) is incompetent or negligent in the performance of his duties,
- (c) fails to conform with any provisions of the contract, or
- (d) Persists in any conduct which is prejudicial to safety, health, or the protection of the environment.

If appropriate, the contractor shall then appoint (or cause to be appointed) a suitable replacement person.

Client : 	<b>TENDER DOCUMENT FOR SUPPLY, INSTALLATION, TESTING &amp; COMMISSIONING OF IT, COMMUNICATION, ACCESS CONTROL &amp; SURVEILLANCE SYSTEM</b>	nne pharmaplan®
Project No : 120310		Revision : 02 Date : 2015-10-31

#### **6.10 Disorderly Conduct**

The contractor shall at all times take all reasonable precautions to prevent any unlawful, riotous or disorderly conduct by or amongst his staff and labour, and to preserve peace and protection of persons and property in the neighbourhood of the Works against such conduct.

### **7 Plant, Materials and Workmanship**

#### **7.1 Manner of Execution**

All Plant and materials to be supplied shall be manufactured, and all work to be done shall be executed, in the manner set out in the contract. Where the manner of manufacture and execution is not set out in the contract, the work shall be executed in a proper, workmanlike and careful manner, with properly equipped facilities and non-hazardous materials, and in accordance with recognised good practice.

#### **7.2 Delivery to Site**

The Contractor shall be responsible for procurement, transport, receiving, unloading and safekeeping of all plant, materials, contractor's equipment and other things required for the completion of the works.

#### **7.3 Inspection**

The employer and the employer's representative shall be entitled, during manufacture, fabrication and preparation at any places where work is being carried out, to inspect, examine and test the materials and workmanship, and to check the progress of manufacture, of all plant and materials to be supplied under the contract. The contractor shall give them full opportunity to inspect, examine, measure and test any work on site or wherever carried out.

The Contractor shall give due notice to the Employer's representative whenever such work is ready, before packaging, covering up or putting out of view. The employer's representative shall then either carry out the inspection, examination, measurement or testing without unreasonable delay, or notify the Contractor that it is considered unnecessary. If the contractor fails to give such notice, he shall, when required by the employer's representative, uncover such work and thereafter reinstate and make good at his own cost.

#### **7.4 Testing**



If the contract provides for tests, other than the performance tests, the contractor shall provide all documents and other information necessary for testing and such assistance, labour, materials, electricity, fuel, stores, apparatus and instruments as are necessary to carry out such tests efficiently.

The contractor shall agree, with the employer's representative, the time and place for the testing of any plant and other parts of the works as specified in the contract. The employer's representative shall give the contractor not less than 24 hours' notice of his intention to attend the tests. The contractor shall provide sufficient suitably qualified and experienced staff to carry out the tests specified in the contract.

If the employer's representative does not attend at the time and place agreed, or if the contractor and the employer's representative agree that the employer's representative shall not attend, the contractor may proceed with the tests, unless the employer's representative instructs the contractor otherwise. Such tests shall be deemed to have been made in the employer's representative's presence.

The contractor shall promptly forward the reading to the employer's representative if he has not attended the tests; and the employer's representative shall accept the readings as accurate. When the specified tests have been passed, the employer's representative shall endorse the contractor's test certificate, or issue a certificate to him, to that effect.

#### **7.5 Rejection**

Client : 	<b>TENDER DOCUMENT FOR SUPPLY, INSTALLATION, TESTING &amp; COMMISSIONING OF IT, COMMUNICATION, ACCESS CONTROL &amp; SURVEILLANCE SYSTEM</b>	
<b>Project No : 120310</b>		<b>Revision : 02</b> <b>Date : 2015-10-31</b>

If, as a result of inspection, examination or testing, the employer's representative decides that any plant, materials, design or workmanship is defective or otherwise not in accordance with the contract, the employer's representative may reject such plant, materials, design or workmanship and shall notify the contractor promptly, stating his reasons. The contractor shall then promptly correct the defect and ensure that the rejected item complies with the contract.

If the employer's representative requires such plant, materials design or workmanship to be retested, the tests shall be repeated under the same terms and conditions. If such rejection and retesting cause the employer to incur additional costs, such costs shall be recoverable from the contractor by the employer, and may be deducted by the employer from any monies due, or to become due, to the contractor.

## 7.6 *Employership of Plant and Materials*

Each item of plant and materials become the property of the employer at the following times:

- (a) when it is delivered to site;
- (b) When by virtue of sub-Clause 8.9, the contractor becomes entitled to payment of the value of the plant and materials. whichever is the earlier.

## 8 **Commencement, Delays and Suspension**

### 8.1 *Commencement of Works*

The contractor shall commence the design and execution of the works as soon as is reasonably possible after the receipt of a notice to this effect from the employer's representative. Such notice shall be issued within the time stated in the Special Conditions of Contract after the effective date. The contractor shall then proceed with the works with due expedition and without delay, until completion.

### 8.2 *Time for completion*

The works, and each section (if any), shall be completed and shall have passed the Tests on completion within the time for completion of the works or such section (as the case may be).

### 8.3 *Extension of Time for completion*


The contractor may apply for an extension of the time for completion if he is or will be delayed either before or after the time for completion by any of the following causes:

- (a) a variation (unless an adjustment to the time for completion is agreed under sub-Clause 14.3),
- (b) a force Majeure event (as defined in sub-Clause 19.1),
- (c) a cause of delay giving an entitlement to extension of time under a sub-clause of these conditions, unless the contractor has not complied with such sub-clause,
- (d) physical conditions or circumstances on the site, which are exceptionally adverse and were not (by the effective date) foreseeable by an experienced contractor, or
- (e) Any delay, impediment or prevention by the employer.

The contractor shall, within 28 days of the start of the event giving rise to the delay, give notice to the employer's representative of the contractor's intention to apply for an extension of the time for completion, together with any other notice required by the contract and relevant to such cause. The contractor shall keep such contemporary records as may be necessary to substantiate any application, either on the site or at another location acceptable to the employer's representative, and such other records as may reasonably be requested by the employer's representative.

The contractor shall permit the employer's representative to inspect all such records, and shall provide the employer's representative with copies as required.



<b>Client :</b> 	<b>TENDER DOCUMENT FOR SUPPLY, INSTALLATION, TESTING &amp; COMMISSIONING OF IT, COMMUNICATION, ACCESS CONTROL &amp; SURVEILLANCE SYSTEM</b>	<b>nne pharmaplan®</b>
<b>Project No : 120310</b>		<b>Revision : 02 Date : 2015-10-31</b>

Within 28 days of the first day of such delay (or such other period as may be agreed by the employer's representative), the contractor shall submit full supporting details of his application. Except that, if the contractor cannot submit all relevant details within such period because the cause of delay continued for a period exceeding 7 days, the contractor shall submit interim details at intervals of not more than 28 days (from the first day of such delay) and full and final supporting details of his application within 21 days of the last day of delay.

The employer's representative shall proceed in accordance with sub-Clause 3.5 to agree or determine either prospectively or retrospectively such extension of the Time for completion as may be due. The employer's representative shall notify the contractor accordingly. When determining each extension of time, the employer's representative shall review his previous determinations and may revise, but shall not decrease, the total extension of time.

#### **8.4 Delays caused by Authorities**

If the following conditions apply, namely:

- (a) the contractor has diligently followed the procedures laid down by the relevant legally constituted public authorities in the country,
- (b) such authorities delay, impede or prevent the contractor, and
- (c) The resulting delay to the works was not (by the effective date) foreseeable by an experienced contractor, then such delay will be considered as a cause of delay giving an entitlement to extension of time under sub-Clause 8.3.

#### **8.5 Rate of Progress**



If, at any time, the contractor's actual progress falls behind the programme referred to in Sub-Clause 4.14, or it becomes apparent that it will so fall behind, the contractor shall submit to the employer's representative a revised programme taking into account the prevailing circumstances. The contractor shall, at the same time, notify the employer's representative of the steps being taken to expedite progress, so as to achieve completion within the Time for completion.

If any steps taken by the contractor in meeting his obligations under this sub-clause cause the employer to incur additional costs, such costs shall be recoverable from the contractor by the employer, and may be deducted by the employer from any money due, or to become due, to the contractor.

#### **8.6 Liquidated Damages for Delay**

If the contractor fails to comply with Sub-Clause 8.2, the contractor shall pay to the employer the relevant sum stated in the special conditions of contract as liquidated damages for such default (which sum shall be the only monies due from the contractor for such default) for every day or part of a day which shall elapse between the relevant time for completion and the date stated in the Taking-Over Certificate; except that the total payment shall not exceed the limit of liquidated damages (if any) stated in the Special Conditions of Contract. The employer may, without prejudice to any other method of recovery, deduct the amount of such damages from any monies due or to become due to the contractor. In the event of an extension of time being granted under sub-Clause 8.3, the amount due under this sub-clause shall be recalculated accordingly, and any over-payment refunded. The payment or deduction of such damages shall not relieve the contractor from his obligation to complete the works, or from any other of his duties, obligations or responsibilities under the contract.

#### **8.7 Suspension of work**

Client : 	<b>TENDER DOCUMENT FOR SUPPLY, INSTALLATION, TESTING &amp; COMMISSIONING OF IT, COMMUNICATION, ACCESS CONTROL &amp; SURVEILLANCE SYSTEM</b>	
<b>Project No : 120310</b>		<b>Revision : 02</b> <b>Date : 2015-10-31</b>

The employer's representative may at any time instruct the contractor to suspend progress of part or all of the works. During suspension, the contractor shall protect, store, secure and insure such part or the works against any deterioration, loss or damage.

## 8.8 *Consequences of Suspension*

If the contractor suffers delay and/or incurs cost in following the employer's representative's instructions under sub Clause 8.7, and in resumption of the work, and if such delay and/or cost was not (by the effective Date) foreseeable by an experienced contractor, the contractor shall give notice to the employer's representative shall proceed in accordance with sub-Clause 3.5 to agree or determine:

- (a) any extension of time to which the contractor is entitled under sub-Clause 8.3 and
- (b) The amount of such cost, which shall be added to the contract price, and shall notify the contractor accordingly. Except that the contractor shall not be entitled to such extension and payment of cost if the suspension is due to a cause attributable to the contractor, or is necessitated by a contractor's risk as defined in sub-Clause 17.5.

The contractor shall not be entitled to extension of time for, or payment of the costs incurred in, making good any deterioration, defect or loss caused by faulty design, workmanship or materials, or by the contractor's failure to take the measures specified in sub-Clause 8.7.

## 8.9 Deleted

## 8.10 *Prolonged Suspension*

If suspension under sub-Clause 8.7 has continued for more than 84 days, and the suspension is not due to a cause attributable to the contractor, the contractor may by notice to the employer's representative require permission to proceed within 28 days. If permission is not granted within that time, the contractor may treat the suspension as an omission under Clause 14 of the affected part of the works. If such suspension affects the whole of the works, the contractor may terminate his employment, under sub-Clause 16.2.

## 8.11 *Resumption of Work*

After receipt of permission or of an instruction to proceed, the contractor shall, after notice to the employer's representative, and together with the employer's representative, examine the works and the plant and materials affected by the suspension. The contractor shall make good any deterioration or defect in or loss of the works or plant or materials, which has occurred during the suspension.

If the employer has taken over risk and responsibility for the suspended works under sub-Clause 8.9, risk and responsibility shall revert to the contractor 14 days after receipt of the permission or instruction to proceed.



# 9 **Tests on Completion**

## 9.1 *Contractor's Obligations*

The contractor shall carry out the Tests on completion in accordance with this clause and sub-Clause 7.4, after providing the documents in accordance with sub-Clause 5.6 and 5.7. The contractor shall give, to the Employer's representative, 21 days' notice of the date after which the contractor will be ready to carry out the tests on completion. Unless otherwise agreed, such tests shall be carried out within 14 days after this date, on such day or days as the employer's representative shall instruct.

In considering the results of the tests on completion, the employer's representative shall make allowance for the effect of any use of the works by the employer on the performance or other characteristics of the works. As soon as the works, or a section, have passed the tests on completion, the contractor shall provide the employer's representative and the employer with a certified report of the results of all such tests.



Client : 	<b>TENDER DOCUMENT FOR SUPPLY, INSTALLATION, TESTING &amp; COMMISSIONING OF IT, COMMUNICATION, ACCESS CONTROL &amp; SURVEILLANCE SYSTEM</b>	
Project No : 120310		Revision : 02 Date : 2015-10-31

## 9.2 Delayed tests

If the tests on completion are being unduly delayed by the contractor, the employer's representative may by notice require the contractor to carry out such tests within 21 days after the receipt of such notice. The contractor shall carry out such tests on such day or days within that period as the contractor may fix and of which he shall give notice to the employer's representative.

## 9.3 Retesting

If the works, or a section, fail to pass the tests on completion, sub-Clause 7.5 shall apply, and the employer's representative or the contractor may require such failed Tests, and the tests on completion on any related work, to be repeated under the same terms and conditions.

## 9.4 Failure to Pass Tests on Completion

If the works, or a section, fail to pass the tests on completion repeated under sub-Clause 9.3, the employer's representative shall be entitled to:

- (a) order further repetition of tests on completion under sub-Clause 9.3;
- (b) reject the works or section (as the case may be), in which event the employer shall have the same remedies against the contractor as are provided under Clause 15; or
- (c) Issue a taking-over certificate, if the employer so requires, the contract price shall then be reduced by such amount as may be agreed by the employer and the contractor (in full satisfaction of such failure only), and the contractor shall then proceed in accordance with his other obligations under the contract.

## 10 Employer's Taking Over

### 10.1 Taking-Over Certificate

Except as stated in sub-Clause 9.4, the works shall be taken over by the employer when they have been completed in accordance with the contract (except as described in paragraph (a) below), have passed the tests on completion and a taking-over certificate for the works has been issued, or has deemed to have been issued in accordance with this sub-clause. If the works are divided into sections, the contractor shall be entitled to apply for a taking-over certificate for each section.



The contractor may apply by notice to the employer's representative for a taking-over certificate not earlier than 14 days before the works or section (as the case may be) will, in the contractor's opinion, be complete and ready for taking over. The employer's representative shall, within 28 days after the receipt of the Contractor's application:

- (a) issue the taking-over certificate to the contractor, stating the date on which the works or section were completed in accordance with the contract (except for minor outstanding work that does not affect the use of the works or section for their intended purpose) including passing the Tests on completion; or
- (b) Reject the application, giving his reasons and specifying the work required to be done by the contractor to enable the taking over certificate to be issued ; the contractor shall then complete such work before issuing a further notice under this sub-clause.

If the employer's representative fails either to issue the Taking-over certificate or to reject the contractor's application within the period of 28 days, and if the works or section(as the case may be) are substantially in accordance with the Contract, the taking-over certificate shall be deemed to have been issued on the last day of that period.

### 10.2 Use by Employer

The Employer shall not use any part of the works unless the employer's representative has issued a taking-over certificate for such part. If a taking-over certificate has been issued for any part of the works (other than a section), the liquidated damages for delay in completion of the remainder of the works (and of the section of which it forms a part) shall, for any period of delay after the date stated in such taking-over certificate, be reduced in the proportion

<b>Client :</b> 	<b>TENDER DOCUMENT FOR SUPPLY, INSTALLATION, TESTING &amp; COMMISSIONING OF IT, COMMUNICATION, ACCESS CONTROL &amp; SURVEILLANCE SYSTEM</b>	
<b>Project No : 120310</b>	<b>DOCUMENT NO : NPI-120310-LVS-S1-TD-01</b>	<b>Revision : 02</b> <b>Date : 2015-10-31</b>

which the value of the part so certified bears to the value of the works or section (as the case may be); such values shall be determined by the employer's representative in accordance with the provisions of sub-Clause 3.5. The provisions of this paragraph shall only apply to the rate of liquidated damages under sub-Clause 8.6, and shall not affect the limit of such damages.

If the employer does use any part of the works before the taking-over certificate is issued:

- (a) The part which is used shall be deemed to have been taken over at the date on which it is used.
- (b) The employer's representative shall, when requested by the contractor, issue a taking-over certificate accordingly, and
- (c) The contractor shall cease to be liable for the care of such part from such date, when responsibility shall pass to the employer.

After the employer's representative has issued a Taking over certificate for a part of the works, the contractor shall be given the earliest opportunity of taking such steps as may be necessary to carry out any outstanding tests on completion, and the contractor shall carry out such tests on completion as soon as practicable, before the expiry of the contract period.

### **10.3 Interference with Test on Completion**

If the Contractor is prevented from carrying out the tests on Completion by a cause for which the employer (or another contractor employed by the employer) is responsible, the employer shall be deemed to have taken over the works or section (as the case may be) on the date when the tests on completion would otherwise have been completed. The employer's representative shall then issue a taking-over certificate accordingly, and the contractor shall carry out the tests on completion as soon as practicable, before the expiry of the contract period.

The employer's representative shall require the tests on completion to be carried out by 14 days' notice and in accordance with the relevant provisions of the contract. If the contractor incurs additional cost as a result of this delay in carrying out the Tests on Completion, such Cost plus reasonable profit shall be determined by the employer's representative in accordance with the provisions of sub-Clause 3.5 and shall be added to the contract price.

## **11 Performance Tests**



### **11.1 Employer's Obligations**

If Performance Tests are specified in the Contract, the employer shall provide the necessary labour, materials, Electricity, fuel and water, and shall carry out the Performance Tests in accordance with the manuals provided by the Contractor under Sub- Clause 5.7 and such guidance as the Contractor may be required to give during the course of such tests.

The performances Tests shall be carried out as soon as is reasonably practicable after the Works, or Section, have been taken over by the Employer. The Employer shall give, to the Contractor, 21 days' notice of the date after which the Performance Tests will be carried out. Unless otherwise agreed, such Tests shall be carried out within 14 days after this date, on the day or days determined by the Employer. If the Contractor does not attend at the time and place agreed, the Employer may proceed with the Performance Tests, which shall be deemed to have been made in the Contractor's presence, and the Contractor shall accept the readings as accurate.

The results of the Performance Tests shall be complied and evaluated by the Employer and the Contractor. Any effect on the results of the Performance Tests, which can reasonably be shown to be due to the prior use of the Works by the Employer, shall be taken into account in assessing such results.

### **11.2 Delayed Tests**

Client : 	<b>TENDER DOCUMENT FOR SUPPLY, INSTALLATION, TESTING &amp; COMMISSIONING OF IT, COMMUNICATION, ACCESS CONTROL &amp; SURVEILLANCE SYSTEM</b>	
<b>Project No : 120310</b>	<b>DOCUMENT NO : NPI-120310-LVS-S1-TD-01</b>	<b>Revision : 02</b> <b>Date : 2015-10-31</b>

If the Contractor incurs additional Cost as a result of any unreasonable delay by the Employer in carrying out the Performance Tests, such Cost plus reasonable profit shall be determined by the Employer's Representative in accordance with the provisions of Sub – Clause 3.5 and shall be added to the Contract price.

If, for reasons not attributable to the Contractor's, a Performance Tests of the Works or any Section cannot be completed during the Contract Period (or any other period agreed upon by the Employer and the Contractor), then the Works or such Section shall be deemed to have passed such Performance Tests.

### **11.3 Retesting**

If the Works, or a Section, fail to pass the Performance Tests, the Employer or the Contractor may require such failed Tests, and the Performance Tests on any related work, to be repeated under same terms and conditions, If such failure and Retesting result from a default of the Contractor and cause the Employer to incur additional costs, such costs shall be recoverable from any monies due or to become due to the Contractor.

### **11.4 Failure to Pass Performance Tests**

If the following conditions apply, namely:

- (a) the Works, or a Section, fail to pass any or all of the Performance Tests,
- (b) the relevant sum payable as liquidated damages for such failure is stated (or its method of calculation is defined ) in the Special Conditions of Contract, and
- (c) The Contractor pays such relevant sum to the Employer during the Contract Period.

Then the Works or such Section shall be deemed to have passed such Performance Tests.

If the Works, or a Section, fail to pass a Performance Test and the Contractor in consequences proposes to make any adjustment or modification thereto, the Employer's Representative may instruct the Contractor that the Employer does not wish such adjustment or modification to be made until a time that is convenient to the Employer. In such event, the Contractor shall remain liable to carry out the adjustment or modification, and to satisfy such Test within a reasonable time of being notified to do so by the Employer's Representative. If, however, the Employer's Representative fails to give any such notice during the Contract Period, the Contractor shall be relieved of any such obligation and the Works or Section (as the case may be) shall be deemed to have passed such Performance Test.

If the Contractor incurs additional Cost as a result of any unreasonable delay by the Employer in permitting access to the Works or Plant by the Contractor, either to investigate the causes of failure to pass a Performance Test, or to carry out any adjustments or modifications, then the Contractor shall be paid the additional Cost, plus reasonable profit, caused by such delay.



