# **Attachment 2: IV&V Review Areas & Task Items**

| Planning | | | |
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| **Review Area** | **IV&V Task #** | **Task Description** | **Applicable**  **(X)** |
| Feasibility Studies | **FS-1** | Assess the methodologies used for the technical feasibility study verifying it was objective, reasonable, measurable, repeatable, consistent, accurate and verifiable. |  |
| **FS-2** | Assess the methodologies used for the economic feasibility study verifying it was objective, reasonable, measurable, repeatable, consistent, accurate and verifiable. |  |
| **FS-3** | Review the system requirements (e.g., system requirements specification, feasibility study report, business rules description) in the RFP, Vendor Proposal, and Contract SOW to validate whether the requirements can be satisfied by the defined technologies, methods, and algorithms defined for the project (feasibility). |  |
| **Business Case** | **BC-1** | Review and evaluate the Business Case for the project to assess its reasonableness. |  |
| **Procurement** | **PROC-1** | Verify that the procurement strategy supports Agency and Commonwealth project objectives. |  |
| **PROC-2** | Review and make recommendations on the solicitation documents relative to their ability to adequately inform potential vendors about project objectives, requirements, risks, etc. |  |
| **PROC-3** | Verify that the evaluation criteria are consistent with project objectives and evaluation processes are consistently applied; verify all evaluation criteria are metrics based and clearly articulated within the solicitation documents. |  |
| PROC-4 | Verify that the obligations of the vendor, sub-contractors and external staff (terms, conditions, statement of work, requirements, technical standards, performance standards, development milestones, acceptance criteria, delivery dates, etc.) are clearly defined. This includes verifying that performance metrics have been included that will allow tracking of project performance and progress against criteria set by the agency and the Commonwealth. |  |
| **PROC-5** | Verify the final contract for the vendor team states that the vendor will participate in the IV&V process, being cooperative in the coordination and communication of information. |  |
| **Project Complexity** | **PC-1** | Verify that the assigned project complexity level is current and accurate. If the project complexity level is not current and/or accurate, then reassign a project complexity level to the project. |  |

| Project Management | | | |
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| **Review Area** | **IV&V Task #** | **Task Description** | **Applicable**  **(X)** |
| Project Sponsorship | **PS-1** | Assess agency sponsor buy-in, participation, support and commitment to the project. |  |
| **PS-2** | Verify that open pathways of communication exist among all project stakeholders. |  |
| **PS-3** | Verify that agency sponsor has bought-in to all changes that impact project scope, cost, schedule or performance. |  |
| **Management Assessment** | **MA-1** | Verify that lines of reporting and responsibility provide adequate technical, financial and managerial oversight of the project. |  |
| **MA-2** | Evaluate project progress, resources, budget, schedules, and reporting. |  |
| **MA-3** | Assess coordination, communication and management, to verify agencies and departments are not working independently of one another. |  |
| **Project Management** | **PM-1** | Verify that a project management plan exists and that the plan is followed. |  |
| **PM-2** | Evaluate the project management plan maintenance procedures to verify that they are developed, communicated, implemented, monitored and complete. |  |
| **PM-3** | Evaluate project reporting processes, procedures, and actual project reports to verify that project status is being accurately traced using project metrics. |  |
| **PM-4** | Verify that milestones and completion dates are planned, monitored, and met. |  |
| **PM-5** | Verify the existence and institutionalization of an appropriate project issue tracking mechanism that documents issues as they arise, enables communication of issues to proper stakeholders, documents a mitigation strategy as appropriate, and tracks the issue to closure. |  |
| **PM-6** | Evaluate the status of the schedule being reported for the project on the Commonwealth IT Project Schedule. |  |
| **PM-7** | Verify that the Critical Path Milestones described for the project on the Commonwealth IT Project Charter are those approved by Agency Management, including the date when the Critical Path Milestones received approval from Agency Management. |  |
| **PM-8** | Evaluate the system’s planned life-cycle development methodology or methodologies (waterfall, evolutionary spiral, rapid prototyping, incremental, etc.) to see if they are appropriate for the system being developed. |  |
| **PM-9** | Evaluate the status of each Measure of Success being reported for the project on the Commonwealth IT Project Status Report. |  |
| **PM-10** | Verify that the Measures of Success for the project incorporate input from the system’s users and customers. |  |
| **PM-11** | Verify that the Internal Agency Oversight Committee (IAOC) has approved the Measures of Success, including the date when the Measures of Success received approval from the IAOC. |  |
