

**REQUEST FOR PROPOSAL
FOR
SELECTION OF AGENCY
TO IMPLEMENT
DEVELOPMENT OF SPACE BASED LAND USE INTELLIGENCE
SYSTEM FOR GUWAHATI (SLIS-G)**

जुलाई /July 2023

**भारत सरकार/Government of India
अंतरिक्ष विभाग/Department of Space
उत्तर-पूर्वी अंतरिक्ष उपयोग केंद्र/North Eastern Space Applications Centre
उमियम/Umiar-793103, मेघालय/Meghalaya**

CONTENTS

NOTICE INVITING TENDER

1. DATASHEET	1
2. Objective	1
3. Instruction to bidders	4
3.1 General	4
3.2 Important Dates	5
3.3 Earnest Money Deposit (EMD) Fee	5
3.4 Basic Eligibility Criteria	5
3.5 MAKE IN INDIA (MII) CONDITIONS	5
3.6 Evaluation Criteria and Award of Contract	6
4. Scope of work	9
4.1 Image processing and analysis using time series high resolution remote sensing data	9
4.2 Database Creation and standardization and Publishing	9
4.3 AI/ML Based Model for Change Detection	10
4.4 SLIS-G Management and Monitoring Dashboard	10
4.5 Mobile Application for alert tracking and ground verification	13
4.6 Hosting and Go Live	14
4.7 Admin Module	15
4.8 Program management	15
4.9 Capacity Building	15
4.10 Annual Maintenance and Operation support	16
5. Intellectual Property	16
6. Deliverables	17
7. Bill of Quantities	18
8. Payment Terms	19
Annexure - I	20
Annexure - II	21
Annexure - III	22

भारत सरकार/Government of India
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उमियम/Uiam - 793103, मेघालय/ Meghalaya

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निविदा आमंत्रण सूचना/ NOTICE INVITING TENDER

निदेशक, एनईसैक, उमियाम, मेघालय, भारत निम्नलिखित के लिए प्रतिष्ठित सेवा प्रदाताओं, फर्मों, ठेकेदारों आदि से मुहरबंद प्रस्ताव आमंत्रित करते हैं। / Director, NESAC, Umiam, Meghalaya, India invites sealed offers from reputed Service Providers, Firms, Contractors etc for the following:

एनआईटी सं./ NIT No.	कार्य का नाम/ NAME OF THE WORK	इएमडी(₹)डीडी के रूप में/ EMD (₹) IN THE FORM OF DD	निविदा शुल्क/ TENDER FEE (₹)
NESAC/1567/2023	Selection of Agency to Implement Development of Space Based Land Use Intelligence System for Guwahati (SLIS-G)	₹ 2,00,000/-	₹ 500/-

निविदा दस्तावेजों के विक्रय का दिनांक/Dates for selling of tender documents : 01.07.2023 to 26.07.2023

निविदा दस्तावेजों को जमा करने की अन्तिम तिथि व समय /Last date & Time for submission of tender documents : 26.07.2023 upto 1300 Hrs.

निविदा खोलने की तिथि , समय व स्थान /Date, Time & Venue of Bid Opening : 26.07.2023 at 1500 Hrs at एनईसैक, उमियम/ NESAC, Umiam

निविदाकारों को निर्देश /Instructions to Tenderers:

- For full details and terms and conditions etc., please see the enclosed Tender Document/Request for Proposal.
- Tender documents can be obtained from the Purchase Officer, NESAC, Umiam.
- Tender Fee shall be paid in form of CROSSED Demand Draft only. The Demand Draft should be in favor of Director, NESAC drawn on State Bank of India, Umiam (branch Code 2010).The Tender Fee is NON-REFUNDABLE. Your request letter along with Tender Fee maybe addressed to the Administrative Officer as indicated above.
- Interested tenderers may, at their option, download the tender documents from the NESAC website www.nesac.gov.in and submit the Tender Document along with the prescribed tender fee as per details given in the tender notification.
- While requesting for Tender Documents, please superscribe on the cover as "Request for Tender document against Tender Notice No. **NESAC/1567/2023.**
- Tender Document received after the due date/time will not be considered.
- While sending sealed quotation/offer superscribed respective Tender Number and Due Date on the envelope.
- NESAC, UMIAM is not responsible for any postal delays/loss of documents in transit.
- If the date specified for submission/opening of tenders is declared as a holiday abruptly, the due date for submission/opening of the tenders in such cases shall be postponed automatically to the next working day.
- Director, NESAC reserves the right to accept or reject any/or all the quotations/Expression of Interest in part or full.
- All pages forming part of the tender documents should be duly signed, stamped and submitted to NESAC. Pages not signed and stamped will be considered invalid and rejected.**

दिनांक/Dated: 30.06.2023

हस्ता/-/Sd/-
निदेशक, एनईसैक/ Director NESAC

1. DATASHEET

Sl. No.	Particular	Details
1.	Name of the Client	Director North Eastern Space Applications Center (NESAC) Department of Space, Govt. of India, Umiam-793103 Meghalaya
2.	Method of Selection	The Bidder needs to score minimum 80 Marks in the Evaluation Criteria and Award of Contract (3.6) of the Request For Proposal to be technically qualified for the Financial Bid
3.	Date of Issue of RFP	01.07.2023
4.	Deadline for Submission of Pre-Proposal Query	14.07.2023
5.	Pre-Bid Meeting date	19.07.2023 (Through online mode for which link will be provided)
6.	Submission of Proposal Due Date	26.07.2023
7.	Place of Opening of Proposal	O/o The Director North Eastern Space Applications Center (NESAC) Department of Space, Govt. of India, Umiam-793103 Meghalaya
9.	Cost of Bid Document-	₹500/- to be transferred online (Non-Refundable)
10.	Bid Validity	90 days from last date of submission of bid.
11.	Earnest Money Deposit (EMD)	EMD of ₹2,00,000/- in the form of Demand Draft / Banker's cheque / Bank Guarantee favouring "Director, North Eastern Space Applications Centre" payable at Umiam, Meghalaya. MSME Firms are exempted from EMD submission.
12.	Performance Bank Guarantee	Performance Bank Guarantee would be 10% of the contract value, valid for the contract period to be furnished by the successful bidders (Annexure – 2)
Further details can be seen from NESAC " https://nesac.gov.in/ "		

2. Objective

Regional trends illustrate that there are divergent urban growth patterns among major regions with different levels of economic development in Assam. Among all the districts of Assam, Kamrup is the most urbanized with 35.81 percent urbanization. Guwahati city the capital of the state is the largest urban centre in Assam with 23.89 percent of the total urban population of the state. The city of Guwahati, has expanded significantly in recent years with significant growth of built-up areas.