## **12 Defects Liability**

### **12.1 Completion of Outstanding Work and Remedying Defects**

In order that the Construction documents and the Works shall be in the condition required by the Contract (fair wear and tear excepted) at, or as soon as practicable after, the expiry of the Contract Period, the Contractor shall:

- (a) complete any work which is outstanding on the date stated in a Taking – Over Certificate, as soon as practicable after such date, and
- (b) Execute all work of amendment, reconstruction, and remedying defects or damage, as may be instructed by the Employer or the Employer's Representative during the Defects Liability Period.

If any such defect appears or damage occurs, the Employer or the Employer's Representative shall promptly notify the Contractor in writing.

Client : 	<b>TENDER DOCUMENT FOR SUPPLY, INSTALLATION, TESTING &amp; COMMISSIONING OF IT, COMMUNICATION, ACCESS CONTROL &amp; SURVEILLANCE SYSTEM</b>	
<b>Project No : 120310</b>		<b>Revision : 02</b> <b>Date : 2015-10-31</b>

## 12.2 Cost of Remedying Defects

All work referred to in Sub-Clause 12.1 (b) shall be executed by the Contractor at his own cost, if the necessity for such work is due to:

- (a) the design of the works,
- (b) Plant, Materials or workmanship not being in accordance with the Contract, or
- (c) Failure by the Contractor to comply with any of his other obligations.

If such necessity is due to any other cause, the Employer's Representative shall notify the Contractor accordingly and seek agreement to an adjustment to the Contract Price. In this event, Sub-Clause 14.3 shall apply to such work.

## 12.3 Extension of Contract Period

The contract Period shall be extended by a period equal to the sum of any periods, after the Works are taken – over, during which the Works or any Section or item of Plant cannot be used, for the purposes for which they are intended. By reason of a defect or damages; except that the Contract Period shall not be extended by more than two years.

When delivery of Plant and / or Materials, or erection of Plant, or installation of Materials, has been suspended under Sub-Clause 8.7, the Contractor's obligations under this Sub-Clause shall not apply to any defects or damage occurring more than three years after the Plant and / or Materials would otherwise have been delivered, erected and taken-over.

## 12.4 Failure to Remedy Defects

If the Contractor fails to remedy any defect or damage within a reasonable time, the Employer or the Employer's Representative may fix a date on or by which to remedy the defect or damage, and give the Contractor reasonable notice of such date. If the Contractor fails to remedy the defect or damage by such date, the Employer may (at his sole discretion):



- (a) carry out the work himself or by others, in a reasonable manner and at the Contractors risk and cost, but the Contractor shall have no responsibility for such work : the costs properly incurred by the Employer in remedying the defect or damage shall be recoverable from the Contractor by the Employer;
- (b) require the Employer's Representative to determine and certify a reasonable reduction in the Contract Price; or
- (c) if the defect or damage is such that the Employer has been deprived of substantially the whole of the benefit of the Works or parts of the Works, terminate the Contract in respect of such parts of the Works as cannot be put to the intended use : the Employer shall then be entitled to recover all sums paid for such parts of the Works together with the cost of dismantling the same, clearing the Site and returning Plant and Materials to the Contractor, or otherwise disposing of them in accordance with the Contractor's instructions, and Sub-Clause 15.1 shall not apply.

## 12.5 Removal of Defective Work

If the defect or damage is such that it cannot be remedied expeditiously on the Site, the Contractor may, with the consent of the Employer's Representative or the Employer, remove from the Site for the purposes of repair any part of the Works which is defective or damaged.

## 12.6 Further Tests

If the rectification of any defect or damage is such that it may affect the performance of the Works, the Employer may require that Tests on Completion or Performance Tests, or both, be repeated to the extent necessary. The requirement shall be made by notice within 28 days after the replacement or renewal. Such Tests shall be carried out in accordance with Clause 9 or Clause 11 (as the case may be).

Client : 	<b>TENDER DOCUMENT FOR SUPPLY, INSTALLATION, TESTING &amp; COMMISSIONING OF IT, COMMUNICATION, ACCESS CONTROL &amp; SURVEILLANCE SYSTEM</b>	
<b>Project No : 120310</b>	<b>DOCUMENT NO : NPI-120310-LVS-S1-TD-01</b>	<b>Revision : 02</b> <b>Date : 2015-10-31</b>

### **12.7 Right of Access**

Until the Performance Certificate has been issued, the Contractor shall have the right of access to all parts of the Works and records of the working and performance of the Works, except as may be inconsistent with any reasonable security restrictions by the organisations responsible for operating the Works.

### **12.8 Contractor to Search**

The Contractor shall, if required by the Employer's Representative, search for the cause of any defect, under the direction of the Employer's Representative. Unless the defect is one for which the Contractor is liable, the Cost of such search, plus reasonable profit, shall be added to the Contract Price.

### **12.9 Performance Certificate**

The Contract shall not be considered to be completed until the Performance Certificate has been signed by the Employer's Representative and delivered to the Contractor, stating the date on which the Contractor completed his obligations to the Employer's Representative's satisfaction.

The Performance Certificate shall be given by the Employer's Representative by the date 28 days after the expiry of the Contract Period, or as soon after such date as the Contractor has provided all the Construction Documents and completed and tested all the Works, including remedying any defects.

Only the Performance Certificate shall be deemed to constitute approval of the Works.

### **12.10 Unfulfilled obligation**

After the Performance Certificate has been issued, the Contractor and the Employer shall remain liable for the fulfilment of any obligation, which remains unperformed at that time. For the purposes of determining the nature and extent of any such obligation, the Contract shall be deemed to remain in force.

## **13 Contract Price And Payment**

### **13.1 The Contract Price**

DELETED

### **13.2 Deleted**

### **13.3 Application for Interim Payment Certificates**

DELETED

### **13.4 Schedule of Payments**



## **Terms and Mode of Payment**

Payment shall be made subject to recoveries, if any, by way of liquidated damages or any other charges as per terms & conditions of contract in the following manner.

#### **A) Payment for Domestic Goods Or Foreign Origin Located Within India.**

Payment shall be made within in 15 days from the date of submission of all the required documents and invoice as per the schedule given below and it shall be paid in Indian Rupees:

#### **a) On delivery at site:**

<b>Client :</b> 	<b>TENDER DOCUMENT FOR SUPPLY, INSTALLATION, TESTING &amp; COMMISSIONING OF IT, COMMUNICATION, ACCESS CONTROL &amp; SURVEILLANCE SYSTEM</b>	
<b>Project No : 120310</b>		<b>Revision : 02</b> <b>Date : 2015-10-31</b>

80 % of the contract price shall be paid on receipt of goods in good condition and upon the submission of the following documents:

- (i) Four copies of supplier's invoice showing contract number, goods description, quantity, unit price and total amount;
  - (ii) Consignee Receipt Certificate (as per Annexure in TED) in original issued by the authorized representative of the consignee;
  - (iii) Two copies of packing list identifying contents of each package;
  - (iv) Dispatch Clearance from Purchaser or authorized agent
  - (v) Inspection certificate issued by the nominated Inspection agency, if any.
  - (vi) Certificate of Country of origin.
- b)** 10% of the contract value against Installation & configuration as per the installation completion report issued by the authorized representative of the consignee.
- c)** Balance 10 % payment would be made against 'Final Acceptance Certificate' as per the annexure mentioned in tender document to be issued by the consignee/ purchaser subject to recoveries, if any, either on account of non-rectification of defects/deficiencies not attended by the Supplier or otherwise.

#### **B) Payment for Imported Goods:**

Payment against Imported goods shall be made in the currency through irrevocable, non-transferable Letter of Credit (LC) opened in favour of the supplier in a bank in his country as specified in the contract.

**100% of DAP value shall be made in the currency through irrevocable, non-transferable Letter of Credit (LC) opened in favour of the supplier in a bank in his country as specified in the contract in the following manner:**

##### **a) On Receipt of Goods at site:**



80% of the net DAP price (DAP price less Indian Agency commission) of the goods delivered shall be paid and upon submission of documents specified hereunder:

- (i) Four copies of supplier's invoice showing contract number, goods description, quantity, unit price and total amount;
- (ii) Original and four copies of the negotiable clean, on-board Bill of Lading/ Airway bill, marked freight pre-paid and four copies of non-negotiable Bill of Lading/Airway bill;
- (iii) Four Copies of packing list identifying contents of each package;
- (iv) Documents to be submitted for payment of LC, confirming that dispatch documents has already been sent to all concerned as per the contract within 24 hours;
- (v) Manufacturer's/Supplier's warranty certificate;
- (vi) Manufacturer's own factory inspection report and
- (vii) Certificate of origin by the chamber of commerce of the concerned country;
- (viii) Goods receipt certificate by the ultimate consignee on receipt of goods at this site/warehouse as per annexure provided in this tender document.

- b)** 10% of the contract value against Installation & configuration as per the installation completion report issued by the authorized representative of the consignee.

##### **c) On Final Acceptance Certificate by Client/ Purchaser:**



Client : 	<b>TENDER DOCUMENT FOR SUPPLY, INSTALLATION, TESTING &amp; COMMISSIONING OF IT, COMMUNICATION, ACCESS CONTROL &amp; SURVEILLANCE SYSTEM</b>	
<b>Project No : 120310</b>	<b>DOCUMENT NO : NPI-120310-LVS-S1-TD-01</b>	<b>Revision : 02</b> <b>Date : 2015-10-31</b>

Balance 10 % of the net DAP price payment would be made against 'Final Acceptance Certificate' as per the annexure mentioned in Section XVIII of this tender document to be issued by the consignee/ purchaser subject to recoveries, if any, either on account of non-rectification of defects/deficiencies not attended by the Supplier or otherwise.

- d) Payment of incidental services (including installation & commissioning, supervision, demonstration and training)** will be paid in Indian Rupees to the Manufacturer's Authorized Indian representative or to the principal in their currency.
- e) Payment of customs clearance and handling charges, loading/ unloading, inland transportation, incidental costs till consignee site** will be paid in Indian Rupees to the Manufacturer's Authorized Indian representative or to the principal in their currency on intimation to the purchaser with Bill of Entry and supporting documents. However Customs duty will be paid in Indian Rupees to the customs department directly by HBL on intimation by the vendor's Customs Clearing Agent with demand notice / Assessment order from Customs.
- f) Payment of Indian Agency Commission:**

Indian Agency commission will be paid to the manufacturer's agent in Indian rupees indicated in the relevant Price Schedule (as per prevailing rate of exchange ruling on the date of Contract) and shall not be subject to further escalation / exchange variation. 100% Payment shall be paid in Indian Rupees to the Indian Agent after 100 % payment to the foreign principal.

**g) Payment for services:**



In case of separate service order issued to the vendor, the payment shall be as below:

- a. 50% of service order value against installation
- b. 30% of service order value against commissioning
- c. Balance 20% of service order value against Final Acceptance Certificate by Client/ Purchaser

### **13.5 Plant and Materials for the Permanent Works**

If the Sub-Clause applies, interim Payment Certificates shall include (i) an additional amount for Plant and Materials which have been brought to the Site for incorporation in the Permanent Works, and (ii) a deduction when they have been incorporated in the Permanent Works. The Employer's Representative shall determine each condition and deduction in accordance with the following provisions:

- (a) no addition shall be include in the Interim Payment Certificate unless, in the opinion of the Employer's Representative :
  - (i) the Plant and Materials are considered to be in accordance with the contract
  - (ii) the Plant and Materials have been delivered to the Site and are properly stored on Site and protected against loss, damage or deterioration;
  - (iii) the Contractor's records of the requirement, orders, receipts and use of Plant and Material are kept in a form approved by the Employer's Representative, and such records are available for inspection by the Employer's Representative
  - (iv) the Contractor has submitted a statement of the Cost of acquiring and delivering the Plant and Materials to the Site, together with such documents as may be required for the purpose of evidencing such Cost; and
  - (v) The Plant and Material are those listed in the Special Conditions of Contract.
- (b) the additional amount to be certified shall be the equivalent of eighty percent of the Cost of the Plant and Materials delivered to the Site, as determined by the Employer's Representative after review of the documents mentioned in paragraph (a) above, taking account of the contract value of such Plant and Materials as determined and considers appropriate by the Employer's Representative;

Client : 	<b>TENDER DOCUMENT FOR SUPPLY, INSTALLATION, TESTING &amp; COMMISSIONING OF IT, COMMUNICATION, ACCESS CONTROL &amp; SURVEILLANCE SYSTEM</b>	
<b>Project No : 120310</b>	<b>DOCUMENT NO : NPI-120310-LVS-S1-TD-01</b>	<b>Revision : 02</b> <b>Date : 2015-10-31</b>

- (c) the amount of the deduction for any Plant and Materials incorporated in the Permanent Works shall be equivalent to the addition previously certified by the Employer's Representative for such Plant and Materials under paragraph (b) above; and
- (d) the currencies for such additions and deductions shall be determined by the Employer's Representative as follows:
  - (i) in the case of each addition, the currencies shall be those in which the payment will eventually become due for the relevant item of Plant and Materials, upon their incorporation in the Permanent Works; and
  - (ii) in the case of a deduction, the currencies shall be those in which the addition for the respective item of Plant or Materials had been certified.

### ***13.6 Issue of Interim Payment Certificates***

DELETED

### ***13.7 Payment***

AS MENTIONED IN SCHEDULE OF FISCAL ASPECTS

### ***13.8 Deleted***

### ***13.9 Deleted***

### ***13.10 Statement at Completion***

Not later than 84 days after the issue of the Taking-Over Completion Certificate for the Works, the Contractor submit, to the Employer's Representative, four copies of a statement at completion with supporting documents showing in detail, in the form approved by the Employer's Representative under Sub-Clause. 13.3:

- (a) the final value of all work done in accordance with the Contract up to the date stated in such Taking Over Certificate,
- (b) any further sums which the Contractor considers to be due, and
- (c) an estimate of amounts which the Contractor considers will become due to him under the Contract

The estimated amounts shall be shown separately in such statement at completion. The Employer's Representative shall certify payment under Sub-Clause. 13.6.

### ***13.11 Application for Final Payment Certificate***



Not later than 60 days after issue of the Performance Certificate, the Contractor shall submit to the Employer's Representative four copies of a draft final statement with supporting documents showing in detail, in a form approved by the Employer's Representative:

- (a) the value of all work done in accordance with the Contract, and
- (b) Any further sums which the Contractor considers to be due to him under the Contract or otherwise.

If the Employer's Representative disagrees with or cannot verify any part of the draft final statement, the Contractor shall submit such further information as the Employer's Representative may reasonably require and shall make such changes in the draft as may be agreed between them. The Contractor shall then prepare and submit to the Employer's Representative the final statement as agreed (for the purposes of these Conditions referred to as the "Final Statement")

If the following discussions between the Employer's Representative and the Contractor and any changes to the draft final statement which may be agreed between them, it becomes evident that a dispute exists, the Employer's Representative shall deliver to the Employer (with a copy of the Contractor) an Interim Payment Certificate for



Client : 	<b>TENDER DOCUMENT FOR SUPPLY, INSTALLATION, TESTING &amp; COMMISSIONING OF IT, COMMUNICATION, ACCESS CONTROL &amp; SURVEILLANCE SYSTEM</b>	
<b>Project No : 120310</b>	<b>DOCUMENT NO : NPI-120310-LVS-S1-TD-01</b>	<b>Revision : 02</b> <b>Date : 2015-10-31</b>

those parts of the draft final statement which are not in dispute. The dispute may then be resolved under Clause. 20, in which case the Contractor shall then prepare and submit to the Employer (with a copy to the Employer's Representative) a final statement in accordance with the outcome of the dispute.

### **13.12 Discharge**

When submitting the Final Statement, the Contractor shall submit a written discharge, which confirms that the total of the Final Statement represents full and final settlement of at all monies due to the Contractor under the Contract. Such discharge may state that it shall become effective only after payment due under the Final Statement Certificate has been made and the performance security referred to in Sub-Clause. 4.2 have been returned to the Contractor.

The discharge does not free him from the obligations of Annual Maintenance Contract agreed as per this tender.

### **13.13 Issue of Final Payment Certificate**

The Employer's Representative shall issue to the Employer, with a copy to the Contractor, the Final Payment Certificate within 60 days after receiving the Final Statement and written discharge in accordance with Sub-Clauses.13.11 and.13.12, stating:

- (a) the amount which finally due, and
- (b) after giving credit to the Employer for all amounts previously paid by the Employer and for all sums to which the Employer is entitled, other than under Sub-Clause 8.6 the balance, if any, due from the Employer to the Contractor or from the Contractor to the Employer as the case may be.

If the Contractor has not applied for a Final Payment Certificate in accordance with Sub-Clauses13.11 and 13.12, the Employer's Representative shall request the Contractor to do so. If the Contractor fails to make such an application within a period of 60 days, the Employer's Representative shall issue the Final payment Certificate for such amount as he considers being due.

### **13.14 Cessation of Employer's Liability**

The Employer shall not be liable to the Contractor for any matter or thing arising out of (or in connection with) the Contract or execution of the Works, unless the Contractor shall have include a claim for it in his Final Statement and (except for matters or things arising after the issue of the Taking-Over Certificate for the works) in the statement at completion described in Sub-Clause 13.10.

### **13.15 Changes in Legislation**



The Contract Price shall be adjusted to take account of any increase or decrease in Cost resulting from changes in legislation of the Country, made after the Base Date. Such legislation means any law, order, regulation or by-law having the force of law, including currency restrictions, which affects the Contractor in the performance of his obligations.

If the Contractor suffers (or will suffer) delay and / or incurs (or will incur) additional Cost resulting from such changes in legislation, made after the Base Date, the Contractor shall give notice to the Employer's Representative shall proceed in accordance with Sub-Clause 3.5 to agree or determine:

- (a) any extension of time to which the Contractor is entitled under Sub-Clause 8.3, and
- (b) The amount of such cost, which shall be added to the Contract Price, and shall notify the Contractor accordingly.

## **14 Variations**

### **14.1 Right to Vary**

Client : 	<b>TENDER DOCUMENT FOR SUPPLY, INSTALLATION, TESTING &amp; COMMISSIONING OF IT, COMMUNICATION, ACCESS CONTROL &amp; SURVEILLANCE SYSTEM</b>	
<b>Project No : 120310</b>	<b>DOCUMENT NO : NPI-120310-LVS-S1-TD-01</b>	<b>Revision : 02</b> <b>Date : 2015-10-31</b>

The employer's Representative may at any time during the contract period require alterations and/or modifications in the form of additions to, omissions from, or amendments of the works. Such variations may be initiated by the employer's representative, either by instruction or by a request from the contractor to submit a proposal. If the employer's representative requests the contractor to submit a proposal and subsequently elects not to proceed with the change, the Contractor shall be reimbursed for the cost incurred, including design services.

The contractor shall not make any alteration and /or modification of the works, unless and until the employer's representative instructs or approves a variation. If the construction Documents or works are not in accordance with the contract, the rectification shall not constitute a variation.

**14.2 Deleted.**

**14.3 Deleted**

**14.4 Deleted**

**14.5 Deleted.**

## **15. Default of Contractor**

### **15.1 Notice to Correct**



If the contractor fails to carry out any of his obligations, or if the contractor is not executing the works in accordance with the contract, the employer's representative may give notice to the contractor requiring him to make good such failure and remedy the same.

### **15.2 Termination**

If the Contractor:

- (a) fails to comply within a reasonable time with a notice under sub-Clause 15.1,
- (b) abandons or repudiates the contract,
- (c) without reasonable excuse fails :
  - i). to commence the works promptly in accordance with sub-Clause 8.1,
  - ii). to proceed with the works in accordance with Clause 8, or
  - iii). To demonstrate that sufficient design capability is employed in the design of the works to achieve completion within the time for completion.
- (d) becomes bankrupt or insolvent, goes into liquidation, has a receiving or administration order made against him, compounds with his creditors, or carries on business under a receiver, trustee or manager for the benefit of his creditors, or if any act is done or event occurs which (under any applicable law) has a similar effect to any of these acts or events.
- (e) fails to comply with a notice issued under sub-Clause 7.5 within 28 days after having received it, or
- (f) Assigns the contract or subcontracts the works without the required consent, then the employer may, after having given 14 days' notice to the contractor, terminate the contractor's employment under the contract and expel him from the site. The contractor shall then deliver all construction documents, and other design documents made by or for him, to the employer's representative. The contractor shall not be released from any of his obligations or liabilities under the contract. The rights and authorities conferred on the employer and the employer's representative by the contract shall not be affected.

The employer may upon such termination complete the works himself and/or by any other contractor.