|  | **PM-12** | Determine if the project has remained within its approved scope. |  |
| **PM-13** | For each change in the approved scope of the project verify the date the change was approved and by whom. |  |
| **PM-14** | For each change in the approved scope of the project, evaluate the description of the change, the reason for the change, and the impact of the change, particularly on the cost and schedule baselines of the project. |  |
| **Business Process Reengineering** | **BPR-1** | Evaluate the project’s ability and plans to redesign business processes to achieve improvements in critical measures of business performance, such as cost, quality, service, and speed. |  |
| **BPR-2** | Verify that the reengineering plan has the strategy, management backing, resources, skills and incentives necessary for effective change. |  |
| **BPR-3** | Verify that resistance to change is anticipated and prepared for by using principles of change management at each step (such as excellent communication, participation, incentives) and having the appropriate leadership (executive pressure, vision, and actions) throughout the reengineering process. |  |
| **Risk Management** | **RM-1** | Verify that risk management processes and procedures exist and are being followed. Evaluate the project’s risk management processes and procedures to verify that risks are identified and quantified and that mitigation plans are developed, communicated, implemented, monitored, and complete. |  |
| RM-2 | Verify that a list of risk events is maintained and that the probability of occurrence and impact are measured for each event. |  |
| RM-3 | Verify that a mitigation approach has been documented for each risk event listed. |  |
| RM-4 | Determine if any risk events have been dropped from the list and the reason why. |  |
| RM-5 | Verify that the top five risk events identified for the project are those being reported for the project on the Commonwealth IT Project Status Report. |  |
| RM-6 | Verify that the Internal Agency Oversight Committee (IAOC) has reviewed the project Risk Assessment(s), including the date(s) when the Risk Assessment(s) were reviewed by the IAOC. |  |
| **Change Management** | **CHM-1** | Verify that change management processes and procedures exist and are being followed. Evaluate the project’s change management processes and procedures to verify they are developed, communicated, implemented, monitored, and complete. |  |
| **CHM-2** | Evaluate the project’s organizational change management processes and procedures to verify that organizational resistance to change is anticipated and prepared for. |  |
| Communication Management | **COMM-1** | Verify that communication processes and procedures exist and are being followed. Evaluate the project’s communication processes and procedures to verify they support communications and work product sharing between all project stakeholders; and assess if communication plans and strategies are effective, implemented, monitored and complete. |  |
| **Configuration Management** | **CM-1** | Review and evaluate the configuration management (CM) processes and procedures associated with the development process. Verify that configuration management (CM) processes and procedures exist and are being followed. Evaluate the project’s configuration control processes and procedures to verify that they are effective, implemented, monitored and complete. |  |
| **CM-2** | Verify that all critical development documents, including but not limited to requirements, design, code and test are maintained under an appropriate level of control. |  |
| **CM-3** | Verify that the processes and tools are in place to identify code versions and to rebuild system configurations from source code. |  |
| **CM-4** | Verify that appropriate source and object libraries are maintained for training, test, and production and that formal sign-off procedures are in place for approving deliverables. |  |
| **CM-5** | Verify that appropriate processes and tools are in place to manage system changes, including formal logging of change requests and the review, prioritization and timely scheduling of maintenance actions. |  |
| **CM-6** | Verify that mechanisms are in place to prevent unauthorized changes being made to the system and to prevent authorized changes from being made to the wrong version. |  |
| **CM-7** | Review the use of CM information (such as the number and type of corrective maintenance actions over time) in project management. |  |
| **Project Estimating**  **and**  **Scheduling** | **PES-1** | Evaluate the estimating and scheduling process of the project to ensure that the project planning assumptions, budget, and resources are adequate to support the work-breakdown structure and schedule. |  |
| **PES-2** | Examine historical data and data sources to determine if the project has been able to accurately estimate the schedule, labor requirements and cost of product, service or system development efforts. |  |
| **PES-3** | Examine historical data and data sources to determine if the project has been able to accurately apply Earned Value Management to the project. |  |
| **PES-4** | Examine historical data and data sources to determine if the project has been able to accurately accumulate the actual costs of tasks completed for the project. |  |
