Enterprise Geographic Information System on Cloud Infrastructure

Terms of Reference

1. Description

1.1. Background

It is public knowledge that a population and housing census is a major and one of the most important statistical activities undertaken in the country. Data from the census is required by the government for various reasons such as planning for the allocation of government resources and for implementing vital development programs and poverty alleviation measures.

The census of population provides information on the demographic and socio-economic characteristics such as age and sex distribution, household composition and size, education, employment and economic activity, all of which are vital in determining the needs of different segments of the population. The census of housing allows planners to evaluate changes in the quality of housing and related facilities and plan for future housing needs. The census takes stock of human resources which constitute the most important asset of a country. Development efforts and government decisions on the provision of various welfare measures are based on population and housing census data.

The conduct of the 2020 CPH is scheduled in May 2020. It will be the 15th census of population and the 5th census on housing to be conducted in the country since 1903.

Legal Basis and Authority

The authority and mandate of the Philippine Statistics Authority (PSA) to conduct the 2020 CPH emanates from RA No. 10625, Executive Order No. 352 and Batas Pambansa Blg. 72.

Approved on September 12, 2013, Republic Act (RA) No. 10625, also known as the Philippine Statistical Act of 2013, states that the PSA shall be primarily responsible for all national censuses and surveys, sectoral statistics, consolidation of administrative recording system, and compilation of national accounts. Specifically, Section 6(b) of this Act mandates the PSA to prepare and conduct periodic censuses on population, housing, agriculture, fisheries, business, industry, and other sectors of the economy.

Executive Order No. 352 - Designation of Statistical Activities That Will Generate Critical Data for Decision-Making of the Government and the Private Sector, stipulates the conduct of a decennial census and mid-decade census primarily to update the population count in all barangays nationwide. Batas Pambansa (BP) Bldg. 72 provides the taking of integrated census every ten (10) years beginning in 1980.

For the 2020 CPH, PSA will leverage on geospatial technologies in all stages of the census operations---from pre-enumeration, during enumeration and up to post-enumeration activities. PSA believes that a location-based approach will greatly improve the productivity and the efficiency of census operations. PSA shall also use a mix of Paper and Pen Interviewing (PAPI) and Computer Assisted Personal Interviewing (CAPI) methodologies during the census. Though the implementation will only be on selected areas, this will be the first national census that will use mobile devices (tablets) to manage and conduct fieldwork.

1.2. Objectives

PSA aims to meet the following objectives:

1. Streamline processes and increase operational efficiency in the conduct of the 2020 nationwide Census of Population and Housing;

2. Successfully test the implementation of a Computer-assisted Personal Interviewing (CAPI) methodology on actual census; and

3. Improve dissemination of Census results through web-based platforms.

2. Requirements

The Bidder should provide a **GIS *(Geographic Information System)*** and the tools necessary to implement a solution based on PSA's requirements, with the following components:

- Scope
- Functional Requirements
- Technical Requirements
- Deliverables

The requirements listed refers to the minimum requirements that must be met by the Bidder. Compliance or non-compliance to the requirements and detailed in the Bidder's Technical proposal.

3. Scope

The general scope of work of the Bidder are as follows:

3.1.1. Provide a GIS (Geographic Information System) based on a solution that will support all stages of census operations (pre-enumeration, enumeration and post-enumeration activities);

3.1.2. Provide tools that support both CAPI and PAPI methodologies for census;

3.1.3. Assist PSA in the deployment of the enterprise GIS;

3.1.4. Conduct of capability building activities for PSA in the use of the proposed GIS; and

3.1.5. Provide a 1-year cloud infrastructure subscription that will be used for the deployment of the proposed GIS.

4. Functional Requirements

This section details the functional requirements for the *Procurement of Enterprise Geographic Information System on Cloud Infrastructure*. Aside from this section in the Terms of Reference, Bidders are required to respond to the listed Technical Specifications in the bid documents.

