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E-Government Portal for Ministry of Economy of Armenia

Technical Assessment Report

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Introduction

The Government of Armenia (GOA) has demonstrated its commitment to implementing e-government to help transform the way the government delivers its services in the 21st century, The Ministry of Economy (MOE) has emerged as a strong e-government champion, and hopes to demonstrate leadership and commitment to the overall e-government effort by piloting the development of an online services portal. The portal will help the Ministry provide services to citizens, and facilitate effective communication with the private and public sectors.

The MOE, with assistance from the NORK Informational-Analytical Center (NORK Center), has developed a draft terms of reference (TOR) for portal development; however, the TOR must be revised since some of the requirements of the portal and some conditions have changed. Consequently, the MOE has requested that USAID provide technical assistance to review the MOE-NORK TOR, assess the current capacity and conditions for the portal development, recommend actions for next steps and rewrite the TOR.

In December 2010, the Worldwide Support for Trade Capacity Building (TCBoost) project fielded Sergey Chapkey, an expert in e-government, to assist the MOE. Mr. Chapkey's assessment, per the approved scope of work, included the following tasks:

- Review the terms of reference (ToR) for the web portal drafted by the Ministry of Economy (MOE);
- Review and assess the necessary prerequisites for the portal – availability and adequacy of hardware and connectivity;
- Assess interface with other government agencies' current or future systems;
- Assess interoperability with the Ministry's current systems and applications; including but not limited to, the Ministry itself, the Armenian Intellectual Property Agency, the National Institute of Standards (SARM) and the SME National Development Center of Armenia (SME-DNC)
- Prepare a final package of recommendations regarding hardware, connectivity and other aspects of the system for MOE;
- Prepare the final ToR for the company who will develop the portal.
- Prepare a budget estimate for developing the portal;
- Description of the MIS development

Mr. Chapkey's complete scope of work, his exit briefing to USAID and the his agenda/list of contacts have been attached to this document as Annexes A, B, and C, respectively.

Background

Before presenting the specific findings on the MOE's technical infrastructure (hardware and software), interface with other GOA agencies, and interoperability, it is helpful to understand the MOE's current organizational structure, IT capacity and web presence.

ORGANIZATIONAL STRUCTURE

The MOE is currently led by Minister Tigran Davtyan, one First Deputy, four Deputies and a Chief of Staff. Altogether, the Ministry has over 200 employees at its headquarters, not counting its semi-autonomous agencies (see below). The Ministry's organizational structure includes the following departments and divisions:

- Department of Economic Policy and Strategy Development
- Department of EU and International Economic Affairs
- Department of Knowledge Economy, Innovation and Entrepreneurship Promotion
- Department of Industry
- Department of High-Tech and IT
- Department of Trade and Effective Markets
- Department of E-society Formation and E-governance
- Department of Tourism and Regional Economic Development
- Department of Legal Affairs
- Department of Finance and Budgeting
- Department of Administrative Affairs
- Department of Human Resources
- Secretariat
- Information and Public Relations Division
- First Division (Secretariat for Classified Documents)

The following semiautonomous agencies are also part of the MOE:

- Agency of Intellectual Property
- Agency of Project Administration
- Agency of Accreditation
- State Inspectorate of Protection of Markets and Consumers Rights
- National Institute of Standards
- National Institute of Metrology

MOE IT LEADERSHIP/CAPACITY

The MOE does not currently have an IT leadership position, the equivalent to a Chief Information Officer (CIO) or Chief Technical Officer (CTO), who could articulate IT policies and oversee e-

government initiatives. In the absence of a CIO/CTO, Mr. Vahe Danielyan, a Deputy Minister, has emerged as the e-government champion and main contact for the purposes of the portal project. Mr. Danielyan articulated the Ministry's information technology needs, in close consultations with Mr. Emil Tarasyan, the MOE Chief of Staff (regarding automation of the internal administrative processes) and Ms. Syuzanna Hayrapetyan, the Minister's Press Secretary (regarding the public information portal).