The Supreme court of India has concern over encroachment on public lands across the country and observed this is a "sad story" that is going on for the last 75 years and major cities have "turned into slums". They have advised the local government to find ways to deal with it.

The Government of Assam has been undertaking regular eviction drive to clear illegal encroachment in and around Guwahati. Recently, the Assam government prepared to carry out an eviction drive to clear around 400 bighas (over 132 acres) of land from alleged encroachers on the bank of Silsako Beel in Guwahati.



Figure: Increase in built-ups around water body in Guwahati as seen in the satellite images

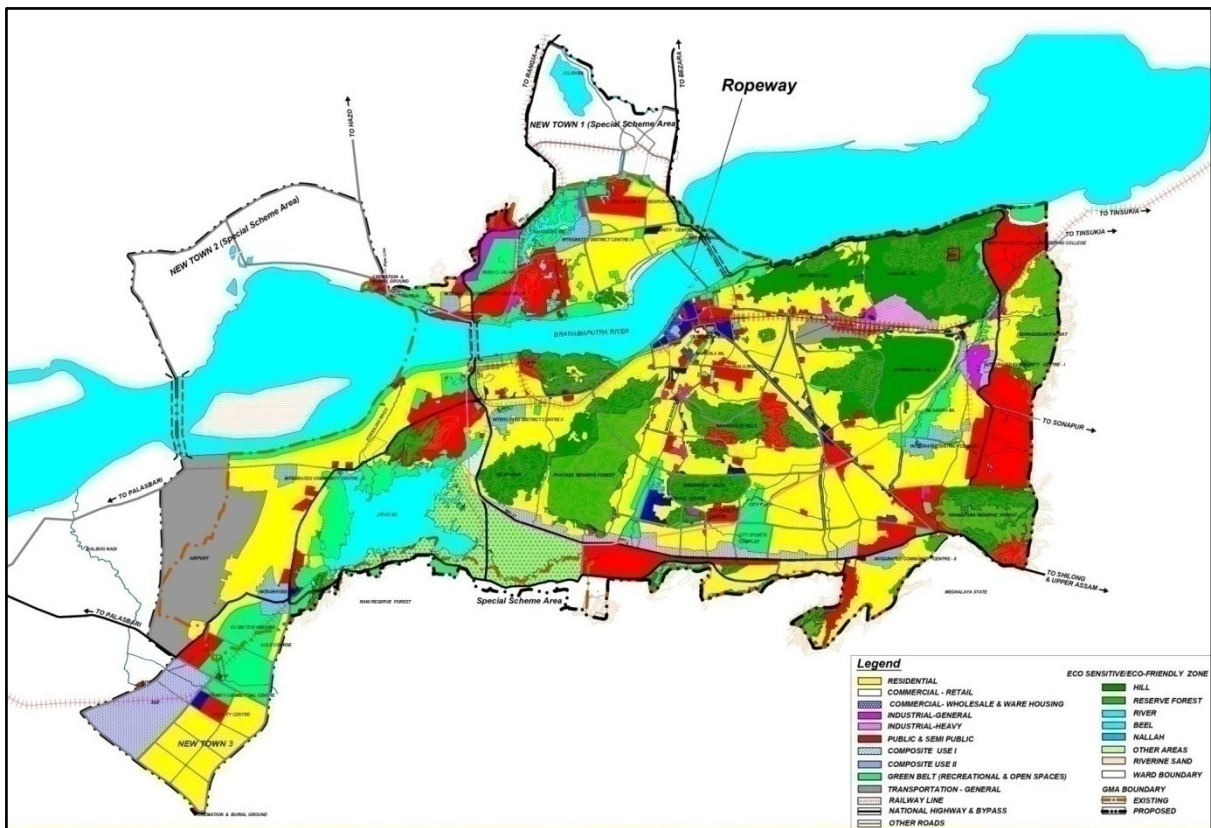
The manual process for identification of encroachment or any land use change with precision is difficult, cumbersome and time taking. On the other hand, the satellite images can identify the relevant changes by observing the different surface features at different times more efficiently and automatically.

We need better tools to automatically ingest, filter and process the high resolution images as fast as possible. The use of newer techniques in AI/ML allows the user to process these massive amounts of imagery and get the desired change areas with statistics within a short time.

Based on these requirements, the implementation of AI/ML based geo-intelligence technologies for land use & infrastructure monitoring is proposed with the following objectives:

- a) Monitor & safeguard the Govt. land and protect against encroachments
- b) Enhance urban local bodies revenues
- c) Improve Department resources performance by digitizing workflows and integrating SLAs

In this regard, the project **SLIS-G** is envisaged by NESAC (North Eastern Space Applications Centre) for implementing across the jurisdiction of Guwahati Metropolitan Development Authority (GMDA). It will address the critical challenges of timely detection of unauthorized land-cover and land-use changes of high value lands under the control of GMDA, Govt. of Assam.



Map of GMDA Area showing different land use and land cover

Key objectives of SLIS-G:

The goal of the project is to develop a Web enabled Land Use Information System which should use high resolution satellite data on monthly basis and use of drone imagery for selected sites, to monitor and track unauthorized land-use changes using the latest advances in AI/ML and mobile technology to help the concerned authorities to monitor & safeguard government land and enhance revenue.

The primary goal is to provide a GIS based Web and Mobile based integrated solution for effective management and monitoring of government lands. Major activities of the project are as follows:

- a) Automated ingestion, pre-processing and storage of satellite data.
- b) Identifying quantifying changes in land use of government owned lands by leveraging high resolution satellite imagery on a monthly basis
- c) Raising alerts when there is a change in land use in government owned lands
- d) Validating the alerts by government officials by using mobile application
- e) Providing a complete audit trail of the alerts
- f) Geo-tagging of changes (pictures & videos) by the concerned officials using Mobile App
- g) Interactive Visualization of the land use changes and compare current land use to historical land use through Web GIS
- h) Integrated MIS for overall management of land records.
- i) Making the data available to all stakeholders based on their roles and jurisdiction
- j) Leverage Open-Source technologies in providing a scalable and performant solution.

