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January 7, 2022

SUBMISSION OF CRFI BMS2200000001 - Medicaid Enterprise System (MES)

Please find attached the Random Bit submission to the Medicaid Enterprise System (MES) RFI. We have printed and submitted the response single-sided for ease of photocopying, scanning, and/or distribution.

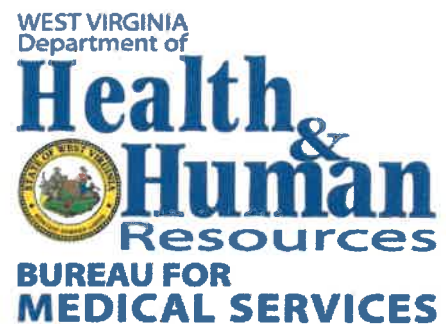
Respectfully yours,

A handwritten signature in blue ink, appearing to read "Gerhard G Ungerer".

Gerhard G Ungerer
Chief Technology Officer (CTO)



Response to Request for Information
Medicaid Enterprise System (MES)
CRFI BMS2200000001





Response to Request for Information CRFI BMS 2200000001 – Medicaid Enterprise System (MES)

Submitted by:

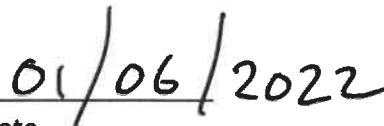
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Gerhard Ungerer, CTO



Date



Corporate Overview

Random Bit specializes in Enterprise Architecture, Governance, Cloud Strategy, and Cloud Transformation services to State Medicaid Agencies (SMA) seeking to embark on large system modernization projects. We have tremendous experience in assisting SMAs in meeting the requirements as set forth by the Centers of Medicare and Medicaid Services (CMS). We have provided system planning, architecture, and governance services to South Carolina, New York, and Georgia.

In the sections below, we share our experiences and advice for the West Virginia Bureau for Medical Services (BMS) in support of its upcoming Medicaid Enterprise Systems (MES) implementation. Our experience extends to the work that Random Bit performed under the scopes of our own contracts. Other parts of our observed experience and advice comes from closely working with State agencies and their vendors in establishing a MES. When discussing our MES observations, Random Bit will generalize the comments to obscure the identities of the States and vendors.

Random Bit has planned, architected, designed, and implemented the cloud infrastructure for one of the first operational MES integration platforms (the MES Core) in the nation. This MES Core was implemented on the Amazon Web Services (AWS) Cloud platform and predominantly leverages cloud native implementation patterns. Random Bit further developed the proofs of concept that resulted in the Technical Reference Architecture (TRA), implementation patterns, and coding standards for the interfaces (both web services and batch file exchanges) across the trading partners of the MES. We will provide BMS with suggestions to consider related to the transition to a cloud platform. However, some of this content is better suited for our response to the appropriate MES Request for Proposal (RFP).

Consistently throughout this document, Random Bit will propose as a first step that BMS start with a thorough planning phase to ensure that project expectations (including timelines, costs, etc.) are established, and managed, across the BMS stakeholders, vendor community, provider community, and CMS. A well laid out plan and a consistent message across stakeholders is a critical component for cost containment and MES success.

Random Bit LLC is a limited liability corporation based in North Carolina and was established in 2012 to provide expert Information Technology (IT) consulting services to State governments. We have established ourselves as a specialty consultancy company that provides outstanding Technical Assistance Consulting services in the Health and Human Services System Modernization space. Random Bit developed a consulting method including tools and teams that are focused on enterprise architecture, governance, security, compliance, and cloud services.

Random Bit is certified as a Women's Business Enterprise (WBE) through the Women's Business Enterprise National Council (WBENC), the nation's largest third-party certifier of businesses owned and operated by women in the US. Random Bit is also federally certified as a Woman Owned Small Business (WOSB).



Random Bit employees are highly qualified, focused, and experienced. Our teams are mostly comprised of employees who have a unique collection of skills, experience, and knowledge and we have developed a proven methodology for service delivery. The combination of this well-established team with our proven methodology benefits our clients in speed of execution and quality of output.

Random Bit believes in, and lives, by the values of Excellence, Integrity, and Responsibility in how we treat each other and our clients. Our employees are treated as family and expected to live by these values both within the Random Bit and client workplaces. Excellence is an expression of our goal to provide services designed around the exacting specifications of our clients in an environment of collaboration, shared knowledge, innovation, leadership, and competence. Integrity ensures that our actions and interactions are always guided by the highest standards of professionalism and ethical behavior. Responsibility is demonstrated individually and as a company by acknowledging ownership and accountability of our actions without exception or excuses.



4.2 Questions

4.2.1 Please describe any elements BMS should consider incorporating into its vision, planning, and implementation for a modernized, modular MES.

SMAAs that start their journey towards MES modernization typically have a tremendous amount of technical debt built over decades of maintaining complicated legacy systems and their underlying, often fragile, infrastructure. This legacy environment is often supported by a combination of State and vendor staff, sometimes across multiple vendor companies. SMAAs have adapted their business processes to the limited capabilities of these aging solutions and expend long lead times and high implementation costs for any proposed changes. Sometimes, vendors even report that proposed changes to the legacy systems are not possible. These challenges prevent SMAAs from providing quality care and services to the citizens in their state.

Faced with these challenges, State Chief Information Officers (CIO) are tempted to outsource as much as possible as quickly as possible to remedy the situation. State Chief Operating Officers (COO) and Medicaid Directors also see an opportunity to outsource as many business functions as possible and align the technology landscape to Business Process Outsource (BPO) capabilities. Such wholesale outsourcing results in exchanging one monolith for another.

Plan

The Medicaid Enterprise System (MES) update is a multigenerational, progressive modernization program. The Implementation Roadmap largely depends on the current state, planned future state, and a number of implementation plateaus to be reached along the modernization journey. These plateaus are captured from the Business, Information, Application, Infrastructure, and Information Security perspectives. The Medicaid Information Technology Architecture (MITA) Business Process Model frames the Business Architecture for the MES implementation. However, BMS must establish the TRA that will be used to communicate expectations to key stakeholders across State, Agency, and Vendor communities.

Since the MES is such a large project to implement, the initial phase in this process is to issue a MES Modernization Planning RFP to carefully identify appropriate stakeholders, capture the MES modernization vision, document key tenets for business process redesign and technology modernization objectives, establish the governance structure that ensures a successful project, and capture the Implementation Roadmap. During this planning phase, challenges related to State procurement, required CMS documentation, Organizational Change Management, Program Management, and IV&V should be considered and addressed.

Manage change

During the execution of the BMS Modernization project, BMS must expect and plan to manage change. Changes are inevitable in large system implementation and business transformation projects. The way in which changes are governed drives the success of the project. BMS must be able to make, document,



and communicate decisions timely and efficiently. Adhering to the following key areas of governance keeps project costs under control:

- Executive Stakeholders and Program Governance
- Enterprise Architecture, Solution Architecture, and Governance
- Data Governance
- Security, Privacy, and Compliance
- Program Management
- Organizational Change Management
- Contract Management
- Vendor Management

As the technology landscape has changed significantly in the last decade, multiple vendors claim that they can provide commercial off the shelf (COTS) integration platforms and minimal customization of BPO components. In our experience with these projects, this type of approach does not work. The COTS implementations become “learn-as-you-go” and customizations become the norm. To improve the odds of success for the MES modernization, BMS should first establish business, technology, integration, and security requirements to ensure that the agency objectives are understood. Then, plan your Implementation Roadmap and procurement strategy. BMS will then have the information needed to release detailed RFPs that reduce the chances that unexpected customization is encountered.

Random Bit is uniquely positioned to assist BMS in defining your vision as well as capturing the current and future state architecture and Implementation Roadmap. We are experienced in preparing an SMA to successfully procure (or build) the integration platform and BPO components of the MES. Our “plan first” approach ensures minimal business impact while continually making progress towards a modernized MES. Our progressive modernization process ensures close alignment between technology and business operations.

4.2.2 In the projects you have been on, what was the optimal configuration of MES modules specific to functionality, integration of other solutions, and management of data?

SMA's that operate older legacy Medicaid Management Information Systems (MMIS) typically build business processes around the capabilities of the technology they have and the vendors that support the technology instead of designing business practices and then establishing technology to meet the needs of the agency. The business process model outlined in CMS MITA 3.0 is comprised of 10 business areas and 80 individual business processes. This Medicaid operations model often differs widely from the current operational structure of SMA's. In this situation, the technical aspects of the project are not the major concern; the major concern is that the operations teams must completely redesign their business processes. The “optimal configuration of MES modules” depends on the realities of the current operating environment and the ability of the BMS team to adapt to business process changes. For example, in our current MES project, there are 11 separate modules that encompass the MES Core. The ideal number of modules for the BMS MES would be defined in the Solution Plan and Implementation Roadmap phase of planning.



After teaming with Random Bit to establish the Implementation Roadmap and associated planning, we suggest that BMS consider the MES Core integration platform (integration hub and data hub) as the first component in the MES Implementation Roadmap. The creation of the MES Core should be run in parallel with the architecture work associated with the planning activities. Since all modules exchange data through this integration platform, it is important to establish the standards that govern interfaces across the MES up front. Modules, when added, can only exchange data with one another through the MES Core. No point-to-point integrations between MES modules are allowed, for the sake of modularity and interoperability. Once established, the MES Core can begin ingesting data from the legacy platforms, as dictated by the Implementation Roadmap. Changes to data sharing patterns and usage are defined in the architectural layers and expressed in the Solution Plans and Implementation Roadmap.