| **PES-5** | Examine historical data and data sources to determine if the project has been able to accurately determine the earned value of tasks completed for the project. |  |
| **PES-6** | Examine historical data and data sources to determine if the project has been able to accurately accumulate the budgeted cost/planned value of tasks for the project. |  |
| **PES-7** | Examine historical data and data sources to determine if the project has been able to accurately calculate Schedule Variance. |  |
| **PES-8** | Examine historical data and data sources to determine if the project has been able to accurately calculate Cost Variance. |  |
| **PES-9** | Compare and evaluate the status of the planned and actual costs being reported for the project on the Commonwealth IT Project Status Report. |  |
| **PES-10** | Validate that the Planned Costs To Date reflected for the project on the Commonwealth IT Project Status Report are the same as those approved by the Internal Agency Oversight Committee. |  |
| **PES-11** | Validate the Actual Costs To Date figures reported for the project on the Commonwealth IT Project Status Report. |  |
| **PES-12** | Evaluate the nature and amount of cost variance between the budgeted and actual costs to the project to date. |  |
| **PES-13** | Verify that Internal Agency Oversight Committee (IAOC) approved the Planned Costs for the Project, including the date when the Planned Costs received approval from the IAOC. |  |
| **Project Personnel** | **PP-1** | Examine the job assignments, skills, training and experience of the personnel involved in program development to verify that they are adequate for the development task. |  |
| **PP-2** | Evaluate the project’s personnel planning for the project to verify that adequate human resources will be available for development and maintenance. |  |
| **PP-3** | Evaluate the project’s personnel policies to verify that staff turnover will be minimized. |  |
| Project Organization | **PO-1** | Verify that lines of reporting and responsibility provide adequate technical, financial and managerial oversight of the project. |  |
| **PO-2** | Verify that the project’s organizational structure supports training, process definition, risk management, quality assurance, configuration management, product testing and any other functions critical for the project’s success. |  |
| **Contractors**  **and**  **External Staff** | **CES-1** | Evaluate the use of contractors or other external sources of project staff (such as IS staff from another State organization) in project development. |  |
| **CES-2** | Verify that the obligations of contractors and external staff (terms, conditions, statement of work, requirements, standards, development milestones, acceptance criteria, delivery dates, etc.) are clearly defined. |  |
| **CES-3** | Verify that the contractors’ software development methodology and product standards are compatible with the system’s standards and environment. |  |
| **CES-4** | Verify that the contractor has and maintains the required skills, personnel, plans, resources, procedures and standards to meet their commitment. This will include examining the feasibility of any offsite support of the project |  |
| **CES-5** | Verify that any proprietary tools used by contractors do not restrict the future maintainability, portability, and reusability of the system. |  |
| **Oversight of Contractors** | **OC-1** | Verify that project management oversight of contractors is provided in the form of periodic status reviews and technical interchanges. |  |
| **OC-2** | Verify that the project management has defined the technical and managerial inputs the contractor needs (reviews, approvals, requirements and interface clarifications, etc.) and has the resources to supply them on schedule. |  |
| **OC-3** | Verify that the project management staff has the ultimate responsibility for monitoring project cost and schedule. |  |

| Quality Management | | | |
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| **Review Area** | **IV&V Task #** | **Task Description** | **Applicable**  **(X)** |
| Quality Management | **QM-1** | Evaluate and make recommendations on the project’s quality assurance (QA) processes, procedures and organization. |  |
| **QM-2** | Verify that QA has an appropriate level of independence from project management. |  |
| **QM-3** | Verify that the QA organization monitors the fidelity of all defined processes in all phases of the project. |  |
| **QM-4** | Verify that the quality of all products produced by the project is monitored by formal reviews and sign-offs. |  |
| **QM-5** | Verify that project self-evaluations are performed and that measures are continually taken to improve the process. |  |
| **QM-6** | Monitor the performance of the QA contractor by reviewing its processes and reports and performing spot checks of system documentation; assess findings and performance of the processes and reports. |  |
| **QM-7** | Verify that QA has an appropriate level of independence. Evaluate and make recommendations on the project’s Quality Assurance plans, procedures and organization. |  |
| **QM-8** | Verify that the QA vendor provides periodic assessment of the CMM activities of the project and that the project takes action to reach and maintain the next CMM Level. |  |
| **QM-9** | Evaluate the mechanisms that are in place for project self-evaluation and process improvement. |  |
