System Requirement Specification

FOR

Integrated Enterprise Information System

Prepared For:

Guyana Geology and Mines Commission

Prepared By:

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Consultant

Information and Communications Technology

April 2010
System Requirements Sign-Off

We the undersigned signatories by affixing our signatures below indicate that the contents of the attached Systems Requirement Specification for the Integrated Enterprise Management Information System developed by eSure Labs for the Guyana Geology and Mines Commission have been duly reviewed and accepted subject to the following assertions:

1. We agree that this document represents our best understanding of the requirements for the Integrated Enterprise Management Information System for the Guyana Geology and Mines Commission today.

2. We agree that this sign-off constitutes satisfactory fulfillment of the works with respect of the engagement between eSure Labs and the Guyana Geology and Mines Commission.

By signing this document, I acknowledge that I have delivered all the stated deliverables, at the agreed to quality levels, as stated in the contract.

By signing this document, I acknowledge that I have received all the stated deliverables, at the agreed to quality levels, as stated in the contract.

Sese Jones  
eSure Labs

William Woolford  
Commissioner ag.  
Guyana Geology and Mines Commission

Date  

Date
## Revision History

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1. Introduction

Information & Communication Technology (ICT) intervention, applied to the right problem(s) in the right way, delivers enormous efficiency and effectiveness gains to organisations. The challenges, in this regard, are (1) to identify the real problems and (2) to strategically apply the organisation’s resources so that these investments are appropriately aligned with the organisation’s business goals/strategy such that return on investment is optimised; ie to implement effective IT governance and to ensure compliance with good practices in the use of IT.

1.1. Purpose

The purpose of this document is to:

- convey the Consultant’s understanding of the business needs of the Guyana Geology and Mines Commission (GGMC) that can benefit from appropriate Information and Communication Technology (ICT) intervention, and

- provide the Commissioner and Senior Management Team of the GGMC with the System Requirement Specification (SRS) for an Integrated Enterprise Management System.

The SRS is intended for rigorous consideration by the Senior Management Team prior to commencement of the design/implementation of the proposed Integrated Enterprise Information System that is intended to satisfy the expressed needs of the GGMC. This SRS outlines the requirements as obtained and understood by the ICT Consultant from interviews conducted with over forty-five staff (see Appendix I) of the GGMC, direct observation of select aspects of GGMC’s business operations, review of secondary sources of information/documentation, and interactions with existing ICT solutions owned and operated by the GGMC.

To complete the verification aspect of this engagement, this was carefully review by the Senior Management Team of the GGMC.
1.2. Document Overview

This document is broken down into three major sections. Notwithstanding this, the “Introduction” provides an overview of the System Engineering exercise, the key participants involved in the administrative and operations business functions of the GGMC - the intended audience of this document. The Introduction also explains challenges the participants currently face and their interest in the way the Integrated Enterprise Information System is conceptualised and will behave in meeting the Commissions strategic goal of enhanced Customer Satisfaction.

The section, 'Strategic Aim,' explains the aim of the System Requirement Engineering exercise (which forms the basis of this project) and it identifies the six top-level requirements critical to the successful implementation and sustainability of GGMC’s current ICT reform initiative.

Next, the “System Requirement Specification” section is the most significant part of the document. It expands the top-level requirements and explains the specific business needs of the over all system in terms of what is actually require for GGMC’s reformed Information System (IS) to operate optimally, and some of the constraints that will apply. This is summarised in a context diagram (see Page 15) for a breakdown of the conceptual functional modules. Because of the technical nature of the System Requirement Specification (SRS), it then moves on to explain the steps of the procedures to meet these requirements, with specific emphasis on the areas identified in the Scope of this engagement.

The last major section 'Software Requirements' identifies the top-level functional and non-functional requirements, including key data that will need to be handled by the Integrated Enterprise Information System.

1.3. Scope

This document defines at a functional level the business activities that are encompassed by the proposed Integrated Enterprise Information System. It also encompasses the key high-level technical requirements of the system required to support business processes within the Mines, Environment and Geological Services (Land Management) Divisions. It draws heavily on both the data collection tools employed and research conducted by the Consultant on similar type ICT solutions. The scope of the detailed analysis phase specifies that it will include:

1. Conduct systems analysis and document the system requirement specification complete with functional/non-functional specifications for the design and
implementation of an Integrated Enterprise Information System for the Commission.

The scope of the analysis phase, for which this document forms the deliverable, does not include technical software specifications intended for developers. These specifications must be produced in the application delivery phase, based on the results of the detailed analysis and feedback from the review and requirement sign off activities which this document is intended to facilitate.

1.4. Intended audience

The intended audience of this document is the Commissioner and members of the Senior Management Team of the GGMC, and other duly authorised representatives of the GGMC that are directly involved in the delivery of the proposed Integrated Enterprise Information System.

1.5. Stakeholders

The primary stakeholders, we classify as those individuals/businesses and divisions/departments/units that that are involved in the mining industry in Guyana, that can be impact on by the operation of the Integrated Enterprise Information System.

- Business Entrepreneurs and Customers of the GGMC
  Individuals and/or business entities involved in mining or mineral trading industry in Guyana.

- Engineers, Field Officers and Administrative and Operations staff of the GGMC
  Responsible for executing project related and routine job functions and requirements of the GGMC.

- The Commissioner and Managers of GGMC
  Responsible for providing strategic direction, and administration of the operations and production responsibilities of the GGMC.
• Guyana National Printers Limited (The National Gazette)
  Responsible for printing and publishing notices of the granting of mining and/or
  trading rights to companies and individuals.

• The Environmental Protection Agency
  Responsible for the management, conservation, protection and improvement of
  the environment, and sustainable use of natural resources in Guyana

• The Guyana Gold Board
  Responsible for local and international trading (setting of price, purchase and
  sale) of all gold produced in Guyana

1.6. Contact information/SRS team members

All communications concerning this SRS, if for the ICT Consultant must be directed
to:

Malcolm Williams and/or Sese Jones and/or Verrol Adams
354 East Ruimveldt
Greater Georgetown

e-mail: eggmc@ephonegy.com
cell: 592-646-1444

And if for the Guyana Geology and Mines Commission, must be directed to

The Commissioner
Thru’ Mr. Lennox Tucker
WWF
GGMC Compound
Brickdam, Georgetown

e-mail: lennoxt2101@yahoo.com
1.7. References

i. Laws of Guyana, Mining Act
ii. Mining (Amendment) Regulations 2005
iii. GGMC Performance Improvement Plan (PIP), May 2008
vii. GGMC: System Requirement Engineering Update, eSure Labs, 2010
viii. GGMC’s ICT Strategic Plan
ix. GGMC’s Quality Systems Manuals
x. Complexity Process Map of Application Process
xi. Reports obtained from previous ICT solutions delivery initiatives that were conducted internally and outsourced, and other supporting documents.
2. Executive Summary

The best way to improve institutional knowledge (business intelligence) and understanding is not through the provision of more static reports/feedback from management to staff, but rather through overall enhanced communication and interactive dialogue.

The System Requirement Engineering exercise has established the need for an enterprise approach to the delivery, implementation, use and administration of information systems across the Guyana Geology and Mines Commission (GGMC). In view of this approach, the resulting information system can be described as an Integrated Enterprise Information System. This position was arrived at through the requirement elicitation and analysis exercise which revealed the following:

1. Several of the challenges faced by the GGMC pose risks to the attainment of a high order of success in meeting GGMC’s Strategic Goal of Customer Satisfaction

2. A not insignificant absence of a complete and concrete ICT Strategy that supports and in itself is appropriately aligned with the Business Strategy of the GGMC

3. GGMC’s ISO 9001:2000 certification and Balanced Scorecard performance management initiatives stand to receive substantial human resource support, since a significant amount of GGMC’s staff are computer literate and already use collaborative tools, such as an Intranet and e-mail, in their daily business functions as a means of getting job done more efficiently

4. A significant amount of data are collected and maintained without data standards, security and standard operating procedures that coordinate and manage data consistently throughout GGMC. This situation has led to a tremendous amount of:

   (1) informally acquired, unauthorised collections of data

   (2) duplication of effort and data,

   (3) under-utilisation of ICT resources, and
(4) ad-hoc modeling and use of data, which makes it difficult to share, reuse and analyse

5. Remote access to customer information and spatial data (especially maps) is critical to the operation of the Mines, Geological Services (Land Management Department), Environment and Petroleum Divisions

6. GIS skills, including spatial data mapping, modeling, maintenance and analysis, are not equitably distributed, horizontally and vertically, across GGMC;

7. Absence of formalised standards/protocols for sharing data internally and externally

8. A backlog of Information Communication Technology training needs

9. Human resource management constraints impact on staff relations and performance

As a means of addressing the above and in support of the delivery, operation and maintenance of the Integrated Enterprise Information System, we recommend that the GGMC must (1) setup an effective IT Governance mechanism, (2) prioritise its ICT investments and institutionalise appropriate ICT strategies, principles etc, (3) establish appropriate standard/protocols for data governance to ensure that data is handled consistently across the organisation, and (4) institutionalise a human resource training and recruitment programme that will facilitate the continuous development of requisite information literacy skills and information technology champions within the GGMC.

Further, we posit that the best course of action for GGMC is to pursue a practical balance between maintaining department-based business computing capabilities, and provide, through appropriate and well thought out integration, opportunities for collaboration across the organisation.

Further to the findings of this investigation in respect of GGMC’s previous failures regarding information systems delivery, and above all other considerations, the Senior Management Team must be cognizant that ICT systems implementation requires resolute purposefulness and patience. Information Systems delivery life cycle - from identification of problems/needs, to system specifications, to system procurement/development, deployment, acceptance testing, and commissioning — can take several months to several years to complete, depending on the nature of the systems under consideration. GGMC, in this regard, must pay specific attention to (1) the prioritisation of ICT investments, (2) applications needs identification and (3) end-user training. In addition, GGMC must
develop a strategic ICT implementation plan that is informed by strategic priorities and with explicitly defined phases, each with clear objectives and milestones. As each phase is completed, GGMC and the system stakeholders must involve themselves in acceptance testing of the system under development as a means of validating whether the system still meets the needs of the GGMC and its stakeholders.
3. System Requirement Specification

ICT implementations without a clear business goal, purpose and value will fail.