Client : 	<b>TENDER DOCUMENT FOR SUPPLY, INSTALLATION, TESTING &amp; COMMISSIONING OF IT, COMMUNICATION, ACCESS CONTROL &amp; SURVEILLANCE SYSTEM</b>	
<b>Project No : 120310</b>	<b>DOCUMENT NO : NPI-120310-LVS-S1-TD-01</b>	<b>Revision : 02</b> <b>Date : 2015-10-31</b>

The employer or such other contractor may use for such completion so much of the construction documents, other design documents made by or on behalf of the contractor, contractor's equipment, temporary works, plant and materials as he or they may think proper. Upon completion of the works, or at such earlier date as the employer's representative thinks appropriate, the employer's representative shall give notice that the contractor's equipment and temporary works will be released to the contractor at or near the site. The contractor shall remove or arrange removal of the same from such place without delay and at his cost.

If it is found that the employer was not entitled to terminate under this sub-clause, the contract shall be deemed to have been terminated under sub-Clause 2.4.

### **15.3 Valuation at Date of Termination**

The employer's representative shall, as soon as possible after such termination, determine and advise the contractor of the value of the Construction Documents, plant, materials, contractor's equipment and works and all sums then due to the contractor as at the date of termination.

### **15.4 Payment after Termination**

After such termination, the employer shall not be liable to make any further payments to the contractor until the costs of design, execution, completion and remedying of any defects, damages for delay in completion (if any), and all other costs incurred by the employer, have been established.

The employer shall be entitled to recover from the contractor the extra costs, if any, of completing the works after allowing for any sum due to the contractor under sub-Clause 15.3. If there are no such extra costs, the employer shall pay any balance to the contractor.

### **15.5 Bribes**

If the contractor, or any of his subcontractors, agents or servants gives or offers to give to any person any bribe, gift, gratuity or commission as an inducement or reward:

- (a) for doing or forbearing to do any action in relation to the contract or any other contract with the employer, or
- (b) for showing or forbearing to show favour or disfavour to any person in relation to the contract or to any other contract with the employer, then the employer may, after having given 14 days' notice to the contractor, terminate the contractor's employment under the contract and expel him from the site, and the provisions of this clause shall apply as if such termination and expulsion had been made under sub-Clause 15.2.


### **15.6 Integrity Pact**

The Integrity Pact Annexed as Annexure-III shall be part and parcel of this tender and has to be signed by the bidder(s) at the pre tendering stage itself as a pre-bid obligation and should be submitted along with the financial & technical bids. All the bidders are bound to comply the Integrity Pact Clauses. Bids submitted without signing Integrity Pact will be ab initio rejected without assigning any reason."

## **16 Default of Employer**

### **16.1 Contractor's Entitlement to Suspend Work**

If the Employer fails to pay the Contractor the amount due under any certificate of the Employer's Representative, and fails to explain why the Contractor is not entitled to such amount, within 21 days after the expiry of the time stated in Sub-Clause 13.7 with in which payments is to be made, except for any deduction that the Employer is entitled to make under the contract, the contractor may suspend work or reduce the rate of work after giving not less than 7 days' prior notice to the employer (with a copy to the employer's representative). Such action shall not prejudice the contractor's entitlements to payment under sub-Clause 13.8 and to terminate under sub-Clause 16.2.

<b>Client :</b> 	<b>TENDER DOCUMENT FOR SUPPLY, INSTALLATION, TESTING &amp; COMMISSIONING OF IT, COMMUNICATION, ACCESS CONTROL &amp; SURVEILLANCE SYSTEM</b>	<b>nne pharmaplan®</b>
<b>Project No : 120310</b>		<b>Revision : 02 Date : 2015-10-31</b>

If the contractor suspends work or reduces the rate of work, and the employer subsequently pays the amount due (including payment in accordance with sub-Clause 13.8), the contractor's entitlement under sub-Clause 16.2 shall lapse in respect of such delayed payment, unless notice of termination has already been given, and the contractor shall resume normal working as soon as is reasonably possible.

If the contractor suffers delay and/or incurs cost as a result of suspending work or reducing the rate of work in accordance with this sub-clause, the contractor shall give notice to the employer's representative. After receipt of such notice, the employer's representative shall proceed in accordance with sub-Clause 3.5 to agree or determine:

- (a) any extension of time to which the contractor is entitled under sub-Clause 8.3, and
- (b) the amount of such cost plus reasonable profit, which shall be added to the contract price, and shall notify the contractor accordingly.

## **16.2 Termination**

If the employer:

- (a) fails to pay the contractor the amount due under any certificate of the employer's representative within 90 days after the expiry of the time stated in sub-Clause 13.7 within which payment is to be made (except for any deduction that the employer is entitled to make under the contract),
- (b) becomes bankrupt or insolvent, goes into liquidation, has a receiving or administration order made against him, compounds with his creditors, or carries on business under a receiver, trustee or manager for the benefit of his creditors, or if any act is done or event occurs which (under any applicable law) has a similar effect to any of these acts or event,
- (c) consistently fails to meet the employer's obligations under the contract, or
- (d) assigns the contract without the contractor's written consent, or, if a prolonged suspension affects the whole of the works as described in sub-Clause 8.10, then the contractor may terminate his employment under the contract by giving notice to the employer, with a copy to the employer's representative. Such notice shall take effect 14 days after the giving of the notice.

## **16.3 Cessation of Work and Removal of Contractor's Equipment**

After termination under sub-Clause 2.4 or sub-Clause 16.2, the contractor shall:

- (a) cease all further work, except for such work as may be necessary and instructed by the employer's representative for the purpose of making safe or protecting those parts of the works already executed, and any work required to leave the site in a clean and safe condition,
- (b) Hand over all construction documents, plant and materials for which the contractor has received payment.
- (c) hand over those other parts of the works executed by the contractor up to the date of termination, and
- (d) Remove all contractors' equipment which is on the site and repatriate all his staff and labour from the site.


Any such termination shall be without prejudice to any other right of the contractor under the contract.

## **16.4 Payment on Termination**

After termination under sub-Clause 16.2, the employer shall return the performance security, and shall pay the contractor an amount calculated and certified in accordance with sub-Clause 19.6 plus the amount of any loss or damage, including loss of profit, which the contractor may have suffered in consequence of termination.

## **17. Risk and Responsibility**

### **17.1 Indemnity**

<b>Client :</b> 	<b>TENDER DOCUMENT FOR SUPPLY, INSTALLATION, TESTING &amp; COMMISSIONING OF IT, COMMUNICATION, ACCESS CONTROL &amp; SURVEILLANCE SYSTEM</b>	<b>nne pharmaplan®</b>
<b>Project No : 120310</b>		<b>Revision : 02</b> <b>Date : 2015-10-31</b>

The contractor shall indemnify and hold harmless the employer, the employer's representative, their contractors, agents and employees from and against all claims, damages, losses and expenses arising out of or resulting from the works, including professional services provided by the contractor.

These indemnification obligations shall be limited to claims, damages, losses and expenses which are attributable to bodily injury, sickness, disease or death, or to injury to or destruction of tangible property (other than the works), including consequential loss of use. Such obligations shall also be limited to the extent that such claims, damages, losses or expenses are caused in whole or in part by a breach of a duty of care, imposed by law on the contractor or anyone directly or indirectly employed by the contractor.

### **17.2 Contractor's care of the Works**

The contractor shall take full responsibility for the care of the works from the commencement date until the date of issue of the Taking-Over Certificate, when responsibility shall pass to the employer. If the employer's representative issues a Taking-Over Certificate for any section or part of the works, the contractor shall cease to be responsible for the care of that section or part from the date of issue of such taking-over certificate, when responsibility shall pass to the Employer.

The Contractor shall take responsibility for the care of any outstanding work which is required to be completed prior to the expiry of the Contract Period, until the employer's representative confirms in writing that such outstanding work has been completed. If any loss or damage happens to the works, arising from any cause other than the employer's risks listed in sub-Clause 17.3, during the period for which the contractor is responsible, the contractor shall rectify such loss or damage, at his cost, so that the works conform with the contract. The contractor shall also be liable for any loss or damage to the works caused by any operations carried out by the contractor after the date of issue of the taking-over certificate.

### **17.3 Employer's Risks**


The employer's risks are:

- (a) war, hostilities (whether war be declared or not), invasion, act of foreign enemies,
- (b) rebellion, revolution, insurrection, or military or usurped power, or civil war,
- (c) Ionising radiation's, or contamination by radio-activity from any nuclear fuel, or from any nuclear waste from the combustion of nuclear fuel, radio-active toxic explosive, or other hazardous properties of any explosive nuclear assembly or nuclear component of such assembly,
- (d) Pressure waves caused by aircraft or other aerial devices travelling at sonic or supersonic speeds,
- (e) Riot, commotion or disorder, unless solely restricted to employees of the contractor or of his subcontractors and arising from the conduct of the works,
- (f) Loss or damage due to the use or occupation by the employer of any section or part of the works, except as may be provided for in the contract, and
- (g) Any operation of the forces of nature against which an experienced contractor could not reasonably have been expected to take precautions.

### **17.4 Consequences of Employer's Risks**

The contractor shall give notice, to the employer's representative, of an employer's risk upon it being foreseen by, or becoming known to, the contractor. If an employer's risk results in loss or damage, the contractor shall rectify such loss or damage to the extent required by the employer's representative. If the contractor suffers delay and/or incurs cost as a result of an employer's risk, the contractor shall give further notice to the employer's representative. After receipt of such further notice the employer's representative shall proceed in accordance with sub-Clause 3.5 to agree or determine:

- (a) any extension of item to which the contractor is entitled under sub-Clause 8.3, and

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<b>Project No : 120310</b>		<b>Revision : 02</b> <b>Date : 2015-10-31</b>

- (b) the amount of such cost, which shall be added to the contract price, and shall notify the contractor accordingly.

### **17.5 Contractors' Risks**

The contractor's risks are all risks other than the employer's risks listed in sub-Clause 17.3.

## **18. Insurance**

### **18.1 Insurance for Design**

The contractor shall effect and maintain professional indemnity insurance, which shall insure the contractor's liability by reason of error, omission or professional negligence in the design of the works. Such insurance shall be for a limit of not less than the amount specified in the special conditions of contract. Such amount shall be available to cover the liability of the contractor, irrespective of any other claims made against, or losses incurred by, the contractor (whether arising from the works or his other activities,) during the contract period.

The contractor shall use his best endeavours to maintain such professional indemnity insurance in full force and effect throughout the periods of his liability, under the contract and under the law of the country. The contractor undertakes to give the employer reasonable notice in the event of difficulty (if any) in extending or renewing such insurance.

### **18.2 Insurance for Supply and Installation till testing and commissioning**

The insurance for supply and installation till testing and commissioning shall be under the scope of purchaser. However, for arranging the transit insurance, the shipment details have to be immediately mailed to the purchaser.

### **18.3 Insurance against Injury to Persons and damage to Property**

The contractor shall insure against liability to third parties, in the joint names of the employer, the contractor and subcontractors, for any loss, damage, death or bodily injury which may occur to any physical property (except things insured under sub-Clause 18.2) or to any person (except persons insured under sub-Clause 18.4), which may arise out of the performance of the contract and occurring before the issue of the Performance Certificate. Such insurance shall be for a limit of not less than the amount specified in the special conditions of contract if any.

### **18.4 Insurance for Workers**

The contractor shall effect and maintain insurance against losses and claims arising from the death or injury to any person employed by the contractor or any subcontractor, in such a manner that the employer and the employer's representative are indemnified under the policy of insurance. For a subcontractor's employees, such insurance may be effected by the subcontractor, but the contractor shall be responsible for compliance with this clause.



### **18.5 General Requirements for Insurances**

The contractor shall, within the respective periods stated in the special conditions of contract (calculated from the commencement Date), submit to the employer:

- (a) evidence that the insurances described in this clause have been effected, and
- (b) copies of the policies for the insurances described in sub-Clause 18.3

When each premium has been paid, the contractor shall submit copy receipts to the employer. The contractor shall also when providing such evidence, policies and receipts to the employer, notify the employer's representative of so doing.



Client : 	<b>TENDER DOCUMENT FOR SUPPLY, INSTALLATION, TESTING &amp; COMMISSIONING OF IT, COMMUNICATION, ACCESS CONTROL &amp; SURVEILLANCE SYSTEM</b>	
<b>Project No : 120310</b>	<b>DOCUMENT NO : NPI-120310-LVS-S1-TD-01</b>	<b>Revision : 02</b> <b>Date : 2015-10-31</b>

The contractor shall effect all insurances for which he is responsible with insurers and in terms approved by the employer. Each insurance policy shall be consistent with the general terms agreed prior to the effective date. Each policy insuring against loss or damage shall provide for payments to be made in the currencies required to rectify such loss or damage. Payments received from insurers shall be used for the rectification of such loss or damage.

The contractor (and, if appropriate, the employer) shall comply with the conditions stipulated in each of the insurance policies. The contractor shall make no material alteration to the terms of any insurance without the prior approval of the employer. If an insurer makes (or purports to make) any such alteration, the contractor shall notify the employer immediately.

If the contractor fails to effect and keep in force any of the insurances required under the contract, or fails to provide satisfactory evidence, policies and receipts in accordance with this sub-clause, the employer may, without prejudice to any other right or remedy, effect insurance for the coverage relevant to such default, and pay the premiums due.

Such payments shall be recoverable from the contractor by the employer, and may be deducted by the employer from any monies due, or to become due, to the contractor.

Nothing in this clause limits the obligations, liabilities or responsibilities of the contractor or the employer, under the other terms of the contract or otherwise. Any amounts not insured or not recovered from the insurers shall be borne by the contractor and/or the employer accordingly.

## **19. Force Majeure**

### **19.1 Definition of Force Majeure**

In this Clause, “force Majeure” means an event beyond the control of the Employer and the Contractor, which makes it impossible or illegal for a party to perform, including but not limited to:

- (a) act of God ;
- (b) war, hostilities (whether war be declared or not), invasion, act of foreign enemies, mobilisation, requisition, or embargo;
- (c) rebellion, revolution, insurrection, or military or usurped power, or civil war;
- (d) contamination by radio-activity from any nuclear fuel, or from any nuclear waste from the combustion of nuclear fuel, radio-active toxic explosive, or other hazardous properties of any explosive nuclear assembly or nuclear component of such assembly;
- (e) Riot, commotion or disorder, unless solely restricted to employees of the Contractor or of his Subcontractors.

### **19.2 Effect of Force Majeure Event**



Neither the Employer nor the Contractor shall be considered in default or in contractual breach to the extent that performance of obligations is prevented by a Force Majeure event which arises after the Effective Date.

### **19.3 Contractor’s Responsibility**

Upon occurrence of an event considered by the Contractor to constitute Force Majeure and which may effect performance of his obligations, he shall promptly notify the Employer’s Representative, and shall endeavour to continue to perform his obligations as far as reasonably practicable. The Contractor shall also notify the Employer’s Representative of any proposals, including any reasonable alternative means for performance, but shall not effect such proposals without the consent of the Employer’s Representative.

### **19.4 Employer’s Responsibility**

Upon occurrence of an event considered by the Employer to constitute Force Majeure and which may affect performance of his obligations, he shall promptly notify the Contractor and the Employer’s Representative, and

Client : 	<b>TENDER DOCUMENT FOR SUPPLY, INSTALLATION, TESTING &amp; COMMISSIONING OF IT, COMMUNICATION, ACCESS CONTROL &amp; SURVEILLANCE SYSTEM</b>	
<b>Project No : 120310</b>		<b>Revision : 02</b> <b>Date : 2015-10-31</b>

shall endeavour to continue to perform his obligations as far as reasonably practicable. The Employer shall also notify the Employer's Representative and the Contractor of any proposals, with the objectives of completing the works and mitigating any increased costs to the Employer and the contractor.

#### **19.5 Payment to Contractor**

If, in consequence of Force Majeure, the works shall suffer loss or damage, the Contractor shall be entitled to have included, in an Interim Payment Certificate, the cost of Work executed in accordance with the Contractor, prior to the event of Force Majeure.

If the Contractor incurs additional Cost in complying with Sub-Clause 19.3, such Cost shall be determined by the Employer's Representative in accordance with the provisions of Sub-Clause 3.5 and shall be added to the Contract Price.

#### **19.6 Optional Termination Payment and Release**

Irrespective of any extension of time, if a Force Majeure event occurs and its effect continues for a period of 182 days, either the Employer or the Contractor may give to the other a notice of termination, which shall take effect 28 days after giving of the notice. If, at the end of the 28-day period, the effect of the Force Majeure continues, the Contract shall terminate. If the Contract is terminated under this Sub Clause, Sub-Clause 2.4 or Sub-Clause 16.2, the Employer's Representative shall determine the value of the work done and:

- (a) the amounts payable for any work carried out for which a price is stated in the Contract;
- (b) the Cost of Plant and Materials ordered for the Works which have been delivered to the Contractor, or of which the Contractor is liable to accept delivery : such Plant and Materials shall become the property of ( and be at the risk of ) the Employer when paid for by the Employer, and the Contractor shall place the same at the Employer's disposal;
- (c) the reasonable Cost of removal of Temporary Works and Contractor's Equipment from the Site and the return of such items to the Contractor's works in his country (or to any other destination at no greater cost).

#### **19.7 Release from Performance under the Law**

If an event of Force Majeure occurs, and under the law of the Contract the Employer and the Contractor are released from further performance, the sum payable by the Employer to the Contractor shall be the same as would have been payable under Sub-Clause 19.6 if the Contract had been terminated under that Sub-Clause.

### **20 Claims, Disputes And Arbitration**



#### **20.1 Procedure for claims**

If the Contractor intends to claim any additional payment under any Clause of these Conditions or otherwise, he shall give notice to the Employer's Representative within 28 days of the start of the event giving rise to the claim.

The Contractor shall keep such contemporary records as may be necessary to substantiate any claim, either on the Site or at another location acceptable to the Employer's Representative. Without admitting the Employer's liability, the Employer's Representative shall, on receipt of such notice, inspect such records and may instruct the Contractor to keep further contemporary records. The Contractor shall permit the Employer's Representative to inspect all such records, and shall (if instructed) submit copies to the Employer's Representative.

Within 28 days of such notice, or such other times as may be agreed by the Employer's Representative, the Contractor shall send to the Employer's representative an account, giving detailed particulars of the amount and basis of the claim. Where the event-giving rise to the claim has a continuing effect, such account shall be considered as Interim. The Contractor shall then, at such intervals as the Employer's Representative may reasonably require, send further interim accounts giving the accumulated amount of the claim and any further particulars. Where interim accounts are sent to the Employer's Representative, the Contractor shall send a final account within 28 days of the end of the effects resulting from the event.



<b>Client :</b> 	<b>TENDER DOCUMENT FOR SUPPLY, INSTALLATION, TESTING &amp; COMMISSIONING OF IT, COMMUNICATION, ACCESS CONTROL &amp; SURVEILLANCE SYSTEM</b>	
<b>Project No : 120310</b>		<b>Revision : 02</b> <b>Date : 2015-10-31</b>

If the Contractor fails to comply with this Sub-Clause, he shall not be entitled to additional payment.

## 20.2 Payments of Claims

The Contractor shall be entitled to have included in any Interim Payment Certificate such amount for any claim as the Employer's Representative considers due. If the particulars supplied are insufficient to substantiate the whole of the claim. The Contractor shall be entitled to payment for such part of the claim as has been substantiated.

## 20.3 Expert

Unless the Expert has been previously mutually agreed upon the parties and named in the Contract, the parties shall, within 28 days of the Effective Date, jointly agree upon and appoint a suitably qualified person as Expert. The Expert shall be (and the terms of his appointment shall so provide) independent of the parties and shall act impartially and in accordance with the Contract. The terms of the remuneration of the Expert, including the remuneration of any specialist from whom the Expert may require to seek advice, shall be mutually agreed upon among the Employer, the Contractor and the Expert. The Employer and the Contractor shall each pay one-half of the Expert's remuneration in accordance with such terms. The Expert's appointment may be terminated only by mutual agreement of the Employer and the Contractor. The Expert's term of appointment shall expire when the discharge referred to in Sub-Clause 13.12 shall have become effective, or at such other time as the parties may mutually agree.

If the parties so agree, they may appoint a suitably qualified person to replace the Expert. The appointment will come into effect if at any time the Expert declines to act or is unable to act as a result of his death, disability, resignation or termination of his appointment.

If the parties fail to agree on the appointment or the replacement of the Expert, the person or administration named by employer shall appoint the Expert, after due consultation with the Parties and such appointment shall be final and conclusive.



## 20.4 Procedure for Obtaining Expert's Decision

If a dispute arises between the Employer and the Contractor in connection with, or arising out of, the Contract or the execution of the Works, including any dispute as to any opinion, instruction, determination, certification or valuation of the Employer's Representative, the dispute shall initially be referred in writing to the Expert for his decision, with a copy to the other party. Such reference shall state that it is made under this Sub-Clause. The parties shall promptly make available to the Expert all such information, access to the Site, and appropriate facilities, as the Expert may require for the purposes of rendering his decision. No later than the forty-second day after the day on which he received such reference, the Expert, acting as an expert and not as an arbitrator, shall give notice of his decision to the parties. Such notice shall include his reasons and shall state that it is given under this Sub-Clause.