PSA requires the Bidders to show proof of their claims in their proposal, including factual narratives to substantiate responses. Mere statements of compliance without adequately supporting the descriptions of how the compliance will be achieved are not acceptable and may be grounds for bid disqualification. Demonstrations may also be required by PSA as part of the evaluation process.

4.1. Pre-Enumeration

An enterprise GIS will be used to improve the productivity and efficiency of PSA in preparing for the actual field enumeration and post-enumeration activities of the 2020 CPH.

This will include the following:

- GIS software and licenses to be used in the preparation of maps for census;
- IT infrastructure to host and store data and apps during census for areas that will use CAPI methodology;
- A centralized database for census maps and survey information; and
- A map production system for areas that will use PAPI methodology.

4.1.1. Provision of GIS Software and Licenses

The envisioned GIS platform for the 2020 CPH is expected to have the core functions of a geographic information system. This includes map creation, navigation, editing, publishing, data management, analysis and administration.

The Bidder must provide a turnkey Geographic Information System (GIS) that will support the objectives.

4.1.1.1. Desktop GIS

The Desktop GIS is an important component of the CPH GIS platform. It shall be composed of a set of tools for users to author content: maps, data, metadata, and GIS web services.

The Bidder shall provide a turn-key (commercial-off-the-shelf) desktop GIS that is widely implemented across a range of application areas in Philippine government agencies and in a wide variety of countries around the world. It shall have the following capabilities:

Map Display and Visualization

One of the primary capabilities of a GIS is to display and visualize spatial data. The proposed Desktop GIS shall have the following capabilities:

- Directly read and display both vector and raster data on a map;
- Visualize maps in 2D and 3D. It shall be able to visualize 2D and 3D views of the same data in one interface; and
- Create 3D features from scratch, import 3D models or symbolize 2D feature attributes in 3D.

Map Navigation and Interaction

The proposed Desktop GIS shall provide tools to allow users to navigate the map and interact with the data layers in it. These shall include the following:

- Navigation of map views e.g. zoom in, zoom out, pan, etc.
- Selecting and querying map features based on specific attribute records;
- Selecting and querying map features using location.

Data Editing

The proposed Desktop GIS shall provide tools to allow users to create and edit map features and its attributes. Specifically, these shall include the following:

- Point and click on-screen digitizing;
- Stream digitizing;
- Feature manipulation tools (create new, reshape existing features; creating copies of existing features; etc.)
- Snapping tools to ensure feature connectivity;
- Attribute editing tools;
- Transformation of vector data;
- To ensure spatial and referential integrity, the editing tools provided must work with the topology rules, domains and subtypes that have been set up in the geospatial database.

Spatial Analysis

The proposed Desktop GIS must be able to perform spatial analysis that help identify patterns, make predictions, and answer complex questions. This intends to support users in decision making and interpretation of data through processing of spatial data. This should include the following functionalities:

- Identification of relationships among spatial features;
- Performing analysis through spatial statistics tools;
- Automating analysis processes and tasks through geoprocessing models; and
- Publishing of maps and data created as a result of spatial analysis.

Map Publishing and Sharing

The proposed Desktop GIS must have the tools to allow users to share the maps created by users to other users in PSA. Options export maps into printable and shareable formats should be available. The proposed Desktop GIS must have tools to publish maps as web services for consumption of external systems.

Data Support and Interoperability

The proposed Desktop GIS must be capable of visualizing and analyzing spatial data from many sources. It shall have tools for easy conversion of data between formats to eliminate barriers to data sharing. Specifically, the proposed Desktop GIS should have the capability to:

- Work with (read, transform and write) different spatial data formats without programming;
- Extract, transform and load spatial data;
- Work with open data standards (OGC, ISO and other GIS standards bodies);
- Support for raster data e.g. GIF, JFIF, JPEG, PNG, TIFF, GeoTIFF

Productivity Tools

The proposed Desktop GIS must have tools to improve the users' productivity by streamlining editing, geoprocessing, and analysis workflows. Specifically, the proposed solution shall include:

- a ready-to-use interface where users can formulate workflows that strings together sequences of geoprocessing tools; and
- a tool wherein users can use set preconfigured steps to guide other users through a workflow or business process.