This System Requirement Specification (SRS) outlines the issues and business needs that must be addressed for the successful implementation of the proposed Integrated Enterprise Information System that will offer appropriate ICT support for the GGMC to satisfy its mission and achieve the strategic goal of Customer Satisfaction. It is important to note that the Integrated Enterprise Information System, like all Information Systems (IS), is made up of six fundamental components. These components are inter-dependent, and the weakness in any one component determines the overall strength of the Information System. The six fundamental components are:

1. Software used to support the business functions
2. Hardware used to support the software and communication
3. Data to be processed
4. Business procedures and rules to ensure that data is processed accurately and consistently
5. Technical support personnel to maintain the network, hardware and software
6. Users who input the data and retrieve output for decision making

This SRS is developed in view of all of the above components. All components must operate optimally for the success of the Integrated Enterprise Information System.

3.1. Strategic Aim

The strategic aim for the development of this SRS is for it to serve as a guide to the provision of appropriate ICT intervention and support within GGMC to meet the Strategic Goal of fostering and sustaining Customer Satisfaction through satisfying the broad data
processing, communications and information generation needs of the GGMC for mission critical applications, information dissemination and business analysis.

Figure 1 depicts the Consultant’s conceptualisation of the proposed Integrated Enterprise Information System (see for Section 3, Page 32, for details). As the context diagram illustrates, the integrated nature of the system is not constrained by the organisational structure, but rather, is based on the critical business functions of the GGMC. In this regard, divisional and departmental lines are blurred as an integrative whole is envisaged. Consequently, the goal is to develop an integrated enterprise system – consisting of legacy and new information systems modules – into a seamless ICT infrastructure for the GGMC.

The remainder of this document elaborates on the system requirement at increasingly deeper levels of detail.

Figure 1: Context Diagram for proposed Integrated Enterprise Information System
In view of the integrated system nature of the proposed solution, and in order to attain the Customer Satisfaction strategic goal, the following were established as the top level requirements for the delivery of the Integrated Enterprise Information System. In this regard, GGMC must

1. Effect **Business and Information Technology (IT) Strategy alignment**; the correspondence between GGMC’s business objectives and corresponding/related IT requirements. GGMC’s ISO 9001:2000 certification and Balanced Scorecard performance management initiatives offer tremendous support and guidance in this respect and are a step in a positive direction for the GGMC.

2. Effect **reform of the IT Governance mechanism and overall IT Departmental structure** within the GGMC, to ensure that (1) the Commissions business strategy is clarified and the role that ICT plays in achieving the strategy are effectively communicated and promoted in the Commission; (2) co-ordination of the overall ICT systems development are effectively implemented; and (3) to develop the appropriate environment, within GGMC, to ensure sustainability of the business enabling responsibilities of the ICT Department.

3. Establish **IT Principles – ICT Strategy, Mandate, Mission Statement, Core Values etc** – by which the IT portfolio of the GGMC will be managed and operated in service to the Commission and its Customers.

4. Establish **audit policies to govern and institutionalise (1) acceptable level of ICT administration, security and support services, (2) standards and best practices for data collection, documentation, processing and management, and (3) usage of the ICT infrastructure** by staff, partners and customers of the GGMC.

5. Design, implement and deploy the proposed **Integrated Enterprise Information System – hardware and software infrastructure, appropriate human resources workforce, and business rules and standard operating procedures** - the modules/services of which are appropriately selected and prioritised, and deemed “fit for purpose,” by the Senior Management Team. Specific attention must be placed on standardising data gathering, management, data sharing between the departments and staff/partners/customers of the GGMC, security and support for Management decision making.

The existing ICT hardware infrastructure (see Figure 3, Page 34) – LAN and WAN technologies; with connections at the central GGMC office to its remote offices and
Mining Stations in the mining districts – will form the basis of the communications infrastructure to support the software infrastructure of the Integrated Enterprise Information System.

Data conversion and standardisation will form an important input into the Integrated Enterprise Information System, in terms of test data and business critical data that will be placed into production upon commission of part or all of the Integrated Enterprise Management System. In consideration of the design of the Integrated Enterprise Information System, provision must be made for appropriate conversion, normalisation and standardisation of existing data (both in electronic and paper-based formats). This requirement is especially important in the Mines Division – mineral property, trading and mining equipment management – which is partially computerised, but is affected by the disparate nature of existing solutions and the absence of a sufficiently normalised database schema.

Conversion of GIS data must also be considered in view of the design of the proposed system, and emphasis must be place on consolidating property geodatabases to support the immediate needs of the GGMC. As the Integrated Enterprise Information System matures and stabilises (both in terms of implemented features and usage), the GGMC may focus on integrating other concerns such as customer profiles, and the standardisation of data capturing and maintenance of geodatabases and datasets.

It is worth noting that specialised applications will always exist outside the main integrated system and provision must be made for these. For example, specialised applications will include Statistical Analysis Tools, such as SPSS and STATA; simulation tools, such as AutoCAD and mathlab used by engineers.

Notwithstanding the above, the special attention must be given to the optimization of the use of existing instrumentation tools and their eventual integration with the Integrated Enterprise Management System. For example, though the utilities exist to automate the processes of obtaining and sharing analytical results from the Atomic Absorption Spectrometer, used by the Chemists, the recording of these results outputs are predominantly done manually, due to the absence of the appropriate software configurations.

In view of the current evolution and development of the GGMC, in pursuit of ISO 9001:2000 certification and enhanced quality management, special care must be taken by the designers to revisit Standard Operating Procedures (SOPs) prior to design and implementation to ensure that the expressed workflows that are used as the basis of this system analysis exercise remain consistent with those in use at the time of design.
6. Implement and institutionalise a **human resource Training Programme for ICT and Information Literacy Skills** development that must address the immediate and future skills required to operate, maintain and extend the Integrated Enterprise Management System, and optimise the business value to be obtained from the same. In this regard, immediate attention must be placed on identifying critical training needs of existing staff. For example, training in the use of statistical tools and formulae in spreadsheets (such as MS Excel) has been highlighted for urgent attention.

In consideration of the above, and in order to implement a sustainable integrated information system, GGMC must be prepared to commit to the following:

1. Standardised data classification and naming conventions, with which events and entities attributes will be handled across the GGMC;

2. Establish and institute internal audit controls over data entry, transaction processing, and reporting; and

3. Standard operating procedures and standardised processes for handling similar type transactions and

4. An integrated system design that eliminates unnecessary duplication of data entry and effort.

### 3.2. Divisions and Departments involved in the System Requirement Engineering Exercise

The foundation for the SRS was a series of interviews, direct observation of business operations, and readings of existing literature involving key business areas. Some business areas were often found to cross divisional and departmental boundaries. The elicitation of information included participation from over forty (40) employees across the organisation. The business areas covered:

1. Mines Division
2. Environmental Division
3. Geological Services Division
4. Central Registry and Mines Registry
5. Petroleum Division
6. Finance
7. Administration and Human Resource
8. Occupational Health & Safety and Clinic
Although the departments at Item 5 – 12 were not part of the original scope of this engineering exercise, the interdependence and existence of cross-cutting concerns between all of the divisions and departments of GGMC deemed their inclusion necessary. In this regard, a holistic understanding of the business needs of the GGMC evolved as a critical success factor.

3.3. Challenges faced by GGMC

Below we present the major challenges faced by the GGMC regarding efforts to use ICT business enabling tools and services within GGMC to fast pace and achieve its strategic objectives. Matters/issues relating to the preceding challenge are also addressed. The Integrated Enterprise Information System is intended to alleviate, in the worst case, and eliminate in the best case, these challenges faced.

C01. IT Governance
   a. Lack of complete and concrete Business and Information Technology Strategy alignment
   b. Lack of an appropriately institutionalised IT Governance mechanism
   c. High incidence of ICT systems delivery failure
   d. High degree of effort, data and resources redundancy brought about by virtue of the existence of silos of ICT solutions that are department specific

C02. Customer Relations and Services (Mineral Property Management)
   a. Time intensive workflows for processing of applications for Claims, Licenses and Permits (some of these workflows are currently under review by the ISO 9001:2000 certification project)
   b. Lack of consistency and transparency in the availability, presentation and provision of information to customers
   c. Time consuming storage and retrieval of paper-based records inhibit fostering of customer satisfaction at some of GGMC’s customer contact points
d. Lack of real time access by the Mining Stations and field officers on duty in the mining districts to existing Information Systems and electronic data, such as GIS maps.

e. Insufficiency of appropriate security for Information Systems. For example, the Diamond Trading database security mechanism does not satisfy the Kimberley protocols database security requirements; staff with data entry responsibilities have low-level administrative access to databases tables.

f. Lack of appropriate verification mechanism to verify and validate data entered into the existing Information Systems. Data entered into most existing databases are generally accepted as is, without any subsequent verification. It is worth noting that lack of verification interferes with reliability of and accountability for the data, and also contributes to staff approaching work mechanically rather than critically as there are no apparent consequences for errors, deliberately or otherwise incurred.

g. Incomplete, inaccurate, redundant, unverifiable and inconsistent data maintained in some existing Information Systems, such as the Claims and Dredges databases.

h. Lack of structure – standard operating procedure – for data sharing internally and externally.

i. Inconsistent data storage mechanism/policy. The existence of silos of solutions,

j. Lack of electronic dispute database and tracking system.

k. Lack of a desirable level of customer access to online services and information about the GGMC. The existing Web Site, offers minimal information, some of which are not current.

l. Lack of the desired level of interactivity in the existing Web Site.

m. Inadequacies in the content and presentation logic of the existing Web Site.

n. Difficulties in tracking and advising Holders of licenses/permits and Claim Owners of missed payments and other notices.

o. Untimely filing of new applications for licenses and permits.

p. Inability to print licenses and other required reports from the existing Information Systems.