| **Process Definition**  **and**  **Product Standards** | **PDPS-1** | Review and make recommendations on all defined processes and product standards associated with the system development. |  |
| **PDPS-2** | Verify that all major development processes are defined and that the defined and approved processes and standards are followed in development. |  |
| **PDPS-3** | Verify that the processes and standards are compatible with each other and with the system development methodology. |  |
| **PDPS-4** | Verify that all process definitions and standards are complete, clear, up-to-date, consistent in format, and easily available to project personnel. |  |

| Training | | | |
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| **Review Area** | **IV&V Task #** | **Task Description** | **Applicable**  **(X)** |
| User Training and Documentation | **UTD-1** | Review and make recommendations on the training provided to product users. Verify that sufficient knowledge transfer occurs for the maintenance and operation of the new product. |  |
| **UTD-2** | Verify that training for users is instructor-led and hands-on and is directly related to the business process and required job skills. |  |
| **UTD-3** | Verify that user-friendly training materials and help desk services are easily available to all users. |  |
| **UTD-4** | Verify that all necessary policies, processes, and documentation are easily available to users. |  |
| **UTD-5** | Verify that all training is given on time and is evaluated and monitored for effectiveness, with additional training provided as needed. |  |
| **Developer Training and Documentation** | **DTD-1** | Review and make recommendations on the training provided to system developers. |  |
| **DTD-2** | Verify that developer training is technically adequate, appropriate for the development phase, and available at appropriate times. |  |
| **DTD-3** | Verify that all necessary policies, processes and standards documentation are easily available to developers. |  |
| **DTD-4** | Verify that all training is given on time and is evaluated and monitored for effectiveness, with additional training provided as needed. |  |

| Requirements Management | | | |
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| **Review Area** | **IV&V Task #** | **Task Description** | **Applicable**  **(X)** |
| Requirements Management | **REQ-1** | Evaluate and make recommendations on the project’s process and procedures for managing requirements. |  |
| **REQ-2** | Verify that system requirements are well defined, understood and documented. |  |
| **REQ-3** | Evaluate the allocation of system requirements to hardware and software requirements. |  |
| **REQ-4** | Validate that software requirements can be traced through design, code and test phases to verify that the system performs as intended and contains no unnecessary software elements. |  |
| **REQ-5** | Validate that the relationships between each software requirement and its system requirement are correct. |  |
| **REQ-6** | Verify that requirements are under formal configuration control. |  |
| **Security and Privacy Requirements** | **SPR-1** | Evaluate and make recommendations on project policies and procedures for ensuring that the system is secure and that the privacy of client data is maintained. |  |
| **SPR-2** | Evaluate the project’s restrictions on system and data access. |  |
| **SPR-3** | Evaluate the project’s security and privacy risk analyses. |  |
| **SPR-4** | Verify that processes and equipment are in place to back up client and project data and files and archive them safely at appropriate intervals. |  |
| **Requirements Analysis** | **RA-1** | Verify that an analysis of user needs and objectives has been performed to verify that requirements of the system are well understood, well defined, and satisfy any regulatory requirements. |  |
| **RA-2** | Verify that all stakeholders have been consulted to the desired functionality of the system, and that users have been involved in prototyping of the user interface. |  |
| **RA-3** | Verify that all stakeholders have agreed to all changes that impact project cost, schedule or performance. |  |
| **RA-4** | Verify that performance requirements (e.g. timing, response time and throughput) satisfy user needs. |  |
| **RA-5** | Verify that user’s operations and maintenance requirements for the system are completely specified. |  |
| **RA-6** | Concept documentation evaluation: Validate that the concept documentation satisfies user needs and is consistent with acquisition needs. Validate constraints of interfacing systems and constraints or limitations of proposed approach. Analyze system requirements and validate that the following satisfy user needs:  a. System functions  b. End-to-end system performance  c. Feasibility and testability of the functional requirements  d. System architecture design  e. Operation and maintenance requirements and environments  f. Migration requirements from an existing system where applicable. |  |
| **Interface Requirements** | **IR-1** | Verify that all system interfaces are exactly described, by medium and by function, including input/output control codes, data format, polarity, range, units, and frequency. |  |
| **IR-2** | Verify those approved interface documents are available and that appropriate relationships (such as interface working groups) are in place with all agencies and organizations supporting the interfaces. |  |