Unless the Contract has already been repudiated or terminated, the Contractor shall, in every case, continue to proceed with the Works with all due diligence, and the Contractor and the Employer shall give effect forthwith to every decision of the Expert, unless and until the same shall be revised, as hereinafter provided, in an amicable settlement or an arbitral award.

If either party is dissatisfied with the Expert's decision, then either party, on or before the twenty-eighth day after the day on which it received notice of such decision, may notify the other party of its dissatisfaction. If the Expert fails to give notice of his decision on or before the forty-second day after the day on which he received the reference, then either party, on or before the twenty-eighth day after the day on which the said period of 42 days has expired, may notify the other party of its dissatisfaction. In either event, such notice of dissatisfaction shall state that it is given under this Sub-Clause, set out the matters in dispute and the reason(s) for dissatisfaction and, subject to Sub-Clause 20.7 and 20.8, no arbitration in respect of such dispute may be commenced unless such notice is given.

If the Expert has given notice of his decision as to a matter in a dispute to the Employer and the Contractor and no notice of dissatisfaction has been given by either party on or before the twenty-eighth day after the day on which

Client : 	<b>TENDER DOCUMENT FOR SUPPLY, INSTALLATION, TESTING &amp; COMMISSIONING OF IT, COMMUNICATION, ACCESS CONTROL &amp; SURVEILLANCE SYSTEM</b>	
<b>Project No : 120310</b>		<b>Revision : 02</b> <b>Date : 2015-10-31</b>

the parties received the Expert's decision, then Expert's decision shall become final and binding upon the Employer and the Contractor.

## 20.5 Amicable Settlement


Where notice of dissatisfaction has been given under Sub-Clause 20.4, the parties shall attempt to settle such dispute amicably before the commencement of arbitration. Provided that unless the parties agree otherwise, arbitration may be commenced on or after the fifty-sixth day after the day on which notice of dissatisfaction was given, even if no attempt at amicable settlement has been made.

## 20.6 Arbitration

If any dispute, difference, question or disagreement arises between the parties hereto or their respective representatives at any time in connection with construction, meaning, operation, effect, interpretation or out of the contract or breach thereof, the parties shall seek to resolve such a dispute or difference by mutual consultation within a period of 30 days from the date on which the party raising the dispute, first communicated the same in writing to the other party. The existing directions, classifications, measurements, drawings and certificates of the Employer shall be final and binding upon the contractor during the progress of the works and shall not be set aside on account of non-observance of any formality, any omission, delay or error in proceeding in or about the same or on any other ground or for any reason.


In case the dispute is not settled by mutual consultation, then either party may refer the same to Arbitration by an Arbitral Tribunal consisting of three arbitrators. Each party shall appoint an arbitrator and the arbitrators so appointed shall appoint a third arbitrator who will act as presiding arbitrator. The reference to arbitrator shall specify the matters which are in question, dispute or difference and only such dispute or differences of which the demand has been made be referred to arbitration. Notwithstanding the reference to arbitration, the contractor shall continue to duly perform his obligations under the contract. The Award of the Arbitral Tribunal shall be final, conclusive and binding on the parties. The Arbitration shall be conducted in accordance with the provisions of Arbitration and Conciliation Act, 1996. The venue of the arbitration shall be at Chennai. The fees of the arbitrators shall be borne by the parties nominating them and the fee of the Presiding Arbitrator, costs and other expenses incidental to the arbitration proceedings shall be borne equally by the parties.

Note: In case of discrepancy in tender conditions the chapter 3.2 (Special Condition of Contract) shall supercede

<b>Client :</b> 	<b>TENDER DOCUMENT FOR SUPPLY, INSTALLATION, TESTING &amp; COMMISSIONING OF IT, COMMUNICATION, ACCESS CONTROL &amp; SURVEILLANCE SYSTEM</b>	<b>nne pharmaplan®</b>
<b>Project No : 120310</b>		<b>Revision : 02 Date : 2015-10-31</b>



#### **20.9 Jurisdiction**

The courts at Chennai, Tamilnadu shall have exclusive jurisdiction for all disputes and difference arising out of this contract.-Addition

<b>Client :</b> 	<b>TENDER DOCUMENT FOR SUPPLY, INSTALLATION, TESTING &amp; COMMISSIONING OF IT, COMMUNICATION, ACCESS CONTROL &amp; SURVEILLANCE SYSTEM</b>	<b>nne pharmaplan®</b>
<b>Project No : 120310</b>		<b>Revision : 02 Date : 2015-10-31</b>

## CHAPTER – 3.2

### SPECIAL CONDITIONS OF CONTRACT

Client : 	<b>TENDER DOCUMENT FOR SUPPLY, INSTALLATION, TESTING &amp; COMMISSIONING OF IT, COMMUNICATION, ACCESS CONTROL &amp; SURVEILLANCE SYSTEM</b>	
<b>Project No : 120310</b>		<b>Revision : 02</b> <b>Date : 2015-10-31</b>

### 3.2 SPECIAL CONDITIONS

#### 3.2.1 GENERAL

These special conditions shall be read in conjunction with the General Conditions of contract, Job Specifications, Drawings and other documents forming part of this contract wherever the context so requires.

Notwithstanding the sub-division of the documents into these sections and volume every part of each shall be deemed to be supplementary to and complementary of every other part and shall be read with and into the context in so far as it may be practicable to do so.

The several documents forming the contract are to be taken as mutually explanatory of one another. In case of discrepancy the following order of precedence shall be observed:

- a. The works described in drawings and notes thereon.
- b. The items in the schedule of quantities.
- c. Particular specifications (given in Tender documents)
- d. Special conditions of contract.
- e. General conditions of contract.

The intending Contractor / contractor shall be deemed to have visited the site and familiarized himself thoroughly with the site conditions before submitting the tender or before signing the contract. Non-familiarity with the site conditions will not be considered a reason either for extra claims or for not carrying out the work in strict conformity with the drawings and specifications.

The rate quoted by the tenderer for any item of work for a particular building shall be applicable for other buildings also. If different rates are quoted, lowest of the rates quoted will be applicable for all buildings.

Contractor shall submit registration nos. for Service Tax, VAT, Works Contract Tax, IT PAN No., PF Contract Labour License, ESIC along with bid documents. The prices quoted should include supply, installation, testing & commissioning at site & should include all applicable taxes & duties.

#### 3.2.2 COMPLETION TIME & LIQUIDATED DAMAGES



Over all completion time shall be as mentioned in the Schedule of Fiscal Aspect. The LD shall be levied at the rate of 0.5% per week maximum being 5% of Total Contract Value, if the work is delayed beyond the stipulated completion time.

Contractor on receipt of the Work Order shall submit to Employer/Engineer, a further detailed schedule showing the way the work is proposed to be carried out so as to achieve all milestones in time. The Schedule so submitted will be scrutinized by Employer and if not found suitable will be changed by the contractor. The agreed schedule shall form a part of the contract and shall be strictly adhered to and all necessary arrangements shall be made to guarantee the fulfillment of overall construction schedule and milestones.

The Completion time is inclusive of monsoon period and no extension of time shall be granted on this account. During inclement weather, the contractor shall suspend all such work where quality is likely to be affected due to such weather conditions. Loss of time due such exigencies shall be made up during good weather without any cost implication to Employer.

#### 3.2.3 PROGRESS REPORTS

The Contractor shall submit brief weekly report & an exhaustive monthly report to Employer/Engineer-in-charge. The structure of the report will be in line with the Agreement. The Contractor shall also maintain at site a regular and proper record of progress on a continuous basis. Such record shall include Bar /PERT charts, Material movement, consumptions, rate of progress of various activities and any other record as may be advised by Employer from time to time. The contractor whenever demanded by Employer shall produce all such reports, record, progress charts etc.

Client : 	<b>TENDER DOCUMENT FOR SUPPLY, INSTALLATION, TESTING &amp; COMMISSIONING OF IT, COMMUNICATION, ACCESS CONTROL &amp; SURVEILLANCE SYSTEM</b>	
<b>Project No : 120310</b>		<b>Revision : 02</b> <b>Date : 2015-10-31</b>

The Contractor shall submit sufficient number of Colored photographs. Every month indicating the progress of execution. These photographs shall be taken from same points each time, covering entire field activities.

### **3.2.4 WORK ON SUNDAYS, HOLIDAY AND DURING NIGHT HOURS**

Contractor will be expected to work extended hours (2 shifts minimum) and on Sundays, Holidays and during night hours after obtaining the prior written approval of Employer/engineer-in-Charge. It is also expected that the Contractor shall make his own arrangement for lighting etc. for the purpose of night working. Employer however, shall not entertain any claim for extra cost or charges on account of such extended hour working or working on Sundays, Holidays and during night hours.

### **3.2.5 PRIORITISING THE WORK**

The Contractor shall work on areas in accordance with the priorities assigned by Employer and shall complete the same in the sequence as directed by Employer.

### **3.2.6 EXECUTION OF WORK**

The whole of the work must proceed within such sections at such times and in such manner as described in specifications and as directed by Employer. Drawings and details will be issued keeping in view the progress of works and the requirements of schedule of sequence of construction activities. Such drawings and details, if required, will be issued in advance to the Contractor before commencement of related construction activity at site. No extra time or relaxation of construction schedule will be permitted on account of this.

### **3.2.7 MINIMUM RE-WORKING**

The contractor shall ensure strict quality control at site. In no case more than 2% re-work on any individual item shall be allowed. For the purpose of determining the re-worked % either volumetric or surface area shall form the basis. Such basis shall be decided by Employer/engineer-in-Charge or his representative and shall be binding on the Contractor. Failure to comply with re-working requirement shall be treated as breach of contract in which case Employer shall take punitive action against the defaulting Contractor, as deemed fit.

### **3.2.8 FAILURE TO ARRANGE COMMITTED MANPOWER /MACHINERY**

The Contractor shall submit manpower and machinery / equipment proposed to be deployed to carry out the work within the stipulated time. Such committed manpower/machinery shall be considered as minimum requirement and failure to maintain the same at site shall be treated as deemed fit.

### **3.2.9 ACCESS TO SITE**

All necessary access to working area will have to be made and maintained by the Contractor. Such temporary constructions shall have to be removed after completion of the work or if so advised by Employer at any point of time at no extra cost.



### **3.2.10 PROPERTY RIGHTS**

All materials / goods / items at site whether free issue or otherwise, other than the Contractor's construction machinery, will be property of Employer, which shall not be removed from site of work and shall be open to inspection by Employer. The Contractor shall be responsible for any theft, loss and damage to such material, items, goods etc.

### **3.2.11 INSURANCE**

The insurance for supply and installation till testing and configuration shall be under the scope of supplier. All other insurances which required to complete the project shall be under the scope of contractor.

### **3.2.12 SECURITY / WATCH & WARD**

Client : 	<b>TENDER DOCUMENT FOR SUPPLY, INSTALLATION, TESTING &amp; COMMISSIONING OF IT, COMMUNICATION, ACCESS CONTROL &amp; SURVEILLANCE SYSTEM</b>	
<b>Project No : 120310</b>		<b>Revision : 02</b> <b>Date : 2015-10-31</b>

The Contractor shall make his own arrangement for safety/Security and Watch & Ward of his staff, materials and also the materials supplied by Employer as free issue or on chargeable basis. If Employer decides to have additional security at site then the Contractor is expected to work within the regulations of such security.

### 3.2.13 LABOUR AT SITE

Employer will not allow any temporary or permanent hutments or colonies at the Work Site. The Contractor will have to make his own arrangement for such labour camp(s) away from site at his own cost.

### 3.2.14 WATER AND ELECTRICITY FOR CONSTRUCTIONS

DELETED

### 3.2.15 ASSIGNING THE WORK/SUB-CONTRACTING/VENDOR SELECTION

- a) Employer/Engineer-in-charge approval shall be obtained before engaging any sub contractors/vendors.
- b) Assignment to another agency shall not be allowed unless specifically approved by Employer.
- c) Approval of such sub-contractors/vendors by Employer will not relieve the contractor from over-all contractual obligations.

### 3.2.16 OTHER CONTRACTS/CONCURRENT WORKS

- a) Employer reserves the right to let other contractors work in the same area in connection with his work under similar Agreement. The Contractor shall afford other Contractors reasonable opportunity for the introduction and storage of their materials and the execution of their work and shall properly connect and co-ordinate his work with theirs. If any part of Contractor's or sub-contractor's work depends for proper execution or results upon the work if any other Contractor or Sub-Contractor, the Contractor shall inspect and promptly report to Employer any defects in such work that render it unsuitable for such proper execution and results. Failure of the Contractor to so inspect and report shall constitute an acceptance of the other contractor's work as fit and proper for the reception of his work.
- b) During the progress of this contract, other construction works will also be concurrently in operation. The contractor shall co-operate with the other Contractors working at site to the fullest extent and shall allow reaching other every facility and co-operation for execution of this work, simultaneously and satisfactorily during the erection of machinery or execution of any other activity. Contractor may have to suspend his work partially or totally in the interest of the whole project. He may also be required to dismantle or to shift his construction plant and equipments for erection of machinery and /or any other operation. In such cases, he shall not be given any compensation on account of reduction or stoppage of labour force or dismantling, shifting of his construction plant and equipments, etc.

### 3.2.17 SAFETY PRECAUTIONS AT WORK



The contractor shall make all necessary arrangements for safety of personnel working at site and ensure that all safety precautions in line with established industry practices are taken and Guide Lines issued by Statutory Authorities are complied with.

### 3.2.18 PROTECTION AND CLEANING

The contractor shall protect and preserve the work from all damage or accident providing any temporary roof, window and door coverings, boxing or other construction as required by the Architect. This protection shall be provided for all property adjacent to the site as well as on the site.

The contractor shall properly clean the work as it progresses and shall remove all rubbish and debris from the site from time to time as is necessary and as directed. On completion, the Contractor shall ensure that the premises and / or site are cleaned, surplus materials debris, sheds etc. removed, areas under floors cleared of rubbish, gutters and drains cleared, doors and sashes eased, locks and fastenings oiled, keys clearly labeled and handed over to the Clerk-



Client : 	<b>TENDER DOCUMENT FOR SUPPLY, INSTALLATION, TESTING &amp; COMMISSIONING OF IT, COMMUNICATION, ACCESS CONTROL &amp; SURVEILLANCE SYSTEM</b>	
<b>Project No : 120310</b>	<b>DOCUMENT NO : NPI-120310-LVS-S1-TD-01</b>	<b>Revision : 02 Date : 2015-10-31</b>

of Works so that the whole is left fit for immediate occupation or use and to the satisfaction of the Architect/Company.

### 3.2.19 PROTECTION OF WILD LIFE

The Contractor shall ensure the safety of wild Life animals in and around the site and ensure that all Statutory Regulations are complied with. He shall indemnify Employer against violation of Wild Life Protection Act or any such Government Regulations.

### 3.2.20 BOQ & PRICE SCHEDULE

The contract shall be based on Item wise Price for the Items listed in the Schedule of quantities. The unit price quoted shall remain fixed irrespective of quantity variation.

### 3.2.21 EARNEST MONEY DEPOSIT

The tenderer shall furnish along with its tender, earnest money for amount as shown under chapter 3.2 schedule of Fiscal aspects. The earnest money is required to protect the purchaser against the risk of the tenderer's unwarranted conduct. The EMD should be furnished in the name of “ **HLL Biotech Limited,** payable at Chennai”.

The earnest money shall be denominated in Indian Rupees The earnest money shall be furnished in one of the following forms:

- i) Account Payee Demand Draft
- ii) Bank Guarantee ( format enclosed as ***Annexure-IV***)

The demand draft shall be drawn on any commercial bank in India or country of the tenderer, in favour of the “**HLL Biotech Limited**” payable at Chennai. In case of bank guarantee, the same is to be provided from any from scheduled commercial bank in India.



**The earnest money shall be valid for a period of forty-five (45) days beyond the validity period of the tender.**

Unsuccessful tenderers' earnest money will be returned to them without any interest, after expiry of the tender validity period, but not later than thirty days after conclusion of the resultant contract. Successful tenderer's earnest money will be returned without any interest, after receipt of performance security from that tenderer.

Earnest Money is required to protect the employer against the risk of the Tenderer's conduct, which would warrant the forfeiture of the EMD. Earnest money of a tenderer will be forfeited, if the tenderer withdraws or amends its tender or impairs or derogates from the tender in any respect within the period of validity of its tender or if it comes to notice that the information/documents furnished in its tender is incorrect, false, misleading or forged without prejudice to other rights of the purchaser. The successful tenderer's earnest money will be forfeited without prejudice to other rights of Purchaser if it fails to furnish the required performance security within the specified period.

### 3.2.22

**DELETED**

Client : 	<b>TENDER DOCUMENT FOR SUPPLY, INSTALLATION, TESTING &amp; COMMISSIONING OF IT, COMMUNICATION, ACCESS CONTROL &amp; SURVEILLANCE SYSTEM</b>	
<b>Project No : 120310</b>	<b>DOCUMENT NO : NPI-120310-LVS-S1-TD-01</b>	<b>Revision : 02 Date : 2015-10-31</b>

### 3.2.23 PERFORMANCE SECURITY/SECURITY DEPOSIT

The successful tenderer shall furnish a Bank Guarantee within Thirty (30) days from the date of issue of Work Order in the format as acceptable to the Company for a sum of **5%** of the contract value from any Nationalized/Scheduled commercial bank **valid for the period of the Contract** plus 12 months along with additional claim period of 2 months towards the security for the execution and fulfillment of the contract

(initially for a period of 19 months)

- i. The security deposit recovered from the contractor and held with the employer will be released on the expiry of the defects liability period (12 months from the date of work completion certificate).

The security deposit of the successful tenderer will be forfeited, if he fails to comply with any of the conditions of the contract.

### 3.2.24 DELETED

### 3.2.25 VALIDITY OF OFFER/RATES / PRICES

- a. The Offer remains valid for a period of 90 days from the date of submission of tender.
- b. After placement of Work Order all the rates/prices quoted by Contractor shall remain valid till the Final Acceptance Certificate / Measurement Certificate is issued by Employer/Engineer-in-Charge.
- c. The unit rates / prices quoted by the Contractor in the Schedule of Rates / Prices / BOQ shall be firm irrespective of any quantity of individual items of work and/or in the total contract price.
- d. Prices and unit rates shall be valid even if the contract is split.
- e. Prices and unit rates of any or each item shall be valid irrespective of whether the item to be executed is located at any height/depth, any floor, inside or outside the building unless otherwise specifically mentioned in the description of item in the Schedule of Rate / Price / BOQ.

- 3.2.26 The rates quoted shall be deemed to be for the finished work to be measured at site. Tenderers must include, transportation of materials to site, VAT, Excise Duty, Octroi and any other tax and duty or other levy levied by the Central Govt or any State Govt. or Local Authorities, if applicable in their rates. No claim in respect of any of the above levies will be entertained by the Company. **For interstate sales, form “C” will be issued for concessional CST..**



Necessary deductions towards the Employee's State Insurance as per the Act, will be made in the contractor's bills if necessary. The contractor shall provide the proof of ESI payments and its adherence. The Contractor should maintain all records of labour payments (including subcontractors) and product as and when required by the Company or ESI Authorities for assessment and recovery. In case any additional amount is demanded from the Company by the authorities on any account, the Company shall have the right to recover the same from the Contractor.

### 3.2.27 CONFIDENTIALITY

The Contractor shall not reveal the scope of work/rates/quantities/facilities appearing in the Work Order/Contract to any body without the knowledge of employer. Violation of this Clause will be treated as breach of Contract, in which case Employer will reserve the right to take necessary punitive action against the Contractor.

### 3.2.28 TERMS OF PAYMENT

Refer GCC 13.4

Client : 	<b>TENDER DOCUMENT FOR SUPPLY, INSTALLATION, TESTING &amp; COMMISSIONING OF IT, COMMUNICATION, ACCESS CONTROL &amp; SURVEILLANCE SYSTEM</b>	
<b>Project No : 120310</b>		<b>Revision : 02</b> <b>Date : 2015-10-31</b>

### 3.2.29 NON TENDERED ITEMS:

- 3.2.29.1 The rates furnished in the Schedule of Quantities will apply for the entire project. Any item of work which is not covered in the Schedule of Quantities which may be required to be carried out on Site shall be executed by the Contractor and payment for such items of work shall be based on the rates that may be derived from the rates quoted for similar comparable items.
- 3.2.29.2 And for such items which cannot be derived from the quoted rates the payment shall be based on rate analysis of materials, labour, plus 10% towards overheads and profit.

### 3.2.30 TESTING OF MATERIAL

Employer/Engineer-in-Charge reserves the right to ask for any kind of test to be carried out on any construction material / consumables / finished structures or goods or items / bought outs. The Contractor shall bear all necessary charges for all such tests. Such tests shall be carried out by a laboratory / person approved by Employer/Engineer-in-Charge.