These tools must be out-of-the box and resulting workflows must be shareable to other users of the GIS platform.

4.1.1.2. Enterprise GIS

PSA's GIS must be enterprise-ready. This will ensure that it can deliver maps, apps and spatial information to users across the organization. By having an enterprise-ready GIS platform, PSA can provide access to their spatial content whenever it is needed.

The proposed enterprise GIS platform shall have the following capabilities:

Flexible Deployment

PSA's GIS platform must support enterprise IT requirements. It should support deployment on either PSA's own on-premise and cloud infrastructure. It should be able to integrate with common enterprise systems, data sources and security frameworks.

Sharing and Collaboration

The proposed enterprise GIS shall have a robust GIS server that will publish PSA's maps as web services for sharing to other users and for consumption of web applications and PSA's other systems. It shall be capable of integrating with existing enterprise systems and data sources. Furthermore, the proposed GIS solution should allow users to embed maps in other enterprise systems.

The proposed enterprise GIS shall allow users to visualize and analyze spatial data housed in enterprise databases. The Bidder shall specify supported enterprise database of their proposed solution.

The proposed enterprise GIS should also support numerous data formats such as shapefiles, imagery, tables, CAD and KML files. It should also support OGC and open web services e.g. WMS, WFS, WCS, WMTS, WPS, KML and GeoJSON.

Enterprise portal

The proposed enterprise GIS shall have a secure portal where geospatial content will be organized and managed. This web-based portal shall allow users to:

- search, organize, analyze and store spatially enabled content;
- visualize spatial data directly on a map providing users with smart mapping capabilities; and
- edit and perform spatial analysis

The portal shall also provide PSA with the capability to manage user access roles and privileges.

Multiuser Editing

The proposed enterprise GIS shall provide PSA with the capability to implement a multiuser editing environment to allow multiple users to simultaneously modify the same data without interfering with each other, taking the data offline, or creating multiple copies of the data. It shall also provide the tools to implement QA procedures for validating edits. The system must provide a version management solution that allows multiple edits to be working on the same data layers without locking the data. It should have an automated conflict detection and resolution capability between versions.

Data Management

The proposed enterprise GIS shall have a point-and-click user interface for:

- Creating and managing databases;
- Defining and modifying database schemas; and
- Defining and managing security and access control on the GIS database.

Ready-to-use Maps

The proposed GIS shall include access to ready-to-use basemaps which includes but is not limited to topographic and imagery basemaps. These basemaps should be accessible online as web services and should be viewable using the Desktop GIS and other GIS web and mobile applications.

4.1.1.3. Map Production System to support PAPI workflows

PSA needs a system that will allow them to produce hard copy maps that can be utilized by the field and supervisor staff to conduct the in-person surveys using Paper and Pen Interviewing (PAPI) methodology during the CPH.

This map production system shall include a digital geodatabase which will store the basemaps and all map data to be used for the Census and shall have the tools to automate map production through scripts and templates, enabling batch processing of maps. This map production system will generate maps that will be printed by PSA field offices for use during enumeration.

4.2. Enumeration

To support the requirements during the Enumeration stage of the CPH, mobile and web apps shall be deployed for a map-based CAPI workflow in selected provinces.

These apps shall provide the following capabilities:

- allow enumerators to collect population and household information during their interviews with the households; and
- provide PSA with operational awareness on the progress of field enumeration and have visibility on the data collected while the census is ongoing.