Mr. Danielyan and Mr. Tarasyan demonstrated a clear familiarity with high level e-government concepts and the benefits of e-government and both strongly advocated for using IT to transform the MOE business model from a command-style bureaucracy into a customer-oriented service provider. The stakeholders acknowledged the distinction between general automation of the Ministry's business processes and "e-Government" as way of delivery of government services by electronic means to its constituencies. However, based on conversations with MOE and others, it appears that different institutional actors are operating under competing or misconstrued definitions of "e-government".

There also appeared to be a disconnection between the high level conceptual vision of e-Government and the practical implementation of specific e-government projects. It was necessary to clarify that the MOE portal project will require both front-end systems and applications (web portal) and back-end systems and applications (management information system). Each set of systems requires a different scope of work, timeframe and resource allocation. Once this was clear, it became easier to discuss different implementation strategies for the Ministry's project. The MOE agreed that any successful e-government project should include at least the following elements:

- Clearly defined conceptual framework;
- Business process analysis and modeling;
- Technical infrastructure;
- Integrated business software solutions;
- Data architecture and data exchange protocols;
- Project management;
- Mechanism for transition of system ownership from developers to operators; and
- Skills and capacities to repeat the implementation cycle.

These elements have all been reflected in the revised TOR, as presented in Task 6/Annex D.

CURRENT MOE WEBSITE

The MOE's current website is located at <http://www.mineconomy.am>. The website is a basic, consumer-style website with mostly static HTML content. The majority of the Ministry's web content is in Armenian, with limited content available in English and Russian. The site has information about the Ministry's organization and structure, contact information for key officials, news, projects presented for public discussion, strategy, concepts, programs, reports, presentations, jobs, citizens' reception procedure, and links to other government websites.

The website also provides information on key functional activities of the Ministry covering economic reforms, accreditation process for relevant agencies, economic policy and development planning, issues related to Armenia's relations with the European Union, investment policy and

foreign economic cooperation, science and innovation, industrial development, Armenia's relations with the World Trade Organization (WTO), small and medium entrepreneurship, trade and services, export control, information technologies sector, tourism, market and competition, standardization and metrology, the mining industry, economic legislation, official events and announcements, publications, and performance monitoring.

The website provides information on how to obtain an electronic signature certificate, to be used in official communications with the government, as well as a link to a *Mulberry EDMS* form (for more on this, see below) that allows citizens to track the letters sent to the Ministry.

Separate semi-autonomous agencies within MOE have their own, separate websites, specifically the Armenia Intellectual Property Agency [<http://www.aipa.am>], the National Institute of Standards, [<http://www.sarm.am>], and the Small and Medium Entrepreneurship Development National Center of Armenia [<http://www.smednc.am>]. The National Institute of Metrology has registered a domain (<http://www.metrology.am>) but does not yet have an actual website.

The MOE website was designed and developed by a private Armenian contractor, Helix Consulting, using free, open source software: the so-called "LAMP". LAMP is a popular formula for the combination of Linux (operating system), Apache (web server), MySQL (database), and PHP (scripting language). The AIPA, SARM and SME-DNC websites were also built with the same LAMP freeware.

OTHER IT RESOURCES EXTERNAL TO MOE

There are two wholly-owned government-owned companies that MOE occasionally calls upon for help on a case by case basis: the E-Governance Infrastructure Implementation Unit OJSC (EKENG) and the NORC Information and Analysis Center (NORC Center).

EKENG was established by the GOA in 2009 and is chaired by the Minister of Economy of Armenia. EKENG's mission is to coordinate the overall implementation of the e-Government Strategy in the Republic of Armenia. The company is expected to provide a common framework ensuring a general coherence among different information systems and allowing different entities of the GOA to coordinate not only the various e-government initiatives, but also to align information systems with overall business goals, to ensure interoperability and to avoid duplicate investments. However, its limited organizational capacity (12 employees) prevents the company from fulfilling its proclaimed mission. According to interviews with several government officials, EKENG's actual role has been reduced to issuing electronic signatures to individuals and legal entities and administering certificates.