BMS should leverage cloud technologies to establish the MES Core. In our experience, the creation of the MES Core in the cloud, specifically AWS, can be established very quickly. The patterns already exist from a previous Random Bit deployment, so standing up the MES Core in a matter of weeks is possible. Data processing patterns (Master Data Management, data stewardship, straight-through processing, etc.) vary by SMA and have a direct impact on implementation timelines. Leveraging cloud native implementation patterns is a tremendous project accelerator but requires a paradigm shift for SMA staff, given the differences cloud brings to the operational model. Random Bit is experienced in assisting SMAs in developing a cloud strategy and cloud transformation plan. Random Bit considers the legacy MMIS as a MES trading partner and leverages existing interfaces to provide transactional, operational, and analytical data very early in the MES modernization timeline.

Once the MES Core is launched, the MES Implementation Roadmap outlines the modules to implement next. Minimization of business operations risk is the core tenet that defines the order in which the modules are implemented. MITA is specific as to the business functions expected of the MES, which include:

- Provider Management
- Eligibility and Enrollment Management
- Care Management
- Business Relationship Management
- Contractor Management
- Financial Management
- Member Management
- Operations Management
- Performance Management
- Plan Management

Current business processes and the organizational design can vary considerably from the standard MITA business process structures. The number and nature of the BMS MES modules will be influenced by this gap. Ideally, current business processes are mapped to the existing CMS standards, but exact mapping to the CMS standards are rare in our experience. Defining the future state vision condenses the myriad of Medicaid business processes into the optimal BMS configuration.



4.2.3 Describe Medicaid Enterprise solutions your organization provides or is developing that BMS should consider during its roadmap planning. BMS is interested in learning about the following:

We partner with SMAs to help assess existing solution offerings against future state goals and objectives. To that end, we provide the services and leadership to help BMS articulate current state details and future state vision expressed in the language of Enterprise- and Solution Architecture. We have experience performing this role, and we have a proven methodology that delivers high quality quickly.

Random Bit does not provide MES functional components as a COTS product. In addition to the aforementioned architecture, governance, and planning services, Random Bit is experienced in providing system development services to the MES Core across a variety of technologies. We assist SMAs in licensing the appropriate services from AWS, and then provide the patterns and models to accelerate the creation of the data hub and integration platform.

1. The Medicaid Enterprise business processes or discrete functionalities targeted by the Medicaid Enterprise solution.

In alignment with MITA 3.0, the MES should support the entirety of the Medicaid enterprise landscape. Operations Management, Provider Management, and Member Management stand out as business process areas in which the MES plays a key role from its earliest implementation.

Random Bit created an Enterprise Architecture method based on industry standards and federal requirements related to TOGAF 9.2 and MITA 3.0. MARS-E and NIST 800-53 Rev4 are our security reference models. DAMA, OHDSI Common Data Model, and USCDI are our data governance reference models.

Random Bit provides essential Enterprise and Solution Architecture support based on hands-on, practical experience to help SMAs develop and articulate the optimal solution for their MES implementations. Our Implementation Roadmaps contain Medical Administrative Service Organization (MASO) solution components such as:

- Provider enrollment and management
- Medical fee-for-service claims adjudication and payment processing
- Managed care encounters and capitation payments
- Medicare Buy-In payments preparation
- Prior Authorization
- Reference Data Administration
- Program integrity and quality assurance

Our approach enables implementation of 3rd party COTS modules (as opposed to a monolithic MMIS) from a larger group of potential vendors for in-scope functional areas, delivering standardized, agency-owned integration and data management services.



2. How the Medicaid Enterprise solution is packaged (i.e., commercial-off-the-shelf (COTS) or proprietary; modular or tightly integrated; cloud or local).

Random Bit technology modernization planning and implementation services are provided on a consultancy basis. We assist SMAs in building an AWS-based, cloud native MES Core that manages the data sharing and integration for the various components of the overall solution. We are experts in the creation of AWS MES solutions but are not resellers of AWS cloud services. We assist SMAs in understanding what to license while providing oversight of the MES Core deployment.

Our Solution Planning process focuses on integrating COTS solutions (preferably SAAS offerings) consistent with CMS guidelines. We help SMAs build an AWS cloud-based MES Core, and our architecture services help support a fully modular Medicaid Enterprise System on top of that Core.

3. How the Medicaid Enterprise solution is priced (please include methodology only, e.g., Per Member per Month, fixed price per year, data usage—please do not provide actual purchase prices).

Random Bit’s architectural services can be provided either on a time-and-material or fixed cost/deliverables basis. The AWS MES Core pricing is based on usage.

4. In how many states is your Medicaid Enterprise solution currently deployed, or expected to be deployed, and how long has it been in use.

The MES reference model developed by Random Bit is currently being used by three SMAs, and has been shared, by CMS or State request, with 4 other SMAs.

5. Configurations and customizations typically requested to adapt the product for use in a State Medicaid Program.

Random Bit provides architecture as a service to SMAs. We adapt architecture frameworks based on agency-specific business processes and trading partner capabilities. Our Implementation Roadmap is also adapted according to trading partner and BMS capabilities. We use MITA 3.0 and MARS-E as reference architectures so any adaptations or customizations within the MES solution would be reviewed through the compliance lenses of those industry frameworks.

When solution planning for the MES, a key consideration is the integration of third-party modules and vendor solutions. We develop customized roadmaps that mitigate the impact and challenges inherent in the change. We have adapted vendor and agency solution components to enable incremental delivery of interfaces and application services needed to enable incremental implementations, to realize early benefits to the DHHS provider community, or to resolve an aging, critical Plan for Action and Milestones (POA&M).

6. Technical architecture and processing capacity/scalability.

Our proposed architecture is technology agnostic and built on open standards and integration through AWS web services and batch jobs. The reference patterns are already built in several states, and our architecture and infrastructure designs can quickly and easily be deployed in



AWS again. The MES Core is configured to auto-scale both up and down the capacity curve. There are also many ways in which access to AWS services can be designed to minimize operating expenses. One example involves data sharing with CMS, who leverages the AWS cloud services already. Data can be exchanged at no cost.

7. User-facing and self-service capabilities.

It is recommended that modular user-facing and self-service capabilities be procured from vendors. For example, BMS could license an off-the shelf provider enrollment portal, and a provider operations portal (member benefit inquiries, claims, status inquiries, remittances) attached to the BPO vendor solution components.

Random Bit includes in the TRA a section that addresses consistency of identity, credentials, and access management (IAM) services across a system-of-systems solution.

8. Interface support, flexibility, and extensibility to other stakeholders and State Agencies.

TRA documents are created during architecture design. The TRA includes the Interface Classification Framework, which forms the basis for standardized interface design and governance. Standards opportunities include HL7 FHIR, and ASC X12 Version 5010, for example. To the extent possible, interfaces with data trading partners follow a standardized interface framework. For interfaces that require exceptions, the Architecture Review Board (ARB) governs those decision points, and these interfaces are planned and designed well in advance of their required usage.

The AWS platform helps us here again with flexibility and extensibility to enable solution delivery teams to move quicker and handle workloads of virtually any size. The AWS services that enable interface implementation, such as API Gateway and the AWS Transfer Family services, share these characteristics.

4.2.4 What do you see as the benefits and risks of including business process outsourcing (BPO) services together with technical services?

Benefits from combining BPO and technology services include access to qualified and experienced resources. Outsourcing these functions can relieve some of the pressure faced by many SMAs to attract and retain qualified personnel. Many SMAs struggle with the accumulation of deep technical debt (people, process, and technology). It may be difficult or even impossible to close that technical debt gap due to funding constraints or access to qualified staff. Thus, outsourcing both business and technology services could be a way to avoid having to address technical debt issues.

Security and compliance are areas where issues can linger and grow. A potential benefit of a BPO project might be to mitigate aging problems in this space. CMS requires that SMAs submit POA&Ms on any open compliance issues. Experience has shown that open POA&Ms or security gaps remain open because they have become very difficult to address. Thus, outsourcing a function might be a way to close a gap.



Other potential benefits associated with BPO and technical services outsourcing might include:

- Once costs have been contracted with vendors, it places the SMA in a position where there is a greater degree of future cost certainty, which benefits SMA financial planning and management processes
- SMAs may prefer to direct their resources toward achieving health outcomes by focusing on strategy development and implementation, without the distraction of ongoing operational and technical management responsibilities
- SMAs and constituents may benefit from operational responsibilities being owned by vendors who have developed scale and mature levels of operational management capability

Expenses in both the Design, Develop and Implement (DDI) and Operations and Maintenance (O&M) phases can get out of control very quickly when change controls become frequent. Major risks are associated with the lack of complete agreement and understanding of the future state business and technical model by agency leadership and the operations teams, thus opening the door to change controls late in the DDI phase or even in the O&M phase. The financial risk can become enormous when change controls occur late in the game. However, the risks can be managed by up-front investment in the MES modernization planning phase. The countermeasure to this commonly seen problem is the creation of a strong future state architecture coupled with a solid Implementation Roadmap.