### 3.2.31 TAXES & DUTIES

Any variation in statutory levies/taxes within the contractual delivery period shall be to HBL's account subject to production of documentary evidence and Govt. notifications by the Supplier & beyond contractual delivery period, upward variation shall be to Supplier's account. Unit Prices quoted by the bidder shall be firm and valid, irrespective of any statutory variations in Taxes/levies. In case any taxes, duties are not clearly specified in price bid then it will be presumed that no such tax/levy is applicable or payable. Blank field in Price Bid shall be treated as 'Inclusive' in the quoted price.

### 3.2.32 DELETED

### 3.2.33 CONTRACTOR'S INABILITY TO SUPPLY MATERIAL

In case of Contractor fails to supply any item of material covered under contract then Employer will be at liberty to procure the same from open market at the risk & cost of the contractor and recover the same from forthcoming running bill or Security Deposit/Bank Guarantee.

### 3.2.34 PUNITIVE MEASURES

Employer will decide on punitive measures wherever reference to punitive measures or otherwise due to breach of contract is indicated in the clauses above. Decision of Employer in such matters shall be binding on the Contractor.



### 3.2.35 AMBIGUITIES IN TERMS & CONDITIONS/ QUANTITIES.

In case of any dispute or ambiguity in the interpretation of any condition contained both in the Agreement and the Special Conditions of Contract the interpretation of the Special Conditions of Contract shall prevail.

In case of interpretation of any item description in the schedule of quantities and the equivalent specifications, the item description given in the schedule of quantities shall prevail.

### 3.2.36 CHANGES IN CONSTITUTION

Before any change is made in the constitution of the firm, the prior approval is to be obtained by the Contractor in writing of the Accepting Authority. If the Contractor is an individual or a proprietary concern and the individual or the proprietor dies and if the Contractor is a partnership concern and one of the partners dies, then the Accepting Authority reserves the right to cancel the contract, if the Accepting Authority is not satisfied that the

Client : 	<b>TENDER DOCUMENT FOR SUPPLY, INSTALLATION, TESTING &amp; COMMISSIONING OF IT, COMMUNICATION, ACCESS CONTROL &amp; SURVEILLANCE SYSTEM</b>	
<b>Project No : 120310</b>		<b>Revision : 02</b> <b>Date : 2015-10-31</b>

legal representatives of the individual firm or the proprietor of the proprietary concern and in the case of partnership, the surviving partners are capable of carrying out and completing the contract.

### 3.2.37 UNDER PAYMENT / OVER PAYMENT

The employer reserves the right to carry out past payments, audit and technical examinations of the trial bill including all supporting vouchers, abstracts, etc., If as a result of such audit and technical examination any overpayment is discovered, it shall be recovered from any other sum due to the contractor, which may be available with the Employer or he shall pay the claim on demand.

Any amount due to the Contractor under this Contract for underpayment may be adjusted against any amount then due or which may at any time thereafter become due before payment is made to the Contractor.

### 3.2.38 CONFLICT IN INTERPRETATION OF CONDITIONS

If there is any conflict or difference in the interpretation of conditions stipulated in various sections of this tender document the reading and interpretation of the conditions stated shall prevail in the following order of priority:

- I) Scope of work and technical requirements
- II) Special conditions of contract
- III) General conditions of contract



In case of any discrepancy between the description of items in schedule of quantities, specifications, drawings and other tender documents, the decision of the Engineer-in-charge, in writing, shall be final binding and conclusive for the purpose of this contract. The contractor in any case shall not delay or stop the work for the questions or disputes being referred to arbitration but shall proceed with work with all diligence until the decision of the arbitrator and shall abide by arbitrators decision.

### 3.2.39 The contractor shall submit a bill giving details of measurement of works executed for interim payments to the Employer. The bill for interim payment shall include only those items as applicable as per the terms of payments.

**In addition to the above, following will also be taken into consideration:**

- A. Deleted
- B. Deduction of Income Tax and other applicable statutory deductions shall be made on the gross amount of each bill as per the provision of the Income Tax Act and other statutory act in force.
- C. Within three weeks of the receipt of the bill for interim payment, in case where there is difference in opinion as to the value of any item, the Employer's / Consultants view shall prevail.
- D. Deleted
- E. All interim payments shall be treated as advance payments. On completion of the entire work, the contractor shall submit his final bill. After verifying the bill, the final amount shall be released.
- F. The rates for each item shall include all taxes, duties including VAT etc. that may be levied according to the laws and regulations on the constructional plant, materials and supplies acquired for the purpose of the contract and on the services performed under the contract.
- G. The contractor shall submit computerized statement of total BOQ, completed BOQ and weekly schedule to Employer.
- H. The contractor shall submit room wise schedule activities for better monitoring and co-ordination with other agencies such as HVAC, Modular, Piping etc. to Employer.

### 3.2.40 The Contractor for Electrical Works shall be fully responsible, in all respects, for the co-ordination of all the services work including Modular, piping and HVAC works or works of other Employer appointed agencies.

<b>Client :</b> 	<b>TENDER DOCUMENT FOR SUPPLY, INSTALLATION, TESTING &amp; COMMISSIONING OF IT, COMMUNICATION, ACCESS CONTROL &amp; SURVEILLANCE SYSTEM</b>	
<b>Project No : 120310</b>		<b>Revision : 02</b> <b>Date : 2015-10-31</b>

Contractor shall ensure proper co-ordination for the inter-dependent / related activities between himself, services sub-contractors and other nominated, Specialist Contractors etc.

- a. The contractor shall arrange the water, electricity and scaffoldings required on their own.
- b. The Electrical Contractor shall be responsible to work out a co-ordinated work schedule with the HVAC, Modular, Plumbing and other nominated Contractors.
- c. No other claim shall be entertained from the contractor on the plea that the work has been executed in the above circumstances or under difficult conditions. It shall be the responsibility of the contractor to enforce necessary discipline among his workers and staff to ensure smooth working at the site in a spirit of co-operation and amity with all other agencies. In case of any dispute, decision of Employer or Employer's representative shall be final and binding to the contractor.

**3.2.41** The contractor is made explicitly clear that the work is to be carried out in co-ordination with HVAC agency and other nominated contractors/ agencies, which shall be engaged to execute other services of the project.

The contractor shall submit to the Employer's approval, immediately the following information in order to proceed with the work.

- A. Exact Layout and details of the temporary work that the contractor wants to carry out to fulfil his obligations under the contract.
- B. A general layout of storage space for material for the execution of work within stipulated time period.

**3.2.42** Depending on the exigencies at the site the temporary offices, stores etc. may have to be moved or shifted and the contractor shall do so, if so required by the Employer / Consultant at no extra cost to the Employer.

**3.2.43** After the award of the contract the contractor shall furnish Samples, Mock-ups and Shop Drawings (where appropriate) of all the materials and work listed elsewhere in these conditions, for approval by the Consultant / Employer. These samples / Shop Drawings / Mock-ups shall be prepared either at the site or at the Contractor's workshop as directed by the Consultant / Employer and delivered at the site to meet the time schedule finalised with the Employer.

All samples shall be made to the size and in the manner required by the Consultant / Employer.



All such sample work, shop drawings etc. shall be produced by the contractor at his cost and no extra payment shall be made for the same.

**3.2.44** Employer shall have full power to get any materials of work to be tested by an independent agency at contractor's expense in order to prove the soundness and adequacy.

**3.2.45** If any material / equipment are supplied by the Employer to the contractor free of cost, the contractor shall receive the same at site, handle with care and store them as directed by the Employer. The contractor shall be responsible for the safe custody and shall insure all materials against theft and damage by fire. The contractor shall maintain records of consumption on daily basis.


**3.2.46** The contractor shall ensure cleanliness and keep the site free from all debris, hazardous material, loose wires, open fires or any other materials and avoid damage due to accidents, negligence etc. All the above measures including fencing etc. required to be provided during the time period of the contract, shall be provided by the contractor at no expense to the Employer. The provision of all these measures does not absolve the contractor of his liabilities as per the contract.

**3.2.47** It shall be the responsibility of the Contractor to ensure that his workmen do not trespass into areas and buildings adjacent to the construction site. The contractor shall enforce proper discipline in this regard by making proper arrangements.

Client : 	<b>TENDER DOCUMENT FOR SUPPLY, INSTALLATION, TESTING &amp; COMMISSIONING OF IT, COMMUNICATION, ACCESS CONTROL &amp; SURVEILLANCE SYSTEM</b>	
<b>Project No : 120310</b>	<b>DOCUMENT NO : NPI-120310-LVS-S1-TD-01</b>	<b>Revision : 02</b> <b>Date : 2015-10-31</b>

- 3.2.48** The entire work shall be completed in all respects within 5 (**Five**) **continuous months** from the date of issue of Notification of Award
- 3.2.49** Penalty: If the Contractor fails to complete and hand over the completed work to the Employer within the stipulated period as per the Contract, penalty of 1% of the Contract Value per week of delay will be charged from the Contractor up to a maximum of 5% of the Contract Value.
- 3.2.50** Along with the submission of bid, the contractor will submit a detailed schedule. The schedule program will show the completion targets for major milestones of the job.
- The Contractor shall mobilise equipment, tools, plant, material, labour etc. in sufficient quantities so as to complete the work to meet the above agreed scheduled program. In the event of delay in the execution activities, the contractor shall mobilise additional resources to complete the job in the specified time period and at no extra cost to the Employer.
- The Consultant / Employer may suggest an alternative scheduling of operations, should they find it necessary, to accomplish the targets and the contractor shall accordingly mobilise additional resources at no extra cost to the Employer.
- 3.2.51** To facilitate satisfactory completion of the work under this contract, and to co-ordinate work with other agencies working at the site, meetings will be held at the time and venue decided by the Consultant / Employer.
- During these meetings progress of various works will be reviewed and those matters needing clarifications / decisions to expedite the work will be taken up.
- 3.2.52** During progress of the work, completed portion of the building may be occupied and put to use by the Employer. The Contractor shall however remain fully responsible for the maintenance of all the work till the entire work covered by the contractor is satisfactory completed and handed over to the Employer.
- 3.2.53** Safe custody of all materials and products supplied by the contractor shall be his own responsibility till the final taking over by the Employer. He should therefore employ sufficient staff for watch and ward at his own expenses.
- 3.2.54** It shall be the responsibility of the Contractor to study carefully all the drawings, instructions etc and point out discrepancies and obtain clarifications, if any, in writing before taking up the work. He shall also be responsible to ensure that the work is carried out in accordance with Local Bye-Laws in all respects, and to ensure that he obtains all prior sanctions from all the Competent Local Authorities before he takes up the work. If, as a result of his failure to do so, in spite of the works having been carried out as per the drawings and instruction issued by the Consultant and /or the Employer, and/or in the presence of the representative(s) of the Consultant / Employer, the Contractor himself shall be solely responsible and if so directed, dismantle and reconstruct at his own cost the work/item(s) of work as per such directions. No claims in this regard will be entertained.
- 3.2.55** It shall be the sole responsibility of the Contractor to ensure all safety measures giving proper prior notices etc. and obtaining prior permission from concerned local authorities as per Bye-Laws or directions issued by them, all at his own cost. No claim of the contractor in this regard shall be entertained.
- 3.2.56** With the submission of the tender, the Contractors declares and agrees that all the labour and requisite materials required for the work are available for completion of the work within the period stipulated for completion of the work.
- 3.2.57** It shall be the responsibility of the contractor to submit sample and obtain prior approval of the Consultant in respect of all materials, fittings and fixtures and any other items as decided by the Consultant. One such approved sample of each shall be kept with the Consultant and at site for future reference.
- 3.2.58** Any material / item / fitting / fixtures rejected by the Employer / Consultant shall be removed from the site within 48 hours of issue of instructions to this effect by the Consultant. Failing this, the Consultant shall have



<b>Client :</b> 	<b>TENDER DOCUMENT FOR SUPPLY, INSTALLATION, TESTING &amp; COMMISSIONING OF IT, COMMUNICATION, ACCESS CONTROL &amp; SURVEILLANCE SYSTEM</b>	<b>nne pharmaplan®</b>
<b>Project No : 120310</b>		<b>Revision : 02 Date : 2015-10-31</b>


the rights to get these so removed at the contractor's cost and the contractor shall have no claim whatever in this regard.

- 3.2.59** It shall be the entire responsibility of the Contractor to initiate action well in time with regard to extra/substituted items before taking up such items. The same shall apply to items, which have deviated as per the terms of the Contract. Contractor's failure in this regard shall be entirely at his own risk and cost.
- 3.2.60** Carrying out / taking of joint measurements along with the Employer's representative and / or getting the measurements of the various items included in any bill shall be the sole responsibility of the Contractor. Failure to get such measurements verified may entail non payments for such items for which the contractor himself shall be solely responsible and so also for all consequences flowing there from.
- 3.2.61** The contractor is alone responsible, for any discrepancy arising out of the definition / interpretation etc. of any matter connected with the execution of the work, which has not been got clarified prior to submission of tenders as required and all consequences arising there from.
- 3.2.62** The Contractor as per the given proforma shall submit a program of work. The agreed programme shall form a part of the contract.
- 3.2.63** The contractor shall adhere to the programme in its detail. Any modification to this shall be subject to the approval of the Employer / Consultant. Interim bills shall be raised upon completion of stages of work marked on the agreed program.
- 3.2.64** The contractor shall also include in his quoted rate barricading / fencing of construction activity area. All materials, fabrication yards, stores, manpower are to be contained within the barricaded area. The contractor shall not be allowed to extend his activities beyond this area.
- 3.2.65** Deleted.
- 3.2.66** Deleted.
- 3.2.67** No place and no temporary constructions will be allowed at the site for workers' accommodation during the construction work.
- 3.2.68** The Contractor will be provided with open space free of cost for constructing temporary site office near the construction area.
- 3.2.69** It is essential that the works site be kept in an orderly and neat manner at all times. Stacking of materials, arrangement of fabrication yards, water tank for construction, equipment etc. shall be free from obstructions and easy to survey and inspect. The Employer should have the right to get such work as is necessary to ensure proper maintenance of the works site at the contractors cost, in case the contractor fails to comply with the requirements.
- 3.2.70** The contractor has to meet all construction safety requirements as laid down by purchaser at their own cost.
- 3.2.71** The contractor shall use only steel scaffolding and not bamboos for any kind of work.

**(Contractor)**

**(Employer)**



Client : 	TENDER DOCUMENT FOR SUPPLY, INSTALLATION, TESTING & COMMISSIONING OF IT, COMMUNICATION, ACCESS CONTROL & SURVEILLANCE SYSTEM	nne pharmaplan®
Project No : 120310	DOCUMENT NO : NPI-120310-LVS-S1-TD-01	Revision : 02 Date : 2015-10-31



**Annexure-7**

**FORMAT OF PERFORMANCE CERTIFICATE**

**To whom it may concern**

Date. \_\_\_\_\_

Certified that M/s -----(name & address of the manufacturer) supplied us -----  
-----Nos (indicate quantity) of equipment, -----(indicate name of the equipment) against our  
order no -----dt -----(please indicate order no & date as figuring in the performance  
statement). The equipment was installed, commissioned & handed over to us on -----(indicate date) & since  
then the equipment has been working to our entire satisfaction.

Client : 	<b>TENDER DOCUMENT FOR SUPPLY, INSTALLATION, TESTING &amp; COMMISSIONING OF IT, COMMUNICATION, ACCESS CONTROL &amp; SURVEILLANCE SYSTEM</b>	
<b>Project No : 120310</b>	<b>DOCUMENT NO : NPI-120310-LVS-S1-TD-01</b>	<b>Revision : 02 Date : 2015-10-31</b>

### Annexure-8

## **TENDER FORM**

Date \_\_\_\_\_  
To \_\_\_\_\_

\_\_\_\_\_  
**HLL Biotech Limited, Chennai**

Ref. Your TE document No. \_\_\_\_\_ dated \_\_\_\_\_

We, the undersigned have examined the above mentioned TE document, including amendment/corrigendum No. \_\_\_\_\_, dated \_\_\_\_\_ (if any), the receipt of which is hereby confirmed. We now offer to supply and deliver \_\_\_\_\_ (*Description of goods and services*) in conformity with your above referred document for the sum of \_\_\_\_\_ (total tender amount in figures and words), as shown in the price schedule(s), attached herewith and made part of this tender.

If our tender is accepted, we undertake to supply the goods and perform the services as mentioned above, in accordance with the delivery schedule specified in the List of Requirements.

We further confirm that, if our tender is accepted, we shall provide you with a performance security of required amount in an acceptable form in terms of GCC clause 5, read with modification, if any, in Section - V – “Special Conditions of Contract”, for due performance of the contract.

We agree to keep our tender valid for acceptance as required in the GIT clause 19, read with modification, if any in Section - III – “Special Instructions to Tenderers” or for subsequently extended period, if any, agreed to by us. We also accordingly confirm to abide by this tender up to the aforesaid period and this tender may be accepted any time before the expiry of the aforesaid period. We further confirm that, until a formal contract is executed, this tender read with your written acceptance thereof within the aforesaid period shall constitute a binding contract between us.



We further understand that you are not bound to accept the lowest or any tender you may receive against your above-referred tender enquiry.

We confirm that we do not stand deregistered/banned/blacklisted by any Govt. Authorities.

We confirm that we fully agree to the terms and conditions specified in above mentioned TE document, including amendment/ corrigendum if any

\_\_\_\_\_  
(Signature with date)

(Name and designation) Duly authorised to sign tender for and on behalf of

Client : 	<b>TENDER DOCUMENT FOR SUPPLY, INSTALLATION, TESTING &amp; COMMISSIONING OF IT, COMMUNICATION, ACCESS CONTROL &amp; SURVEILLANCE SYSTEM</b>	
Project No : 120310	DOCUMENT NO : NPI-120310-LVS-S1-TD-01	Revision : 02 Date : 2015-10-31

### Annexure-9

#### **BANK GUARANTEE FORM FOR EMD**

Whereas \_\_\_\_\_ (hereinafter called the “Tenderer”) has submitted its quotation dated \_\_\_\_\_ for the supply of \_\_\_\_\_ (hereinafter called the “tender”) against the purchaser’s tender enquiry No. \_\_\_\_\_ Know all persons by these presents that we \_\_\_\_\_ of \_\_\_\_\_ (Hereinafter called the “Bank”) having our registered office at \_\_\_\_\_ are bound unto \_\_\_\_\_ (hereinafter called the “Purchaser) in the sum of \_\_\_\_\_ for which payment will and truly to be made to the said Purchaser, the Bank binds itself, its successors and assigns by these presents. Sealed with the Common Seal of the said Bank this \_\_\_\_\_ day of \_\_\_\_\_ 20\_\_\_\_. The conditions of this obligation are:

- (1) If the Tenderer withdraws or amends, impairs or derogates from the tender in any respect within the period of validity of this tender.
- (2) If the Tenderer having been notified of the acceptance of his tender by the Purchaser during the period of its validity:-
  - a) fails or refuses to furnish the performance security for the due performance of the contract.
  - or
  - b) fails or refuses to accept/execute the contract.
  - or
  - c) if it comes to notice that the information/documents furnished in its tender is incorrect, false, misleading or forged


We undertake to pay the Purchaser up to the above amount upon receipt of its first written demand, without the Purchaser having to substantiate its demand, provided that in its demand the Purchaser will note that the amount claimed by it is due to it owing to the occurrence of one or both the two conditions, specifying the occurred condition(s).

This guarantee will remain in force for a period of forty-five days after the period of tender validity and any demand in respect thereof should reach the Bank not later than the above date.

\_\_\_\_\_  
(Signature of the authorised officer of the Bank)

\_\_\_\_\_  
Name and designation of the officer

\_\_\_\_\_  
Seal, name & address of the Bank and address of the Branch

Client : 	<b>TENDER DOCUMENT FOR SUPPLY, INSTALLATION, TESTING &amp; COMMISSIONING OF IT, COMMUNICATION, ACCESS CONTROL &amp; SURVEILLANCE SYSTEM</b>	<b>nne pharmaplan®</b>
Project No : 120310	DOCUMENT NO : NPI-120310-LVS-S1-TD-01	Revision : 02 Date : 2015-10-31

### Annexure-10

#### MANUFACTURER'S AUTHORISATION FORM

To

---

**HLL Biotech Limited, Chennai**

Dear Sirs,

Ref. Your TE document No \_\_\_\_\_, dated \_\_\_\_\_

We, \_\_\_\_\_ who are proven and reputable manufacturers of \_\_\_\_\_ (name and description of the goods offered in the tender) having factories at \_\_\_\_\_, hereby authorise Messrs \_\_\_\_\_ (name and address of the agent) to submit a tender, process the same further and enter into a contract with you against your requirement as contained in the above referred TE documents for the above goods manufactured by us.