Per the EKENG Director, their specialists have the necessary skills to help MOE develop the functional requirements and TOR for its proposed e-government portal. In fact, EKENG drafts proposals for e-government projects and oversees their implementation on a regular basis, as part of their mission. However, the EKENG Director claimed that MOE has not yet requested EKENG's help with the conceptualization and procurement of the portal. The Director also mentioned that EKENG had been in consultations with IBS, a major Russian software development company (over 3,000 employees) to build an e-government portal and even received

a technical proposal with price quote. The proposal was not available for review, due to a confidentiality agreement, signed between EKENG and IBS.

The NORK Center, a wholly owned GOA entity under the Ministry of Labor and Social Issues, has close to 100 employees, including 24 IT specialists (4 project managers and 20 software programmers). The NORK Center's mission is "to develop and introduce such IT solutions which will help our customers to become preferable for their customers, the best for their consumers and the most attractive for investors". According to their website, the NORK Center specializes in information systems development, website design, construction of global and local computer networks, IT maintenance, and training. In July 2010, MOE engaged the NORK Center to draft the requirements for the Ministry's new portal. This document formed the basis of our review under Task One of our scope of work.

Task 1: Review Draft ToR for the Web Portal

The 50-page NORK document begins with a proposed upgrade for the current MOE website, including two alternate home page versions. For the most part, the NORK draft offers an improved organization and layout of the site static than what currently exists. The NORK document also proposes to feature multimedia content on the MOE website, such as an interactive guide to the state budget, video, audio, webcasts, etc.

Notably, the NORK document proposes adding a new section to the MOE website: “interactive services”. This proposal aligns with MOE leadership’s goal to upgrade from a basic, mostly static, consumer-style “web brochure” to an enterprise-class, interactive public information portal powered on the backend by a modern, robust content management system with automated workflows. At a minimum, these e-services are expected to provide interactive web forms for taking applications from businesses and individuals, tracking application status and returning the output (e.g., certificate or license) as downloadable documents. Application processing would take place on the backend and could be done in an automated, semi-automated or manual manner. Some of these e-services are expected to be provided by MOE staff; others will be just links to other government agencies.

Per the NORK document, MOE intends to offer nearly 30 different e-services, including but not limited to:

1. Small business financing
2. Registration of intellectual properties
3. Provision of electronic signatures
4. Kimberly process certification (conflict-free diamonds)
5. Licensing of tourist agency operators
6. Licensing of tour guides
7. Licensing of hotels
8. Temporary import permit
9. Temporary export permit
10. Licensing of consumer marketplaces
11. Licensing of weapon manufacturing

12. Licensing of manufacturing of metrological equipment
13. Accreditation
14. Value-added tax exemptions
15. Customs duty exemption
16. Calculation and transfer of social security benefits
17. Product certification
18. Lab testing
19. Development and dissemination of national standards
20. Education and training, etc

The MOE is also planning to provide links to the e-government services already offered by the Government of Armenia via a specialized portal, <https://www.e-gov.am>. Such e-services include:

- Submission and tracking citizens' letters to the government
- License applications
- Search of government regulations and agenda
- List of no-bid contracts
- List of government grants to nonprofit organizations
- Interactive guide to the national budget
- E-filing of tax declarations
- Applications to register intellectual property
- Search of registered intellectual properties
- Application for an entry visa
- Application for an electronic signature.

The NORC Center document can be considered a reasonably strong annotated outline of the proposed website; however, it presents neither functional requirements nor technical specifications for the portal.

Task 2: Review and Assess Portal Prerequisites (Hardware and Connectivity)

The development of the MOE web-based services portal will require the appropriate hardware infrastructure and tech support base, as well as software infrastructure and applications, including programs devoted to business process management and performance monitoring. The assessment of the current state of these issues is presented below.

HARDWARE INFRASTRUCTURE

MOE's current technical infrastructure is basic. It includes 6 (six) servers, several Cisco routers with firewalls, and 24 (twenty four) switches for local area network that connects over 210 computer workstations. There are seven laptop computers used by senior officials.