Other potential risks associated with BPO and technical services outsourcing might include:

- Once BPO and technical service agreements are in place, it may lock the agency into a defined operating model for the duration of such an agreement, which may limit the agency's ability to implement changes and innovations in a timely, cost-effective manner
- While BPO and technical services vendors often have access to human capital that are very capable of managing outsourced operations, they may not have the historical insights and appreciation of local operational and service nuances and interests, which may negatively impact stakeholders
- When SMAs outsource operations and technical responsibilities to vendors, they still retain management accountability. Managing outsourced operations requires a level of management prowess which SMAs may need to develop
- SMAs will sometimes focus on a specific BPO initially without a defined vision, architecture, or roadmap. This typically leads to the temptation to bundle as much as possible into that first procurement; leading to huge cost overruns and vendor lock-in
- SMAs often considers a BPO model as a cost-savings mechanism and find that the BPO contract may indeed cost significantly more than anticipated. The additional cost must be measured against the potential benefits of BMS staff focusing on service delivery and program integrity.

A well-formed vision, architecture, and Implementation Roadmap sets the scene for a successful implementation. These documents should accompany all procurements, including the system integrator, and focus on interoperability and standardization. Business Process Outsourcing will be integrated according to a well-defined interface pattern and allow BPO vendors to define what their data needs and interface patterns are. In short, the exact function of the BPO agreement must be



documented and accompanied by a detailed Key Performance Indicators (KPI) measurement system, enforced by strong contract language.

4.2.5 Describe your experience, if any, with CMS Outcomes-Based Certification or Streamlined Modular Certification.

Random Bit creates two key deliverables that directly support the Outcomes-Based Certification process: Solution Plans and Implementation Roadmap. The Solution Plan includes essential business capabilities and a description of the business processes and intended outcomes.

New business capabilities are described in the Solution Plan, and the timing for when they should be ready for review is described in the Implementation Roadmap. This is the mechanism that SMAs use to manage expectations with CMS for both APD/funding and certification issues.

4.2.6 What approaches to supporting consistency in business process functions and data architecture across multiple systems and vendors have you encountered?

The Random Bit enterprise architecture framework is based on the TOGAF Architecture Development Method (ADM) - an industry standard. Our method aligns the business processes with its associated data inputs and outputs. The resulting architecture, aligned carefully with MITA 3.0, includes flexible standards-based data exchanges, reference data sets, and a canonical model. These artifacts are used to support consistency in business functions and data architecture across the evolving MES environment.

BMS should operate a robust ARB comprised of agency business and IT leadership. IV&V also should attend the meetings. Governance is critical to ensure adherence to standards, and to make changes where required by the program. These recommendations are from practical, hands-on experiences deploying a modular MES within an SMA and contain lessons learned from that work spanning years of effort.

4.2.7 Please provide your recommended strategy for ongoing compliance with the CMS Interoperability and Patient Access final rule (CMS-9115-F). The rule can be found at the following location: <https://www.cms.gov/files/document/cms-9115-f.pdf>.

Compliance with CMS-9115-F offers three key challenges to a SMA:

- Providing Business Ownership for the Interoperability APIs
- Building the Interoperability APIs
- Securing the Interoperability APIs

Business ownership of the Interoperability APIs

The first and most critical challenge for CMS-9115-F compliance is governance and business ownership of the business capabilities that must be built. Interoperability APIs fall outside of most existing Medicaid operational areas, so identifying the appropriate business owner may be a challenge. In states with a Health Information Exchange (HIE), the business area that manages the HIE may be a good candidate for owning the Interoperability APIs.



Random Bit is experienced in navigating the requirements of CMS-9115-F while addressing the legal, operational, and technological implications of making data accessible to members.

We strongly suggest BMS procure a FHIR-service technology AFTER the above challenges are addressed.

Building the Interoperability APIs

The FHIR API standard is an open framework, and there are multiple vendors and platforms on the market that can implement a FHIR API. Beyond the business requirements described above, the critical technical requirement for the SMA is the aggregation and preparation of the data that must be served by the API. Some states have leveraged an existing HIE as a data source. Others have leveraged the integration hub at the heart of their modern MES. Regardless, establishing a source for the data is the biggest technical challenge in establishing the Patient Access API.

Random Bit has achieved good results using an architecture where the Provider Directory and Patient Access FHIR APIs were implemented using an AWS-based MES Core as data source, serving data to a CMS Interoperability application, which is also hosted in AWS, but isolated for security reasons.

Securing of the Interoperability APIs

Securing the Patient Access API presents two main challenges:

- Identity and Access Management (IAM)
- Data authorization and consent

The Patient Access API must provide access to all state Medicaid users—potentially millions of people. Each of these users needs a separate account and credential in the system in order to be granted access when requesting data from the API. There are many ways this problem can be solved, but the most appropriate solution for a given state depends on what Identity and Access Management (IAM) solutions are already in use. A well-designed IAM capability is a prerequisite for the Patient API to function properly.

A recently released report by security researcher Alissa Knight identified several security vulnerabilities in FHIR APIs across the nation. Many of these vulnerabilities were related to data authorization. It is critical that a given user account only be authorized to access data for a specific Medicaid member. This requires data authorization and consent to be managed at the item level in the data system. Random Bit has the knowledge and experience to help BMS accomplish this goal.



4.2.8 Provide your strategy for compliance with the Health Insurance Portability and Accountability Act (HIPAA) and Federal Risk and Authorization Management Program (FedRAMP) Requirements. Information about HIPAA compliance can be found at the following location:

<https://www.hhs.gov/hipaa/forprofessionals/privacy/index.html>.

Information about FedRAMP can be found on www.fedramp.gov.

An SMA’s strategy for compliance varies based on the overseeing entity. HIPAA and FedRAMP are important, but in our experience the biggest compliance burden comes from CMS (particularly in the form of program certification and MARS-E) and from the state level. Centralized state IT departments can enforce a security compliance burden that requires significant effort to meet.

The main operational concern for MES modernization is “minimum use”, particularly regarding data de-identification and test data management. Without a significant de-identification capability that works across all modules, it is extremely challenging to perform both end-to-end testing as a part of implementation as well as regular testing as a part of ongoing operations and maintenance without using PHI/PII. This potentially creates both HIPAA and MARS-E compliance challenges.

FedRAMP compliance is heavily reliant on specific cloud vendor capabilities. Random Bit recommends the use of AWS cloud services for the MES Core. AWS is certified FedRAMP High and provides a platform that enables BMS to establish and maintain an appropriate level of FedRAMP compliance level.

Given these various requirement sets, our strategy for compliance emphasizes integration—addressing multiple compliance requirements with a single process. We encourage a well-defined, integrated governance framework that analyzes the compliance requirements from all the applicable frameworks (HIPAA, MARS-E, FedRAMP, SSA, etc.) into an integrated set of controls that are applicable to multiple frameworks and overseen by the same personnel.

Many states have open POA&Ms that age beyond acceptable levels. An integrated approach to compliance that analyzes these against priority and severity and starts implementing remediation is the key to success.

4.2.9 Provide your strategy for assisting states in achieving compliance with CMS, and federal rules, regulations, and guidance related to modularity, leverage, reuse, and outcomes achievement.

The Random Bit compliance methodology is directly aligned with MITA 3.0 and MARS-E and includes State Self-Assessment (SSA) requirements. Standards-based data exchanges promote modularity and the realization of desired business outcomes. The development of integrated datasets helps with decision support systems, straight-through processing, and machine learning in the program integrity arena.

Our proven strategy is to partner with BMS on the development of the future state vision, Solution Plans, and the Implementation Roadmap that are consistent with the guidance provided by CMS for MES modularity. The MES modernization program is thought of most often as a technology effort. While partially true, the larger impact is related to the complete transformation of the business operating



model. Our services are designed to guide both the technology changes as well as the Organizational Change Management (OCM) efforts. Changing the way employees and trading partners conduct business is the very heavy lift, and that is where Random Bit can help BMS succeed.

Our enterprise and solution architecture team, security and compliance team, and governance group are all well versed in MITA 3.0 and MES Modularity goals and objectives. Random Bit helps SMAs develop their own visions and align those future state models with CMS guidelines. We understand the myriad of requirements and can help BMS navigate the planning processes to achieve success.

4.2.10 What approaches do you suggest for Disaster Recovery processes in a modular MES that accounts for integration and communication across multiple partners?

When developing a Business Continuity/Disaster Recovery (BC/DR) plan, we advise against treating all MES modules equally. Random Bit promotes an approach by which applications are tiered according to their business criticality during times when broad-spectrum service disruptions are encountered. The types of service disruptions encountered (e.g., operational outage or cyberattack) also play a large role in the Return to Operations plan. The Random Bit Enterprise Architecture framework guides BMS and its stakeholders to define the tiering of all components according to the Business Architecture and Application Architecture layers.

The MES Core should be a Tier-1 component and use the capabilities of the Cloud Service Provider (CSP) to provide BC/DR across geographic regions. First, we recommend that the agency design robust resiliency into the MES Core. For the Tier-1 applications, the code bases should reside within business partner operations. We suggest that the agency contractually require all MES business partners to leverage a common cyber-vault solution external to their operations and managed by BMS. We also recommend both data and application escrows and the requirement of cloud deployments to remove vendor risk. Additionally, the agency should contractually require very robust BC/DR capabilities within each of the MES business partner environments with periodic testing and assessment by third party experts licensed by the agency.

4.2.11 What organizational change and communications management processes have you seen employed for a modernized, multi-vendor MES implementation? How would you help support the evolution of the Medicaid Enterprise as a whole?

The MES program is a series of new business capabilities that will be introduced over time. The integrated MES Implementation Roadmap very clearly establishes the timeline for each of these changes. The roadmap might extend years into the future and is constantly adjusted within the boundaries of the governance model and refined as the DDI program advances. With this continually updated roadmap in place, the agency knows precisely which human resources need training and assistance with changing business processes.