4.2.1.Mobile app for CAPI

The proposed enterprise GIS shall include a mobile app for collection of data from the field. This app shall have these capabilities:

- Deployable on different field mapping activities;
- Native mobile app, ready-to-use and configurable;
- Map-based interface where the user can plot points, lines or polygons to represent the location of the data being collected;
- Supports connected and disconnected editing;
- Deployable on iOS, Android and Windows mobile platforms
- Includes survey design facility and a survey app with a form-based interface;
- Has tools to easily design and create various survey forms;
- Supports complex form requirements;
- Has smart form capabilities to make data collection easier and responsive to the user:
    - Drop down lists for responses;
    - Autocomplete capability when typing responses to choice questions; and

    - Auto-filtering of questions based on answers to previous questions (questions can be hidden or shown depending on the responses of previous questions).

- Capable of syncing data collected as soon as it is collected making it readily available to other users in the organization;
- Supports attachment of images and sounds to survey responses;

4.2.2. Dashboard for Monitoring CAPI

The proposed enterprise GIS shall include dashboards that will provide PSA with operational awareness on the progress of enumeration while the census operations are ongoing. Specifically, this app shall have the following capabilities:

- Web based dashboard app;
- Ready-to-use and configurable and can be extended if necessary;
- Provides real-time operational view of people, events, activities, etc. e.g. survey progress;
- Display information in the form of maps, lists, charts, gauges and other visual indicators;
- Automatically update to display most current census indicators;
- Configurable to various display environments e.g. large screen, desktop or tablet; and
- Tools to query or filter data.

4.3. Post-enumeration

The proposed enterprise GIS shall include tools to allow PSA to share results of the CPH through webmaps and apps to its stakeholders, partner agencies, and the public without any programming. This apps should support multimedia content (maps, data, text, images, audio and video) for effective delivery of information.

5. Technical Requirements

This section states the various technical specifications and requirements that must be fulfilled by the Bidder. These specifications in addition to the functional requirements, will be the basis of PSA's technical evaluation criteria.

5.1. Data Support

The Bidder's proposed enterprise GIS should support Open Geospatial Consortium (OGC) and open web services e.g. WMS, WFS, WCS, WMTS, WPS, KML, GeoJSON, etc.

5.2. Deployment

The proposed enterprise GIS shall be deployed on a hybrid infrastructure to ensure its optimum performance in support for PSA's workflows. The proposed GIS solution should support both on-premise and cloud environments.

5.2.1. Enterprise GIS

The proposed enterprise GIS should include the provision and deployment of GIS software licenses.

5.2.2. Infrastructure

PSA will be providing the on-premise infrastructure. The Bidder shall provide the needed cloud infrastructure through subscription for one (1) year. The proposed cloud infrastructure should meet the requirements stated in in this Terms of Reference.

Cloud Infrastructure

The proposed cloud infrastructure must be an in-country cloud or locally hosted within the Philippines.

The proposed cloud infrastructure must comply with the following specifications.

Connectivity to this cloud infrastructure must be via Private and Dedicated layer3 VPN and/or Public Internet.

The Bidder must provide all necessary components to make the cloud infrastructure operational e.g. operating systems, RDBMS, security, etc.

The Bidder shall provide the following support for the proposed cloud infrastructure:

- Overall systems admin, 24x7 managed operations;
- Operating systems management and maintenance;

- Network monitoring and minor configuration changes;
- Database capacity monitoring;
- Back-up and restore;
- VM hardening and firewall management;
- Patching management; and
- Analyze and recommend capacity related fixes

The proposed cloud infrastructure's physical environment must be compliant to building, cooling, fire protection, security and network specifications.

The Data Center where the proposed cloud platform is hosted must have the following certifications:

- ISO 9001: 2008 Quality Management System (QMS)
- ISO 27001: 2013 Information Security Management System (ISMS)
- ISO 14001: 2004 Environmental Management System (EMS)
- ISO 22301: 2012 Business Continuity Management System (BCMS)
- ISO 20000-1: 2011 IT Service Management System (ITSMS)
- PCI Data Security Standard 3.2

The Bidder must provide proof of the above certifications as part of their proposal. Lacking documentation means non-compliance to the bid requirements.

The Bidder must provide four (4) methods in which data can be restored.