The Ministry is connected to a fiber-optic wide area network (WAN) that connects all government agencies in Yerevan with each other at a data transmission speed of 50MBps. The WAN also connects the national government with district (*marz*) governments at 1MBps. Internet access to the Ministry's headquarters is provided separately, by ADC, a private Internet service provider. The shared line offers connectivity at 4MBps downstream and 1MBps upstream. All of the Ministry's workstations have Internet access.

While this hardware infrastructure may suffice to meet the MOE's current needs, it would probably need to be upgraded in order to accommodate the web portal.

SOFTWARE INFRASTRUCTURE AND APPLICATIONS

The MOE has a very diverse collection of software, for both Microsoft Windows and Unix/Linux operating systems. The Microsoft products include Windows 2008 Server with Active Directory, SQL Express Database Server, Exchange Mail Server, SharePoint Server, and Project Server. All of the MOE's 210+ workstations have Microsoft Windows XP and Office installed. There are several applications in use throughout the MOE developed in Microsoft Access. The finance department is using the 1C accounting software purchased from a Russian vendor. This software is popular throughout the former Soviet Union.

One of the six servers is dedicated to the Ministry's website and running open source Apache web server software on the Unix/FreeBSD operating system. Two of the six servers are dedicated to hosting Mulberry Groupware, a government-wide document tracking system installed on an open source software platform that includes the Linux operating system, Apache web server, web applications written in PHP programming language and MySQL database.

Future directions for the Ministry's software infrastructure are somewhat unclear. Nearly all MOE employees use Microsoft Windows and Windows-based Office applications (Word, PowerPoint, Excel, Outlook and Access) running on the Windows XP operating system. During the assessment, MOE held a demonstration of the project management solution delivered by their contractor SFL. This enterprise-class business solution (the only one currently operating in the MOE) was developed to track and manage donor-funded technical assistance projects. This solution is based on Microsoft SharePoint and Project Servers, which is a significant investment and indicates serious commitment to Microsoft technologies.

According to the Microsoft Country Director, most of the Microsoft applications currently in use by MOE are illegal but Microsoft is in the process of negotiating a volume licensing agreement with the Government of Armenia. In our discussions, MOE leadership confirmed its commitment to using Microsoft Windows oriented software.

However, sources within the Ministry also revealed that the IT Department is currently implementing a plan to replace Microsoft Windows with an open-source operating system (Linux) on all 210+ computer workstations, to save on licensing costs and improve performance. Additionally, in sharp contrast to the predominantly Microsoft Windows environment, the MOE staff is required to use an open source custom solution called *Mulberry Electronic Document Management System (EDMS)*.

Mulberry EDMS is a relatively basic, limited in functionality client-server application with web interface and messaging capabilities designed for tracking citizens' letters and other documents exchanged by government agencies. *Mulberry EDMS* was developed by *VXSoft Ltd*, a small Armenian-Irish company with six employees in Yerevan. For the last three years, the software has been required for use by all government agencies in Armenia.

Within the MOE environment, *Mulberry EDMS* can be considered a stand-alone application, as it is not integrated with any other software applications used within the MOE. It is installed at the Ministry server running the Linux operating system and is accessible via a web browser-based interface written in PHP, an open source programming language. The database used on the backend is MySQL--also free, open source software.

Such contradictory messages (Microsoft vs. open source) point to the need to appoint a qualified MOE CIO or CTO to ensure consistent IT leadership and uniform policies in implementing information technologies.

BUSINESS PROCESS MANAGEMENT

The Ministry has hired a private contractor, ManagementMix, to determine its automation needs and functionality of the future software solutions. ManagementMix is a small Armenian-French-

Israeli company with five employees in Yerevan. For the last 12 months, they have conducted a business process analysis and reengineering study. The study has resulted in a report describing five standardized business processes (analysis, policy design, planning, implementation, and monitoring and evaluation). A custom combination of these five generic processes has been created for each of the Ministry's twenty departments and business units, with a total of over 100 specific business processes.