3. Instruction to bidders

3.1 General

- a) The Bidder shall be deemed to have satisfied himself fully before Bidding as to the correctness and sufficiency of these Bids for the contract to cover all obligations under this Tender.
- b) It must be clearly understood that the Terms and Conditions and specifications are intended to be strictly enforced. No escalation of cost in the Tender by the Bidder will be permitted throughout the period of Agreement or throughout the period of completion of contract whichever is later on account of any reasons whatsoever.
- c) The Bidder is fully and completely responsible for all the deliverables.
- d) While every effort has been made to provide comprehensive and accurate background information, requirements and envisaged solution(s) specifications, Bidders must form their own conclusions about the solution(s) needed to meet the requirements. Bidders and recipients of this RFP may wish to consult their own legal advisers in relation to this RFP.
- e) All information supplied by Bidders as part of their bids in response to this RFP, may be treated as contractually binding on the Bidders, on successful award of the assignment by on the basis of this RFP.
- f) No commitment of any kind, contractual or otherwise shall exist unless and until a formal written contract has been executed by or on behalf of the department.
- g) Any notification of preferred bidder status by the department shall not give rise to any enforceable rights by the Bidder.
- h) The department may cancel this public procurement at any time prior to a formal written contract being executed by or on behalf of the department.
- i) In the event of the specified date for the submission of tender offers being declared a public holiday by the Government of Meghalaya, the offers will be received up to the appointed time on the next working day. The department may, at its discretion, extend this deadline for submission of offers by issuing corrigendum and uploading the same on e-Procurement portal.
- j) The bids shall be uploaded at NESAC website (<https://nesac.gov.in/>)
- k) Any other form of bid submission through email, FAX, Telephone etc. offers shall not be accepted.
- l) The bids shall be scrutinized through the prescribed Pre-Qualification, Technical Evaluation & final Commercial Stage. Only upon successfully complying with all the stages the bids would be scrutinized for the next stage of evaluation.
- m) The bidder can submit only one response to this tender. In case of more than ONE response by a bidder, the department reserves the right to reject such bids.
- n) **No Consortium / Joint Venture allowed for this assignment.**
- o) BENEFITEXTENDED BY MINISTRY OF MICRO, SMALL AND MEDIUM ENTERPRISE (MSME), GOVERNMENT OF INDIA : In order to avail of the benefits extended by Government of India to the Micro, Small and medium Enterprises, bidder should submit self attested copy of valid certificate of registration for specific services asked in the tender by any authority so authorized by Ministry of Micro, small and Medium Enterprise (MSME), Government of India to issue such certificate. Bidder will be required to produce original certificate when called for to do so by NESAC.
- p) BID SECURITY DECLARATION : Micro Small and Medium Enterprise (MSME) and firms registered with NESAC are exempted from submission of Bid Security but in lieu of Bid Security bidders are required to submit along with the bid document signed "Bid Security Declaration" (Annexure-III) accepting that if they withdraw or modify their bids during period of validity etc, they will be suspended for the time specified in the tender documents"

3.2 Important Dates

1	Queries can be sent to below mail id: Purchase.nesac@nesac.gov.in	On or before 14.07.2023
2	Pre-bid meeting	19.07.2023
3	Clarifications to the queries	Within 3 days after the pre-bid meeting
4	Bid Submission Date	26.07.2023 at 01:00 PM
5	Technical Bid Opening Date	26.07.2023 at 03:00 PM

3.3 Earnest Money Deposit (EMD) Fee

- ₹ 2,00,000.00 in the form of Demand Draft / Banker's cheque/ Bank Guarantee favouring "Director, North Eastern Space Applications Centre" payable at State Bank of India, Umiam, Meghalaya.
- EMD of all non-shortlisted participants will be refunded after due process of tender closure.
- MSME Firms are exempted from EMD submission.

3.4 Basic Eligibility Criteria

- The Bidder/s shall be a public/private company, firm incorporated in India under the (Indian) Companies Act 1956/2013. The Bidder/s shall be required to submit a true copy of its Incorporation Certificate.
- The Bidder/s must have a valid Goods and Service Tax registration
- The Bidder/s must have at least one office in India which has been operational for the last three years or more
- The bidder should not have been blacklisted/ debarred/termination of contract except for reasons of convenience of client by any Government / Government Board / Corporation / Company/ Statutory Body / PSU company/ Non-Government/ Government of any sovereign countries /Private Agencies and Multi-Lateral Funding Agencies in the last 10 years.
- The bidder should have a minimum average annual turnover of Indian ₹57 lakhs during the last three (3) financial years;
- The Bidder should have successfully completed projects involving development of Web GIS based systems pertaining to Automated Change detection/ Encroachments using AI/ML analytics in minimum of one state capital of India using Satellite and Drone imageries during last 3 years. Such project reports should be submitted as documentary evidences.

3.5 MAKE IN INDIA (MII) CONDITIONS

For this procurement, bids from Class I & class II Local Suppliers are admissible. Hence provisions contained in Public Procurement (Preference to Make in India), Order 2017 issued by Department for Promotion of Industry and Internal Trade (DIPP), Ministry of Commerce & Industries vide letter No.P45021/2/2017 PP(BE II) dated 04.06.2020 and subsequent amendment & directives shall be followed. Accordingly, offer will be evaluated & processed in conformation with above referred GOI order (Specially mentioned below). The bidder shall provide compliance and undertaking as per order and hereafter amendments:

- Order no: F.No.6/18/2019 PPD dated 23.07.2020 of Department of Expenditure), Ministry of Finance Under Public procurement division for the General Financial rule (GFRs).
- Class I local supplier means a supplier or service provider, whose goods, service or works offered for procurement, has local content equal to or more than 50%, as defined under order.

- iii. Class II local supplier means a supplier or service provider, whose goods, services or works offered for procurement, has local content more than 20% but less than 50%, as defined under this Order.
- iv. Bidders offering imported products will fall under the category of Non-local suppliers. They cannot claim themselves as Class I Local suppliers/Class II Local suppliers by claiming the services such as transportation, insurance, installation, commissioning, training and after sales service support like AMC/CMC etc. as local value addition.
- v. Verification of local content:
 - a) The Class I local supplier/ Class II local supplier at the time to tender, bidding or solicitation shall be required to indicate percentage of local content and provide self certification that the item offered meets the local content requirement for Class I local supplier / Class II local supplier as the case may be. They shall also give details of the location(s) at which the local value addition is made.
 - b) ii) In case bid value is in excess of Rs. 10 Cr., Class I local supplier/ Class II local supplier shall be required to provide a certificate from the statutory auditor or cost auditor of the company (in the case of companies) or from a practicing cost accountant or practicing chartered accountant (in respect of suppliers other than companies) giving the percentage of local content.
 - c) iii) False declarations will be in breach of the code of Integrity under Rule 175(1) (i) (h) of the General Financial Rules (GFR) for which a bidder or its successors can be debarred for up to two years as per Rule 151 (iii) of the general Financial Rules along with such other actions as may be permissible under Law.