C03. Inter-departmental Services

a. Low order and quality of intra and inter-divisional communication. This is brought about in part due to insufficient usage of the existing Intranet and other modern communication media/equipment.

b. Lengthy turn around time between request for information and the corresponding response. The procurement process is one such example.
c. Insufficient software support for transportation facilitation, administration and
maintenance scheduling
d. Insufficiency of software tools to gather, process and analyse data to support the
desired level of effective management of the Commission's workshops and
transportation services
e. Lack of timeliness of feedback concerning requests for resources, such as
vehicles and material
f. Lack of timeliness in obtaining advices concerning schedule/delivery changes,
such as emergent unavailability of vehicles or inability to satisfy requests. This
and the preceding have tremendous negative impacts on the start time, and
often times the actual execution, of projects
g. Limitations in the existing mechanism for processing requests for procurement
h. Lack of visibility of the status of procurement requests
i. Insufficient high quality of inter-departmental communication and updates
j. Insufficient training in the use and awareness of the Intranet and its features
k. Lack of a sufficiently intuitive user-interface on the Intranet

C04. Geographic Information System
a. Lack, in some departments, of intermediate and expert spatial data and GIS
application use and analysis skills, and generally, lack of custom GIS application
design and Application Programming Interface (API) development skills
b. Limitations on the integration, web and API services offered by the existing GIS
implementation
c. Lack of flexibility and inherent limitations of sharing data with other agencies
such as Lands and Surveys due to inter-agency data governance issues and non-
existent of GIS system of standards
d. Lack of extensive workforce (internal and external) to provide technical support
for the existing GIS implementation

C05. Human Resource Management
a. Though seemingly unrelated to ICT, the following challenges exist: (1) lack of
sufficient and appropriate space for existing staff accommodation, (2) meeting
the accommodation needs of required staff, and (3) need for flexibility in the job
responsibilities of staff – some staff passively resist doing jobs outside of their
specific training/area. The nexus in this regard is that comfortable and happy
staff are productive and more amenable to change. This is especially important
when considered in view of the nature of change that are typically brought about
my ICT intervention, such as the need for additional training and changes in job responsibilities/descriptions
b. Predominance of paper-based staff and related records
c. Backlog of ICT training. GGMC stands to receive immediate benefits from appropriate training in Spreadsheet skills
d. Lack of software support for maintaining staff training records/needs
e. Insufficient support for training and staff sensitisation/advices via the Intranet
f. Insufficient opportunities and means of interacting with staff via modern ICT tools
g. Insufficient trained staff in the use, operation and administration of the existing Human Resource software
h. Lack of system interface to the existing Payroll software; inhibits integration of existing HR software and Payroll
i. Retaining trained staff. Forces a need for continuous training in view of resource constraints
j. High staff turnover impacts on business continuity
k. Backlog of data entry needs (in the HR unit and other departments)

C06. Project Management
a. Lack of a structured and consistent mechanism by which a metrics can be obtained to support the Balanced Scorecard performance management mechanism
b. Lack of an organisation wide, real time view of GGMC’s performance achievements with respect of established strategic objectives and goal
c. Lack of consistency with respect of how projects are planned, executed, monitored and documented across the Commission
d. Lack of standard operating procedures for reporting datasets obtained from project work, and updating of existing data repositories
e. Lack of accounting visibility concerning the “Activity Costs” for project based activities

C07. Accounting and Finance
a. Time consuming nature and associated risks of the manual processing of accounting and financial transactions and data
b. Lack of timeliness in obtaining accounting/financial reports and data from the Mining Stations
c. Insufficiency of tools to gather and support financial analysis, such as operational, project and data production costs; and Activity Cost accounting
d. Insufficiency of training in the use, administration and maintenance of the existing ACCPAC accounting system
e. Lack of a complete integrated finance and accounting information system
f. Lack of existing system interfaces between the ACCPAC accounting system and IS relating to the revenue generating and cost incurring functions of the Commission
g. Interfacing between existing Human Resource and Payroll information systems

C08. Document Archiving and Tracking
a. Time consuming, error prone and high risk manual system for document management (within the individual divisions and centrally)
b. Incidences of misplaced, lost and deteriorating paper-based records
c. Lack of sufficient space for archiving, to facilitate easy retrieval, paper-based records
d. Lack of timeliness in retrieving paper-based files/record filed
e. Difficulties in tracking paper-based records checked out of the registries
f. Difficulties in controlling the care and maintenance of files/documents checked-out of the registries
g. Insufficient computer hardware to support increased reliance on electronic administrative record keeping
h. Inappropriate software support for electronic file management

C09. Data Sharing with External Agencies
a. Lack of established standards and policies for data sharing
b. Requirement to convert petroleum exploration and production data received from external agencies
c. Lengthy turn around time from request for information to delivery of information

C10. Registries, Library and Electronic Data Repository
a. Insufficient computer hardware available for users of the library
b. Backlog of resources to be catalogued electronically; the library has an existing library management IS. The designers of the Integrated Enterprise Management System must not ignore the opportunity of reusing this software
c. Lack of a central repository for datasets. For example, results from analytical works done in the Laboratory are recorded in individual spreadsheets and stored on a central server. In addition to the risk this poses, this storage arrangement does not adequately support time series or longitudinal analysis.

d. Insufficient access to electronic journals and material used by staff of the GGMC

C11. Statistics and Analysis
a. Lack of a central repository for datasets. This imposes a major overhead for the statisticians or officers carrying out statistical works. For example, data required for a study may exist in several different spreadsheets, across several departments, and in different layout formats. The officer carrying on the study must first request and obtain the spreadsheets, extract the relevant data into a format suitable for analysis and then carry out the analysis. In addition, should the source data change during the course of the study, these will not be reflected in the study if due diligence is not exercised.

b. Lack of consistent format and proper documentation of datasets received from other departments

c. Limited/restricted access to datasets

d. Lack of standards for sharing of data between the Commission and government agencies such as the Ministry of Home Affairs

C12. Occupational Health and Safety
a. Lack of appropriate information systems support for the collection, processing and analysis of OHS data. For example, OHS mining equipment and medical supplies inventory management system are non existent

b. Inefficient and untimely communication with Mining Communities, Mining Stations and on duty field staff

C13. Legal Services
a. Lack of sufficiently secure mechanism for exchange and dissemination of information via e-mails between GGMC's Board Members

b. Immense mental overhead required to manage Board Minutes, Decisions and Action Sheets. High reliance on availability of Legal Officer
c. Lack of software support for tracking of document vetting and related services provided by the Legal Division

3.4. Objectives for Addressing Challenges

O01. IT Governance
   a. Establish a system for management of GGMC’s ICT portfolio that is streamlined such that interdepartmental co-operation and ICT resource use are optimised, and overlap and duplication of effort are minimised to ensure that ICT return on investment is optimised.

O02. Customer Relations and Services
   a. Establish a professional, customer friendly business environment within the Commission that will support the Strategic Goal of Customer Satisfaction
   b. Provide appropriate ICT and technical support for the mission critical business functions of the GGMC to meet customer needs in a timely and consistent manner
   c. Increase opportunities for customers to interact with the Commission through the use of existing systems and the increased use of modern technologies, such as the Web-site and portals

O03. Inter-departmental Services
   a. Enhance the delivery of services and information, from one department to another, as a means of supporting the beneficiary department’s performance and ability to satisfy their mandate
   b. Enhance staff relations across the Commission

O04. Geographic Information System
   a. Provide a centralised, robust spatial data storage and analysis platform from which the Commission’s business critical applications will received appropriate support for location referenced requirements
   b. Provide a central repository for the Commission’s geospatial data, from which customer spatial data needs can be met
   c. Provide the relevant technical support and management skills, and business continuity support requisite for the upkeep of the mission critical business value that GIS brings to GGMC

O05. Human Resource Management
   a. Provide the requisite human resource skills to operate and maintain the Commission’s ICT assets and information systems
b. Provide a sustainable mechanism to support the development of requisite information literacy, application and IS skills required for the sustainable and optimised use of the Commission’s ICT assets

**006. Project Management**

a. Provide a mechanism to ensure that the Commission’s investments in project related works are handled in a consistent manner across the Commission. This is to increase the likelihood of business continuity in the face of threats, and provide insight into the execution, activity costs and deliverables of projects

b. Provide a mechanism to align GGMC’s Strategic Objectives with the work staff perform on a day-to-day basis

c. Provide Senior Management the ability to oversee, more closely, ongoing projects under their charge

d. Provide the Finance Division the enhanced ability for cost-benefit analysis, budgeting and financing of projects

e. Provide a mechanism to communicate the performance metrics from the above to facilitate their use in strategic planning, strategy execution, and overall organizational management across the GGMC.

**007. Finance and Accounting**

a. Enhance the Commission’s ability to process in a timely and accurate manner all accounting and financial transactions

b. Provide appropriate support for financial analysis, forecasting and budgeting

**008. Document Archiving, Circulation and Tracking**

a. Enhance the document management capabilities of the Commission

b. Provide enhanced security for archiving and retrieval of files/documents that are of importance to the Commission

c. Facilitate ease of access to files/documents in the filing system

d. Provide a robust archiving mechanism for the Commission’s files/documents

**009. Data Sharing with External Agencies**

a. Facilitate the ease of data sharing with government and public agencies

b. Speedup processing of transactions that are dependent on external data

**010. Registries, Library and Electronic Data Repository**

a. Provide appropriate support for learning, reference and dataset resources that are essential to the execution staff job responsibilities

b. Enhance the services offered by the Library

c. Provide a consistent mechanism for access to and use of the Commission’s library and data repository resources

d. Provide a consistent and secure mechanism to manage administrative correspondences within the GGMC
011. **Statistics and Analysis**  
a. Provide appropriate support for analytical and research works within the Commission  
b. Enhance the Commission’s ability to respond to events within the remit of their regulatory and monitoring responsibilities based on analysis and research  
c. Enhance the Commission’s aim of increased decision making based on information and analysis  

012. **Occupational Health and Safety**  
a. Provide appropriate response mechanism to enhance safety of mining operations and administration in Guyana  
b. Provide appropriate support for the timely reporting of accidents and incidents that occur involving GGMC’s staff, mines workers and community members residing on or near to mining districts  

013. **Legal Services**  
a. Provide appropriate mechanisms for the security of communication involving Board level information and decisions  
b. Provide appropriate mechanism for the dissemination of timely information/advice to GGMC internal and external stakeholders  

3.5. **Recommendations**  

R01. **IT Governance**  
a. Develop strategic plan for management of decision rights, decision inputs and decision accountability across GGMC  
b. Setup a ICT Steering Committee (with ICT champions from each department/unit) to oversee the delivery of the integrated enterprise information system  
c. Implementation of the IEIS strategy should not be undertaken without addressing the IT governance challenges; development of a vision statement, statement of principles and an outline of goals for the IEIS development;  
d. Restructure and reorganise IT Department, and institute HR change to facilitate positions for:
i. Information and Communications Technology (ICT) Manager (with responsibilities commensurate with internationally accepted responsibilities for Chief Information Officer)