Organizational Change Management (OCM) is a specialized function that manages the impact of changes in business processes and organizational structures in an effective way. The stakeholders that are subject to OCM go far beyond BMS operational staff. The provider community, fiscal agents, contract



management, State Procurement, Accounts Payable, technology operations, and CMS are some examples of critical stakeholders that must receive clear, constant, and effective communication regarding changes that are coming.

Random Bit recommends that BMS seek the services of an organization that specializes in OCM. Random Bit has adopted the Prosci ADKAR methodology for OCM, an industry leading framework for managing change. We suggest that the OCM vendor uses this methodology also.

The OCM function must be supported by an effective process governance model. The new MES technologies require change in business processes and these changes should be governed to ensure delivery of the needed business results and compliance with all appropriate internal and external policies. Our deep experience in Medicaid IT policy and process governance is directly applicable to this need.

Finally, from a MES program perspective, Random Bit reiterates the value of an integrated governance approach. As discussed earlier, governance is ultimately about decision management—making decisions and documenting those decisions. In the context of an extremely complex technology transformation like the MES, change is a constant, even during the execution of the project. Scope changes. Requirements change. Solutions change. Managing these changes to ensure minimal disruption to BMS is an important part of OCM, and one that our integrated approach to governance is designed to support.

4.2.12 How does a multi-vendor environment change how you manage your own Design, Development, and Implementation (DDI) work? How should dependencies be identified, negotiated, and implemented in a multi-vendor environment?

Risk issues in the multi-vendor environment are caused predominately by a lack of clear project vision which results in a lack of clearly defined requirements from the agency. While vendors are normally more practiced at large change efforts, SMAs are embarking on a transformational journey where the biggest challenges are related to changes in business processes and the responsibilities of the agency personnel. Random Bit has experience navigating these issues and engaging with personnel to negate the insecurities of change in an organization. Investing in communications and open dialogue with all the personnel resources from the inception of the project also reduces the number of change controls from misunderstandings and disputes.

The up-front investment in the vision, enterprise architecture, and transition plan makes the DDI risks associated with large, multi-vendor programs much more manageable and reduces exposure to runaway change control expenses. The downside is that it takes more time to first develop a rock-solid future state model and attendant Implementation Roadmap but investing the time up-front is the best approach to initiating the MES transformation. Senior agency leaders and state leadership must commit to this type of planning model by investing their time in the project planning phase and then intermittently during execution of the plan.



4.2.13 Describe your experience, if any, with collaboration tool(s) such as or equal to Jira®, Confluence, and IBM® Rational Team Concert (RTC) or other tools to track items, which include, but are not limited to, project milestones, deliverables, and/or implementation testing. Do you recommend any specific approaches or tool(s) for collaboration in a multi-vendor environment? Does your company prefer using its own collaboration tool(s) to support an implementation, or do you prefer using collaboration tool(s) provided by a state and/or a systems integrator (SI)?

Random Bit team members have hands-on experience with many industry-leading tools used for collaboration and project management, including:

- Atlassian suite – Jira, Confluence, Slack
- Microsoft suite – Teams, SharePoint, Project Server
- Architecture and design workbenches – Sparx Enterprise Architect (Sparx / EA)

Random Bit utilizes architecture design workbenches, such as Sparx EA, to prepare enterprise architecture blueprints that comply with broadly adopted architecture methods such as the TOGAF ADM and notations such as ArchiMate. Using such tools enables the enterprise architecture team to achieve a level of rigor and accuracy that is nearly impossible using general diagramming and office productivity software. The workbench thus enables the EA team to define implementation plateaus along the MES transformation journey and to trace the relationships between components across the business, system, and technology architecture layers. This approach enables the EA team to highlight relationships and dependencies that might otherwise be overlooked and thus assess the impact of changes very effectively. Random Bit has developed a Solution Planning method that allows technical and business stakeholders to design a solution together without the need to understand architecture frameworks. Solution Plans are documented in the technology choice of the SMA.

We have found the Atlassian suite to be an extremely effective part of architecture governance. It effectively bridges the gap between architecture and implementation teams. Approved architecture detail and requirements are maintained in Confluence by the architecture team and accessed by the dev teams. Jira is an excellent Agile backlog management tool, suitable for both Scrum and Kanban approaches, and its integration with Confluence makes it easy to tie architecture components to implementation tasks such as user stories, designs, application code, test cases, and deployment scripts.

Microsoft's enhanced collaboration capabilities offered by Microsoft 365 and Teams have proven quite useful for other forms of governance, such as policy and process governance.



4.2.14 What roles and responsibilities have you seen for a system integrator (SI) in a modular systems environment? Was this role fulfilled by a separate vendor, incorporated with other services, or performed by the state Medicaid agency itself? What are the key success factors and risks to success related to using a SI?

The MES Core is an integral part of the MES, providing the mechanism by which to exchange data across the enterprise. The MES Core system integrator (SI) requires three activities:

- Define the strategy, architecture, and design for data exchange
- Implement the infrastructure upon which the MES Core will be built
- Implement the interfaces that will be used to exchange data

SMA's are tempted to group all three functions into the role of one SI. It has been Random Bit's experience that this is a risky and expensive proposition. SI's typically promote their own technologies, data center solutions, and integration patterns to lock in the longest SI contract possible. This is against the modularity and interoperability objectives set by CMS.

Random Bit suggests an implementation oversight vendor to represent the best interests of the State. Furthermore, we suggest that BMS considers owning the MES Core infrastructure (preferably in the cloud).

The MES Implementation Roadmap and TRA are critical to successfully provide SI services. We have seen states elect to do some of the following for SI services:

- 1) Use the services of the SI vendor that have maintained the MMIS for multiple decades
- 2) Outsource all SI functions to a new vendor
- 3) Outsource only the development of infrastructure and interfaces to the new vendor and contract with the EA vendor to represent the best interests of the SMA
- 4) Insource the development of the integration layer with guidance from the enterprise architecture vendor (Random Bit)

We have seen success in the latter two options.

4.2.15 Describe your depth, breadth, and frequency recommendations for performing periodic vulnerability scans of production and development environments?

BMS is currently performing vulnerability scans on its server infrastructure (on both physical and virtual servers). With the introduction of new technologies, SMA's are tempted to divide the team into "old technology" and "new technology" groups. Random Bit advises against this approach to vulnerability scans. Scanning new cloud environments may require some new tools, but in general, the SMA should avoid allowing operational silos to develop where cloud personnel perform vulnerability scanning on cloud environments with a toolset and at a cadence that is unaligned with the rest of the SMA's practice.



In all cases, scanning automation is desirable, with a frequency as high as achievable. In our experience, automated daily scanning of MES environments for vulnerabilities and misconfiguration using appropriate tools is achievable, with the results being fed back to development teams for remediation daily. A centrally accountable security office that can staff appropriately and coordinate these activities across BMS is necessary, both from vulnerability-management and compliance points of view.

When it comes to vulnerability scanning, the distinction between development and production environments is not particularly meaningful. Systems on shared infrastructure often create risk for one another with unaddressed vulnerabilities, even if they are in separate environments. Thus, vulnerability scanning should be performed consistently for both development and production environments.

4.2.16 What processes, techniques, and solutions does your organization consider critical for delivering optimal data sharing throughout the MES?

A critical set of decisions that BMS must make for the MES relate to the MES Core. BMS must answer questions such as:

- Will point-to-point interactions be allowed between components? Or will all data exchanges be made through the MES Core only?
- Will data be persisted in the MES Core (in the data hub) or is it simply transitory?
- Will data be mastered across data trading partners? If so, who are considered data owners for specific data domains?
- How will poor data quality be handled?
- How will BMS use transactional, operational, and analytical data?
- Which data standards will BMS support? Will it only be HIPAA 5010 X12? Or other formats such as JSON, XML, and FHIR?
- Will proprietary data exchange formats be allowed? Or only published BMS standards?
- How will canonical models be maintained for each data domain?

The information architecture of the Random Bit MES Implementation Roadmap answers these questions for each implementation plateau from the current state to the future state. The TRA defines the guardrails for implementation and any deviation assessed according to the integrated governance model.

4.2.17 What standards and practices would you recommend with regards to key data governance, master data management, data stewardship, and data-sharing concerns? What approaches do you recommend for engaging business data owners separately from technical data system managers?

Consistent with other sections in this RFI, Random Bit strongly believes that data governance is a critical capability for a successful MES transition, and we recommend that BMS establish a comprehensive data governance program early in the planning phases. The Random Bit Medicaid Data Governance Framework is driven by a simple goal: Unlock the potential of Medicaid data while strictly guarding member privacy. This framework implements a set of standards and practices that are applicable to any SMA engaged in a MES transition.



Our Medicaid Data Governance Framework is built on five key practice areas that are derived from the Data Management Association (DAMA) Data Management Body of Knowledge (DMBoK) and tailored specifically for the needs of an SMA undertaking a MES transition. We recommend that any SMA undertaking a MES transition establish a competency in each of these areas as part of the first phase of the transformation effort.