Unfortunately, the study appears to be based in process analysis methodology that may be too simplistic and outdated to suit the MOE needs. Business processes are described using free-style flowcharts that are vague and imprecise and do not provide the level of detail suitable for design of an automated information system. These flowcharts do not use business process analysis methodologies that have become standards in software engineering, such as Uniform Modeling Language (UML) format or the more recent Business Process Modeling Notation (BPMN) format. The consultants' recommendations only constitute the first step toward business process improvement. A follow-up study is required to produce detailed functional requirements that would meet the classic *S.M.A.R.T.* (*Simple, Measurable, Achievable, Realistic and Testable*) criteria.

PERFORMANCE MONITORING

The Ministry is still using old-style statistical reporting. The statistics are not directly related to the Ministry's performance and cannot be used for performance-based management. A serious performance analysis study is required to determine key performance indicators, data sources and data collection formats, performance monitoring procedures, report design, delivery methods, integration with policy design and decision making process, etc.

TECHNICAL SUPPORT

The Ministry's IT unit has two full-time and one part-time staff. They have good professional qualifications (BS or MS in computer science and at least five years of work experience). However, their duties almost exclusively relate to system administration (hardware and local area network). With 6 servers, 24 network switches and over 210 workstations under their control, they have practically no time to venture into website development or even site administration. Neither have they the necessary skills. Only the part-time staff has experience working with LAMP open source freeware and can help the Ministry staff update some of the website content (e.g., news).

The situation with the IT resources in the Ministry's agencies is similar. The National Institute of Standards has 150 employees and four IT staff, including three system administrators and one IT specialist with basic software programming skills. The National Institute of Metrology (150 employees) has no IT support staff. The Armenia Intellectual Property Agency has 50 employees supported by two IT specialists. Since the mid-1990s, the AIPA has depended on a single software programmer who developed its registry application in MS Access and provides periodic upgrades working as an independent contractor.

Tasks 3 and 4: Review and Assess System Interface and Interoperability

Based on interviews with officials in GOA, the MOE and its agencies, and private Armenian IT companies, there do not appear to be any system interoperability standards at the national or Ministry level. As a result, a wide, eclectic variety of incompatible systems and software applications has independently emerged and is being used across government agencies, including the MOE.

As was mentioned previously, all government agencies are required to use *Mulberry EDMS*, which is built on the Linux operating system and other free, open source software (PHP, MySQL). The websites of the Ministry of Economy, National Center for Small and Medium Enterprise, Armenia Intellectual Property Agency, and the National Institute of Standards are also running on the open source software combination, so called LAMP (Linux, Apache, MySQL and PHP). On the other hand, the MOE is nearly exclusively using Microsoft Windows and Office applications on its local area network. As a result, interoperability is either nonexistent or extremely limited. The two competing environments require two separate sets of hardware and, for the purposes of technical support, two separate skill sets from the IT staff.

Contrary to internationally recognized best practices, there is evidence that some within the MOE and broader GOA do not consider such an eclectic environment problematic, despite its growing complexity, resource implications, lack of interoperability and related supportability problems. In theory, all of the software applications can be made interoperable. However, in many cases, the time and cost implications are too high for such an effort to be feasible. A much more practical, cost-effective approach would be to standardize fewer system architectures, software platforms, application frameworks, data models and data exchange protocols, as well as enforce strict adherence to system and software engineering practices (e.g., Capability Maturity Model Integrated, ISO 9000-2).

Task 5: Prepare Final Recommendations

The MOE's proactive stance towards designing and implementing an interactive web-based services portal is commendable. In championing this potentially highly visible pilot project, it will demonstrate to the GOA and Armenian people the transformative effect that e-government can have on improving service delivery. However, there is still much to be done. In this section, we recommend some concrete steps to be taken to expedite the portal development and ensure the effort is successful and sustainable. We also suggest some means that MOE can advocate for improvement in the operating environment for the GOA's e-government effort. These recommendations are reflected in the draft TOR included with this report as Annex D.

Design clear concept of operations and formulate functional requirements for the e-government portal. The requirements of Web-based e-service portals transcend those of basic static websites; they require a modern, interactive portal framework, with a fully functional content management system on the backend; functional requirements need to be formulated to accommodate government-to-citizens (G2C), government-to-business (G2B) and government-to-government (G2G) interactions; content sources and e-services need to be clearly defined, as well as functional roles (actors) and automated work flow procedures. Before MOE proceeds with procurement of the e-government portal, the MOE must fully articulate and disseminate (through EKENG?) its conceptual framework for service automation—including both front end and back end requirements. The draft TOR includes steps for conceptual design.