**PURPOSE:** To develop, refine and chart appropriate ICT vision with strategic focus on the deployment of ICT resources to meet the business needs of the GGMC; to communicate and collaborate with the Management Team, Directors and Managers of Divisions on ICT needs and initiatives; to manage existing and new ICT reform projects; and to lead a team of ICT professionals in the administrative and operational functions of the IT Department to ensure the upkeep and high availability of the GGMC’s ICT infrastructure and business critical Management Information Systems in order to ensure that all stakeholders are provided with accurate, verifiable, timely, useful and relevant information to support quality decision making and customer service.

ii. Database Administrator

**PURPOSE:** to ensure acceptable levels of performance, integrity and security and disaster recovery of all of GGMC’s database resources; to plan, develop and troubleshoot database related problems, bottlenecks and performance; to ensure that storage, archiving, back-up and recovery procedures are functioning correctly; to monitor user access, map out the conceptual design for planned database to satisfy business critical and ad hoc database driven projects inclusive of procedures and definitions for the data dictionary; to maintain data standards and enforce data processing policies of the GGMC; communicating regularly with data and communications, applications and operational staff to ensure database integrity and security.

iii. Communications and Network Administrator

**PURPOSE:** To provide operational and administrative technical ICT support to GGMC’s Local Area Network (LAN) and Wide Area Network (WAN) and telephony infrastructure and services in order to enable the IT Department to provide a high availability data and communications network infrastructure to support GGMC’s business critical software applications. This is to ensure that the various functional and operational divisions and areas to operate more effectively and efficiently.
iv. Application and Help Desk Support Administrator

**PURPOSE:** To develop plans for software and systems purchases and budgets; to oversee the development, implementation, installation, and operation of GGMC’s MIS; and to manage the operational end-user ICT support for all business critical software to the computing staff of the GGMC in order to ensure that all computing staff are able to use their communication equipment and software efficiently and effectively, so as to improve communication amongst staff, customers and other stakeholders; to provide technical and administrative support for both in-house and outsourced ICT projects, in terms of the planning, development/deployment, testing and end-user training aspects of the project; to develop ad hoc special purpose and single-use applications for use by GGMC; and to provide second and third level technical support in one or more highly specialized areas of applications systems administration, analysis and development to ensure, in the first instance, that GGMC’s business critical software applications operate optimally, and in the second case, that internal and external website/intranet provide adequate e-Governance support for needs of GGMC’s customers, staff and other stakeholders.

v. GIS Administrator (does not necessarily have to be directly under the ICT Dept)

**PURPOSE:** To design, operate, oversee and maintain GGMC’s Geographic Information System (GIS); to coordinate, manage, and direct GIS activities, database/applications development, definitions, maintenance, and implementation; to provide assistance and coordination of drafting, mapping, graphic illustrations, and related report preparation for the GGMC; and provides training for GIS operators.

vi. Statistical and Analytical Support Officer (does not necessarily have to be directly under the ICT Dept or a single person)

**PURPOSE:** To provide services (design of experiments/surveys, data collection, cleansing, analysis techniques etc) relating to statistical analysis on behalf of officers of the GGMC; to advise on finds of analysis and recommend strategies/action based on these findings; to provide appropriate training and support to GGMC staff with respect of statistical analysis; to serve as the administrator of GGMC dataset repository.
R02. **Geographic Information System**
   a. Creation of a position for GIS Manager to coordinate GIS activities.
   b. Undertake to review the Commissions GIS strategy and platform
   c. In view of R01.a above, the Commission must not ignore the possibility for change over from MapInfo to ArcGIS
   d. If the changeover in R01.b is adopted then, the Commission must develop a complete strategic migration plan from MapInfo to ArcGIS. Plan must include provision for
      i. identification of desirable extensions and utilities
      ii. projected end-user needs (engineers, customer facing and research services); critical to informed decision making regarding the conversion
      iii. Spatial data standards and documentation must be developed for all spatial data collected, stored and used within GGMC (effort and opportunities should be taken to coordinate spatial data standards with external agencies such as the Lands and Surveys to facilitate data sharing;
      iv. Develop a permissions, user authorisation and authentication strategy that will permit access (internally and over GGMC's WAN) to GGMC's spatial data and GIS software;
   e. Provision appropriate hardware for GIS server
   f. Implement and Test data conversion
   g. Provide training in the use and administration of the new GIS system
   h. Roll out the new GIS system

R03. **Integrated Enterprise Information System**
   a. Setup and ICT Steering Committee to oversee design, implementation, testing and roll out of the proposed Integrated Enterprise Management System
   b. Develop an implementation plan for a well thought out, phased delivery of the components of the IEIS; that ensure business value is obtained by the GGMC after every delivery
   c. establish appropriate standard/protocols for data governance and acceptable use of ICT resource to ensure that data is handled consistently and safely across departments
   d. institutionalise a human resource training and recruitment programme that will facilitate the continuous development of requisite information literacy skills and information technology champions within the Commission to support the system
4. **Requirement Specification for Integrated Enterprise Information System**

*Organisations that generate superior returns on their ICT investments exhibit an increased focus with respect of non-duplication of effort and data, reuse and optimisation of resources (material and human), data sharing and the need to advance the integration of core support systems.*

In this Section we elaborate the requirement specification for the proposed Integrated Enterprise Information System. First, we discuss the high level requirements for the system as depicted in Figure 1, which are classified as follows:

1. Geographic Information System
2. Customer Relations and Services Management
3. Project Management
4. Material and Human Resource Management
5. Accounts/Finance
7. Library and Electronic Data Repository Management System
8. Statistics and Analysis Software
9. IT Asset and Help Desk Management
10. Intranet and Web Services (Internet)
11. Occupational Health & Safe
12. Legal Services
Rationale for each of the above are provided below.

4.1. Geographic Information System
GIS offers tremendous support for the Commission’s core business function – unlocking the mineral and petroleum wealth of Guyana. GIS offers tools and storage mechanisms that are well suited to support GGMC’s service provision, business intelligence and research. Since GGMC’s data is predominantly location referenced, GIS will enable better decision making, by offering a mechanism to organise the data meaningfully - geodatabase - and provide visualisation and analysis of that data.

Web-enabled GIS tools will facilitate remote multi-user access - across the WAN - and editing where required. This will facilitate extensive functionality within the Commission’s multiuser environment and provide an effective spatial data management platform for the variety of existing and anticipated users.

4.2. Customer Relations and Services Management
To foster and maintain customer satisfaction/intimacy is the Commission’s strategic goal. Customer Relations and Services Management software tools will empower/enable staff of the Commission to provide personalised, timely and high quality customer service through interfaces that provide relevant information about the customer and the means to efficiently process their transactions at the customer contact points. In addition, these software tools will provide real time access to information by the Mining Stations to support staff, such as engineers and inspectors that work predominantly in the fields. Customer Relations and Services Management software includes support for:

1. Environmental Management
2. Mineral Property (Small, Medium and Large Scale) Management
3. Mining Equipment Management (Dredges and Specified Machinery)
4. Trade Management
5. Petroleum Exploration and Production
6. Interfacing financial transactions processed as part of all of the above with Accounting/Financial management sub-system
7. Internet facing information and service portal
The Customer Relations and Services Management system will enable the Commission to establish effective and meaningful links between its business concerns, such as permits, licenses and its location-based asset/concern, such as claims, dredge locations and so on. Figure 2 below depicts the entities/services and relationships existing in the management of the business function of Mineral Property Management.

Further, this system will enable the Commission to benefit from two-way exchanges with customers that will lead to the development of intimate knowledge of the customer needs, wants, and business behaviour patterns. In this way, it will help the Commission to understand, as well as anticipate and meet, the needs of current and potential customers.
4.3. **Project Management**  
Project Management software tools will enable departments and staff to plan, execute, monitor and resource field work (field verification, research and monitoring exercises) and activities/tasks that contribute to the realisation of strategic aims of the GGMC. In this regard, appropriate Project Management tools will provide the automation mechanism to support the Balanced Scorecard initiative. This medium in combination with the Intranet and Internet Services will communicate status and performance related information about GGMC to staff and stakeholders. In addition, project management tools can be used in a collaborative mode to enable managers/management an overseeing/tracking view of projects under their charge. Further, resources exploited in the execution of field work can be accounted for and the associated Activity Costs made available, through appropriate interfaces, to the Accounting/Finance function to support analysis.

4.4. **Material and Human Resource Management**  
Will enable the Administrative Division to effectively plan (including procuring and recruiting), schedule and manage the resources - including tangible assets, materials, and human resources – that are used in the execution of the Commission’s business. Procurement and inventory management fall under this category and impact on the Accounting/Finance responsibility. Material and Human Resource Management software will enable departments requesting resources to receive a higher quality of service, both in terms of timely feedback and timeliness of resource provision.

Human Resource Management is a critical success factor in achieving the Commission’s ISO Certification and overall management of the Commission’s most valuable resource.

Aside: Designers of the Integrated Enterprise Information System must not ignore the potential to use Enterprise Resource Planning (ERP) software to provide this suite of services.

4.5. **Account/Finance**  
Will enable the Finance Division to process and record accounting transactions and track financial events within the context of the financial processes of the GGMC. Further it will allow the Finance Division to accumulate this data and make it available for management decision making regarding, but not limited to, revenue generation, administration of field work projects, management of resources and budgets, and the preparation of financial reports and statements.
Designers of the Integrated Enterprise Information System must not ignore the potential and need to make provision for the integration of not only the core financial management functions, but also interfacing with other modules of the Integrated Enterprise Information System, such as human resources, payroll, claims and license application and renewal Point of Sale sub-system.

4.6. **File/Document Archiving, Circulation and Tracking System**

Will enable the Central Registry, Mines Registry, other divisional/departmental registries; and the Legal Division to effectively and securely manage and maintain files/documents originating from meetings, correspondences and/or generated from engagements between the Commission, its partners and customers. This system will facilitate the digitization and conversion of original paper-based documents to their electronic equivalent, ease of circulation and tracking of files/documents checked in and out of the respective registries, recording of annotations made on the original paper-based documents, and reporting on the history of staff interaction with specific files/documents. Further, this system will complement the workflows built into other modules of the Integrated Enterprise Information System; and facilitate ease of access to files/documents, over the LAN/WAN, to alleviate the major risks, such as deterioration of paper, lost and misplaced files, associated with manual file/document filing and archiving systems.

4.7. **Library and Electronic Data Repository Management System**

Will enable the Library to extend the Material and Human Resource Management system to include (1) library resources, such as books, journals, multimedia material and electronic datasets; and (2) the management and administrative services associated with library resource cataloging, user borrowing records, electronic resources such as subscribed electronic journals, fieldwork reports and related datasets. This system will facilitate the appropriate documentation, cataloging and storage of field reports and data sets obtained from field work and analytical services provided by the Laboratory.