| **IR-3** | Verify that all external and internal system and software interface requirements have been identified. |  |
| **IR-4** | Verify that each interface is described and that the interface description includes data format and performance criteria (e.g., timing, bandwidth, accuracy, safety, and security). |  |
| **Requirements Allocation and Specification** | **RAS-1** | Verify that all system requirements have been allocated to either a software or hardware subsystem. |  |
| **RAS-2** | Verify that requirements specifications have been developed for all hardware and software subsystems in a sufficient level of detail to ensure successful implementation. |  |
| **RAS-3** | Verify that performance requirements (e.g., timing, response time, and throughput) allocated to hardware, software, and user interfaces satisfy user needs. |  |
| **RAS-4** | Verify that the internal and external interfaces specify the data formats, interface protocols, frequency of data exchange at each interface, and other key performance requirements to demonstrate compliance with user requirements. |  |
| **RAS-5** | Verify that application specific requirements, such as functional diversity, fault detection, fault isolation, and diagnostic and error recovery satisfy user needs. |  |
| **RAS-6** | Verify that the user’s maintenance requirements for the system are completely specified. |  |
| **RAS-7** | Validate that there are objective acceptance testing criteria for validating the requirements of the requirements specification documents. |  |
| Reengineering | **RE-1** | If a legacy system or a transfer system is or will be used in development, verify that a well-defined plan and process for reengineering the system is in place and is being followed. |  |

| Development Environment | | | |
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| **Review Area** | **IV&V Task #** | **Task Description** | **Applicable**  **(X)** |
| Development Hardware | **DH-1** | Evaluate new and existing development hardware configurations to determine if their performance is adequate to meet the needs of system development. |  |
| **DH-2** | Determine if hardware is maintainable, easily upgradeable, and compatible with the agency’s existing development and processing environment. This evaluation should include, but is not limited to CPUs and other processors, memory, network connections and bandwidth, communication controllers, telecommunications systems (LAN/WAN), terminals, printers and storage devices. |  |
| **DH-3** | Current and projected vendor support of the hardware should also be evaluated, as well as the agency’s hardware configuration management plans and procedures. |  |
| **Development Software** | **DS-1** | Evaluate new and existing development software to determine if its capabilities are adequate to meet system development requirements. |  |
| **DS-2** | Determine if the software is maintainable, easily upgradeable, and compatible with the agency’s current hardware and software environment. |  |
| **DS-3** | Evaluate the development environment as a whole to see if it shows a degree of integration compatible with good development. This evaluation should include, but is not limited to, operating systems, network software, CASE tools, project management software, configuration management software, compilers, cross-compilers, linkers, loaders, debuggers, editors, and reporting software. |  |
| **DS-4** | Language and compiler selection should be evaluated with regard to portability and reusability (ANSI standard language, non-standard extensions, etc.) |  |
| **DS-5** | Current and projected vendor support of the software should also be evaluated, as well as the agency’s software acquisition plans and procedures. |  |

| System Development | | | |
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| **Review Area** | **IV&V Task #** | **Task Description** | **Applicable**  **(X)** |
| High-Level Design | **HLD-1** | Evaluate and make recommendations on existing high-level design products to verify the design is workable, efficient, and satisfies all system and system interface requirements. |  |
| **HLD-2** | Evaluate the design products for adherence to the project design methodology and standards. |  |
| **HLD-3** | Evaluate the design and analysis process used to develop the design and make recommendations for improvements. Evaluate design standards, methodology and CASE tools used and make recommendations. |  |
| **HLD-4** | Verify that design elements can be traced back to system requirements. |  |
| **HLD-5** | Determine if the relationship between the design elements and the requirements are specified to a constant level of detail. |  |
| **HLD-6** | Verify that all design products are under configuration control and formally approved before detailed design begins. |  |
| **Detailed Design** | **DD-1** | Evaluate and make recommendations on existing detailed design products to verify that the design is workable, efficient, and satisfies all high-level design requirements. |  |
| **DD-2** | Evaluate the design products for adherence to the project design methodology and standards. |  |
| **DD-3** | Evaluate and make recommendations on the design and analysis process used to develop the design. |  |