3.6 Evaluation Criteria and Award of Contract

A	Specific experience of the bidder relevant to the assignment / job	70 Marks	Proofs to be submitted
	Sub Criteria		
A.1	The bidder must have more than INR 57 lakhs as average annual turnover in last 3 financial years ending 31.03.2023. The annual turnover shall be from software development and associated Services components only.	10 marks	Audit reports to be submitted certified by CA
A.2	The Bidder with following certifications: <ol style="list-style-type: none"> a. Valid CMMI Level Certification in Software Application Development & Machine Learning and Artificial Intelligence <ul style="list-style-type: none"> • Level 5 = 6 marks • Level 3 = 2 marks b. Valid ISO 27001:2013 Certification in Geographic Information System, Cloud Software Development, Mobile Application Development = 2 Marks 	10 Marks	Certificate copies to be enclosed. (All required components should be mentioned in the certificate)

	c. Valid ISO 9001:2008/2015 Certification in IT/ ICT/ Software Development / GIS related activities /Cloud hosting and Spatial Decision Support System = 2 Marks		
A.3	<p>The Bidder must have experience and carried out operational projects in Commissioning of web-based AI / Machine learning analytics on Satellite or Drone based Imagery for any central / state government department in last 3 years in India.</p> <p>The application should have the features such as [a] Auto Fetching of satellite Imagery and pre-processing on cloud [b] Mobile based workflow to capture changes via mobile devices on the go to validate via geotagged images and video [c] Auto detection, Feature extraction and classification of Encroachment/ Change Detection [d] Auto identification of point of interests using AI/ML on Satellite or Drone Imageries such as Solid Waste Dumps, Green Cover, Road Quality.</p> <p>1. One Work Order : 5 marks 2. Two Work Orders: 10 marks 3. Three Work Orders: 15 marks 4. Four work Orders : 20 marks</p>	20 marks	Work orders/ Agreements/ Completion Certificates from Government Departments
A.4	<p>The Bidder must have experience in development of cloud-based system with workflow, alerts, Cloud computing and Big Data Analytics with option to retrieve historical satellite data, Machine Learning based detections, alerts and analytics for any state or Central Government in last 3 years in India.</p> <p>a. Each project with live URL – 1 mark (max up to 10 marks)</p>	10 marks	<p>Work orders/ Agreements/Completion Certificates from Government Departments</p> <p>Product Write-up, Screen shots, methodology and Live URL</p>
A.5	<p>Experience in Mobile Application with workflow management for data collection & validation for any state or Central Government in last 3 years in India. With the following features such as [a] Capability to capture geo-intelligent features latitude, longitude with geo tagged photos and videos of land use changes [b] MIS and interactive visualization of land use change alerts [c] Integrated Workflow management.</p> <p>1. One Work Order: 5 marks 2. Two Work Orders: 10 marks 3. Three Work Orders: 15 marks</p> <p>Note: These work orders shall be different than A.3</p>	15 marks	<p>Work orders/ Agreements/ Completion Certificates from Government Departments</p> <p>Product Write-up, Screen shots, Methodology and Live URL should be provided.</p>

A.6	Affiliation with Cloud Hosting Service Provider: <ul style="list-style-type: none"> • Empaneled Member of MEITY Data Center or Affiliation with MEITY approved cloud service provider for VPC/GCC service offerings as per GoI cloud initiative – 3marks • Affiliated CSP or equivalent having minimum 2 Data Centers (Tier III Standard) and audited by STQC Location in India – 1 mark • Affiliated CSP having ISO 27001, ISO/IEC 27017:2015, ISO 27018, ISO-22301, ISO/IEC 20000-1, SOC-1, SOC-2, SOC-3 certification – 1 mark 	5 marks	Valid copies of certificate and authorization letter from CSP
B	Proposed Methodology and work plan in response to the terms of reference.	25 marks	
	Sub Criteria		
B.1	Proposed Solution and Approach and Methodology: Technical solution shall clearly describe the process, tools and platform proposed, satellite systems, usage of RS and GIS tools, use of AI/ML tools for specific functionalities, description of current existing mechanism, additional customization to be done to meet the technical requirements of RFP etc. (Flowchart to be provided)	10 marks	(Details to be presented in RFP response) Power Point Presentation to be given as per the instructions of the Authorities.
B.2	Live Demonstration using Automated AI/ML tools for <ul style="list-style-type: none"> • Auto Detection of civil land area changes, Auto generation of alerts based on changes using Satellite Imageries with native resolution (<1m) - 4 Marks • Auto Identification of Point of Interest (Solid Waste, Green Cover) using Drone or High-resolution satellite imageries – 4 marks • Alerts to actions on ground – 7 marks 	15 marks	Demonstration on Live System
C	Key Professionals	5 Marks	
C.1	Project Manager / Team Leader - 01	5 marks	B.E./B.Tech. with min 3 years of total experience and should have experience in Commissioning of AI / Machine learning based applications.

Note:

- I. The minimum score to get qualified for financial opening is 80 marks.
- II. All the qualified bidders in technical round will be called for financial opening.
- III. The bids quoted as per the financial bid format will be considered for financial evaluation.
- IV. Director, NESAC reserves the right to award the contract to the most eligible bidder complying all RFP requirements, even if there is single bid.
- V. The presentation as mentioned in S.No. B.1 and B.2 above will be intimated after opening of bid received on first Monday from the bid opening date.

4. Scope of work

The envisaged system deployed by the vendor should have the following components.

4.1 Image processing and analysis using time series high resolution remote sensing data

The high-resolution data is an important component of this system. The system fetches ortho-rectified Satellite Imagery provided through NESAC, Dept. of Space on desired frequency. NESAC will procure and provide 50 cm or geo-referenced imagery for enabling on Web GIS solution. Satellite imageries procurement shall be the department's responsibility. Under this program, the work on Digitization & Geo-referencing of Revenue maps and Geotagging of all Govt. lands in Guwahati will be undertaken by NESAC, using Georeferenced Cadastral data and Ortho images of the city.