We also hereby extend our full service, support, warranty as applicable as per clause 15 of the General Conditions of Contract, read with modification, if any, in the Special Conditions of Contract for the goods and services offered for supply by the above firm against this TE document.

Yours faithfully,

---



[Signature with date, name and designation]

for and on behalf of Messrs \_\_\_\_\_

[Name & address of the manufacturers]

**Note:**

1. This letter of authorisation should be on the letter head of the manufacturing firm and should be signed by a person competent and having the power of attorney to legally bind the manufacturer.
2. Original letter may be sent.

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Project No : 120310	DOCUMENT NO : NPI-120310-LVS-S1-TD-01	Revision : 02 Date : 2015-10-31

### Annexure-11

#### **BANK GUARANTEE FORM FOR ADVANCE**

Ref.....

Date.....

Bank Guarantee No....

To

HLL Biotech Ltd.,  
Module 013-015,  
Ticel Biopark Campus,  
CSIR Road, Taramani,  
Chennai – 600 113.

Dear Sirs,



In consideration of the HLL Biotech Ltd., hereinafter referred to as 'HBL', which expression shall unless repugnant to the context or meaning thereof include its successors, executors, administrators and assigns, having awarded to M/s.\_\_\_\_\_ having its registered office at \_\_\_\_\_ hereinafter referred as the 'Supplier', which expression shall unless repugnant to the context or meaning thereof, include its successors, Administrators, executors and assigns, a contract hereinafter referred to as the 'Order' for \_\_\_\_\_ referred to as the 'Supply and Services' on terms and conditions set out, inter-alia in the HBL's Order No. \_\_\_\_\_ dated \_\_\_\_\_ valued \_\_\_\_\_ at \_\_\_\_\_ (in words & figures) and as the HBL having agreed to make a payment against the above ORDER, to the Supplier amounting to Rs. \_\_\_\_\_ (in words & figures) as an advance against Bank Guarantee to be furnished by the Supplier, the said advance to be adjusted against the supply and services to be performed by the Supplier, we \_\_\_\_\_ hereinafter referred to as the 'Bank' which expressions shall, unless repugnant to the context or meaning thereof, include its successors, administrators, executors and assigns **having our office at \_\_\_\_\_ do hereby undertake to give the irrevocable and unconditional guarantee and** do hereby undertake to pay the HBL on first demand without any demur, **reservation, contest recourse and protest and without reference to the Supplier** any and all monies payable by the Supplier by reason of any breach by the said Supplier of any of the terms and conditions of the said order to the extent of Rs. \_\_\_\_\_ (in words & figures) till the said advance is adjusted as aforesaid at any time upto \_\_\_\_\_. We agree that the guarantee herein contained shall continue to be enforceable till the sum due to the HBL on account of the said advance is adjusted/recovered in full as aforesaid or till the HBL discharges this guarantee.

The HBL shall have the fullest liberty without affecting in any way the liability of the Bank under this guarantee, from time to time vary the advance or to extend the time for performance of the supply and services by the Supplier. The Bank shall not be released from its liability under these presents by any exercise of the HBL of the liberty with reference to the matter aforesaid.

The HBL shall have the fullest liberty, **without reference to Supplier and** without affecting this guarantee to postpone **for any time or** from time to time the exercise of any powers vested in them or of any right which they might have against the Supplier, and to exercise the same at any time in any manner, and either to enforce or to forebear to enforce any **power**, covenants contained or implied in the order between the HBL and the Supplier or any other course or remedy or security available to the HBL and the Bank shall not be released of its obligations under these presents by any exercise by the HBL of its liberty with reference to matters aforesaid or any of them or by reason of any other act or forbearance or other acts of omission or commission on the part of the HBL or any other indulgence shown by the HBL or by any other matter or thing whatsoever which under law would, but for this provision, have the effect of relieving the Bank Guarantee.

**The right of HBL to recover the outstanding sum of advance with applicable costs upto Rs. \_\_\_\_\_ from the bank in the manner aforesaid will not be affected or suspended by reason of the fact that any dispute or disputes is or are pending before any officer, tribunal or court and any demand made by HBL on the Bank shall be conclusive and binding.**

The Bank further undertakes not to revoke this guarantee during its currency without prior and written consent of the **HBL and further agrees that the guarantee contained shall continue to be enforceable till the HBL discharges this guarantee.**

<b>Client :</b> 	<b>TENDER DOCUMENT FOR SUPPLY, INSTALLATION, TESTING &amp; COMMISSIONING OF IT, COMMUNICATION, ACCESS CONTROL &amp; SURVEILLANCE SYSTEM</b>	
<b>Project No : 120310</b>	<b>DOCUMENT NO : NPI-120310-LVS-S1-TD-01</b>	<b>Revision : 02</b> <b>Date : 2015-10-31</b>

The Bank also agrees that the HBL shall at its option is entitled to enforce this guarantee against the bank as principal debtors, in first instance, notwithstanding any other security or guarantee that **HBL** may have in relation to the Supplier's liabilities of the said advance.

Notwithstanding anything contained herein above, our liability under this guarantee is restricted to as Rs. \_\_\_\_\_(in words & figures) and it will remain in force upto and including (date of completion of supply and services) and shall be extended from time to time for such periods as may be advised by M/s..... on whose behalf this guarantee has been given.

Therefore, we hereby affirm that we are guarantors and responsible to you on behalf of the Supplier upto a total amount of \_\_\_\_\_(amount of guarantees in words and figures) and we undertake to pay you, upon your first written demand declaring the Supplier to be in default under the purchase order and without caveat or argument, any sum or sums within the limits of (amount of guarantee) as aforesaid, without your needing to prove or show grounds or reasons for your demand or the sum specified therein.



This Guarantee is valid until \_\_\_\_\_ day \_\_\_\_\_.

**We have power to issue this guarantee in your favour under Memorandum and Articles of Association and the undersigned has full power to do under the Power of Attorney / Resolution of Board of Directors dated.....granted to him by the Bank.**

Dated.....this.....day of.....2015

Signed by  
Place:

(Person duly authorised by Bank)  
Witness :

Client : 	<b>TENDER DOCUMENT FOR SUPPLY, INSTALLATION, TESTING &amp; COMMISSIONING OF IT, COMMUNICATION, ACCESS CONTROL &amp; SURVEILLANCE SYSTEM</b>	
<b>Project No : 120310</b>	<b>DOCUMENT NO : NPI-120310-LVS-S1-TD-01</b>	<b>Revision : 02 Date : 2015-10-31</b>

### **Annexure-12**

#### **BANK GUARANTEE FORM FOR PERFORMANCE SECURITY**

To

HLL Biotech Ltd.,  
Module 013-015,  
Ticel Biopark Campus,  
CSIR Road, Taramani,  
Chennai – 600 113.

1. In consideration of HLL Biotech Limited (hereinafter called “HBL”) having agreed under the terms and conditions of Order No..... dated..... made between ..... (here in after called “the said contractor(s)”) for the ..... work (herein after called “the said agreement”) for compliance of his obligation in accordance with the terms and conditions in the said agreement.

We ..... (indicate the name of the Bank) (herein after referred to as “as Bank) hereby undertake to pay to the HBL and amount not exceeding Rs..... (Rupees..... only) on demand by HBL.

2. We ..... (Indicate the name of the Bank) do hereby undertake to pay the amount due and payable under this Guarantee without any demure, merely on a demand from HBL stating that the amount claimed is required to meet the recoveries due or likely to be due from the said contractor(s). any such demand made on the Bank shall be conclusive as regards the amount due and payable by the bank under this Guarantee. However, our liability under this guarantee shall be restricted to an amount not exceeding Rs..... (Rupees..... only).

3. We undertake to pay to HBL any money so demanded notwithstanding any dispute or disputes raised by the contractor (s) in any suit or proceeding pending before any court or Tribunal relating thereto our liability under this present being absolute and unequivocal.

The payment made by us under this guarantee shall be valid discharge of our liability for payment to there-under and the contractor(s) shall have no claim against us making such payment.

4. We ..... (Indicate the name of Bank) further agree that the guarantee herein contained shall remain in full force and effect during the period that would be taken for the performance of the said agreement and that it shall continue to be enforceable till all the dues of HBL under or by virtue of the said agreement have been fully paid and its claims satisfied or discharged or till Engineer-in-charge on behalf of HBL Certified that the terms and conditions of the said Agreement have been fully and properly carried out by the said contractor(s) accordingly discharges this guarantee.



5. We..... (Indicate the name of Bank) further agree with HBL that HBL shall have the fullest liberty without our consent and without affecting any manner our obligations hereunder to vary any of the terms and conditions of the said agreement or to extend time of performance by the said contractor(s) from time to time or to postpone for any of the powers exercisable by HBL against the said contractor(s) and to forebear or enforce any of the terms and conditions relating to the said agreement we shall not be relieved from our liability by reasons of any such variation or extension being granted to the said contractor(s) or for any forbearance act of omission on that part of the HBL or any indulgence by HBL to the said contract(s) or by any such matter or thing whatsoever which under the law relating to sureties would, but for this provision, have effected or so relieving us.

6. The guarantee will not be discharged due to the change in the constitution of the Bank or the contractor(s).

7. We..... (indicate the name of Bank) lastly undertake not to revoke this guarantee except with the previous consent of HBL in writing.

8. This guarantee shall be valid up to ..... unless extended on demand by HBL. Notwithstanding anything mentioned above our liability against this Guarantee is restricted to Rs..... (Rupees.....only) and




<b>Client :</b> 	<b>TENDER DOCUMENT FOR SUPPLY, INSTALLATION, TESTING &amp; COMMISSIONING OF IT, COMMUNICATION, ACCESS CONTROL &amp; SURVEILLANCE SYSTEM</b>	
<b>Project No : 120310</b>		<b>Revision : 02</b> <b>Date : 2015-10-31</b>

unless a claim in writing is lodged with us within six months of the date of expiry or the extended date of expiry of this guarantee, all our liabilities under the Guarantee shall stand discharged.

Dated the ..... day of 20....

For .....  
(Indicate the name of Bank)



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<b>Project No : 120310</b>		<b>Revision : 02 Date : 2015-10-31</b>

### **Annexure-13**

#### **PROFORMA OF CONSIGNEE RECEIPT CERTIFICATE** (To be given by consignee's authorized representative)

The following store(s) has/have been received in good condition:

- 1) Contract No. & date : \_\_\_\_\_
- 2) Supplier's Name : \_\_\_\_\_
- 3) Consignee's Name & Address with telephone No. & Fax No. : \_\_\_\_\_
- 4) Name of the item supplied : \_\_\_\_\_
- 5) Quantity Supplied : \_\_\_\_\_
- 6) Date of Receipt by the Consignee : \_\_\_\_\_
- 7) Name and designation of Authorized Representative of Consignee  
: \_\_\_\_\_
- 8) Signature of Authorized Representative of Consignee with date  
: \_\_\_\_\_
- 9) Seal of the Consignee : \_\_\_\_\_

Client : 	<b>TENDER DOCUMENT FOR SUPPLY, INSTALLATION, TESTING &amp; COMMISSIONING OF IT, COMMUNICATION, ACCESS CONTROL &amp; SURVEILLANCE SYSTEM</b>	
Project No : 120310	DOCUMENT NO : NPI-120310-LVS-S1-TD-01	Revision : 02 Date : 2015-10-31

### Annexure-14

#### Proforma of Final Acceptance Certificate by the Consignee

No \_\_\_\_\_

Date \_\_\_\_\_

To

M/s \_\_\_\_\_

\_\_\_\_\_

Subject: Certificate of commissioning of equipment/plant.

This is to certify that the equipment(s)/plant(s) as detailed below has/have been received in good conditions along with all the standard and special accessories and a set of spares (subject to remarks in Para no.02) in accordance with the contract/technical specifications. The same has been installed and commissioned.

- (a) Contract No \_\_\_\_\_ dated \_\_\_\_\_
- (b) Description of the equipment(s)/plants: \_\_\_\_\_
- (c) Equipment(s)/ plant(s) nos.: \_\_\_\_\_
- (d) Quantity: \_\_\_\_\_
- (e) Bill of Loading/Air Way Bill/Railway  
Receipt/ Goods Consignment Note no \_\_\_\_\_ dated \_\_\_\_\_
- (f) Name of the vessel/Transporter: \_\_\_\_\_
- (g) Name of the Consignee: \_\_\_\_\_
- (h) Date of commissioning and proving test: \_\_\_\_\_

#### **Details of accessories/spares not yet supplied and recoveries to be made on that account.**


Sl. No.	Description of Item	Quantity	Amount to be recovered
---------	---------------------	----------	------------------------

The proving test has been done to our entire satisfaction and operators have been trained to operate the equipment(s)/plant(s).

The supplier has fulfilled its contractual obligations satisfactorily ## or

The supplier has failed to fulfill its contractual obligations with regard to the following:

- He has not adhered to the time schedule specified in the contract in dispatching the documents/drawings pursuant to 'Technical Specifications'.
- He has not supervised the commissioning of the equipment(s)/plant(s) in time, i.e. within the

Client : 	<b>TENDER DOCUMENT FOR SUPPLY, INSTALLATION, TESTING &amp; COMMISSIONING OF IT, COMMUNICATION, ACCESS CONTROL &amp; SURVEILLANCE SYSTEM</b>	<b>nne pharmaplan®</b>
Project No : 120310	DOCUMENT NO : NPI-120310-LVS-S1-TD-01	Revision : 02 Date : 2015-10-31

period specified in the contract from date of intimation by the Purchaser/Consignee in respect of the installation of the equipment(s)/plant(s).

- The supplier as specified in the contract has not done training of personnel.

The extent of delay for each of the activities to be performed by the supplier in terms of the contract is:

The amount of recovery on account of non-supply of accessories and spares is given under Para no.02.

The amount of recovery on account of failure of the supplier to meet his contractual obligations is \_\_\_\_\_ (here indicate the amount).

Signature

Name



Designation with stamp

### **## Explanatory notes for filling up the certificate:**

**He has adhered to the time schedule specified in the contract in dispatching the documents/drawings pursuant to ‘Technical Specification’.**

**He has supervised the commissioning of the equipment(s)/plant(s) in time, i.e. within the time specified in the contract from date of intimation by the Purchaser/Consignee in respect of the installation of the equipment(s)/plant(s).**

**Training of personnel has been done by the supplier as specified in the contract  
In the event of documents/drawings having not been supplied or installation and commissioning of the equipment(s)/plant(s) having been delayed on account of the supplier, the extent of delay should always be mentioned in clear terms.**

Client : 	<b>TENDER DOCUMENT FOR SUPPLY, INSTALLATION, TESTING &amp; COMMISSIONING OF IT, COMMUNICATION, ACCESS CONTROL &amp; SURVEILLANCE SYSTEM</b>	
<b>Project No : 120310</b>	<b>DOCUMENT NO : NPI-120310-LVS-S1-TD-01</b>	<b>Revision : 02 Date : 2015-10-31</b>

### Annexure-15

To be signed by the bidder and same signatory competent/authorized to sign the relevant contract of  
behalf of HLL Biotech Limited

### **INTEGRITY AGREEMENT**

This Integrity Agreement is made at ..... on this ..... Day of.....20.....

#### **BETWEEN**

President of India represented through CHIEF EXECUTIVE OFFICER, HLL Biotech Limited (Hereinafter referred as the “Principal/Owner”, which expression shall unless repugnant to the meaning or context hereof include its successors and permitted assigns.

#### **AND**

.....  
through .....(Hereinafter referred to as the  
“**Bidder/Contractor**” and which expression shall unless repugnant to the meaning or context hereof include its successors and permitted assigns).

#### **Preamble**



WHEREAS the Principal / owner has floated the Tender (NIT No.....)  
(hereinafter referred to as “**Tender/Bid**”) and intends to award, under laid down organizational procedure, contract for  
.....  
Hereinafter referred to as the “**Contract**”

AND WHEREAS the Principal /Owner values full compliance with all relevant laws of the land, rules, regulations, economic use of resources and of fairness/transparency in its relation with its Bidder(s) and Contractor(s).

AND WHEREAS to meet the purpose aforesaid both the parties have agreed to enter into this Integrity Agreement (hereinafter referred to as “**Integrity Pact**” or “**Pact**”), the terms and conditions of which shall also be read as integral part and parcel of the Tender Bid documents and Contract between the parties. NOW, THEREFORE, in consideration of mutual covenants’ contained in this Pact, the parties hereby agree as follows and this Pact witnesses as under:

### **Article 1: Commitment of the Principal /Owner**

- 1) The Principal /Owner commits itself to take all measures necessary to prevent corruption and to observe the following principles.
  - (a) No employee of the Principal/Owner, personally or through any of his/her family members, will in connection with the Tender, or the execution of the Contract, demand, take a promise for or accept, for self or third person, any material or immaterial benefit which the person is not legally entitled to.
  - (b) The Principal/Owner will, during the Tender process, treat all Bidder(s) with equity and reason. The Principal/owner will, in particular, before and during the Tender process, provide to all Bidder(s) the same information and will not provide to any Bidder(s) confidential / additional information through which the Bidder(s) could obtain an advantage in relation to the Tender process or the Contract execution.
  - (c) The Principal /Owner shall Endeavour to exclude from the Tender process any person, whose conduct in the past has been of biased nature.
- 2) If the Principal/Owner obtains information on the conduct t of any of its employees which is a criminal offence under the Indian Penal code (IPC)/Prevention of Corruption Act, 1988 (PC Act) or is in violation of the principles herein



Client : 	<b>TENDER DOCUMENT FOR SUPPLY, INSTALLATION, TESTING &amp; COMMISSIONING OF IT, COMMUNICATION, ACCESS CONTROL &amp; SURVEILLANCE SYSTEM</b>	
<b>Project No : 120310</b>		<b>Revision : 02</b> <b>Date : 2015-10-31</b>

mentioned or if there be a substantive suspicion in this regard, the Principal/Owner will inform the Chief Vigilance Officer and in addition can also initiate disciplinary actions as per its internal laid down policies and procedures.

## **Article 2: Commitment of the Bidder(s) / Contractor(s)**

- 1) It is required that each Bidder/Contractor(including their respective officers, employees and agents) adhere to the highest ethical standards, and report to the Government/Department all suspected acts of **fraud or corruption or Coercion or Collusion** of which it has knowledge or becomes aware, during the tendering process and throughout the negotiation or award of a contract.
- 2) The Bidder(s)/Contractor(s) commit himself to take all measures necessary to prevent corruption. He commits himself to observe the following principles during his participation in the Tender process and during the Contract execution.
  - (a) The Bidder(s)/Contractor(s) will not, directly or through any other person or firm, offer, promise or give to any of the Principal/owner's employees involved in the Tender process or execution of the Contract or to any third person any material or other benefit which he/she is not legally entitled to, in order to obtain in exchange any advantage of any kind whatsoever during the Tender process or during the execution of the Contract.
  - (b) The Bidder(s) will not enter with other Bidder(s) into any undisclosed agreement or understanding, whether formal or informal. This applies in particular to prices, specifications, certification, subsidiary contracts, submission or non-submission of bids or any other actions to restrict competitiveness or to cartelize in the bidding process.
  - (c) The Bidder(s)/Contractor(s) will not commit any offence under the relevant IPC/PC Act. Further the Bidder(s) /Contract(s) will not use improperly, (for the purpose of competition or personal gain).or pass on to others, any information or documents provided by the Principal/Owner as part of the business relationship, regarding plans, technical proposals and business details, including and business relationship, regarding plans, technical proposals and business details, including information contained or transmitted electronically.
  - (d) The Bidder (s) /Contractor(s) of foreign origin shall disclose the names and addresses of agents/representatives in India, if any Similarly Bidder(s)/Contractor(s) of Indian Nationality shall disclose names and addresses of foreign agents/representatives, if any. Either the Indian agent on behalf of the foreign principal or the foreign principal directly could bid in a tender but not both. Further, in cases where an agent participate in a tender on behalf of one manufacturer, he shall not be allowed to quote on behalf of another manufacturer along with the first manufacturer in a subsequent/parallel tender for the same item.
  - (e) The Bidder (s)/Contractor (s) will , when presenting his bid, disclose (with each tender as per proforma unclosed) any and all payments he has made, is committed to or intends to make to agents, brokers or any other intermediaries in connection with the award of the Contract.
- 3) The Bidder(s) /Contractor(s) will not instigate third persons to commit offences outlined above or be an accessory to such offences.
- 4) The Bidder(s)/contractor(s) will not, directly or through any other person or firm indulge in fraudulent practice means a willful misrepresentation or omission of facts or submission of fake/forged documents in order to induce public official to act in reliance thereof, with the purpose of obtaining unjust advantage by or causing damage to justified interest of others and /or to influence the procurement process to the detriment of the Government interests.
- 5) The Bidder(s)/Contractor(s) will not, directly or through any other person or firm use Coercive Practices (Means the act of obtaining something, compelling an action or influencing a decision through intimidation, threat or the use of force directly or indirectly, where potential or actual injury may befall upon a person, his/her reputation or property to influence their participation in the tendering process).