1. Data Architecture
2. Data Modeling
3. Data Integration
4. Data Quality
5. Data Security & Privacy

Random Bit suggests that BMS consider the following suggestions as it relates to data governance:

- Consider data governance as integrated into the enterprise architecture, and not as a separate function. Data governance falls within the information architecture viewpoint of the enterprise architecture.
- Invest time in considering the data quality of the legacy system and the data conversion strategy of the legacy system. The agency must decide the data that can be purged (e.g., eligibility data from long deceased members) or retained (e.g., life-time service limits for active members).
- Develop the strategy for managing test data for multiple systems across the MES.
- Develop an enterprise data-model that identifies the various data domains and the relationships between them.
- Prepare data dictionaries that describe data entities in business language.
- Develop canonical models for each of the primary data domains (e.g., provider, member, claims) so that solution delivery teams and trading partners can use them as a common reference.
- Base all the above on industry reference models, which include USCDI, FHIR, and HIPAA 5010 X12.

4.2.18 Describe your company's current roles and responsibilities as a fiscal agent, if applicable, in a modular systems environment. Describe how you coordinate with other vendors to incorporate their services in a modular systems environment. What are the key success factors and risks for separating Fiscal Intermediary functions from technical functions?

Random Bit is not a fiscal agent.

4.2.19 Describe the division of responsibilities on successful projects, in relation to a multivendor environment, between vendor and subcontractor Project or Portfolio Management Offices (PMO), and an Enterprise PMO provided by either BMS or a separate vendor?

An integrated program management approach is critical to the success of the MES modernization project. Coordinating the activities across multiple procurements, the development of the MES Core, Organizational Change Management (OCM), and module implementations require an integrated view of:



- Planned milestones and progress reporting
- Dependencies
- Issues & Risks
- Decisions

A central PMO with control over all change activities within BMS is critical. There might be an Enterprise PMO within BMS with oversight over in-flight projects external to the MES program. The size and scope of a MES Modernization dictates that the MES DDI PMO be the controlling entity. In fact, BMS should aggressively reduce or stop other projects while the MES Modernization program is in flight. This is a difficult request, but the more in-flight change parallel to the MES effort, the more demands on agency staff and leadership. If the planning phase takes 2 years to complete, then that is the runway to complete all other projects to clear the decks.

The MES PMO should be a procurement with the expectation that the winning company has a strong history of successful MES Program delivery. Specific Medicaid knowledge is very important, and this list is short. The tendency is to add the MES PMO to another procurement, such as a functional module, but it is a better idea to have an independent Program Management team unencumbered by corporate affiliations with solution providers, similar to the IV&V model.

The Random Bit methodology is to partner with the MES PMO and OCM teams to provide critical planning information into the project creation and management functions.

4.2.20 Describe your recommended approach to addressing the complex relationships between a variety of vendors working on separate parts (or modules) of the overall Medicaid Enterprise System. To what degree do you recommend BMS require these approaches in any RFP(s) it issues?

The TRA and Implementation Roadmap define the modernization and integration strategies for all module vendors. The Solution Plan for each module goes into a deeper level of detail about BMS objectives and requirements. For a successful MES implementation, it is critical that these documents be shared as part of the procurement library. Although it takes time to develop these documents, in our experience, the upfront time investment pays huge dividends during both the procurement and implementation phases. The Random Bit methodology enables SMAs to define Solution Plans and the Implementation Roadmap at a level of detail to support procurement, planning, and vendor management activities across vendor and BMS stakeholders.

Setting the expectation of the standards vendors should adhere to is not the same as enforcing vendor compliance. This will be an area of conflict during the program, and BMS support is essential to the function's success. Once standards are set, they must be enforced, meaning vendors who state that their solutions can adhere to the RFP requirements must be forced to deliver. If they need custom development to meet the requirements after being awarded a contract, then the vendor needs to pay for it. The upfront planning phase is so critically important because this protects the agency. The interactions between the various chosen solution providers are expressed in the EA documentation.



Guidelines for RFP content include:

- Implementation roadmap to be included in each RFP
- TRA to be included in each RFP
- Adherence to current and future updates to the roadmap, BC/DR model, and TRA included as a requirement in each RFP
- Respondents to include Interface Control Document (ICD) outlines that specify the interface requirements for the scope of the issued RFP (e.g., TPL, Provider Enrollment, etc.)
- Solution Plans that define the architecture and objective of the scope of the issued RFP (e.g., TPL, Provider Enrollment, etc.)

4.2.21 What factors (technologies, development methodologies, frameworks, etc.) would you recommend BMS require in an RFP in order to accelerate the DDI of MES modules?

Before soliciting bids from technology vendors for MES modules, we strongly recommend BMS works with an experienced architecture and governance consultant to discover and define the applicable governance frameworks and standards and establish the necessary governance structures to guide technical procurements.

All contributors to the MES transition should have deep familiarity with and experience implementing the federal frameworks relevant to their domain. Examples of these include:

- MITA
- MARS-E
- NIST 800-53
- FHIR
- USCDI
- HIPAA
- SSA TSSR
- IRS 1075
- FedRAMP

In addition to these federal standards, vendors should be expected to utilize and comply with any professional or state standards that BMS has determined applicable to the MES project. These can include state-specific IT or security governance standards as well as professional standards adopted by BMS. Examples of such standards might include:

- TOGAF (enterprise architecture)
- SABSA (security architecture)
- DAMA DM-BOK (data governance)
- Prosci ADKAR (organizational change management)
- AWS Well-Architected Framework (AWS cloud infrastructure)
- PMBOK (project management)

Identity federation allows BMS workers Single Sign-On (SSO) access to vendor applications.



Technical considerations to incorporate into RFPs include:

- Telemetry (operational and technical) to be produced by the vendor that can be fed to an integrated Security Information and Event Management (SIEM) capability
- Ability to federate Identity and Access Management (IAM) tokens across agency and vendor solutions to allow agency workers to authenticate using agency credentials
- BC/DR integration in the BMS model

4.2.22 Describe ways you feel BMS should structure an RFP to encourage competition and innovation from Medicaid Enterprise solution bidders.

Once the vision, architecture, and Implementation Roadmap are completed, BMS should consider hosting open meetings to describe the agency strategy for MES modernization. An open communication with the vendor community provides valuable input to validate the MES strategy prior to mandating it in an RFP. Open communication also drastically shortens the vendor Q&A phase of procurement and the strain Q&A places on agency resources. The more open and transparent BMS is with the future state information and gap from current state, the higher the likely participation.

States that are tempted to include as much functionality into a handful of very large RFPs, find that the number of respondents is drastically reduced. In many cases, either no vendor responds, or the one response received is such a high price that the only option is to re-procure. It is for this reason that Random Bit proposes that BMS consider much smaller procurements to attract vendors that provide niche solutions that might serve the agency better. This approach aligns well with the truly modular MES that CMS desires and encourages smaller, innovative companies to step forward to engage.

Random Bit has participated on both sides of the RFP process. We have assisted SMAs with the development of the RFP and review of responses. We have also bid on multiple MES transformation RFPs and have been successful on several. The best RFPs are well thought out, allow vendor staff enough time to develop a quality response, and followed with a timely review and response from the state agency. RFPs that require a 6-week turnaround and take 12 months to review serve only to exasperate the vendor community.

Many States have passed laws that preclude a state agency from serving as a reference for any vendor. Random Bit suggests that BMS considers how and when to request references for similar services. A close partnership with CMS can help in this regard as CMS can make requests of states to share more detailed information about their respective experiences with vendors and SMAs.

4.2.23 What recommendations do you have for establishing procurement and implementation timelines that help deliver value sooner, reduce risk, maximize Federal Financial Participation (FFP), and achieve Outcomes-Based Certification or Streamlined Modular Certification?

The Implementation Roadmap is designed to clearly show how and when new business capabilities are expected to be delivered. One of the planning objectives is value recognition and FFP optimization. Solution Plans and Implementation Roadmaps are fantastic communication tools with CMS. These tools deliver clear, concise insights into how BMS plans to meet CMS requirements and the projected



timelines. CMS has indicated consistently that they want to be shown a solid plan and then evidence that the plan is working. Random Bit architecture services provide this information.

Value is contextual. BMS will decide which components are most needed and deliver highest value as an SMA executing on behalf of CMS. This information is captured and used in our enterprise architecture methodology to prioritize those specific elements. Risks experienced by SMAs can be cost, schedule, and/or functionality related issues. Our experience has been consistently that states that spend less time on the upfront planning suffer significant financial and timeline issues, and do not fully realize new business capabilities that are desired. Another factor that should be very carefully considered is consensus amongst BMS leadership as to future state. Disagreements here that are not uncovered and resolved show up late in the program and become extremely detrimental to the success of the program, causing a loss of confidence with CMS and deferring desired value recognition. Taking the time to complete quality planning and ensure complete consensus amongst BMS and state leadership is your largest lever to reduce the risk of deferred value attainment.

4.2.24 Describe the major trends in your Medicaid Enterprise solution category that you believe BMS should be aware of, including any product or approach changes that you believe will come to market within the next 12 – 24 months. How do your Medicaid Enterprise solution roadmaps stay current with such trends? If possible, please be specific regarding how these trends affect Medicaid, WVCHIP, or healthcare IT in West Virginia.

Cloud native services, as opposed to simply cloud-based, are a powerful tool for simplification and operating efficiency. However, SMAs and central IT groups remain hesitant to fully embrace the cloud. BMS should make every effort to fully embrace the cloud and add a “cloud-first/cloud-native” guiding principle to its MES modernization strategy. There must be very sound reasons to run anything on premises or within a state’s data center.

Random Bit has helped other states define their cloud strategy and then navigate the process to procure cloud services through a cloud broker.