Base on the above data, AI based satellite data processing is to be made for detecting land use change. For monitoring purposes alerts to be created for each ward officer through SMS and uploading of ground conditions by Level-I officials is to be made through a Mobile App. Monitoring of actions to be initiated after alert generation till action taken by concerned authorities.

a) Satellite data Ingestion, hosting, Automation through File Transfer Services, Web Services

This System should allow users to add/update/upload, georeferenced/ Ortho corrected satellite data, government parcel shape files in the database. System should also be able automatically download satellite data from a specific location. System should be able to migrate/upload required data from local system to private Cloud environment. System should be able to transfer data, application code, and other technology-related business processes from on-premises infrastructure to the cloud platform.

Also, it should allow to ingest near real-time satellite images on monthly frequency and real time data input by citizens and enforcement officials.

b) Retrieve Historical Satellite data, ML based Detections, alerts and analytics

The system should have option to retrieve historical data and compare using ML based algorithms. Machine Learning should be used to automate the identification process on a quarterly basis and to classify high resolution satellite imagery into different land use classes for identification of changes across two images.

Interactive visualization of land use change alerts, their status, customized reports for authorities' and user specific actionable dashboard should be available under analytics.

4.2. Database Creation and standardization and Publishing

The spatial databases should be designed to store these data. NESAC/ASSAC will provide parcel boundaries and associated attribute data to identify government lands, their current land-use and the owner department. Database should be configured to integrate with existing Systems via web services. All geospatial database must be generated as per standardize formats and schemas as defined by NESAC for interoperability and accessibility. The GIS Server should publish data from spatial database source using OGC open standards. It should be able to dynamically connect between spatial and non-spatial databases to style and publish layers. It should implement industry standard OGC protocols such as Web Feature Service (WFS), Web Map Service (WMS), and Web Coverage Service (WCS). It should be used for creating and managing GIS Web services, applications and data. It should be interoperable and scalable. It should be readily deployable in data center as recommended by the government.

4.3 AI/ML Based Model for Change Detection

Machine learning is an integral part of the envisaged system to parse, comprehend and understand the data. The system should have the capability to perform Machine Learning and Artificial Intelligence based modelling on satellite and drone imagery to categorize and identify the changes in the land use for the given area of interest. This system should be progressive in nature, as the system keeps getting more data the model should be able to use it automatically and enhance its accuracy. The model performance metric must show the behavior of AI/ML model performance. The ML algorithms should preferably be implemented using Python scripting language and should be able to use end-to-end open-source platforms such as Tensor Flow/Scikit-Learn etc.

Using deep neural network, the system automatically classifies any land deviation/ new construction in the images and identifies changes with extent. It should create various land deviation models using ANN (Artificial neural networks), CNN (Convolutional neural networks) & RNN (Recurrent neural networks). Various types of land use including encroachment, construction, any other human activity should be able to detect using the multiple land deviation AI/ML models. The user may choose a particular Land deviation model for automatically detecting the changes in land use and taking necessary actions/precautions.

Further, the ML based change detection system should have the following features/requirements

- The change category along with the actual area of change and percentage of land use change must be reflected
- Provision to show the performance metrics for each prediction/land deviation models
- The ML system must be adaptable so that, custom models developed by NESAC must be able to accommodate.
- All source codebase must be shared to NESAC for technical scrutiny and would recommend for modifications and optimizations etc

4.4 SLIS-G Management and Monitoring Dashboard

The SLIS-G MMD should have following features for interactive visualisation, analysis of temporal satellite images and management of all alerts.

- a) Shall be compatible with popular web browsers like Internet explorer, Google Chrome, Mozilla Firefox etc. It must be responsive for various display sizes.
- b) Should provide the capability to user to select satellite images from different dates for comparison using swipe functionality.
- c) Shall allow for visualization of vector layers of the Department with simple layer on/off features.
- d) Swipe functionality - Detect land use changes by comparing the historic data with the current data
- e) Shall show the land use changes in different icons based on type of change and status of change with statistics showing the areas of changes for different land use change.
- f) Tools like measurement, Pan, Zoom, Zoom Previous, longitude/latitude display shall also be available
- g) Appropriate Legends must be provided for easy comprehension of the encroachment hotspots
- h) Shall allow role-based access to the users based upon login-ids/password created through Admin module
- i) Access for users shall be restricted to their respective zone images.
- j) Interactive visualization of land-use data and changes
- k) Shall provide tools for the users to draw new point, line and polygon and annotate features on the map
- l) Shall provide the capability to the user to select the frequently used layers and add to favorites.
- m) Should provide a data tab displaying details of the selected identified encroachments, such as
 - i. Parcel
 - ii. Ward
 - iii. Ownership details
 - iv. Status of Encroachment

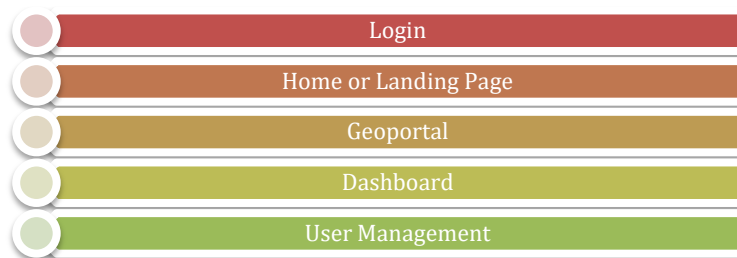
- v. Encroachment Type
- vi. Mobile based images, videos and comments

The Admin module should allow users to add/update/upload, georeferenced/ Ortho corrected satellite data, government parcel shape files in the database. System should also be able automatically download satellite data from a specific location. The entire dashboard should be customizable to the requirements of SLIS-G

The SLIS-G Management and Monitoring Dashboard should provide a unified GIS-MIS dashboard to visualize the various change detection analysis layers. A-LUIS geoportal should provide a platform for department officials to view details of encroachments in their respective areas. The A-LUIS geoportal should provide a platform for department officials to view details of encroachments in their respective areas. The details on the authorized officers of the Department, GMDA/GMC and their categorization for data access will be shared during initial course of implementation.