- Data is restored at LAN speed from Local Storage
- Data is restored across the WAN Link
- Restore Data is delivered via Portable Disk
- Data can be delivered by replicating data on an alternative site.

The proposed cloud infrastructure must have backup software, or its equivalent, configured with the features.

5.3. User Count

The proposed GIS should accommodate up to a maximum number of users, as described below:

User	Quantity	Duration
Head Office (Desktop GIS users)	36	Perpetual
Head Office (web users)	140	1 year
CAPI personnel (mobile and web users)	360	3 months (during enumeration only)

5.4. Security

The Bidder's proposed GIS should come with a robust security framework for securing access to PSA's data.

It should support the following security settings:

- Web-tier authentication e.g. IWA, PKI;
- GIS-tier authentication
- Enterprise logins e.g. SAML 2.0
- Enterprise groups e.g. Active Directory, LDAP, SAML 2.0
- TLS 1.0, 1.1, 1.2

5.4.1.Access control

The proposed GIS should have the capability to enforce role-based security controls delineating access privileges of users to data, maps and apps. It should have an out-of-the-box facility for user management with tools to define levels of access rights or user roles.

5.4.2.User authentication

The proposed GIS must be capable of implementing user authentication standards. The system must be able to leverage enterprise accounts and groups to control access and facilitate Single-Sign On (SSO) experience

5.4.3.Data security

Data security and privacy is very important to PSA. Hence, the proposed GIS should have the capability to secure PSA's data in transit and at rest (storage).

5.4.4.Cloud Infrastructure Security

The Bidder must provide a Security Operations Center (SOC) as a Service. The Bidder must:

- Monitor and improve PSA's security posture while preventing, detecting, analyzing, and responding to cyber security incidents with the aid of expertise, technology, intelligence, and well-defined processes and procedures;
- Provide and consolidate threat intelligence through various local and global sources, and conducts in-house malware analysis, threat hunting, and forensic analysis through a locally available pool of security analysts, engineers and experts;
- Prevent cyber incidents through continuous log, event, and threat analysis, network and host scanning for vulnerabilities, and security policy architecture, and training;
- Monitor, detect, and analyze potential intrusions in real time through historical trending on security-relevant data sources;
- Respond quickly to confirmed incidents by directing use of timely and appropriate countermeasure and through workflow automation;
- Provide situational awareness and reporting on cyber security status, incidents, and trends in adversary behavior appropriate to organizations;

- Extend the organization's existing cyber security capabilities to be able to monitor 24x7, leverage on available expertise and best practices, and add a layer of cyber intelligence while avoiding very large outright investments;
- Have a Command Center that has the following:

    - 24/7 Security Operations and Response
    - In-country SOC facility
    - In-country SOC analysts and incident responders
    - Security Operations Center located in a Data Center Grade Facility with the following certifications:
    - ISO 27001: 2013 Information Security Management System (ISMS)
    - ISO 22301: 2012 Business Continuity Management System (BCMS)
    - ISO 20000-1: 2011 IT Service Management System (ITSMS)
    - PCI Data Security Standard 3.2
    - ISO 14001: 2004 Environmental Management System (EMS)

The Security Operations Center Must have threat intelligence of the following:

- Automated threat analysis process that uses a range of information sources and data types;
- Capability to collect intelligence from the widest choice of commercial and other sources;
- Creation of feedback loops from SIEM alerts to enable any new threat information to automatically update internal rule sets for the future detection and alerting of known infections, or to detect changed patterns of misuse across systems or a user population;
- Modelling of user and asset risk and sensitivity to drive detection, diagnosis and incident response. Sources:

    - Internal Threat Intelligence
    - External Threat Intelligence
    - Contextual Threat Intelligence
    - Community Threat Intelligence

The proposed cloud infrastructure must have a Cyber Laboratory capable of:

- Malware analysis;
- Determining the functionality, origin, and potential impact of a malware by executing it in an isolated environment;
- Active Threat Hunting;
- Actively looking for threats before they penetrate a target or an organization;
- Forensic Investigation; and
- Investigation and analysis techniques to gather and preserve evidence from a particular event.