The library resources will be made available to staff of the Commission to support the execution of their jobs. In this regard, the library serves as a central reference resource pool that merges business and engineering data, with traditional library functions and resources.
4.8. **Statistics and Analytical Software**

Will enable managers, engineers, statisticians and other staff whose job responsibilities involve statistical or other analytical work to function effectively. For example, on one hand, the Chemical Engineers and the Economist use statistical tools (some embedded in MS Excel) in the execution of their duties, while on the other hand, Environmental Engineers use geospatial data and datasets, such as water quality samples, compiled from field work to conduct analysis that are location referenced. In addition, the Chemical Engineers stand to benefit from the outputs of the analysis conducted by the Environmental Engineers, for example in water quality analysis, to perform time-series analysis regarding the effects/impacts of real world implementations of best practice mining methods, such as the use of cyanidation techniques in tailings management developed from their research works.

Further, the Petroleum Division will be able to use exploration and production field data for visualisation and analysis with appropriate GIS extensions\(^1\) or custom built GIS software. Overall, Engineers of the GGMC will be able to interpret trends and patterns visually, which will facilitate proactive response to events that are being monitored.

Software in this category will necessarily be made up of commercial off the shelf (COTS) tools and customised GIS applications that integrate field based data with geospatial data, and that use the multi-dimensional visualisation capabilities of GIS systems.

4.9. **IT Asset and Help Desk Management**

One of the components of Information Systems is the Technical Support available to maintain the software and hardware infrastructure. IT Asset and Help Desk Management software will facilitate (1) optimal use of the Commissions ICT assets by keeping track of the assets and their maintenance schedules, (2) effective incident – problems with the infrastructure – handling; identification and response/resolution, and (3) keeping track of, reporting on, and measuring ROI of the Commission financial investments in IT.

4.10. **Communication - Intranet and Web Services (Internet)**

Will enable staff, partners and customers of the GGMC to make use of the existing network/communication infrastructure – LAN/WAN and Internet (see Figure 2) – for local and distributed (remote) access to software, information and data resources of the GGMC. In order to facilitate access to information, in view of the geographic separation

\(^1\) Petrosys; http://www.petrosys.com.au
of the GGMC’s office locations and the need for customers to be keep reliably informed and able to interact with the GGMC, all services that are not to be conducted independently must be web-enabled.

Further, the Intranet will enable effective communication between divisions, staff, and between the GGMC management and staff, and serve as a knowledge base concerning the GGMC’s standard operating procedures, standards, human resource management, and portal to the GGMC’s business concerns etc. The use of e-mail and other appropriately selected collaboration tools will be available for staff use and communication.

The Intranet may be used by the Project Management Sub-System as a media to disseminate information across the organisation concerning the Balance Scorecard performance metrics and visualizations. In this regard, summary information and appropriately secure drill down detailed information about individual divisions, units and the overall organisation’s performance will be available on the Intranet.

4.11. Occupational Health and Safety Management System

Occupational Health and Safety (OHS) is a critical function of any organisation. This function is responsible for ensuring that staff are healthy and capable of delivering optimal service and productivity. OHS sustains staff productivity.

The OHS sub-system will enable staff of the GGMC to report accidents and incidents occurring on the job, while executing field work or obtained through monitoring and inspection of mining related activities and communities located on or near to Mining Districts. Information thus captured will form the basis of a OHS database. The Intranet and Website will also be used as a communication media to familiarize and educate staff and miners concerning safety and health issues.

Staff of the OHS Unit will be able access information within the database to guide subsequent actions. For example, reported accidents and incidents may require immediate action, escalation or referral for further medical care. Further, staff of the OHS Unit will be able to carry out statistical and other data analysis from which decision can be concerning provisions for safer working environments, corrective actions or need for research that will provide answers/solutions to existing problems.
4.12. Legal Services

Will enable the Legal Division to conduct of its secretarial and legal advisory responsibilities with enhanced efficiency. These efficiency gains will be obtained through enhancements in information security, ease of information dissemination, enhanced communication internally and externally and enhanced storage and retrieval mechanisms for the voluminous documents handled by this division.

This sub-system will seek to realise a practical mix of requisite security and ease of access/communication regarding decisions and information coming out of Board Meetings etc.
5. System Features

In this Section we outline the software requirements of the Integrated Enterprise Information System. These requirements are not intended to be exhaustive but to provide a base and serve as a guide to design priorities for implementing the integrated system.

1. Geographic Information System

Description and Priority

GIS is an immediate term requirement for the Commission’s Integrated Enterprise Information System. GIS is a critical component of the IEIS since a significant amount of the data maintained by the Commission is location referenced. GIS will feature a geospatial database and standard GIS tools for spatial data mapping, visualisation and analysis.

The GIS will provide system and user interfaces to the Project Management, Material and Human Resource Management, Electronic Data Resources and Library Services, and the Customer Relations and Services Management sub-systems. In this regard, the primary functions would be to view visualisations of the spatial data and maps.

The GIS will be managed and maintained by the Land Management Division.

Functional Requirements

The GIS must

REQ-1. Provide all common GIS functionality such as spatial data searching, mapping, visualisation and analysis available in the current implemented GIS, in addition to new features

REQ-2. Be extensible, to the extent that it must allow rules-based customisation to the user interface and development of custom GIS functionality
REQ-3. Provide/comply with Web-Services standards, and Application Programming Interfaces (API) and functions, to support development of web-based and desktop-based GIS applications, and specialised analytical tools

REQ-4. Provide extensions and plugin capabilities to support off-the-shelf industry standard compliant specialised GIS software. For example, GIS software used in Petroleum exploration and production industry

REQ-5. Provide multi-user, distributed capabilities with real time access/updates

REQ-6. Facilitate the availability of all GIS services to Mining Offices in real time.

REQ-7. Support data interchange formats and data conversion between industry standard GIS

REQ-8. Support various levels of users (e.g., power users, intermediate, casual users)

REQ-9. Provide visualization and appropriate tools support for historical snapshots and temporal analysis, such as land tenure status, water quality samples over a user defined period and dredge location as of a specific date
2. Customer Relations and Services Management

Description and Priority

The Customer Relations and Services Management is an immediate term requirement for the Commission’s Integrated Enterprise Information System. This sub-system will be tightly coupled to the GIS component of the IEIS. The Customer Relations and Services Management sub-system will provide functionalities to handle GGMC’s principal business concerns, such as claims, liscences, permits, wells, bore-holes and their related maintenance activities and transactions.

This sub-system will provide system and user interfaces to the GIS; Accounting/Finance; Document Archiving, Circulation and Tracking, and Internet/Intranet sub-systems. Further, this sub-system will serve as a repository of knowledge of mineral mining, prospecting and petroleum exploration and production data in Guyana.

Functional Requirements

The Customer Relations and Services Management system must

REQ-1. Integrate seamlessly with the GIS; applications and geodatabase

REQ-2. Provide a rules-based, consistent mechanism to integrate, into a common database, and handle the Commission’s business concerns: Small, Medium and Large Scale mineral properties, Trading and Prospecting Licenses/Permits, Concessions and Mining Equipment: dredges, specified machinery etc.

REQ-3. Provide a mechanism to guide the workflow and record the approval/verification responsibilities involved in the processing of transactions and maintenance activities related to GGMC’s business concerns. See Appendix II, II and IV for the workflow for processing of small, medium and large scale license/permits applications and maintenance.

REQ-4. Provide data entry mechanisms for permission-based CRUD (create, read, update, delete) operations on customer information. Provision must be made for the following (refer to Challenge CO2.g):
i. Unique record identification for every individual, company and business name

ii. Names of individuals must be separated into first name, other names and last name, to facilitate search by any of the preceding

iii. Names for company or business name must be that name registered/incorporated under the Business Name or Company Act at Deeds Registry

iv. Recording of more than one owners, with each owner tagged with ownership attributes (type of ownership - eg. principal; designation – eg. partner; role – eg. investor, miner)

v. Data entry of more than one unique identification number, such as Tax Identification Number (TIN), driver license number, national identification number, passport number, Business Name or Company registration number. Note unique identification will be used to distinguish customers who may have common names

vi. Data entry of more than one contact information, such as e-mail, website URL, mailing address, permanent address, registered office (if a company or business name), telephone number(s), cell number(s), fax number(s),

vii. Data entry of means of confirmation of nationality, residency and proof of address

viii. Standardised format for address information

ix. Gender and age detail, to support gender employment analysis

REQ-5. Provide a business logic layer that encapsulates GGMC business rules that govern the processing of applications and so on. For example, the system must be able to alert the user to events such as unauthorised nationality of a potential claim owner, or the absence of required documents that are filed as part of the application process
REQ-6. Provide data entry mechanisms for permission-based CRUD (create, read, update, delete) operations on license/permit application information. Provision must be made for the following (refer to Challenge CO2.g):

i. Verification Officer (Mines Officer) handling the application and/or field verification assignment

ii. Type of machinery, with attributes (see Form 19). In addition to the data captured in Form 19, the provision must be made for capture of the following attributes

• Status of machinery (Dormant, Active)
• Verification Status
• Date of Location
• Remarks; any useful or important comments by the Field officer

REQ-7. Provide desktop-based applications to support field work, such as verification data elicitation and inspections.

REQ-8. Provide a data transfer mechanism to seamlessly and securely upload data collected as per REQ-7 into the central database system. This must be carried out only from duly authorised network connections to the Integrated Enterprise Information System.

REQ-9. Provide standardised names/descriptions for static and semi-static reference information such as Engine Types, Status of Machinery and Pump Suction Intake Diameter.

REQ-10. Provide permission-based create and edit rights to maintain standardised reference information (see REQ-6 above).

REQ-11. Provide mechanism to manage transactions and maintenance activities (carried out on GGMC’s business concerns) such as transfer of ownership, change of engine/machinery and dormancy, complaints/disputes.

REQ-12. Provide a rule-based workflow tracking and reporting mechanism to record and guide the handling of court matters; ie. all matters for resolution by a Hearing Officer (to be guided by Appendix “Court Matters”). Incidents will include complaints and disputes.
REQ-13. Provide viewing of all or a user-specified period of historical transaction/maintenance activities for a selected business concern

REQ-14. Provide a rule-based workflow tracking mechanism to record and guide the verification and approval processing of applications (see Appendix II through IV).