The SLIS-G Management and Monitoring Dashboard should consist of the following modules:

The SLIS-G application should consist of the following modules:



Login Module: On accessing the application URL, the login page is displayed. The user can login to the application by clicking here. The login can be mobile number based.

Home/ Landing page: This is the default page which the user lands on after logging in.

Geoportal: The geoportal provides a spatial view of alerts for a given ward, zone or city based on the roles of the users.

Along with the map view, the user can also view the alerts information in tabular format using the DATA tab. The figure below displays geoportal view for a super admin role. A super admin can be a senior supervisor, an apex level or NESAC user.

Geoportal should consist of the following components:

- i. Map View
- ii. Tool Bar
- iii. Navigation Tools
- iv. Data Tab
- v. Search Bar

Map View:Map view should display the cadastral, satellite and alert information. The features are displayed based upon the zoom level. The content displayed in the map view also depends on the Level of user.

- a. **Level-I:** Can visualize information related to vacant plots, buildings, alerts, and satellite imagery for the ward assigned to the ward officer. Clicking on the alert would show the details associated with the alert in the data tab.
- b. **Level-II:** Clicking on the zone in the map view would show all the wards that are within the zone and clicking on any ward would show all the alerts within that ward.
- c. **Level-III:** Can visualize information related to vacant plots, buildings, zones, wards, alerts, and satellite imagery for the entire city.

The system should support any changes or alteration in these levels at any time.

Alert Management Tool bar: It should provide the following sub modules:

- a) **Base Layers:** The base layers present a gallery of basemaps and allows user to select one from the gallery as the basemap for your application.
- b) **Layers:** This module allows user to control the visibility of layers. It also allows the user to add the most frequently used layers as favourites.
- c) **Visualization Tool:** These tools are used to visualize the changes detected by the system in each area for two different time periods. The visualization tools provide two tools, Swipe and Compare, to visualize the changes.
- d) **Measure:** Measure tools allow the user to get point coordinates (latitude and longitude), measure distance between points or length of line feature in the various measure units or calculate area of the polygons.
- e) **Draw Tool:** This tool allows the user to draw features on the map denoting a topographical feature or any other place on the map. One can place a point, line, rectangle, circle or a polygon. User can also add text denoting names of the locations.
- f) **Select Tool:** This tool is available only to super admin users. This tool allows users to select multiple alerts in the map view and perform a delete operation.
- g) **Add Alert**

Navigation tools:

The map tools are provided on the top right corner of the geospatial map and allows user to customize the view of the map. All the map navigation must be present along with Search Tools and Filter tool as mentioned below:

- a) **Search Tool:** The search tool allows user to search based upon zone, ward number, village name and Alert ID. The availability of search tools depends upon the type of user. For Ward level officer, only search by alert id. For zone level officers, only search by Ward, Village and Alert ID is available and for supervisory, apex and NESAC users search by Zone, Ward, Village and Alert ID is available.
- b) **Filter Tool:** The filter tool allows user to search the alerts month wise. The filter tool is available for all users. Select the month and year from the dropdown and click on apply button. Alerts of the selected month and year will display.

Data Tab:

Like the map view, the content displayed in the data tab differs based on the type of user.

- a) **Level-I:** Officials can only view alert information for his or her assigned ward. The Changes frame shows the images of the time series data along with the detected change. The Changes frame is collapsible. The Audit Trail frame gives you the details of the various transactions that are associated with the alert as per the standard operations guidelines. The Audit frame is also

collapsible. Click on the “Open Gallery” button to view the images, videos and document uploaded during the field validation.

- b) Level-II: Officials can view alert information of different wards along with the status for all the wards that fall in his zone.
- c) Level-III: These users would be able to view alert for all the zones.

An alert can be assigned the following status:

a) **Identified:** This status defines the alerts which are newly generated automatically through machine learning.

b) **Change Observed:** The alert is assigned a change observed status if it is found to be a valid alert by the Level-I.

c) **No Change Observed:** If the given alert is found to be a temporary change or no change has been detected, then the Level-I.

d) **Permissible Activity:** If a given alert is found to be valid with proper permission from the authority, then it will be defined as permissible activity by the Level-I and referred to Level-II for further review.

e) **Legal Verification:** An alert found to be valid by the Level-II will be sent to the Department to verify if there are legal issues associated or not.

f) **Case Filed:** If the legal cell finds that there are no legal issues, the case is transferred to a level-II and the alert status would be marked as case filed.

g) **Stay:** In case the legal cell finds that there is a legal binding, and a stay is already in place, in such scenarios the status is set to Stay.

h) **Referred to design Committee** if a level-II finds difficulty in evicting construction corresponding to a given alert, he will transfer the case to the Central Reinforcement Monitoring Committee (CEMC). The alert will be then assigned ‘Referred To CEMC’ status.

i) **Revert and Reverification:** If the collected evidence is not proper or satisfactory, then the Level-II officials can revert the status for further verification by Level-I.

j) **Resolved:** If the encroachment corresponding to the alert is cleared, the alert is assigned resolved status.

Editing an Alert Information: Level-II or Level-III Officer or Super Admin can edit the alert information.

Deleting an Alert: Only a super admin can delete an alert. To delete the alert, click on the delete icon displayed on the top right corner of the Alert Information dialog.

4.5 Mobile Application for alert tracking and ground verification

Mobile App will support both iOS and Android operating Systems. It should support the following workflows

- i. Alerts of the Land-use changes generated from satellite imageries should be automatically available in the Mobile Apps for designated users as per their jurisdictions.

- ii. Alerts for the officials should contain the land parcel details with latitudes and longitudes and land-use change related satellite image.
- iii. Department officials should easily navigate to the hotspots using the Mobile App and report their actions with Texts, Geotagged Photos & Videos on Mobile App
- iv. Mobile App should show and allow the user to update the status of identified Hotspots based on below actions
 - a. Identified
 - b. Validated
 - c. Case Filed
 - d. Resolved
- v. The Mobile App should provide capability to upload Direct land-use change reporting by officials without using satellite imagery
- vi. Support for the English and Assamese Language
- vii. Should be able to save the data locally in the mobile and syncing the data whenever internet connection is available
- viii. Offline Support: Should support using the Mobile App with limited features, in remote areas with limited network connectivity
- ix. Should provide filtering of alerts based on attributes
- x. The basic workflow of using Mobile Apps by officials in various government Departments dealing with Land Utilization is as under:
 - a. User should register for creating the OTP-verified mobile number, name & jurisdiction Validation into the system
 - b. Shall login into his/her account via OTP-based mobile number.
 - c. Can view the data that he/she had previously uploaded.
 - d. Can report incident relating to Land infrastructure development, encroachments, Construction and work progress.
 - e. The data collected in the field with the help of mobile application shall update the database server
- xi. The app will enable field survey with interactive form and geo-intelligent data capture

4.6 Hosting and Go Live

The platform will be hosted on cloud, managed, and supported by the bidder from development to stabilization period of up to 6 months. The bidder will provide necessary cloud infrastructure for deployment. All the components of the SLIS-G Platform will be directly hosted on cloud including AI models to support autonomous workflows.