The proposed infrastructure must include a Sandboxing Agent. The sandboxing agent must provide full visibility with its forensics capabilities, monitoring and recording all endpoint events: files affected, processes launched, system registry changes, and network activity. Firewall should protect endpoints by controlling inbound and outbound traffic. It must ensure compliance while accessing the corporate network. Remote Access VPN secures access to corporate resources when remote. The disk encryption should secure the entire drive. It must protect against ransomware. It must block zero day phishing attack. It must identify and contain infection.

The proposed cloud infrastructure must include next generation firewall and an advanced threat prevention gateway.

The proposed cloud infrastructure must support sandbox for mobile device:

- It should run apps downloaded to mobile devices in a virtual, cloud-based environment to analyze behavior then approves or flags them as malicious;
- It should detect malicious network behavior and automatically disables suspicious networks to help keep mobile devices and data safe. On device network protection, inspects and controls network traffic to and from the device, blocking phishing attacks on all apps and browsers, and communications with malicious command and control servers;
- It should analyze devices to uncover vulnerabilities that cyber criminals exploit to attack mobile devices and steal valuable, sensitive information.

6. Other Requirements

6.1. Training and Capability Building

The Bidder must conduct capability building in the use and management of the proposed Enterprise GIS.

The Bidder should provide an initial training plan together with the proposal. This training plan will be subject to revision upon the conduct of a training needs assessment upon issuance of Notice to Proceed or Contract. The initial training plan should take into consideration all capability building needs of PSA in the use and management of the Enterprise GIS for the preparation and the actual conduct of the 2020 CPH.

The initial training plan should include course description of all courses mentioned.

Trainers should be from an authorized distributor of the proposed GIS. The bidder is required to submit a copy of the trainer's credentials with their proposal.

6.2. Technical Support

The Bidder is required to provide PSA with support services in the conduct a successful CPH 2020 and other programs and projects of the agency that may use the GIS technology. These services will include:

- Facilitation of annual planning meeting
- Resource person to conduct quarterly onsite technology updates
- Remote support during survey/field work
- Documentation of workflows,
- Review of GIS enterprise architecture design,
- Installation/configuration/upgrade of GIS software,
- Conduct Training Needs Assessment.

Technical support services shall be provided to PSA staff to assist with the deployment of all the GIS software, resolve issues impacting the implementation of all activities of CPH 2020, and address any questions or issues related to the technology.

There must be a strong technical support for the core GIS products being proposed in the following forms: phone call, email, online an on-site. The support staff receiving the support calls or emails should be in the same time zone as the end users.

During the software maintenance period, the Bidder should have an online helpdesk support where users can report, monitor and manage support cases. PSA should be able to open new cases using a web form, view the response of the assigned Technical Support Analyst and monitor the status of the case. Users should be able to view case histories and re-open a case if necessary.

The Bidder must propose their recommended SLA to PSA.

6.3. Cloud Infrastructure Management Support

The Bidder must provide support to manage the cloud infrastructure system operations. This outsources PSA's daily cloud functions like infrastructure performance monitoring, operation of the cloud environment up to operating system level, network, back-up and storage configuration and 24x7 general maintenance and trouble shooting. This service must be handled by highly qualified cloud engineers with expertise in operating systems administration, storage, virtualization, security and networking.