REQ-15. Provide web-based access (with appropriate rights/permissions) to digital copies of files/documents associate with a specific business concern in order to facilitate the verification/approval workflow (see Document Archiving, Circulation and Tracking System.)

REQ-16. Provide web-based access, to duly authorised users, to basic GIS features with interactive map view of mining and oil exploration lands in Guyana

REQ-17. Must, in view of REQ-16 above, develop cartographic descriptions from ‘areas of interest’

REQ-18. Casual users (over the Internet or GGMC provided kiosk) must be able to interactively select a point object or feature or a polygonal feature on the GIS map through the provision of basic features, such as selection, identification, pan, and zoom. The underlying GIS must be able to communicate the resulting selection to the Customer Relations and Services Management sub-system for processing

REQ-19. Customers and casual users must be able to access maps and query/analyse the mineral content and potential of a selected area

REQ-20. Provide relevant information; owner/partners for any claim, dredges located at, mineral potential etc; on screen when a user identifies and selects a region

REQ-21. Provide a mechanism for customers (making use of internet facility or kiosks provided in the Commission) to setup temporary customer accounts (see REQ-4 above.)

REQ-22. Provide mechanism for existing or temporary customers to search maps and identify areas of interest, to view attributes such as its availability and mineral potential, to select the same area for the purpose of reserving the same, and indicate interest in the parcel of land by filling out a temporary application
REQ-23. Provide rule-based mechanism (based on GGMC's SOPs) to handle claims/property reservation

REQ-24. Provide mechanism to manage permits. This must include recording all aspects of the application process and maintenance.

REQ-25. Provide mechanism to record financial transactions, such as application and renewal fees, tributes and royalty payments, of GGMC's business concerns and to maintain a history of such transactions.

REQ-26. Integrate with the Accounting/Finance sub-system to manage the records of financial transactions, at REQ-18 above, of GGMC's business concerns.

REQ-27. Interoperate with the Point-of-Sale application component of the existing ACCPAC system.

REQ-28. Provide mechanism to record and maintain historical records of mining and trading production for each of GGMC's trading business concerns. This feature must be integrated with and make use of existing data maintained for the relevant GGMC's business concerns.

REQ-29. Provide a mechanism to record Transfer of ownership of claims.

REQ-30. Provide a mechanism to record and maintain historical records of Diamond trading and export. This feature must be integrated with and make use of existing data maintained for the relevant GGMC's business concerns.

REQ-31. Provide intuitive data entry user interfaces with appropriate user interface widgets, such as dropdown lists, selection and option buttons for static and semi-static data, to facilitate data entry standards and consistency.

REQ-32. Provide a mechanism to store published notices (gazetted) for each of GGMC's business concerns;

REQ-33. Provide reporting tools that must automatically generate on authorised user demand, but is not limited to:

i. Real time mineral production reports unfiltered or filtered by criteria such as Mineral Property, Date Period and Mining Equipment or combination of same.
ii. Cross-tabbed reports mapping periodic production of dredges (licenced, renewed, scrapped, transferred and registered) against the dredge pump suction intake diameter (see Attachment IV).

iii. Draft publications to be printed in the National Gazette to facilitate the No Objection requirement for processing of claims, permits/licence applications.

iv. Lists of Claims, Dredges, Permits and their respective status

v. List of Customers (claim, licence/permit owners) and related customer information and holdings

vi. Maps depicting time based location of specific business concerns such as dredges

vii. History records of activities/transactions by each Customer or any of GGMC’s business concern

REQ-34. Provide a format for dataset developed through monitoring and inspecting

REQ-35. Provide a flexible mechanism for recording indicators currently captured during monitoring exercises, as well as the LCD indicators and any new and emerging indicators

Additional Requirement

The designer/implementers must

REQ-36. Develop an appropriately normalised database schema that provides for the integration of all relevant records of GGMC’s business concerns, and that is interoperable with the GIS sub-system

REQ-37. Convert existing electronic databases to the format and schema developed as part of the preceding and that will form the database core for the new Integrated Enterprise Information System.
REQ-38. Proactively convert, prior or in parallel with the implementation of the Integrated Enterprise Information System, existing paper-base records currently maintained for GGMC’s business concerns
3. Project Management

*Description and Priority*

Project Management software is a medium term requirement. It includes functionalities that enable project planning, task scheduling, resource allocation and cost/budget management, collaboration and documentation used in the management of fixed time special purpose task based activities.

Users of the Project Management system will be expect to interact with the GIS component for retrieval of maps and other geospatial data, and to provide updates to the GIS based on the results of their field work. In addition, users will be expected to submit electronic (and paper-based) reports and datasets to the Electronic Data Repository and Library Services (see Figure 1).

*Functional Requirements*

The Customer Relations and Services Management system must

REQ-1. Provide user authorisation and authentication, permission rights management

REQ-2. Provide duly authorised web-based access to projects

REQ-3. Provide interfaces that appropriately filter customised views that allow users with appropriate rights to interact with relevant data that communicate performance measures and achievements across the GGMC relative to established strategic aims (re. Balanced Scorecard)

REQ-4. Provide summary data sheets that facilitate drill down mechanism to view detailed data

REQ-5. Provide master project view of projects under a master umbrella project. For example, supervisors will have a master view of project being planned and executed by staff under their charge, while the manager will have a master project view made up of all of the projects being monitored by their supervisors
REQ-6. Provide a permission-based mechanism to create resources and assign values to resource attributes, such as cost, work hours and identifier

REQ-7. Facilitate assignment of resources (human and material) to a project

REQ-8. Facilitate creation and scheduling of tasks along with the task attributes such as task name, start time, end time, dependencies and resources used

REQ-9. Facilitate adding of task attributes in addition to the default attributes mentioned in REQ-6 above

REQ-10. Integrate seamlessly with the GIS for retrieval of datasets and spatial data displays

REQ-11. Integrate with the Accounting/Finance system in order to provide Activity Costs for each project based on resource usage

REQ-12. Provide alternative views of the project schedule, such as Gantt chart view, PERT chart view, execution tracking view and baseline view

REQ-13. Provide a reporting mechanism to present printable and preview reports such as current resource allocation, resource availability, project activity cost, critical path, and Gantt and Pert Charts

REQ-14. Provide web-based user interfaces for viewing and tracking of projects
4. Material and Human Resource Management

Description and Priority

The Material and Human Resource Management sub-system is an immediate term requirement for the Commission's Integrated Enterprise Information System. The Material and Human Resource Management sub-system will provide functionalities to handle the Commission's principal resource concerns, such as vehicles and equipment, workshops - mechanical, electrical, carpentry, cleaning and security services, - human resources and related transactions. The Commission has an existing Human Resource Management software, GuySoft. Designers must not ignore the potential to reuse this software.

The Material and Human Resource Management will provide system and user interfaces to the Project Management, Finance and Internet/Intranet sub-systems. In addition this sub-system may interact with the GIS for spatial analysis of resource allocation and service provision (see Figure 1).

Functional Requirements

Designers must not ignore neither the potential for COTS Enterprise Resource Planning software to satisfy the requirements of the Material and Human Resource Management sub-system nor that of existing Human Resource and Material Resource management systems.

Notwithstanding the preceding, the Material and Human Resource Management system must:

REQ-1. Provide Human Resource Management features; at a minimum:

i. Contract Management

ii. Job/Position Classification; identification of appropriate pay ranges; appropriate status (approved, pending, filled etc)

iii. Allow a manager to enter a position requisition; define and monitor key dates associated with a position requisition or posting, e.g., approval dates, posting closing etc
iv. Job Details; creation and maintenance of job descriptions, SOPs and associated skills and competencies, responsibilities etc

v. Hiring and Recruitment Management; must facilitate
   - Applicant application online and profile maintenance (see Applicant Self Service)
   - applicant screening for job suitability, by the HR manager
   - interview scheduling
   - converting an applicant to employee

vi. Succession Planning

vii. Identify employees qualified for promotion (based on annual reviews and pre-defined promotion criteria)

viii. Applicant Self-Service (applying, viewing, mapping skills and competencies, and managing profile online; automatic e-mail acknowledgement)

ix. Employee development and training Management: must
   - Maintain searchable catalogue/database of training courses/programmes relevant to the GGMC in order for employee to identify suitable developmental opportunities.
   - Maintain employee training/qualification/competency history
   - facilitate identification of training requirements based on input from i) job descriptions, ii) employee competencies, iii) employee development plans and iv) employee requests
   - provide reporting capabilities to map employee to job positions

x. Performance Evaluation and Competency Management

xi. Leave/Absence and Time Attendance Tracking: must be able to create any type and number of attendance/leave plans and assign to individual employee or position

xii. Complete and print any required paper-based forms for signature and then scan/file the completed form within the HR sub-system

xiii. Permission based access and management of scanned employee documents

xiv. Employee Management and Self-Service; maintain employee records for biodata, contact information, promotions, transfers, salary increases, contract extensions, job responsibility/assignment changes etc; employee may request vacation or sick leave online (to facilitate MS)

xv. Health and Safety Management

xvi. Notices/Alert, Discipline and Grievance Management
xvii. Payroll Management and Employee Expense Management (Designers must not ignore potential to reuse existing payroll software)
xviii. Benefits Management
xix. User Permission and System Administration Management
xx. Reports Management; allowing printing of employment contracts etc
xxi. Web interface to support Self-Service
xxii. Store and manage up to XXXX active employees
xxiii. Integrates fully with Accounting/Financial/Payroll sub-system

REQ-2. Provide web-based support for the existing Peer Acknowledgement human resource initiative

REQ-3. Provide a permission-based CRUD (create, read, update and delete) operations on GGMC’s resources managed and maintained by the Administrative Division

REQ-4. Provide a mechanism to manage the maintenance of current and historical records of the Commission's vehicles upkeep schedule, maintenance and recurring costs, and duty assignment (Fleet Management)

REQ-5. Provide a mechanism to manage the maintenance of current and historical records of the Commission’s workshops. This will include records of resources used on specific beneficiary department, equipment, vehicle and the related costs

REQ-6. Assign and maintain attribute values to resources. For example, allowable work hours, operational costs, availability and so on. These resources will be used in the Project Management sub-system for project planning and accounting

REQ-7. Provide mechanism for resource planning and tracking

REQ-8. Provide reports, including but not limited to:
   i. Lists of material resources, their availability and/or assignment
   ii. Cost/benefit analysis of maintaining and operating specific resources such as vehicles
   iii. Periodic vehicle maintenance schedule
   iv. Current resource allocation schedule/assignment
   v. Map based spatial display of resource allocation
REQ-9. Provide appropriate support inventory management

REQ-10. Provide a mechanism to manage external suppliers

5. Accounting/Finance

Description and Priority

The Account/Finance sub-system is an immediate term requirement for the Integrated Enterprise Information System. This sub-system will enable the Finance Division to process and record accounting transactions and track financial events within the context of the financial processes of the GGMC. Further it will allow the Finance Division to accumulate this data and make it available for management decision making regarding, but not limited to, revenue generation, administration of field work projects, management of resources and budgets, and the preparation of financial reports and statements.