Gaining access to the cloud is challenging for some SMAs that are struggling to navigate the State procurement processes. Random Bit has helped other states define their cloud strategy and navigate the process to procure cloud services in partnership with their state partners. Central IT teams have operating responsibilities and may perceive a significant move to cloud operations as a threat to their ability to perform their legislated functions. Creating a great working relationship between central IT and BMS in the move to a cloud native service such as AWS allows central IT to gain enhanced capabilities to perform oversight functions while allowing BMS to modernize, taking full advantage of the AWS suite of cloud services.

Creating Enterprise Architecture disciplines allows BMS to remain current with emerging trends. EA artifacts are living documents that should be refreshed on an ongoing basis. If BMS lacks a robust ARB process, Random Bit can either help BMS build and operate the ARB or we can perform that function for BMS as we do in other states. Keeping your TRA and EA artifacts current is another guiding principle that should be adopted. CMS requirements will change, state imperatives will shift, and technology will get



more powerful. BMS should therefore be constantly reviewing and updating the EA documents and should build this task into the Implementation Roadmap.

States are moving away from traditional relational databases and are increasingly adopting NoSQL database technologies. NoSQL technologies are helpful in use cases where large amounts of data with disparate data structures are processed. CMS has also embraced NoSQL technologies for its various data exchanges. AWS offers a variety of database capabilities, including NoSQL services.

4.2.25 Identify any innovations in your Medicaid Enterprise solution for addressing Medicaid Business Priorities (cost savings, performance efficiencies, improved care outcomes, etc.).

The advent of extremely robust cloud service providers is a game changer for the Medicaid community. Previously, SMAs have been bound by monolithic, proprietary, expensive options that are difficult to deploy, hard to replace, expensive to maintain (e.g., hardware on-premises or at state data centers) and, lacking top tier operational staff, rely on very expensive 3rd party support contracts.

Random Bit can help BMS understand the wide variety of CSP options and the potential benefits available with the combination of CMS modularity guidelines coupled with AWS native cloud services. Now, all the infrastructure can be managed by world-class professionals so technical debt can be removed as a constant source of security, operational, and budgeting headaches. Instead, the focus can be on operational efficiency, improvements in outcomes, and obtaining the best available solutions for the MITA 3.0 business components. SMAs are now able to focus on Medicaid excellence and data-driven decision making that allows for more experimentation and faster feedback to help tune optimal expenditures for the most healthcare possible.

There are solution providers who can claim “cloud options.” This is not what we are talking about. We are talking about a revolutionary change to cloud native where BMS controls all the data sharing and measures the daily performance of the MES partners and Medicaid programs in real time.

4.2.26 Identify any innovations in your Medicaid Enterprise solution for addressing technical risk management.

The MES solutions that Random Bit has supported have heavily leveraged cutting-edge innovations inherent in cloud-native infrastructure. A cloud-native architecture offers many advantages over a traditional architecture and provides built-in protection against common technical risks. Some examples include:

1. **Incremental modernization planning** – Overcoming the complexities of the legacy MMIS while satisfying the requirements of the MES is fraught with operational risk. The Random Bit enterprise architecture method balances operational risk throughout the Implementation Roadmap.
2. **Cloud redundancy and high availability** - In the cloud (and especially the cloud-native) environment, contingency planning and disaster recovery planning leverage automated, scalable backup and restore capabilities that are simply not attainable on-prem.



3. **Infrastructure as code** - Because every component of a cloud-native infrastructure (including firewalls, storage units, VMs, containers, and everything else) can be deployed, decommissioned, and modified using the cloud-vendor's command API, it is possible to completely manage the cloud infrastructure with pre-scripted actions. The entire technology stack for the MES Core platform can be scripted into a set of code packages that can be deployed at the press of a button. The code is a perfect representation of the infrastructure and therefore migrating the infrastructure to a new availability zone is simply a matter of running the script in a new location.
4. **Automated CI/ CD pipelines, linked to technical change management processes** - Because proposed infrastructure deployments are scripted, they can be fully validated before any deployment takes place. Some of the industry's most respected vendors have developed code-scanning tools that are specifically designed to identify flaws in cloud infrastructure deployments before deployment. The ability to check for security and configuration errors before deployment in cloud-native environments is a massive improvement in technical risk management over on-prem deployments.
5. **Cloud-native telemetry, log aggregation, monitoring services** - Cloud platforms include integrated logging and log aggregation across the entire infrastructure. Logging needs to be configured, but the holistic inclusion of logging and monitoring is built in. This enables greatly enhanced visibility to the environment, both for operational and security risk-management purposes.

4.2.27 Describe 1 to 3 use cases where innovations in your Medicaid Enterprise solution would apply and the value your Medicaid Enterprise solution would add when applied to them.

The Random Bit Enterprise Architecture, Implementation Roadmap, and Governance services are mentioned throughout this document. The Solution Plans that accompany the Enterprise Architecture models have been a great success with our clients. Business representatives, IT representatives, IV&V resources, PMO staff, and vendor staff use Solution Plans to find common ground on meeting business objectives by functional process.

Random Bit designed, built, tested, and deployed a MES Core infrastructure, while simultaneously leading the work around the creation of a cloud broker model to enable SMA access to AWS services. We offer high speed with high quality. We offer cost effectiveness on a different scale, in partnership with BMS, AWS, and CMS.



4.2.28 In the states where you have implemented, what have been some of the higher value outcomes? What performance metrics were you able to provide to substantiate this success?

Random Bit was able to establish the TRA in two states that was used to set MES modernization expectations across agency, vendor, and CMS stakeholders. We also developed the cloud-based solution architecture in two states that was used to develop the MES Core.

Random Bit provided architecture oversight for the development of one of the first cloud-based production MES Core components in the nation. In one instance, a data ingestion issue that had taken as long as 22 hours to complete was improved to 7 minutes, a dramatic reduction in critical business time.

We have developed solutions plans for 16 MES functional modules. These Solution Plans were used to successfully complete the successful procurement for four MES functional components. Random Bit assisted in the development of six RFPs.

4.2.29 Discuss any experiences you have had integrating your Medicaid Enterprise solution with legacy system management and lessons you have learned for implementing new Medicaid Enterprise solutions. Do you recommend any specific approach for modifying, interfacing with, and managing the legacy system while implementing a new Medicaid Enterprise solution?

Random Bit has direct experience with replacing a four-decade-old legacy mainframe system with a modular MES solution. The legacy MMIS system is often implemented as a monolithic mainframe application covering all Medicaid functionality.

The Implementation Roadmap sequences the transition of business processes in an appropriate order from the legacy system to the modernized MES. Existing operations need to be maintained without disruption, and capabilities must be established in the new system in a way that respects dependencies and builds step by step upon the work that was previously done.

Random Bit recommends that BMS stops developing new system functionality in the legacy system as soon as system modernization planning starts. Only the most critical issues should be addressed, and only under the strictest controls. Every change to the legacy platform means a review of all of the previous planning work to account for the new legacy behaviors.

Due to the progressive transformation process, there is a period when BMS will maintain and operate both the legacy system and the MES components. Managing production data across two operational platforms is a complex task. Having complete agreement with all key stakeholders on the Implementation Roadmap and Solution Plans is critical. Offloading business capabilities and the associated data flows must be choreographed carefully.

Random Bit suggests that BMS perform a data quality assessment of the legacy system and address any issues up front. This is an important consideration since data quality issues become much more difficult



and expensive to correct as the progressive implementations take place. Data conversion is an important consideration during legacy system modernization. BMS must decide, by data domain, what data should be migrated into the MES Core and what data should be archived. For instance, lifetime service limits for members with current and previous eligibility should be transferred to the MES Core. However, eligibility history for members that have been deceased for decades might be good candidates for a data archive.

Whenever possible, the trading partner connection to the new system should be rigorously standardized and transitioned to the MES Core, even if it means near-term disruption for the trading partner as they rebuild their interface. Standardization is a core driver for the entire MES project.

Random Bit recommends that BMS prioritizes the implementation of the MES Core integration and data hub components. When the MES Core is operational, BMS should then prioritize work to position it as a single surface area for exchanging data with vendor and third-party systems, thus transitioning interfaces from legacy systems. This model will enable BMS to isolate the vendor and third-party systems from change impact when functionality is transitioned to replacement modules in future.

4.2.30 What staffing levels, including experience and skillset, are typically required to implement your Medicaid Enterprise solution? What are the suggested state Medicaid agency staffing levels to support DDI and ongoing operations? How do these staffing requirements compare to other offerings in your Medicaid Enterprise solution?

During the Future State architecture design and Implementation Roadmap build-out, the most experienced operations staff need to devote more than half their time to the project on a weekly basis. There are periods when the time demands diminish, but hard experience has taught us that MES modernization is a massive consumer of agency resources for several years. A best practice leading into the MES modernization would be to gain approval from the Governor's office and legislature to increase core operations and IT staff leading into the project so that the subject matter experts from BMS can be focused. This increases labor costs but ultimately saves BMS money, time, and stress. Finding errors in business process design logic late in the game is a major source of massive change controls and delays. This is a transformational exercise that cannot be delegated to junior team members.

The Random Bit staffing levels for enterprise architecture, governance, and implementation oversight will be covered as part of our response to the RFP for system modernization planning.



4.2.31 Describe the System Development Lifecycle (SDLC) approach that you use for implementing your Medicaid Enterprise solution. Can your SDLC approach be incorporated into an environment that uses a traditional “waterfall” SDLC approach? What about “agile” methodologies to support the implementation of your Medicaid Enterprise solution? If so, how can this be accomplished?