Post stabilization, the platform will be hosted in the private cloud environment. The bidder has to provide the required infrastructure details. The hosting will be done at ASSAC or State Data Centre hosting.

The Bidder should carry out Unit Testing, Integration Testing and System Testing as per the approved plans and should submit the Test-completion reports to the Department after the end of each testing phase.

The entire system after going beta live should be audited by NIC/MEITY/CERT-IN empaneled auditor for security compliances, and any observations made during the auditing will be incorporated.

4.7 Admin Module

Admin module will be specific to authorization level configurations where the authorized personnel or an admin will be allowed to do required configurations for the set of data in the database.

- a. User and Role management
- b. This module should allow users to add/update/upload, georeferenced/ Ortho corrected satellite data, government parcel shape files in the database. System should also be able automatically download satellite data from a specific location
- c. The software supplied should be customizable to the requirements of SLIS-G

4.8 Program management

There should be a component of project management which includes QA/QC, testing, levelling as well as both technical and functional training to users on all parts of the system. Help and Troubleshooting guidebooks shall be provided for each section. All training material shall be web-enabled with easy diagrams, screen shots, videos, and help menus in the decision support systems.

The agency should ensure the data preparation by integrating data sets to load into data warehouse. The agency should also ensure the processing and analysis of raw data is accurate and consistent. Correcting data errors, validating data quality and consolidating data shall also be the responsibility of the agency.

4.9 Capacity Building

Ensuring that existing information and knowledge i.e., both technical and functional are made accessible to and shared among all the stakeholders. It is the responsibility of the agency to provide required capacity building activities to all stake holder or participating departments.

- **Workshops:** The agency shall conduct at least one workshop within 3 months from the date of issuing work order at NESAC premises that completely explains workflow and mechanism to the higher officials of the respective Departments.
- **Classroom based Training:** 2 days classroom training for each stake holder department with complete practical training about the concerned module pertaining to the concerned department/stakeholder. Further, the agency shall provide “Help and Troubleshooting guidebooks” to all the participants both hard and soft copy format.
 - During the Classroom training the participants shall be allowed to practice on the real time data and the test data should be destroyed without any loss to the real time data.
- **Initial Data Entry:** During the classroom training, the agency shall provide the following activities:
 - Land resources data creation, validation, and verification.
 - Initial data entry creation, validation, verification for few units
 - Stakeholder wise template training.
- **Online Support:** The agency shall provide online support for the Decision Support System that has been designed, developed, and delivered to all the participating stakeholders.

4.10 Annual Maintenance and Operation support

During the maintenance support for **6 months** post Go-Live and handing over of the system, maintenance activity includes upkeep of the system, bug-fixes and any new data format or report within the modules developed during this project and on call technical support to the users to clarify their doubts.

- **System Maintenance:** The agency shall be responsible for the complete operations and maintenance of all goods supplied under this contract. All the Software related bugs and errors are to be maintained during this O&M period. It is the complete responsibility of the bidder Software related problems, testing and regression testing etc.
- **Dedicated Operational Team:** The agency must position 1 dedicated resource so that the operation and maintenance works are attended without problem and efficiency of the system is at its best.

5. Intellectual Property

Any / all Intellectual Property Rights owned by the Bidder prior to the execution date and/ or applied for prior to the execution date (pre-existing IPR) can be continued to be owned by the Bidder.

After the execution date NESAC shall own/ have rights/ title and have right in perpetuity to use all Intellectual Property that:

- i) are newly created (including customizations) and developed by the Bidder during execution of this Contract and/ or for the exclusive use of NESAC or primarily in connection with institutes Assets.
- ii) Arose from funding with the project, or exclusively or primarily for the benefit of/ the conduct of, Department's Project or in connection with Department's Assets.
- iii) The bidder should share all source codes / modules developed as part of SLIS-G with the ability to later scale/extend by NESAC

6. Deliverables

Activity	Deliverable	Description	Timelines in Months from T (T=Date of Contract Agreement)
Project Initiation & Requirement Gathering	1	Kick-off & Inception report	T+ 1 Month
	1.1	Kick-off meeting with all stakeholders	T+ 0.5
	1.2	Inception report with System Requirement Specifications and Complete Project Plan	T+ 1
Beta GoLive	2	Go-Live with Beta version of SLIS-G Platform (Development of Digital Platform & Unified Database, Remote Sensing Data Automation, Mobile Application)	T+ 2
Development	3	Development and Deployment modules on Staging System and Submission of report on each individual Modules	
	3.1	Geoportal Development	T+3
	3.2	AI/ML Tools Development	T+3
	3.3	Mobile Application	T+3
	3.4	Admin Dashboard	T+3
UAT	4	User Acceptance Deployment Report	
	4.1	Geoportal and Encroachment Module	T+ 4
	4.2	Work Flow Management	T+ 5
Deployment of the System on State Preferred Cloud Environment	5	GoLive of SLIS-G Platform	T+6
Training	6	Capacity Building & Training	T+6
Maintenance	7	Technical Support and Maintenance	6 months after Go Live

7. Bill of Quantities

S.No	Item Description	Unit of Measurement	Quantity	Unit Rate	Total with out Taxes	Tax	Total with tax
Software Development of SLIS-G							
1	SLIS-G Platform <ul style="list-style-type: none"> • Spatial and Non-Spatial Database integration • Machine Learning Engine • Geoportal and Mobile App • Alerts Dashboard • SOP Integration • Mobile Workflow Integration • Reports and Analytics 	Lot	1				
Sub total Cost of Software Development A =							
2	<ul style="list-style-type: none"> • Hosting at Local Staging environment and 6 months of maintenance • Security Audit charges • CERT-IN charges 	Lot	1				
3	Training and Capacity Building	Lot	1				
Sub total Cost of technical support towards hosting at private cloud/State Data Centre, Security Audit, Certification Fees, Training and Capacity Building B =							
4	AMC of SLIS-G software platform for 6 months post development	Months	6				
5	Deployment of 1 dedicated resource	Months	6				
Sub total Cost of Maintenance Support C=							
Grand Total (A+B+C) =							