Services should include:

- Overall systems admin, 24x7 managed operations - 24x7 systems administration for your cloud environment
- Operating systems management and maintenance - Manage and maintain the cloud environment up to the operating system level
- Network monitoring and minor config changes - Maintain the network and private WAN needed to connect the cloud to your sites
- Back-up and restore - Implement data backup via VM copy, image backup to storage, tape drive, file server backup (subject to additional charge)
- Patching management - Install critical OS patches and firmware updates to keep the systems up to date (license and software assurance required). Application patches are subject for assessment.
- Analyze and recommend capacity-related fixes - Monitor alerts or metrics that indicate capacity-related issues. Recommend fixes via a report and implement any changes to resolve them if approved by the customer
- Managed Security
    - Installation and configuration on IaaS
    - 24x7 firewall monitoring in case of security events and high utilization
    - Management of firewall policies
    - Monitoring dashboard for viewing security events and high-level forensics

Service changes such as the need to update software through patching, or implementation of any requested minor configurations as part of the service to the client's Cloud may be:

- Requested by the client through Cloud Helpdesk and escalated to the Cloud Services team for implementation
- Recommended by Cloud Services team based on their monitoring

Activities implementation schedule for any needed changes to the Cloud system of the customer:

Cloud Activities Scheduling:	
Mandatory security patches	Weekly
Implementation of Cloud resource capacity recommendation (if any)	Monthly
Critical patches for OS and for applications if installed	

Implementation of requested or recommended minor configuration changes for network, security, backup	
Non-essential configuration changes and patches that do not affect functionality	At least bi-annual
Reports on Cloud status	Monthly or quarterly option
Recommended course of action	

For configuration requests related to the above features or modifications to the management of your cloud systems, you may contact the winning bidder/Cloud Helpdesk.

Severity Level	Response time	Escalation
Minor requests	Requests should be coordinated 3 days prior to the planned activity	Call or e-mail Cloud Helpdesk
Example:		
• Turn VM on/off		Call or e-mail Cloud Helpdesk
• Delete or add VM using *existing* cloud resources		Call or e-mail Cloud Helpdesk
• Change IP, network routing from cloud to other sites		Call or e-mail Cloud Helpdesk
• Log checking (network or system logs)		
• Request for reports on IaaS status (maximum one per month)		
Level 3	Less than 4 hours	Call or e-mail Cloud Helpdesk
• Customer unable to perform one or two minor functions		
• Customer identified a possible error but there is no effect on any other part of the service		
Level 2	Less than 2 hours	Call or e-mail Cloud Helpdesk
• This refers to partial service outage, resulting in degradation of business functionality with workarounds immediately available.		
• Handling of escalation from level 3		
Level 1	Less than 1 hour	Call or e-mail Cloud Helpdesk
• Complete loss of cloud functionality	Updates every hour until resolved	

6.4. Manpower Requirements

The Bidder must provide a team with the following qualifications to support PSA's requirements:

- GIS Consultant
    - Must have at least one consultant with at least 20 years of experience related to the proposed GIS;

    - Must have experience in supporting large enterprise systems, national spatial infrastructures, demographic and census solutions; and
    - Must have technical certifications on the proposed GIS.

- GIS Technical Support Personnel

    - Must have technical certifications on the proposed GIS.

- GIS Trainor/Instructor

    - Must have technical certifications on the proposed GIS.

- Personnel for Datacenter, cloud, security and connectivity must be certified at least on:

    - 1x Certified The Open Group Architecture Framework
    - 1x Certified Information Technology Infrastructure Library
    - 1x Certified Ethical Hacker (CEH)
    - 1x Project Management Professional

7. Bidder Qualifications

The Bidder is required to comply with the following requirements:

7.1. The Bidder must be a sole authorized local distributor of the proposed GIS solution in the Philippines to address immediate and urgent technical support. The Bidder should submit a certificate of local distributorship for the enterprise GIS to be supplied in order to ensure immediate support.

7.2. The Bidder must be a GIS solutions provider for at least twenty-five (25) years;

7.3. The Bidder must be ISO Certified (9001:2015);

7.4. The Cloud Service Provider must be:

- a provider of IT Cloud Services for at least three (3) years
- authorized dealer of re-seller of Agent-less Backup software;
- must have at least 24 hrs./day x 7 days/week x 365 days/year Help Desk Support.;
- Must have an ISO Certification for Business Continuity Management System.