Our Implementation Roadmaps support both Agile and Waterfall implementation methodologies. At the highest level, the Implementation Roadmap describes three things:

- 1) The Current State
- 2) The Future State
- 3) The Work Packages required to move from current to future state

The development of architecture deliverables is conducive to iterative development models that elaborate on previous cycles until enough of the information is known to proceed. Although Waterfall and Agile models have been successfully applied in the past, an iterative model has proven to be most successful in the Visioning and Planning phase of the MES projects.

The work packages described in the Implementation Roadmap can be utilized in a traditional Waterfall project plan or utilized to populate an Agile backlog. The decision to use Waterfall or Agile is an implementation choice based on the nature of the work being done and the capabilities of the BMS Project Management Office (PMO), application delivery team, and Organizational Change Management team.

The Implementation Roadmap will identify a diverse set of work packages that have to be accomplished. These work packages may include:

- RFP development
- Policy development
- Business Process Redesign
- Infrastructure planning and deployment
- System Integration and software development

The BMS PMO may decide to use a Waterfall approach for some work packages and Agile for others. The Random Bit Implementation Roadmap can be used across both approaches.

4.2.32 What is the typical duration of a project to implement your Medicaid Enterprise solution? How does this timeline break down across the planning and DDI phases?

There are too many variables to attempt an end-to-end implementation estimate for the MES. Contributing factors may include State Procurement Processes, Agency Procurement Processes, procurements that are underway, procurements that have completed, the capabilities of the data



center, access to cloud infrastructure, effectiveness of business processes, and the current condition of the legacy MMIS.

Random Bit developed a proprietary method for system modernization planning that very quickly captures the agency vision, current state architecture, future state architecture, and transition steps for the MES.

4.2.33 What do you see as the key cost drivers for implementing your Medicaid Enterprise solution? What recommendations do you have for managing MES costs and demonstrating outcomes that mitigate any unnecessary costs of a Medicaid Enterprise solution?

Change controls are the #1 driver of unplanned costs for a MES. The best way to limit change controls in vendor contracts is to follow the “plan first” approach discussed in *Section 4.2.1*. Upfront planning and consensus building among key agency and state leadership on the MES vision mitigates costs significantly.

Failure to consider current vendors as valuable stakeholders in the modernization journey also puts a tremendous strain on the project. Vendors involved with the MES modernization program have little authority over the current vendors and legacy system staff. BMS must own these relationships and set expectations on providing access to subject matter experts.

Another guiding principle to help mitigate unnecessary costs is strict adherence to using open standards. Avoiding proprietary solution components helps reduce O&M costs and increases flexibility long term.

Poorly executed Organizational Change Management (OCM) can also be a driver of unexpected cost overruns. BMS will need the workforce to be trained and ready to transition into new business processes when technology changes are made.

The Random Bit Enterprise Architecture framework addresses this uncertainty by methodically documenting the BMS vision and elaborating the business, information, application, and technology goals that support the agency vision. The Enterprise Architecture, coupled with effective program governance and OCM coordination, is a powerful tool for controlling costs.

4.2.34 Using your Medicaid Enterprise solution as an example, what guidelines do you recommend for “phasing in” your modules and/or services? How do these guidelines maximize efficiency and/or minimize risk? What constraints would they place on DDI partners and BMS?

Random Bit does not offer a functional module that integrates into the MES. Our Enterprise Architecture, Planning, and Governance services provide the roadmap and phasing plan for delivering the MES. Our method aims to perform a progressive modernization of business and technology operations while minimizing risk across both functions.

Random Bit suggests tightly coupling the MES Core (Integration and Data Hub) with the legacy system so that throughout the transition period the two systems can deliver business processes on the basis of a



completely and comprehensively shared set of Medicaid data. This tight coupling greatly simplifies dual operations during the transition and give BMS greater flexibility during the migration of each business process.

4.2.35 What do you believe would be the optimum duration and the minimum duration for DDI of your Medicaid Enterprise solution?

There are too many variables involved to offer a definitive opinion on your expected, an optimum, or minimum timelines. Key influencers on this question include current procurement status, the complexity and condition of the legacy systems, the capacity BMS has available to actively support DDI change elements, etc. To ascertain the optimal timing for BMS, an Implementation Roadmap needs to be completed and assessment of procurement and OCM capabilities performed.

Based on our experience architecting and supporting the implementation of cloud-native MES platforms, six to eight years is an appropriately aggressive target to completely transition from a legacy system to a modern MES.

The most immediate benefits can be realized by developing the integration platform early in the project (after the initial planning and implementation roadmap are completed) and getting access to data across the Medicaid Enterprise. All other phases, and module integrations, will go much quicker and easier when the integration plane has been established.

4.2.36 List and describe the documentation developed by your company and/or the state Medicaid agency that is essential to DDI and operations of your Medicaid Enterprise solution.

The table below lists the documentation that Random Bit delivers:

Documentation	Description
Technical Reference Architecture	<p>The TRA is a collection of standards and architecture artifacts that govern enterprise systems implementations.</p> <p>TRA documentation provides a reference model by which components and technologies are measured and governed. As such, TRA documents serve as a common reference point for SMA leadership and staff, trading partners and third-party vendors involved in implementing, integrating, managing, or operating in-scope system solutions.</p> <p>Random Bit is ideally placed to assist BMS to:</p> <ul style="list-style-type: none"> Identify external standards and reference models suited for the agency. Develop or refine, and then document supplementary standards and reference models as needed.
Solution Plan	The Solution Plan is a refinement of the TOGAF Architecture Definition Document, which documents the outcomes of architecture development work to define the current and future states of the in-scope business, application, information, and technology architecture.



Documentation	Description
	<p>Random Bit uses Solution Plans to formalize the outcomes of current and future state assessments for business / systems change initiatives. Solution Plan documents serve to:</p> <ul style="list-style-type: none"> • Summarize and present the outcomes from architecture development work completed for a given change initiative, in a format that is audience appropriate to client business and technology leaders and subject matter experts. • Enable senior client business and technology leaders to make informed decisions about desired future architecture states. Solution Plans typically summarize: <ul style="list-style-type: none"> • A number of future architecture options available to the client organization (including associated pros and cons), along with • The designated architects’ recommendation on the option most suited for the client. • Obtain SMA business and technology leaders’ approval of the current and future state architecture descriptions, including the selected future architecture option (where applicable).
<p>Implementation Roadmap</p>	<p>Random Bit uses a refinement of the TOGAF “Architecture Roadmap & Implementation and Migration Plan” deliverable to:</p> <ul style="list-style-type: none"> • Describe the overall implementation and migration strategy. • Articulate how the SMA will address the gaps between current and future state solutions. • Describe the progression from the current state to the future architecture, including any transitional states and indicative timelines. • Identify work packages, determine their relative size, complexity/ risk and business value. • Identify dependencies between work packages, which may well need to be delivered and operated by different internal teams or vendors. <p>The roadmap is expressed at a similar level of detail to Solution Plans, which provide sufficient insight for planning, but avoids stakeholders being overwhelmed with information volume and complexity.</p>
<p>System Security Plans (SSP)</p>	<p>Random Bit will work with BMS to develop a MARS-E 2.2 compliant . System Security Plan for any systems operated by BMS. Vendors will be held accountable to provide the SSP for any vendor-operated system(s). The document will be prepared based on the template established by CMS. We work with BMS technical SMEs, security officers, and compliance personnel to ensure that:</p> <ul style="list-style-type: none"> • All security and privacy controls are sufficiently documented.



Documentation	Description
	<ul style="list-style-type: none"> • All necessary Plans of Action and Milestones (POA&Ms) are documented for controls that do not meet the appropriate standard. • Support any audit activities by contributing to interviews and other interactions as needed.
<p>Compliance Documents</p>	<p>Random Bit will support BMS in developing the complete range of security and privacy compliance documentation that may be required by CMS for any internally developed systems owned and managed by the SMA. Vendors will be accountable for the documentation for any vendor-provided or operated systems.</p> <p>Documents supported by Random Bit include:</p> <ul style="list-style-type: none"> • Information Security Risk Assessment (ISRA) • Privacy Impact Assessment (PIA) • Security Impact Assessment (SIA) • Configuration Management Plan (CMP) • Business Continuity and Disaster Recovery Plan (BC/DR)
<p>Operating Governance</p>	<p>Random Bit will support BMS in developing a complete range of governance documents to establish working IT governance capabilities at BMS. These include:</p> <ul style="list-style-type: none"> • Governance Charters <ul style="list-style-type: none"> ○ IT Governance Council ○ Data Governance Council ○ Architecture Review Board ○ Change Approval Board • IT Policy Documents <ul style="list-style-type: none"> ○ End User Policies ○ IT Staff Policies • Operational Governance <ul style="list-style-type: none"> ○ Operations and Support Models ○ Maintenance and Operations (M&O) Plans

4.2.37 Detail how your Medicaid Enterprise solution could support BMS in improving data analytics and reporting capabilities, data sharing initiatives, and overall confidence in health data.

Random Bit does not offer a MES functional component. We do offer deep experience in defining an Enterprise Architecture that satisfies both State and Federal Medicaid requirements. The MES Core is central to the MES architecture and provides the mechanism by which to process data (data hub) and share data (integration hub).

The Implementation Roadmap defines the order in which business and technology operations are transitioned into the BMS MES. The roadmap also contains the strategy by which data domains are added to the MES Core. The MES Core, over time, contains all the data required for analytical data processing.