8. Payment Terms

Note: A project committee will assess and verify the quality of the work delivered before releasing each payments

Sl. No.	Phase / Milestones of payment	Payment Schedule percentage including applicable taxes
1	Upon Agreement Sign off	10% Advance of Project Implementation Cost
2	Upon Submission of Inception Report (Deliverable - D1)	15% of Project Implementation Cost
3	Upon Beta Go-Live of SLIS-G Platform (Deliverable – D2)	25% of Project Implementation Cost
4	Upon Submission of report on development of Geoportals, AI/ML, Mobile App, Admin Dashboard (Deliverable D-3)	20% of Project Implementation Cost (upon deployment of each individual Deliverable from D-3.1 to D-3.4, on staging server 5% of Project Implementation Cost)
5	User Acceptance Deployment Report of each individual modules (Deliverable 4: D-4.1 to D-4.2)	15% of Project Implementation Cost (upon deployment of each individual Deliverable from D-4.1 to D-4.2, on staging server 7.5% of Project Implementation Cost)
6	Go-Live of SLIS-G Application (Deliverable D-5)	10% of Project Implementation Cost
7	Capacity Building and Training (Deliverable D-6)	5% of Project Implementation Cost
8	Operation and Support by dedicated resource person (Maintenance Period of 6 months)	Monthly payment (Project Maintenance period)
9	Operation and Support for SLIS-G Software Platform	Quarterly payment (Project Maintenance period)

PROFORMA FOR
BANK GUARANTEE FOR EARNEST MONEY DEPOSIT

(On non-judicial stamp paper of appropriate value)

WHEREAS M/S. (hereinafter called the "Tenderer") have submitted their offer dated..... for the supply of (hereinafter called the "tender") against tender enquiry No. dated made by (name of the Centre/Unit) (hereinafter called the "Purchaser");

KNOW ALL MEN by these presents that WE..... (name of the Bank and Branch) having our Registered Office at (hereinafter called the "Bank") are bound unto the Purchaser in the sum of ` (Rupees only) 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 (month) (year);

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 its validity; and/or
- (2) If the tenderer, having been notified of the acceptance of their tender by the Purchaser during the period of its validity,
- (a) fails to furnish the Security Deposit/Performance Security prescribed by the Purchaser for the due performance of the said Contract; and/or
- (b) fails or refuses to execute the Contract., 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 or conditions.

THIS GUARANTEE will remain in force up to and including 45 days after the period of tender validity and any demand by the Purchaser 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 (Head Office) with Phone/Fax

Nos. Name & Address of the Branch with Phone/Fax Nos.

PERFORMANCE BANK GUARANTEE FORMAT

To,

**The Director
North Eastern Space Applications Center
Department of Space, Govt. of India, Umiam, Meghalaya**

WHEREAS (Name and address of the agency) (hereinafter called “the Agency”) has undertaken, in pursuance of RFP No _____ dated _____ to undertake the service _____ (description of services) (herein after called “the contract”).

AND WHEREAS it has been stipulated by _____ (Name of the Client) in the said contract that the Consultant shall furnish you with a bank guarantee by a scheduled commercial bank recognized by you for the sum specified therein as security for compliance with its obligations in accordance with the contract;

AND WHEREAS we have agreed to give the consultant such a bank guarantee;

NOW THEREFORE we hereby affirm that we are guarantors and responsible to you, on behalf of the Consultant, up to a total of _____ (amount of the guarantee in words and figures), and we undertake to pay you, upon your first written demand declaring the consultant to be in default under the contract and without cavil or argument, any sum or sums within the limits of (amount of guarantee) as aforesaid, without your needing to prove or to show grounds or reasons for your demand or the sum specified therein.

We hereby waive the necessity of your demanding the said debt from the consultant before presenting us with the demand.

We further agree that no change or addition to or other modification of the terms of the contract to be performed there under or of any of the contract documents which may be made between you and the consultant shall in any way release us from any liability under this guarantee and we hereby waive notice of any such change, addition or modification. This performance bank guarantee shall be valid until the _____ day of _____, _____ <Year> Our branch at Shillong (Name & Address of the Bank) is liable to pay the guaranteed amount depending on the filing of claim and any part thereof under this Bank Guarantee only and only if you serve upon us at our Shillong branch a written claim or demand and received by us at our Shillong branch on or before Dt. _____ otherwise bank shall be discharged of all liabilities under this guarantee thereafter.

**(Signature of the authorized officer of the Bank) Name and designation of the officer
Seal, name & address of the Bank & Branch**

Bid Security Declaration

Date: [Insert date (as day, month and year)]

Bid No.:

Tenderer/Bidder's offer no. _____ Dtd: _____

To,

The Director
North Eastern Space Applications Centre
Government of India
Department of Space
Umiam-793103, Meghalaya

Sub: Bid Security Declaration-Reg

We, understand that, according to your conditions, the Tender must be supported by a Declaration.

We accept that we will automatically be suspended from being eligible for bidding in any contract with NESAC for the period of time of 3 years starting from....., if we are in breach of our obligation(s) under the bid conditions because we:

- a) have withdrawn our bid during the period of bid validity specified in the Letter of Bid/Tender; or
- b) having been notified of the acceptance of our bid by NESAC during the period of bid validity, (i) fail or refuse to execute the Contract, if required, or (ii) fail or refuse to furnish the Performance Security.

We understand this Bid-Securing Declaration shall expire if we are not the successful Tenderer/ bidder, upon the earlier of (i) our receipt of your notification to us of the name of the successful Tenderer/bidder; or (ii) twenty-eight days after expiration of our Bid.

Signed: [insert complete name of person signing the Bid-Securing Declaration]

Duly authorized to sign the bid for and on behalf of : [insert complete name of Bidder]

Dated on _____ day of _____, _____ (insert date of signing)

Corporate Seal [where appropriate]

[Note: In case of a Joint Venture, the Bid-Securing Declaration must be in the name of all partners to the joint Venture that submits the bid]