The Finance Division has an existing accounting software package; Sage ACCPAC and Point-of-Sale module. This system is currently not in operation. Notwithstanding this, designers must not ignore the potential to reuse this software to satisfy the needs of the Accounting/Finance sub-system. In this regard, appropriate API will have to be used/developed to provide the integration mechanism to integrate the ACCPAC with, in the first case the Customer Relations and Services Management sub-system, then to the Project Management and Material and Human Resource Management sub-systems.

Functional Requirements

The Accounting/Finance sub-system must

REQ-1. Provide integration mechanisms to facilitate interoperability with the Customer Relations and Services, Project Management, and Material and Human Resource Management sub-systems

REQ-2. Capture details of financial transactions, such as fee and rental payments, related to the Commission’s business concerns using the existing Point-of-Sale software
REQ-3. Provide an user interface to integrate the cashier's tasks of recording transactions originating in the Customer Relations and Services sub-system with data entry and Point-of-Sale transactions into the Accounting/Finance sub-system

REQ-4. Provide the mechanism to report on and track Activity Costs for project based activities

Non-Functional Requirement

REQ-5. End-user training in the operation and maintenance of the ACCPAC and Point-of-Sale software
6. **Electronic Data Repository and Library Services**

**Description and Priority**

The Data Repository and Library Services is a medium to long term requirement for the Commission’s Integrated Enterprise Information System. This system will serve the dual goals of data sharing and long term access. It will constitute a catalogued collection of all of the Commission’s learning, reference and research materials, as well as a repository of field research data sets searchable by appropriately documented meta data.

The Electronic Data Repository and Library Services system will interface with the GIS, Project Management systems for input and provide the dataset repository for statistical analysis and other research based works (see Figure 1).

**Functional Requirements**

The Electronic Data Repository and Library Services system must

REQ-1. Make use of international library standards for library holdings and dataset documentation

REQ-2. Must make use of international naming conventions and data types standards for dataset creation

REQ-3. Provide an appropriately normalised database (modeled in view of REQ-1) of catalogue information library holdings, such as book, journals (physical and electronic) and meta data about datasets

REQ-4. Provide online access to searchable catalogues of the library resources and datasets

REQ-5. Provide online access to electronic resources such as digitized reports, online journals and other electronic resources

REQ-6. Provide a mechanism for the creation and management of library members; ie. staff of the Commission and other duly authorised users. Ideally, library members information must be drawn from the Human Resource database through integration
REQ-7. Allow a library member to reserve and loan physical resources from the library

REQ-8. Maintain records of library members reservation, loan and return interactions with the library
7. **File/Document Archiving, Circulation and Tracking System**

**Description and Priority**

The File/Document Archiving, Circulation and Tracking sub-system is a medium term requirement for the Integrated Enterprise Information System. This sub-system will provide the Central Registry and other registries with the capabilities of managing and maintaining digital equivalents of paper-based files/documents used in the routine operation of the GGMC. All files/documents currently maintained by the various registries within the Commission will be managed by the new system. Special provision must be made for a similar type application for the Legal Division needs.

This sub-system will be tightly coupled with the Customer Relations and Services Management sub-system (see Figure 1). This system will implement all of the features of the existing manual system and add to these features.

**Functional Requirements**

The File/Document Archiving, Circulation and Tracking system must

REQ-1. Provide a mechanism to digitise paper-based records, such as Claims Applications, of the GGMC, and correspondences, reports that will be maintained in the registry.

REQ-2. Provide a mechanism/standalone application to handle Board Decisions

REQ-3. Create digital equivalents of files maintained by the existing manual system

REQ-4. Provide a permission based mechanisms for user to view files/documents of interest

REQ-5. Provide a permission-based mechanism for users to make annotations to existing documents. These annotations must include comments, directives and feedback typically written on the original paper-based documents by Managers and staff authorised to comment or requested to act in respect of the document.
8. **Statistical and Analytical Software**

**Description and Priority**

Statistical and Analytical Software is an immediate to medium term requirement for the Integrated Enterprise Information System. It will comprise of custom GIS-enabled (ie. integrated with the GIS component) and commercial-off-the-shelf (COTS) software. COTS will make up special purpose statistical software and engineering simulation software, while the GIS-enabled software will be developed to merge GIS spatial data and data obtained in the fields from project work for analytical purposes and visualisation.

The Statistical and Analytical Software will interface with the Electronic Data Repository and GIS. Datasets and reports developed by virtue of analytical works for the input in the Electronic Data Repository and Library Service system.

**Functional Requirements**

The Statistical and Analytical Software system must

REQ-1. Provide appropriate support for basic statistical analysis

REQ-2. Provide applied statistical and time series analysis

REQ-3. Provide interface to create datasets specific to results obtained in field work

REQ-4. Provide user interfaces to GIS-enabled functionalities, and display animation sequence consisting of time series changing geographic features, for example, the progression of turbidity in treatment areas after applying treatment in terms of education, and new and improved mining methods

REQ-5. Provide appropriate support for mineral

REQ-6. Provide appropriated interfaces, interface components and functions to model real world systems, such as the construction of a sluice

REQ-7. Provide means of affixing attributes and values to models of real world systems. For example, the cost of materials used in sluice construction model
REQ-8. Provide software simulations of software based model, for example simulation of a sluice in operation.

REQ-9. Provide a means of capturing model’s metadata and computational data arising from the model

**Additional Requirement**

REQ-10. GGMC must identify all environmental and mining operations quality concerns, such as water quality, and establish desired attributes and standards for data gathering.

REQ-11. GGMC must establish a standardised means of encoding descriptive data in order for them to be amenable to quantitative statistical analysis
9. Communication Portal - Intranet and Web Services (Internet)

Description and Priority

Communication Portal – Intranet and Web Services sub-system is an immediate term requirement for the Integrated Enterprise Information System. The Intranet and Internet network/communications infrastructure will form the platform for the Integrated Enterprise Information System. In this regard, the underlying infrastructure will provide linkages between the Central Office, remote offices, mining stations and the general public. This sub-system will be tightly coupled with most of the other sub-systems, and provide collaborative tools, such as e-mail; and a media for communication.

This sub-system will provide critical support for the Balance Scorecard performance management initiative. In this regard, the Intranet and Internet will be used to keep management and staff informed of the day-to-day operations and achievements of the organisation with respect to attainment of its strategic goals.

Functional Requirements

The Communication Portal – Intranet and Web Services (Internet) sub-system must

REQ-1. Provide secure, reliable and high speed access to services, information and data available on the web-enable Integrated Enterprise Information System

REQ-2. Provide secure collaboration tools, such as secure e-mail, to enhance inter-divisional and inter-personal communication

REQ-3. Provide a consistent user-interface framework that will facilitate logical and consistent rules for staff to access and use of application services, information resources and datasets that are made available via the portal

REQ-4. Provide a consistent user-interface framework for external stakeholders to access application services, information resources and datasets that are intended for the general public

REQ-5. Provide support for the Data Repository and Library Services sub-system; exemplified by online catalogue of GGMC’s library resources, such as datasets, books and journals and appropriately privileged access to same
REQ-6. Provide a consistent framework to support the storage and dissemination of information such as standard operating procedures, circulars, training material and resources

REQ-7. Provide an overall mechanism that supports user-friendly navigation

REQ-8. Provide support for the Project Management sub-system to facilitate rules-based distributed access to, updating and viewing of scheduled tasks and activities.

REQ-9. Provide a mechanism to display visualizations of GGMC's Balance Scorecard performance metrics

REQ-10. Provide secure access to the staff and duly authorised stakeholder e-mail

REQ-11. Provide an effective marketing framework to support divisional and departmental web sites. Specific attention must be placed on information and services that effectively promote and market the functions and services of GGMC. Web space must be dedicated to

- Occupational Health and Safety (promotion of safe mining and work)
- Data Repository and Library Services (promotion of research, guidelines etc)
- Legal Services (promotion of regulations, rights, recourse etc)
- Special Projects (promotion of national and community service)
- Divisions (promotion of the Mineral Wealth of Guyana and services)

REQ-12. Provide content management rights and permission to duly authorised staff who will be designated to manage and maintain (in collaboration with the IT Department and the Public Relations Officer) divisional and departmental website

Non-Functional Requirements

REQ-13. Provide navigability, look-and-feel, and resources, that encourage user re-visitation

REQ-14. Provide 99.9% uptime and availability of services and resources
10. Occupational Health and Safety

Description and Priority

The Occupational Health and Safety sub-system is an immediate to medium term requirement for the Integrated Enterprise Information System. This sub-system will primarily aim to, on the first hand, sensitise staff, the general mining public and miners about the need to exercise occupational safety and good health in mining. On the other hand, this sub-system will enable the data collection of accidents and incidents, facilitate the appropriate handling of same and facilitate the conduct of relevant statistical and related analysis that are aimed at providing advise and information to effect requisite change for safer mining and work.

This sub-system will integrate with the Material and Human Resource Management, Project Management and Data Repository and Library Services Management sub-systems.

Functional Requirements

The Occupational Health and Safety sub-system must

REQ-1. Provide a web-based incident and accident management system. This must provide incident/accident reporting mechanism, incident/accident handling and escalation workflows, data filtering by user specified criteria (see indicators below), reports generation and viewing. Data requirements for the incident/accident register must include but will not be limited to, with respect of the incident/accident: date and time, nature of accident (fatal, non-fatal), Nationality of Person, Dredge/Specified equipment involved, location, name of dead/injured, cause(s) of accident, usual employment of individual involved, precise occupation of individual involved at the time of accident/incident, date enquiry held.