Align portal design/implementation with MOE's current capacity. Given its current staffing level, the MOE has sufficient organizational capacity to operate an e-government portal, as long as the portal has a friendly, easy to use interface oriented toward business users (and not IT specialists), provision of new e-services is consistent with the current workflow procedures and that it requires minimal training for the staff involved. The draft TOR and budget attached reflects a project of this size and scope;

Upgrade MOE hardware infrastructure to host the software for the e-government portal. At a minimum, the upgrade should include two additional servers (application server and database server), a data backup / disaster recovery system, and uninterruptable power supply units. We recommend this hardware (goods) be procured separately from the e-portal design and development (services). Illustrative specifications for the hardware have been included as Annex F;

Adopt a consistent software use strategy. MOE has been using an eclectic mixture of small, consumer style, stand-alone software applications with limited functionality for a number of isolated tasks, with little or no effect on productivity. MOE should adopt a consistent software use strategy, including standards in software architecture, application framework, data models and exchange protocols and uniform guidelines for user and machine interfaces. In other words, the MOE should start using large, enterprise-class software solutions versus small, consumer software tools;

Adopt a modern business process management system (BPMS). The Ministry has made the first step in the right direction, by hiring a contractor to analyze, document and improve its business processes; however, the methodology used was not optimal for this project. MOE should to make further steps toward the holistic automation of its administrative processes, by adopting a modern business process management system (BPMS). The proposed draft TOR includes steps for business process modeling, functional requirements specification and process management;

Develop and implement a performance-based management system. MOE does not have a system for monitoring its performance; it needs to adopt tools for performance-based management that will enable the Ministry staff to define, monitor and report on key performance indicators (KPIs), internally and publicly. The proposed TOR features tasks dedicated to establishing these tools and metrics, including performance dashboards;

Establish and enforce a system interoperability policy. The MOE needs to establish and enforce a system interoperability policy. Currently, none of the Ministry's business applications are interoperable; that creates problems with system integration, data exchange and supportability;

Appoint a Chief Information Officer for the MOE. The MOE would greatly benefit from appointing a Chief Information Officer to articulate IT policies (e.g. interoperability, oversee e-government initiatives and promote a standard conceptual framework of e-government and coordinate with other Ministries and branches of government (through EKENG or otherwise). The MOE Deputy Minister has done an admirable job given his competing responsibilities, but the e-government task should be delegated to someone with deep expertise in IT.

Task 6: Prepare Final Terms of Reference

The draft TOR for the MOE Services Portal has been included as Annex D. The proposed project is a business process management system (BPMS) that serves as an extensible application framework and enables the Ministry of Economy of Armenia to automate creation, management, delivery and monitoring of electronic content and services to citizens (government-to-citizen, G2C), to businesses (G2B), and to other government agencies (G2G) via a web-based portal.

The TOR lays out the specifications for the portal framework; content, document & data management; process management; performance dashboards; geospatial data visualization; user management; and service-oriented integration.

Annex E provides illustrative qualifications for potential firms and key personnel bidding to assist MOE in completing the portal.

Task 7: Prepare Budget Estimate

The illustrative budget of USD 272,815 has been included as Annex G. A version in Microsoft Project has also been attached, so that USAID/Armenia and MOE can view the assumptions and obtain a more detailed breakdown. Prices assume that an international vendor will be teamed with an Armenian partner firm.