## **Article 3: Consequences of Breach**

Client : 	<b>TENDER DOCUMENT FOR SUPPLY, INSTALLATION, TESTING &amp; COMMISSIONING OF IT, COMMUNICATION, ACCESS CONTROL &amp; SURVEILLANCE SYSTEM</b>	
<b>Project No : 120310</b>	<b>DOCUMENT NO : NPI-120310-LVS-S1-TD-01</b>	<b>Revision : 02 Date : 2015-10-31</b>

Without prejudice to any rights that may be available to the Principal/Owner under law or the Contract or its established policies and laid down procedures, the Principal/Owner shall have the following rights in case of breach of this Integrity Pact by the Bidder (s)/Contractor(s) and the Bidder(s)/Contractor(s) accepts and undertakes to respect and uphold the Principal /Owner's absolute right:

- 1) If the Bidders) / Contractor(s), either before award or during execution of Contract has committed a transgression through a violation of Article 2 above or in any other form, such as to put his reliability or credibility in question, the Principal/owner after giving 14 days' notice to the contractor shall have powers to disqualify the Bidder (s)/Contractor(s) from the Tender process or terminate/determine the Contract, if already executed or exclude the Bidder/Contractor from future contract award processes. The imposition and duration of the exclusion will be determined by the severity of transgression and determined by the Principal/owner. **Such exclusion may be forever or for a limited period as decided by the Principal/owner.**
- 2) **Forfeiture of EMD/performance Guarantee/Security Deposit:** If the Principal/owner has disqualified the Bidder(s) from the Tender process prior to the award of the Contract or terminated/determined the Contract or has accrued the right to terminate/determine the Contract according to Article 3(1), the Principal /Owner apart from exercising any6 legal rights that may have accrued to the Principal/Owner, may in its considered opinion forfeit the entire amount of Earnest Money Deposit, Performance Guarantee and security Deposit, Performance Guarantee and security Deposit of the Bidder/Contractor.
- 3) **Criminal Liability:** If the Principal/Owner obtains knowledge of conduct of a Bidder or Contractor, or of and employee or a representative or an associate of a Bidder or Contractor which constitutes corruption within the meaning of Indian Penal code (IPC)/Prevention of corruption Act, or if the Principal/owner has substantive suspicion in this regard, the Principal/owner will inform the same to law enforcing agencies for further. Investigation.

#### **Article 4- Previous Transgression**

- 1) The Bidder declares that no previous transgressions occurred in the last 5 years with any other Company in any country confirming to the anticorruption approach or with Central Government or State Government or any other Central/State Public sector Enterprises in India that could justify his exclusion from the Tender process.
- 2) If the Bidder makes incorrect statement on this subject, he can be disqualified from the Tender process or action can be taken for banning of business dealings/ holiday listing of the Bidder/Contractor as deemed fit by the Principal/owner.
- 3) If the Bidder/Contractor can prove that he has resorted / recouped the damage caused by him and has installed a suitable corruption prevention system, the Principal/owner may, at its own discretion, revoke the exclusion prematurely.

#### **Article 5- Equal Treatment of all Bidders/Contractors/Subcontractors**

- 1) The Bidder(s) /Contractor(s) undertake(s) to demand from all subcontractors a commitment in conformity with this Integrity Pact. The Bidder/Contractor shall be responsible for any violation(s) of the principles laid down in this agreement /pact by any of its Sub-contractors/sub-vendors.
- 2) The Principal/owner will enter into Pacts on identical terms as this one with all Bidders and Contractors.



#### **Article 6- Duration of the Pact**

This Pact begins when both the parties have legally signed it. It expires for the Contractor/Vendor 12 months after the completion of work under the contract or till the continuation of defect Liability period, whichever is more and for all other bidders, till the Contract has been awarded.

If any claim is made/lodged during the time, the same shall be binding and continue to be valid despite the lapse of this Pacts as specified above, unless it is discharged /determined by the competent authority, HLL Biotech Limited.

#### **Article 7- other Provisions**



Client : 	<b>TENDER DOCUMENT FOR SUPPLY, INSTALLATION, TESTING &amp; COMMISSIONING OF IT, COMMUNICATION, ACCESS CONTROL &amp; SURVEILLANCE SYSTEM</b>	
<b>Project No : 120310</b>		<b>Revision : 02</b> <b>Date : 2015-10-31</b>

- 1) This Pact is subject to Indian Law., place of performance and jurisdiction is the Head quarters of HLL Biotech Limited of the Principal/Owner, who has floated the Tender.
- 2) Changes and supplements need to be made in writing. Side agreements have not been made.
- 3) If the Contractor is a partnership or a consortium, this Pact must be signed by all the partners or by one or more partner holding power of attorney signed by all the partners or by one or more partner holding power of attorney signed by all partners and consortium members. In case of a company, the Pact must be signed by a representative duly authorized by board resolution.
- 4) Should one or several provisions of this Pact turn out to be invalid; the remainder of this Pact remains valid. In this case, the parties will strive to come to an agreement to their original intensions.
- 5) It is agreed term and condition that any dispute or difference arising between the parties with regard to the terms of this Integrity Agreement/pact, any action taken by the Owner/Principal in accordance with this **Integrity Agreement/Pact or interpretation thereof shall not be subject to arbitration.**

**Article 8- LEGAL AND PRIOR RIGHTS:**

All rights and remedies of the parties hereto shall be in addition to all the other legal rights and remedies belonging to such parties under the Contract and /or law and the same shall be deemed to be cumulative and not alternative to such legal rights and remedies aforesaid. For the sake of brevity, both the Parties agree that this Integrity Pact will have precedence over the Tender /Contact documents with regard any of the provisions covered under this Integrity Pact.

IN WITNESS WHEREOF the parties have signed and executed this Integrity Pact at the place and date first above mentioned in the presence of following witnesses:

.....  
(For and on behalf of Principal/owner)

.....  
(For and on behalf of Bidder/Contractor)

**WITNESSES:**

1.



(Signature, Name & address)

2.

(Signature, Name & address)

Place:

Date:

Client : 	<b>TENDER DOCUMENT FOR SUPPLY, INSTALLATION, TESTING &amp; COMMISSIONING OF IT, COMMUNICATION, ACCESS CONTROL &amp; SURVEILLANCE SYSTEM</b>	
Project No : 120310	DOCUMENT NO : NPI-120310-LVS-S1-TD-01	Revision : 02 Date : 2015-10-31

### **Annexure-16**

#### **INSTRUCTION OF MINISTRY OF SHIPPING & TRANSPORT, NEW DELHI**

#### **1. DETAILS OF SHIPPING ARRANGEMENT FOR LINER CARGOES IN RESPECT OF C & F/CIF/TURNKEY/F.O.R CONTRACTS FOR IMPORTS**

**(a) SHIPMENT FROM PORTS OF U.K INCLUDING NORTHERN IRELAND (ALSO EIRE), FROM THE NORTH CONTINENT OF EUROPE (GERMANY, HOLLAND, BELGIUM, FRANCE, NORWAY, SWEDEN, DENMARK, FINLAND AND PORTS ON THE CONTINENTAL SEABOARD OF MEDITERRANIAN (I.E. FRENCH WESTERN ITALIAN PORTS), TO PORTS IN INDIA.**

The Seller should arrange shipment of the goods by vessels belonging to the member lines of the India-Pakistan-Bangladesh Conference. If the Seller finds that the space on the „Conference Lines” vessels is not available for any specific shipment, he should take up with India-Pakistan-Bangladesh Conference. Conferity House, East Grinstead, Sussex (UK), for providing shipping space and also inform the Shipping Co-ordination Officer, Ministry of Surface Transport, New Delhi, (Cable: TRANSCHART, NEW DELHI, Telex: VAHAN IN – 031 – 61157, 61158, 61159) The Seller should arrange shipment through the Government of India’s Forwarding Agents, M/s Schenker & Co., 2000-Hamburg (Cable: SCHENKER CO., HAMBURG) OR obtain a certificate from them to the effect that shipment has been arranged in accordance with instructions of the Ministry of Surface Transport, (TRANSCHART), New Delhi.

**(b) SHIPMENT FORM PORTS OF U.K. INCLUDING NORTHERN** Goods under this contract would be shipped by the national shipping companies of the Contracting Parties operating bilateral shipping service and vessels under the flag of third countries in accordance with the Agreement between the Government of German Democratic Republic and the Government of the Republic of India in the Field of Merchant Shipping signed on 9.1.1979, as amended up-to-date.

**(c) ISHIPMENT FROM ADRIATIC PORTS OF EASTERN ITALY AND YUGOSLAVIA** The seller should arrange shipment of the goods by vessels belonging to the following Indian member lines;

1. The Shipping Purchaser of India Ltd.
2. The Scindia Steam Navigation Co., Ltd
3. India Steamship Co., Ltd

For the purpose of ascertaining the availability of suitable Indian vessels and granting dispensation in the event of their non-availability, the Seller should give adequate notice about the readiness of each consignment from time to time at least six weeks in advance of the required position to M/s Schenker & Co. 2000 HAMBURG (Cable: SCHENKER CO., HAMBURG) and also endorse a copy thereof to the Shipping Co-ordination Officer, Ministry of Surface Transport, New Delhi, (Cable: TRANSCHART, NEW DELHI, Telex: VAHAN IN – 031 – 61157, 61158, 61159)

The seller should arrange shipment through the Government of India’s Forwarding Agents M/s Schenker & Co. 2000 HAMBURG (Cable: SCHENKER CO., HAMBURG) or obtain certificate from them to the effect that shipment has been arranged in accordance with the instructions of the Ministry of Surface Transport, (TRANSCHART), New Delhi.



#### **(d) SHIPMENT FROM POLAND & CZECHOSLOVAKIA**

##### **(i) IMPORTS FROM POLAND**

Shipment under this contract would be made by the National flag lines of the two parties and vessels of the third flag conference lines, in accordance with the agreement between the Govt. of the Republic of India and the Govt. of the Polish People’s Republic regarding Shipping Co-operation dated 27.6.1960 as amended up-to-date.

##### **(ii) IMPORTS FROM CZECHOSLOVAKIA**

Goods under this contract would be signed by the National flag lines of the two parties and vessels of the third flag conference lines, in accordance with the Agreement Co-operation in shipping between India and Czechoslovakia signed on 3.11.1978 and ratified on 19.12.1979, as amended up-to-date. Shipping arrangement should be made by the Sellers in consultation with Resident Representative of the Indian Shipping Lines in Gdynia, Co., Morska Agencja W. Gdyniul, Pulaskiego 8, P.O. Box 246, Gdynia (Poland) – Telex : MG PL. 054301, Tel.: 207621, to whom details regarding contract number, nature of cargo , quantity, port of lading, discharging, name of Government consignee, expected date of readiness of each consignment etc. should be furnish at least six weeks in advance of the required position, with a copy thereof

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<b>Project No : 120310</b>		<b>Revision : 02</b> <b>Date : 2015-10-31</b>

endorsed to the Shipping Co-ordination Officer, Ministry of Surface Transport, (Chartering Wing), New Delhi, (Cable: TRANSCART, NEW DELHI, Telex: VAHAN IN – 031 – 61157, 61158, 61159)

**(e) SHIPMENT FROM U.S.S.R** Shipment under this contract should be made in accordance with the agreement between the Government of the Republic of India and the Government of U.S.S.R on Merchant Shipping 1976, as amended up-to-date, by vessels of Indo-Soviet shipping Service.

**(f) SHIPMENT FROM JAPAN** The shipment of goods should be made of India vessels to the maximum extent possible subject to the minimum of 50%. The Seller should arrange shipment of the goods in consultation with the Embassy of India in Japan, Tokyo to whom details regarding contract number, nature of cargo, quantity, port of loading/discharge, name of Govt. consignee, expected date of readiness of each consignment etc. should be furnished at least six weeks in advance of the required position. Note: The copies of such contracts are to be endorsed both to the Attached (commercial) embassy of India in Japan, Tokyo, and the shipping Co-ordination Officer, Ministry of Surface Transport, New Delhi.

**(g) SHIPMENT FROM AUSTRALIA, ALGERIA, BULGARIA, ROMANIA, EGYPT** HLL Biotech Limited  
The Seller shall arrange shipment of the goods by Indian flag vessels to the maximum extent possible subject to a minimum of 50 %. For the purpose of ascertaining the availability of suitable Indian vessels, the seller shall give adequate notice of not less than six weeks about the readiness of each consignment to the Shipping Purchaser of India Ltd., SHIPPING HOUSE, 245, Madame Cama Road, Bombay – 400 021 (CABLE: SHIPINDIA BOMBAY) and also endorse a copy thereof to the Shipping Co-ordination Officer, Ministry of Surface Transport, New Delhi, (Cable: TRANSCART, NEW DELHI, Telex: VAHAN IN – 031 – 61157, 61158, 61159)

**(h) SHIPMENT FROM PAKISTAN** The shipment of cargoes should be made by Indian vessels to the maximum extent possible subject to a minimum of 50 %. Shipment arrangement should be made by the sellers in consultation with M/s Mogul Line Ltd., 16-Bank Street, Fort, Bombay – 400023 (Cable: MOGUL BOMBAY: Telex: 011 – 4049 MOGUL), to whom, details regarding contract number, nature of cargo, quantity, port of lading discharging, name of government consignee, expected date of readiness of each consignment etc. should be furnish at least six weeks in advance of the required position, with a copy thereof endorsed to the Shipping Co-ordination Officer, Ministry of Surface Transport, New Delhi, (Cable: TRANSCART, NEW DELHI, Telex: VAHAN IN – 031 – 61157, 61158, 61159)

**(i) SHIPMENT FROM U.S ATLANTIC & GULF PORTS** The Seller should arrange shipment of the goods by vessels belonging to the member lines of the India – Pakistan – Bangladesh – Ceylon and Burma Outward Freight Conference. If the Seller finds that the space of the „Conference Lines“ vessels is not available for any specific shipment he should take up with India – Pakistan- Bangladesh – Ceylon and Burma Outward Freight Conference, 19, Rector Street, New York, N.Y. 10006 USA, for providing shipping space and also inform the Shipping Co-ordination Officer, Ministry of Surface Transport, New Delhi, (Cable: TRANSCART, NEW DELHI, Telex: VAHAN IN – 031 – 61157, 61158, 61159)

**(i) SHIPMENT FROM ST. LAWRENCE AN EASTERN CANADIAN PORTS** The Seller should arrange shipment of the goods by vessels belonging to the following shipping lines;



1. The shipping Purchaser of India Ltd.
2. The Scindia Steam Navigation Co., Ltd

If the Seller finds that the space in the vessels of these Lines is not available for any particular consignments, he should inform the Shipping Co-ordination Officer, Ministry of Surface Transport, New Delhi, (Cable: TRANSCART, NEW DELHI, Telex: VAHAN IN – 031 – 61157, 61158, 61159) immediately so that dispensation from the shipping lines concerned to use alternative lifting may be sought.

## **(j) SHIPMENT FROM WEST COAST PORTS OF U.S. CANADA AND OTHER AREAS NOT SPECIFICALLY MENTIONED ABOVE**

The Seller should arrange shipment of the goods by Indian vessels to the maximum extent possible subject to a minimum of 50 %. For the purpose of ascertaining the availability of suitable Indian vessels and granting dispensation in the event of their non-availability, the Seller should furnish the details regarding contract number, nature of cargo, quantity, port of lading, discharging, name of government consignee, expected date of readiness of each consignment etc. to the Shipping Co-ordination Officer, Ministry of Surface Transport, New Delhi, (Cable: TRANSCART, NEW DELHI, Telex: VAHAN IN – 031 – 61157, 61158, 61159) at least six weeks in advance of the required position.

## **2. BILLS OF LADING:**

<b>Client :</b> 	<b>TENDER DOCUMENT FOR SUPPLY, INSTALLATION, TESTING &amp; COMMISSIONING OF IT, COMMUNICATION, ACCESS CONTROL &amp; SURVEILLANCE SYSTEM</b>	
<b>Project No : 120310</b>		<b>Revision : 02</b> <b>Date : 2015-10-31</b>

**(i) C.I.F./C&F/TURNKEY SHIPMENTS**


The Bills of lading should be drawn to indicate Shipper and „Consignee“ as under: SHIPPER: The C.I.F (C&F)/TURNKEY SUPPLIERS concerned. CONSIGNEE: As per consignee's particulars in the contract (The name and address of the „Port Consignee“ and „Ultimate“ both should be indicated).

**(ii) F.O.R SHIPMENTS**

The Bills of lading should be drawn to indicate shipper Consignee as under: SHIPPER: The F.O.R suppliers Concerned  
CONSIGNEE: Supplier's Indian Agent on order

**Note:**

1. Moreover the name of the „Purchaser“ and „Ultimate“ Consignee should appear in the body of the Bills of Lading as the „Notify“ or as a remark.
2. Two non-negotiable copies of the Bills of Lading indicating the freight amount and discount, if any allowed, should be forwarded to The Shipping Co-ordination Officer, Ministry of surface Transport (Chartering Wing), New Delhi after the shipment of each consignment is effected.
3. The seller should avoid the use of over-aged vessels for the shipment of the goods under the contract and if so used the cost of additional. Insurance, if any, shall be borne by the seller.

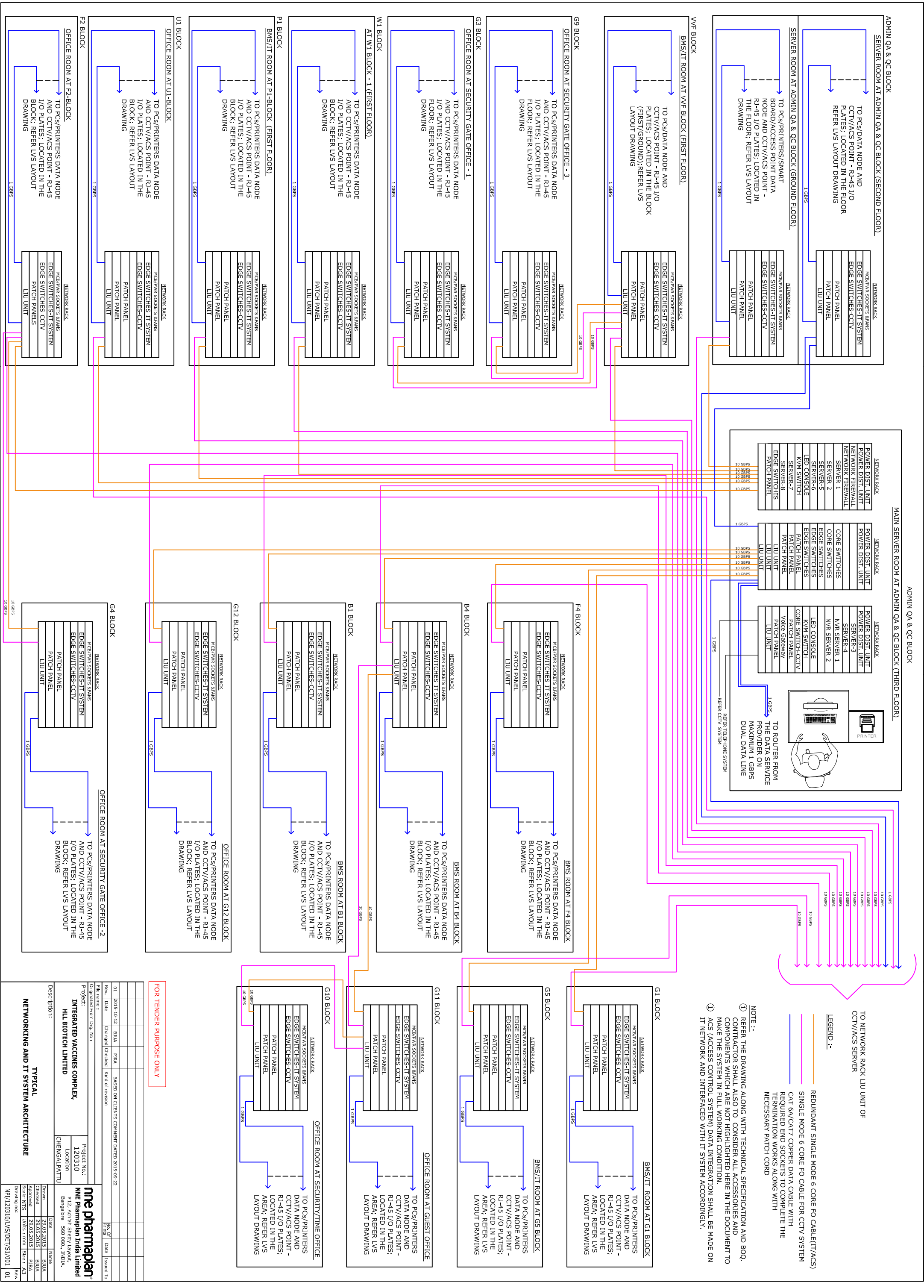
Client : 	<b>TENDER DOCUMENT FOR SUPPLY, INSTALLATION, TESTING &amp; COMMISSIONING OF IT, COMMUNICATION, ACCESS CONTROL &amp; SURVEILLANCE SYSTEM</b>	<b>nne pharmaplan®</b>
Project No : 120310	DOCUMENT NO : NPI-120310-LVS-S1-TD-01	Revision : 02 Date : 2015-10-31