The breadth and depth of AWS data management services is industry leading, and the services require minimal effort to deploy compared to a comparable on-prem solution. Currently, AWS offers 11 distinct database services on their platform allowing BMS to match the exact tool needed for the requirement. So, regardless of the data type or the analytics or reporting required, there is a mechanism to enable it. Access to this array of technologies in the MES Core provides many flexible options to improve analytics, reporting, and sharing of information.

4.2.38 Describe or illustrate your data visualization capabilities.

AWS has a robust set of capabilities in the business analytics and data visualization space that allows BMS to build KPI dashboards, and look at relationships, comparisons, compositions, and distributions within data sets. The breadth and depth of AWS services would enable BMS to make analytics and data visualization more broadly accessible to the workforce. In this way, the culture can move towards a data-driven one. All aspects including program integrity, Medicaid operations, eligibility operations, finance, etc. will benefit from improved access to data and tools. There are also operational efficiencies to be gained when the data and toolsets are co-located so that data transport is minimized.

Random Bit is experienced in modeling NoSQL (Big-Data) data models that enable transactional, operational, and analytical data processing. NoSQL technologies allow for inferring relationships between unrelated data elements, similar to how social media makes connections between people through personal interests. This capability greatly assists in program integrity.

4.2.39 How does your Medicaid Enterprise solution improve the coordination of care, detect and prevent fraud, waste, and abuse to support Medicaid program integrity, and improve stakeholder access to state Medicaid Enterprise data?

Each of the elements in the question relate back to a business process described in the MITA 3.0 ten top-level processes, and their associated 80 subprocesses. Our services deliver a future state operating model for each of those business functions, the data they will need, and the tools required to analyze and report on their findings. Our approach is to be disciplined and extremely focused in driving out the details. BMS leadership, Medicaid Operations resources, and Program Integrity team will need to be available to define their target business model and associated capabilities.

One of the key value propositions of a modular, standards-based MES is to improve stakeholder access to state Medicaid Enterprise data. Every MES we have contributed to has accomplished that goal by implementing the data and interface standards released by CMS according to the MITA architecture. In our experience, a MES Core integration and data hub established on a cloud-native architecture is a good technical approach.

Random Bit suggests making Medicaid Operations staff available to incorporate the following concepts into the MES Implementation Roadmap:

- Improving the coordination of care
- Detecting fraud, waste, and abuse to support Medicaid program integrity
- Automated processing of tasks that are configurable by business rules



4.2.40 How does your Medicaid Enterprise solution increase access and shared use of data with both the state and other vendors, improve healthcare quality management, and increase automation capabilities.

The first stated goal of the MITA initiative is to “develop seamless and integrated systems that communicate effectively . . . through interoperability and common standards.” Any properly-architected MITA-compliant MES will increase access to, and shared use of, data across the Medicaid enterprise — including with state and other stakeholders. Our experience in developing MITA-compliant architectures directly contributes to those goals.

By providing a clear, actionable roadmap for the MES Core interface layer and associated interface standards (such as EDI, USCDI, and FHIR), we provide a direct path to a MES ecosystem where data can be effectively governed and easily shared. The centralization of data provided by the MES core data hub allows BMS to fully leverage data governance tools such as data dictionaries to their fullest extent.

Enforcing data exchanges solely through the MES Core ensures that data is accessible throughout the MES while satisfying the CMS interoperability and modularity objectives.

4.2.41 If applicable, how does your Medicaid Enterprise solution improve access to end-users, such as a user’s data or access to additional services?

As the integration hub and data hub are at the heart of a MES, the MES Core is central to any MES-related data sharing an SMA may wish to undertake. Some channels for end-user access (such as the Patient Access API) are well-defined by CMS, and we have experience both with understanding those requirements and guiding implementations that meet them.

4.2.42 How can your Medicaid Enterprise solution help address gaps in health outcomes? Please provide outcomes from other engagements, if applicable.

Improving equity of health outcomes is an important priority for CMS and BMS alike. Central to any improvements in this area is the successful use of health data to improve understanding of where inequities exist and what root causes need to be addressed. As CMS’s most recent progress report¹ on health equity makes clear, “making existing data more accessible as well as increasing and improving the collection of standardized data” (page 12) is a critical part of the first step on the path to equity, “increasing *understanding and awareness* of disparities” (page 11). Random Bit’s expertise in enterprise architecture and data governance directly contribute to this critical step by providing the framework and guidance needed to build a modular MES that makes data readily available for analysis and study.

As discussed in our responses to previous questions, a MES transition is not merely a technology challenge. It is a planning and governance, including data governance, challenge first. Our proficiency in these areas would allow BMS to plan and implement modern systems that can be adapted to support equity in health outcomes in flexible ways that legacy systems with rigid structures and rules simply cannot.



¹“Paving the Way to Equity: A Progress Report, 2015-2021.” CMS. [January 2021](#).

4.2.43 Describe your experience with payment milestones during the DDI of your Medicaid Enterprise solution. In other DDI projects, were payments tied to deliverables, acceptance criteria, and/or other DDI milestones?

Random Bit has provided services across multiple payment structures, including:

- Hourly rate
- Monthly rate
- Bundled service rate
- Deliverables based rate

4.2.44 Do you have a short demonstration of your approach and/or Medicaid Enterprise solution that you would like to present to BMS? If so, please describe the method of presentation for the demonstration and suggestions for who should attend. If BMS wishes to take part in a demonstration, they will reach out to the Respondent for further information.

Random Bit can provide an overview of our Modernization Planning process with samples of excerpts from the following artefacts:

- Current State Architecture
- Future State Architecture
- Implementation Roadmap
- Solution Plan
- Integrated Governance Framework

The senior leadership responsible for delivering on the MES Modernization vision would be the most appropriate BMS resources to attend the meeting. The following roles are appropriate attendees for the presentation:

- Random Bit CIO
- Random Bit CTO
- Random Bit Lead Architect
- BMS Commissioner
- BMS Deputy Commissioner for Finance and Administration
- BMS Deputy Commissioner for Policy Coordination
- BMS Deputy Commissioner for Operations Management
- BMS Chief Information Officer or IT Operations Lead
- BMS Medicaid Operations Lead
- BMS Procurement Lead

Since our presentation is mostly PowerPoint content and a bi-directional conversation, an in-person meeting is preferred.



4.2.45 Is there additional information you would like to share with BMS related to the topics addressed in this RFI?

Although Random Bit has expressed the benefits of a cloud-based solution, we understand that a migration to the cloud is not an option available to all SMAs. Random Bit has successfully architected, designed, and provided oversight for an on-prem MES Core solution. We can do the same for BMS if needed.



Acronym Glossary

ADM	Architecture Development Method
APD	Advance Planning Documents
ARB	Architecture Review Board
AWS	Amazon Web Services
BC/DR	Business Continuity/Disaster Recovery
BMS	Bureau for Medical Services
BPO	Business Process Outsource
CIO	Chief Information Officer
CMS	Centers for Medicare and Medicaid Services
COO	Chief Operating Officer
COTS	Commercial Off the Shelf
CSP	Cloud Service Provider
DAMA	Data Management Association
DDI	Design, Develop and Implement
EA	Enterprise Architecture
HIE	Health Information Exchange
IAM	Identity and Access Management
MASO	Medical Administrative Services Organization
MES	Medicaid Enterprise System
MITA	Medicaid Information Technology Architecture
MMIS	Medicaid Management Information System
O&M	Operations and Maintenance
OCM	Organizational Change Management
POA&M	Plan for Actions & Milestones
SI	System Integrator
SMA	State Medicaid Agency
SSA	State Self-Assessment
TRA	Technical Reference Architecture



**Request for Information
CRFI BMS220000001
Medicaid Enterprise System
(MES)**

By signing below, I certify that I have reviewed this Request for Information in its entirety; understand the requirements, terms and conditions, and other information contained herein; that I am submitting this response for review and consideration on behalf of my organization.

Random Bit LLC

(Company)

Gerhard Ungerer, CTO

(Representative Name, Title)

(704) 207-6007

(Contact Phone/Fax Number)

January 6, 2022

(Date)

ADDENDUM ACKNOWLEDGEMENT FORM
SOLICITATION NO.: BMS220000001

Instructions: Please acknowledge receipt of all addenda issued with this solicitation by completing this addendum acknowledgment form. Check the box next to each addendum received and sign below. Failure to acknowledge addenda may result in bid disqualification.

Acknowledgment: I hereby acknowledge receipt of the following addenda and have made the necessary revisions to my proposal, plans and/or specification, etc.

Addendum Numbers Received:

(Check the box next to each addendum received)

- | | |
|--|--|
| <input checked="" type="checkbox"/> Addendum No. 1 | <input type="checkbox"/> Addendum No. 6 |
| <input checked="" type="checkbox"/> Addendum No. 2 | <input type="checkbox"/> Addendum No. 7 |
| <input checked="" type="checkbox"/> Addendum No. 3 | <input type="checkbox"/> Addendum No. 8 |
| <input type="checkbox"/> Addendum No. 4 | <input type="checkbox"/> Addendum No. 9 |
| <input type="checkbox"/> Addendum No. 5 | <input type="checkbox"/> Addendum No. 10 |

I understand that failure to confirm the receipt of addenda may be cause for rejection of this bid. I further understand that any verbal representation made or assumed to be made during any oral discussion held between Vendor's representatives and any state personnel is not binding. Only the information issued in writing and added to the specifications by an official addendum is binding.

Random Bit LLC

Company


Authorized Signature
January 6, 2022

Date

NOTE: This addendum acknowledgment should be submitted with the bid to expedite document processing.
Revised 6/8/2012