Annex A. Scope of Work

Annex B. Exit Briefing

Annex C. Trip Agenda

Annex D. Draft TOR

Annex E. Draft Company and Personnel Specifications

Annex F. Draft Hardware Specifications

Annex G. Illustrative Budget

ID	Task Name	Duration	Work	Cost	Start	Dec '10	Jan '11	Feb '11	Mar '11	Apr '11	May '11	Jun '11	Jul '11	Aug '11	Sep '11	Oct '11	Nov '11	Dec '11	Jan '12	
1	Armenia e-Government Server Development Project	245 days	4,408 hrs	\$272,815.00	Jan 3		[Timeline bar from Jan 3 to Dec 31]													
2	Inception	39 days	472 hrs	\$44,505.00	Jan 3		[Timeline bar from Jan 3 to Feb 10]													
3	Background documentation review	5 days	40 hrs	\$2,600.00	Jan 3															
4	Site visits, interviews, legacy data assessment	10 days	80 hrs	\$12,900.00	Jan 3															
5	Conceptual design	3 days	24 hrs	\$1,560.00	Jan 17															
6	Business process modeling	5 days	40 hrs	\$2,600.00	Jan 20															
7	Early prototype / screen flows	10 days	160 hrs	\$10,400.00	Jan 27															
8	Requirements validation	5 days	80 hrs	\$11,725.00	Feb 10															
9	Equipment needs assessment	3 days	24 hrs	\$1,080.00	Feb 17															
10	Open source software feasibility assessment	2 days	16 hrs	\$1,040.00	Feb 22															
11	Project management, status reporting	1 day	8 hrs	\$600.00	Feb 24															
12	D1: assessment report, workplan, data migration plan	0 days	0 hrs	\$0.00	Feb 24															
13	Elaboration	31 days	568 hrs	\$55,400.00	Feb 25															
14	System architecture design & equipment specs	5 days	80 hrs	\$30,400.00	Feb 25															
15	Functional requirements specification	5 days	40 hrs	\$2,600.00	Feb 25															
16	Data modeling & security specifications	5 days	40 hrs	\$2,600.00	Mar 4															
17	User interface design	5 days	40 hrs	\$1,400.00	Mar 11															
18	Working prototype	10 days	320 hrs	\$16,400.00	Mar 18															
19	System docs and user manuals	5 days	40 hrs	\$1,400.00	Apr 1															
20	Project management, status reporting	1 day	8 hrs	\$600.00	Apr 8															
21	D2: biz reqs, system design, equipment specs	0 days	0 hrs	\$0.00	Apr 8															
22	Construction	5 days	1,888 hrs	\$96,120.00	Apr 8															
23	Portal Administration	5 days	248 hrs	\$12,480.00	Apr 11															
32	Content, Document & Data Management	5 days	296 hrs	\$15,200.00	Apr 11															
41	Process Management	5 days	296 hrs	\$15,200.00	Apr 11															
50	Performance Dashboard	5 days	296 hrs	\$15,200.00	Apr 11															
59	Geospatial Data Visualization	5 days	248 hrs	\$12,480.00	Apr 11															
68	User Management	5 days	248 hrs	\$12,480.00	Apr 11															
77	Service-Oriented Integration	5 days	248 hrs	\$12,480.00	Apr 11															
86	Project management, status reporting	1 day	8 hrs	\$600.00	Apr 11															
87	D3: beta software, data, sys docs, user manuals, test plan	0 days	0 hrs	\$0.00	Apr 8															
88	Transition	48 days	1,000 hrs	\$59,990.00	Apr 18															
89	User acceptance testing (UAT)	5 days	80 hrs	\$5,200.00	Apr 18															
90	Final software revisions	10 days	320 hrs	\$16,400.00	Apr 25															
91	Documentation & training materials	5 days	120 hrs	\$5,400.00	May 9															
92	Training & certification for system administrators	5 days	40 hrs	\$8,890.00	May 16															
93	Training & certification for business users	5 days	40 hrs	\$5,420.00	May 23															
94	Deployment assistance, on-site support	15 days	360 hrs	\$16,800.00	May 30															
95	Service level agreement (SLA)	2 days	32 hrs	\$1,280.00	Jun 20															
96	Project management, status reporting	1 day	8 hrs	\$600.00	Jun 22															
97	D4: final software, certificates, SLA, stats, final report	0 days	0 hrs	\$0.00	Jun 22															
98	Technical Support	245 days	480 hrs	\$16,800.00	Jan 3															