REQ-2. Provide a web-based immunization and health care management system. This must provide a mechanisms for escalating and referral of medical issues outside of the remit of the Medical Department, tracking treatment schedules and health care checkups for individuals being treated by the medical department, in addition to data including but not limited to: individual bio-data and contact information (obtained from HD if individual is a staff), family member information (to facilitate medical care for immediate family), immunization record, medical history and medication plan.
REQ-3. Provide a structured data repository with a sufficiently flexible place to support the capture and storage of currently collected and emerging OHS and environmental indicators and issues relevant to incidents, accidents.

REQ-4. Provide a structured data repository with a sufficiently flexible place to support the capture and storage of currently collected and emerging individual and environmental health issues indicators and issues relevant to immunization and health care.

REQ-5. Provide stand-alone desktop-based application for data collection in the fields. This application must be able to automatically upload data to the Integrated Enterprise Information System from duly authorised network connections.

REQ-6. Provide a data exchange mechanism for data sharing with the Ministry of Health and the Environmental Protection Agency.

REQ-7. Provide inventory management system for OHS equipment, and medical care resources.

REQ-8. Provide online-access to the general staff, Mining Stations and Field Officer conducting monitoring duties in Mining Districts and its environs.

REQ-9. Provide rules based access rights and permission to staff, their immediate managers, Human Resource Department and the Commissioner to health care, immunization, accident and incident information of staff.

REQ-10. Provide permission-based content management access and space on GGMC's Web Site for the dissemination and promotion of information concerning, but not limited to:

- OHS and mining equipment usage guidelines and protocols
- Occupational Hygiene
- Ergonomics and information for persons who are differently challenged
- Health and Safety issues, guidelines and standards
- Activities and Initiatives of the OHS unit and associated partners such as the Ministry of Health and the EPA
- OH&S and Health Care training resources and manuals.
REQ-11. Provide a web site look-and-feel framework that will communicate appropriately prepare and formatted information with maximum impact

REQ-12. Provide linkages with the Data Repository and Library Services for the storage and upload of research reports and related datasets
11. Legal Services

Description and Priority

The Legal Services automation system is an intermediate term requirement for the GGMC. This system will not be fully coupled with the Integrated Enterprise Information System. Security issues do not permit the foregoing.

Functional Requirements

The Legal Services system must

REQ-1. Provide a mechanism for communicating information via the GGMC website

REQ-2. Provide a secure electronic document archiving (digitization of paper-based record, indexing and meta-data capture) and easy retrieval (searchable meta data) mechanism to support the secretarial responsibilities of the Legal Division. This system must provide management of digital copies of GGMC Board minutes, decisions and actions sheets maintained by the Legal Service Division.

REQ-3. Provide a mechanism to keep track of Board decisions and related information

REQ-4. Provide a mechanism for the secure dissemination of electronic copies of Board documents

REQ-5. Provide a mechanism for the secure use of e-mail facilities for communication and dissemination of Board documents

REQ-6. Provide a mechanism to track the document and legal services provided by the Legal Division. Services such as contract vetting and preparation provided to other Divisions/Departments.
12. Information and Communication Technology (ICT) Assets and Help Desk

Description and Priority

The ICT Assets and Help Desk sub-system is an immediate term requirement for the Integrated Enterprise Information System. This sub-system will provide a mechanism for the IT Department to manage ICT assets of the GGMC, handle ICT system incident reporting and provide Help Desk support for staff of the GGMC.

This sub-system will integrate with the Finance/Accounting Management sub-system.

Functional Requirements

The ICT Assets and Help Desk sub-system must

REQ-7. Provide an ICT asset (hardware and software) inventory and maintenance management tool. Data collected must include deployment information, maintenance schedule, upgrades/repair/replacement history, supplier and purchase information.

REQ-8. Provide online Help Desk, and incident reporting and handling management tool. Data collected must include name of person reporting incident or requesting support, date and time of request, nature of issue, incident tracking and update, actions taken and incident close out.
13. Hardware and Network Infrastructure

Description and Priority

The Hardware and Network Infrastructure is an immediate term requirement for the Integrated Enterprise Information System. It will comprise Local Area Networks at the Head Office and Mining Offices that are interconnected into a Wide Area Network. This Wide Area Network and connection to the Internet will serve as the backbone for the Integrated Enterprise Information System, providing the hardware interfaces and platform to meet the needs of staff local to the Head Office, staff working remotely from the Mining Stations, customers and staff of the Mining stations. Further, since the Commission will maintain a web-presence it is critical that the complete information system exhibit high availability and responsiveness.

The Wide Area Network will provide the hardware interfaces to interconnect the various connectivity devices, servers, workstations and peripheral devices. Figure 2 (Page 34) depicts the network infrastructure that has been designed and is currently being implemented.

Functional Requirements

The Hardware and Network Infrastructure, in view of the existing plan and needs

REQ-1. Will provide route diversification for and redundant Internet Access

REQ-2. Must provide reliable high speed bandwidth dedicated Internet Access (Commission owned public IP Addresses and URL)

REQ-3. Must provide robust perimeter security for the core of the WAN, established at the GGMC Head Office; perimeter security must include at least Intrusion Prevention Service, Firewall(s) and AntiVirus protection

REQ-4. Must provide credential and challenge-based user authentication/authorisation of access to the network

REQ-5. Must provide physical security for the Main Equipment Room and all equipment cabinets holding the core connectivity devices, and the cable infrastructure
REQ-6. Must provide structured cabling infrastructure

REQ-7. Will provide support for Voice over IP (VOIP), and an appropriate interface to the existing PBX to facilitate use of VOIP communication across the LAN/WAN

REQ-8. Must provide perimeter security for the remote offices; security must include at least Intrusion Prevention Service, Firewalls and AntiVirus protection

REQ-9. Must provide Virtual Private Network connections between each Mining Office and the Head Office, making use of the route diversification mechanism

REQ-10. Must provide antivirus, anti-spamming and related cyber threat management for all workstations connected to the LAN/WAN

REQ-11. Must provide redundant supply of clean and reliable power to the Main Equipment Room

REQ-12. Must provide a robust Disaster Management System; backups (offsite and onsite), fire suppression, appropriate administration of the hardware and software infrastructure

REQ-13. Will provide redundant Uninterrupted Power Supplies with automatic transfer switching between supplies

REQ-14. Must provide a reliable platform for a properly structured, current and effective website (see Library and Electronic Data Repository)

REQ-15. Must provide disaster preparedness and recovery policy

REQ-16. Must provide a mechanism to support ad hoc requests for additional computing power and storage space to be allocated for the processing of calculation and database intensive processing such as the analysis of petroleum exploration datasets.

REQ-17. Must provide offline high volume storage space for large datasets, such as those involving petroleum exploration data

**Non-Functional Requirement**

REQ-18. Must strive to achieve 99.9% high availability

REQ-19. Windows Operating System; to optimise GGMC’ existing investments

REQ-20. Must provide high speed access to network resources
REQ-21. Must be supported by appropriate Acceptable Usage policies.
6. **Overall Systems Requirement**

The Integrated Enterprise Information System must support and be compatible with

- Three nines (99.9%) availability level of service (see GGMC’s Wide Area Network, Figure 2, Page 34)

- Data Conversion of existing data to electronic format suitable for integration into the Integrated Enterprise Information System when it is commissioned

- Control user access to data and functionality based on role-based and user-based permissions

- Open database architecture; must be compatible with industry standard relational database management systems

- Accessible over the GGMC Local Area Network (LAN) and Wide Area Network (WAN)

- Industry standard reporting tools, such as Crystal Reports

- Multi-tier (N-Tiered) architecture; with the business-logic layer – containing GGMC’s business rules and procedures – separated from the presentation and data store layers, and contained in a middle layer.

- Custom designed and implemented web-based and desktop based applications

- All user-interfaces must be simple and intuitive to use (attention must be placed on usability evaluation, taking into account Nielsen’s Usability User Interface Evaluation guidelines)

- Intranet-based access to training material and support; Emphasis must be placed on enhancing productivity in office productivity tools such as spreadsheets and word processing

- “Quality Customer Care,” care training for staff with a high level of Customer contact time. Overall, during the period of the consultancy, customer care appeared to be one of the Commission’s major strengths. Nonetheless, an institutionalised training programme will ensure that customers are treated consistently across the Commission, whether that customer is external or internal.
7. Appendices

APPENDIX I: List of staff interviewed:

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<tr>
<th>Mines Division</th>
<th>Administrative/HR Division</th>
<th>Geological Services</th>
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<tbody>
<tr>
<td>Mr. Derick Babbs</td>
<td>Mr. George Scotland</td>
<td>Mr. Kampta Persaud</td>
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<tr>
<td>Ms. Adel Butts</td>
<td>Ms. Kimika Blake</td>
<td>Dr. Serje Nadeau</td>
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<td>Ms. Bascom</td>
<td>Mr. Christopher Roberts</td>
<td>Mr. Liang Xing Jiang</td>
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<td>Ms. Denise Gibbs</td>
<td>Ms. Abiola Allen</td>
<td>Mr. Kantharaja Chandrappa</td>
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<td>Ms. Jackqueline Jones</td>
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<td>Ms. Sandrene Abrams</td>
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<td>Ms. Alanka Luke</td>
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<td>Ms. Patricia Henry</td>
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<td>Ms. Mary Ann Joseph</td>
<td>Mr. Ted Semple</td>
<td>Ms. Karen Livan</td>
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<td>Ms. Loretta Thompson</td>
<td>Ms. Goyan Rampersaud</td>
<td>Ms. Tejshree Tiwari</td>
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<td>Ms. Urcilla Leitch</td>
<td>Mr. Richard Singh</td>
<td>Mr. Kerion Husbands</td>
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<td>Ms. Mishana Thomas</td>
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<td>Mr. Wendel Alleyne</td>
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<td>Mr. Julian Rowe</td>
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<td>Ms. Dannne. McDoland</td>
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<td>Mr. Lloyd Bandoo</td>
<td>Mr. Donald Singh</td>
<td>Mr. Christopher Lynch</td>
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<td>Mr. Trevor Samaroo</td>
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<td>Mr. George Spencer</td>
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<td>Ms. Suzette Dannett</td>
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<th>Land Management Division</th>
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<td>Mr. Patrick Fraser</td>
<td>Mr. William Woolford</td>
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<td>Mr. Abrams: Economist</td>
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<td>Ms. Beatrice Roberts-Austin</td>
<td>Ms. Rosemary Benjamin-Noble</td>
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<td>Ms. Sharon Dannett</td>
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APPENDIX II: Application Process Sequence Diagram for Small Scale License