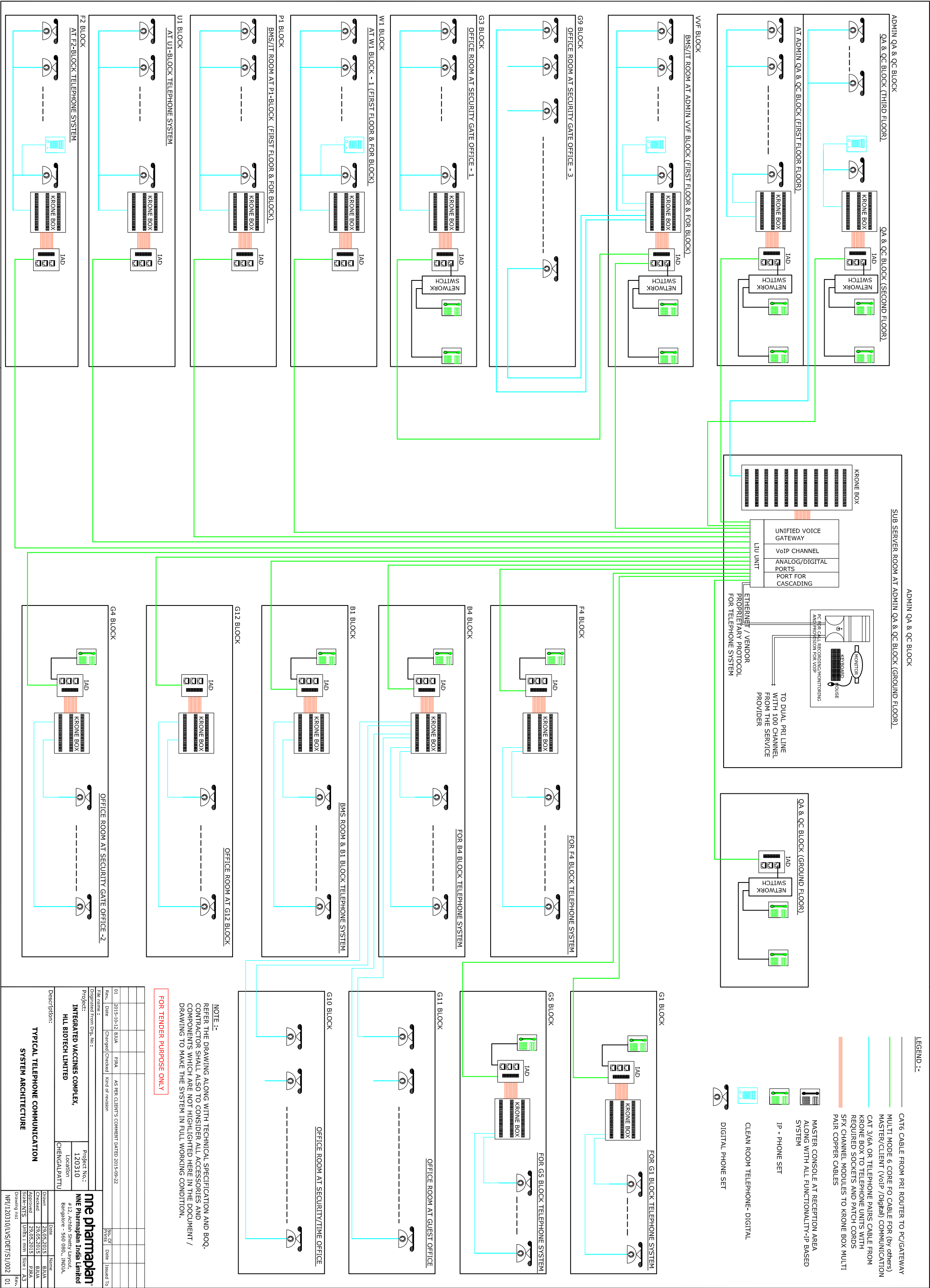
### Annexure-17

#### SCHEDULE OF FISCAL ASPECTS

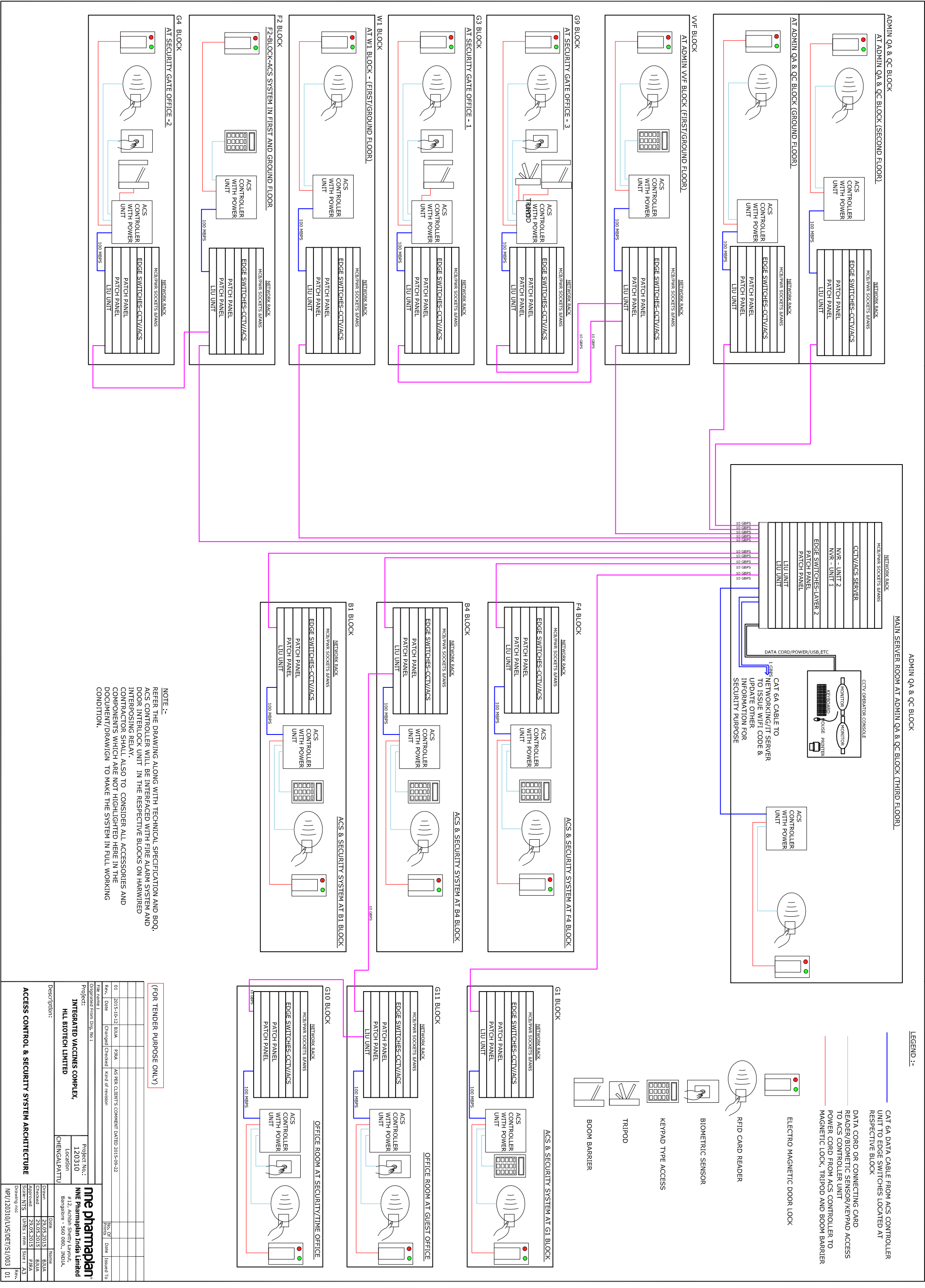
Sr. No.	Particulars	Description
1	Submission of completed Tender	23-11-2015, 11.30 Hrs
2	Opening of Technical Bid	23-11-2015, 12:00 Hrs
3	Delivery	Within 75 days from date of issue of Purchase order
4	Installation and configuration	75 days from the delivery of the equipment at site. The entire work is to be completed within 5 months from the date of Notification of Award
5	Advance	NOT APPLICABLE
6	Payment terms	As per GCC Clause No. 13.4
7	Liquidated damages/per week	0.5% per week inclusive of Sundays & Holidays upto a maximum of 5% of Contract Value
8	Warranty Period	12 (Twelve) months from the date of Completion.
9	Earnest Money Deposit	Rs. 25,00,000/-
10	Refund of Earnest Money Deposit to unsuccessful bidders	On award of contract to successful bidder
11	Insurance	On account of Vendor
12	B.G/ DD to be in favor of	HLL Biotech Ltd., Chennai
13	All queries / communication to be addressed to	The Chief Executive Officer HLL Biotech Limited, Ticel Biopark Campus (Module no. 013-015), CSIR Road, Taramani, Chennai- 600 113 Email: ramanr@hllbiotech.com, sureshs@hllbiotech.com, contact No: 044 22544949 - 78, Fax – 044 22540101
14	Pre-bid Meeting	<b>Venue:</b> HLL Biotech Limited, Ticel Biopark Campus (Module no. 013-015), CSIR Road, Taramani, Chennai- 600 113 <b>Date and Time : 07-11-2015 at 15:00 Hrs</b>
<b>(Contractor)</b>		<b>(Employer)</b>



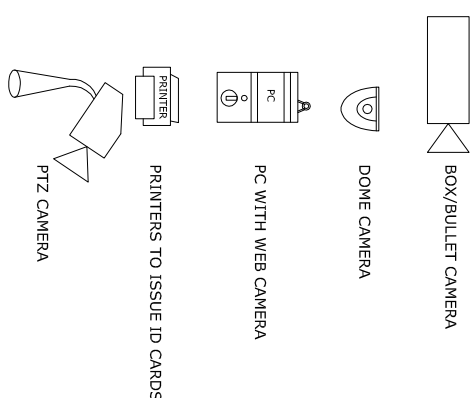
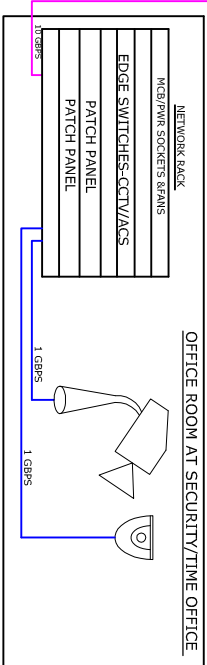
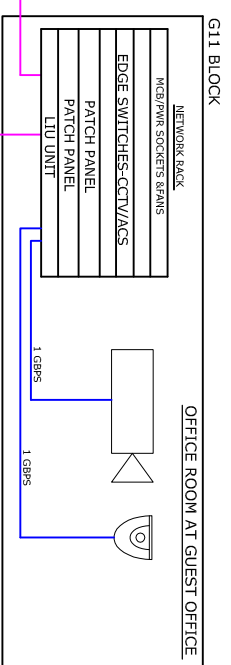
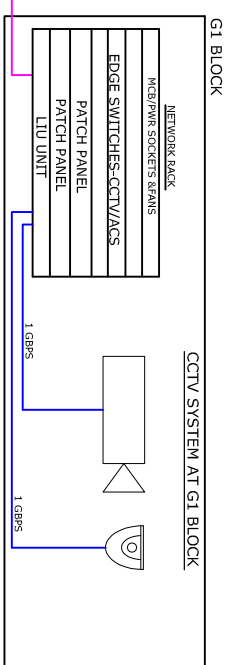
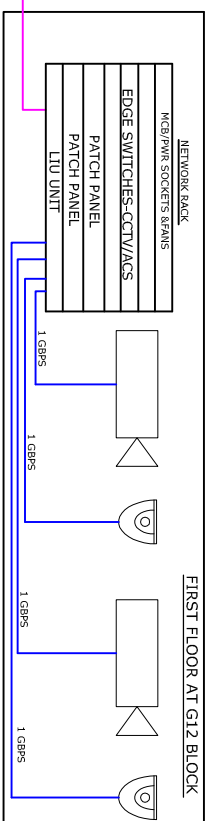
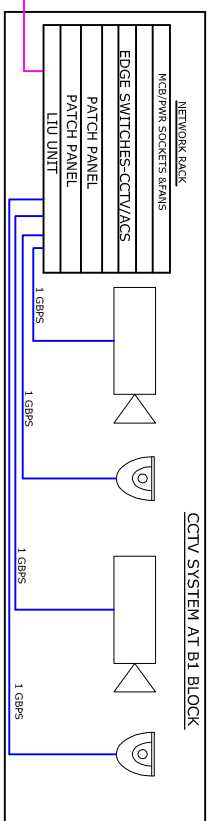
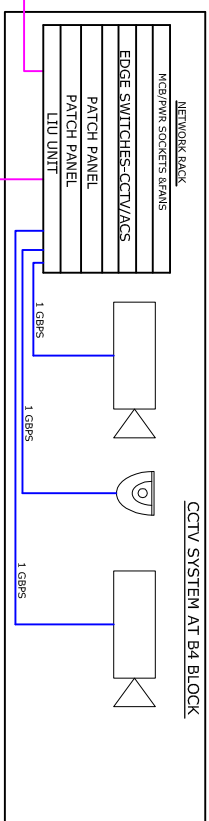
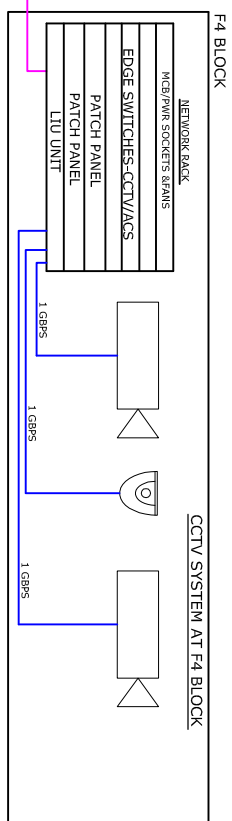
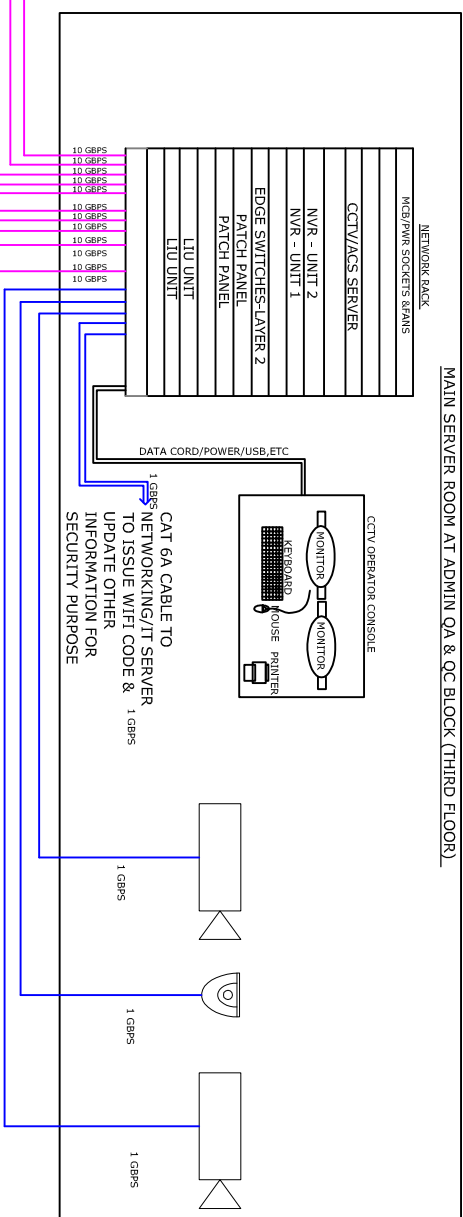
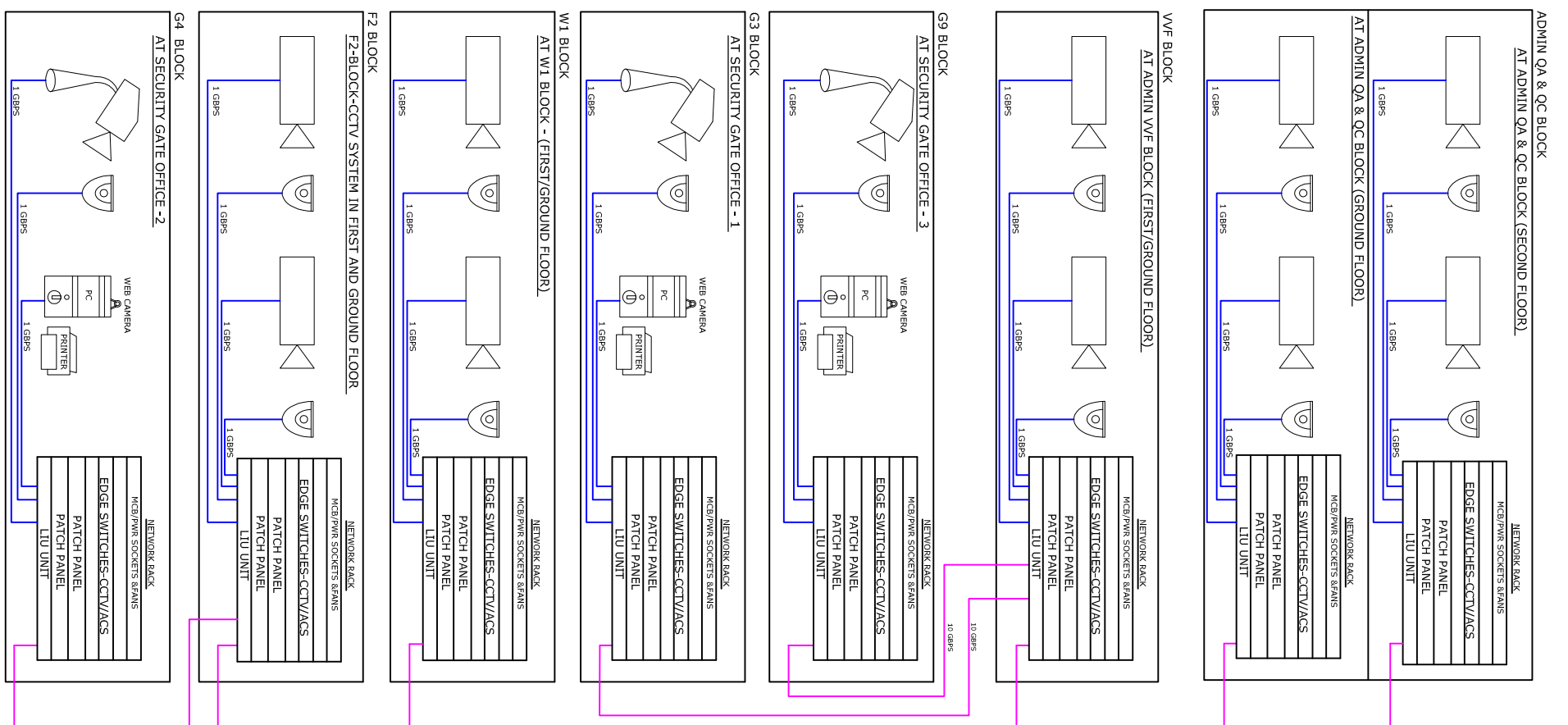








(FOR TENDER PURPOSE ONLY)		Project No.: 120310		Project Location: #12, Action Street Layout, Bangalore - 560 080, INDIA.	
Project: INTEGRATED VACCINES COMPLEX, HIL BIOTECH LIMITED		Project Location: CHENNAI/PATTU		Project Location: CHENNAI/PATTU	
Description:		Access Control & Security System Architecture		Access Control & Security System Architecture	
Title: NINE PHARMAPHAN		Date: 29.05.2015		Name: BJA	
Checked: 29.05.2015		Approved: 29.05.2015		PIBA	
Scale: NTS		Units: mm		Size: A3	
Drawing no: NP/120310/LVS/DET/S1/003		Date: 29.05.2015		Rev: 01	
				101	



LEGEND :-

SINGLE MODE 6 CORE FO CABLE FOR CCTV  
CAT 6A DATA CABLE FROM RESPECTIVE EDGE  
SWITCHES LOCATED AT RESPECTIVE BLOCK  
TO THE CAMERA(S) ON POE

FOR TENDER PURPOSE ONLY

[illegible]