| **DD-4** | Evaluate and make recommendations on the design standards, methodology and CASE tools used. |  |
| **DD-5** | Verify that design elements can be traced back to system requirements and high-level design elements. |  |
| **DD-6** | Determine if the relationship between the design elements and the high-level design elements are specified to a constant level of detail. |  |
| **DD-7** | Verify that all design products are under configuration control and formally approved before coding begins. |  |
| **Coding** | **C-1** | Evaluate and make recommendations on thestandards and processes currently in place for code development. |  |
| **C-2** | Evaluate the existing code base for portability and maintainability, taking software metrics including but not limited to modularity, complexity and source and object size. |  |
| **C-3** | Evaluate code documentation for quality, completeness (including maintenance history) and accessibility. |  |
| **C-4** | Evaluate the coding standards and guidelines and the projects compliance with these standards and guidelines. This evaluation should include, but not be limited to, structure, documentation, modularity, naming conventions and format. |  |
| **C-5** | Verify that developed code is kept under appropriate configuration control and is easily accessible by developers. |  |
| **C-6** | Evaluate the project’s use of software metrics in management and quality assurance. |  |
| **C-7** | Verify and validate that code components satisfy the detailed design. |  |
| **C-8** | Validate that the logic, computational, and interface precision (e.g., truncation and rounding) satisfy the requirements in the system environment. |  |
| **Unit Testing** | **UT-1** | Evaluate the plans, requirements, environment, tools, and procedures used for unit testing system modules. |  |
| **UT-2** | Evaluate the level of test automation, interactive testing and interactive debugging available in the test environment. |  |
| **UT-3** | Verify that an appropriate level of test coverage is achieved through the testing process, that test results are verified, that the correct code configuration has been tested, and that the tests are appropriately documented, including formal logging of errors found in testing. |  |
| **UT-4** | Validate that the unit test plan satisfies the following criteria: Traceable to the software requirements and design; External consistency with the software requirements and design; Internal consistency between unit requirements; Test coverage of requirements in each component; Feasibility of software integration and testing; and Feasibility of operation and maintenance (e.g., capability to be operated and maintained in accordance with user needs). |  |
| **UT-5** | a. Validate that the results of the Unit Testing of each software configuration item indicates that the item correctly implements the software design for the item as documented in the software design documentation for that item.  b. Document the results as required by the test plan.  c. Validate that the results of the Unit Testing of each software configuration item satisfies the test acceptance criteria as specified in the Unit Test Plan.  d. Document discrepancies between actual and expected test results. |  |
| Integration Testing | **IT-1** | Evaluate the plans, requirements, environment, tools, and procedures used for integration testing of system modules. |  |
| **IT-2** | Evaluate the level of automation and the availability of the integration test environment. |  |
| **IT-3** | Verify that an appropriate level of test coverage is achieved through the test process, that test results are verified, that the correct code configuration has been tested, and that the tests are appropriately documented, including formal logging of errors found in testing. |  |
| **IT-4** | Validate that the integration test plan satisfies the following criteria: Traceable to the software requirements and design; External consistency with the software requirements and design; Internal consistency between unit requirements; Test coverage of requirements in each component; Feasibility of software integration and testing; and Feasibility of operation and maintenance (e.g., capability to be operated and maintained in accordance with user needs). |  |
| **IT-5** | Verify that the test organization has an appropriate level of independence from the development organization. |  |
| **IT-6** | a. Validate that the results of the Integration Testing of each software configuration item indicates that the item correctly implements the software design for the item as documented in the software design documentation for that item.  b. Document the results as required by the test plan.  c. Validate that the results of the Integration Testing of each software configuration item satisfies the test acceptance criteria as specified in the Integration Test Plan.  d. Document discrepancies between actual and expected test results. |  |
| **System Testing** | **ST-1** | Evaluate the plans, requirements, environment, tools, and procedures for system testing of the system. |  |
| **ST-2** | Evaluate the level of automation and the availability of the system test environment. |  |
| **ST-3** | Verify that a sufficient number and type of case scenarios are used to ensure comprehensive but manageable testing and that tests are run in a realistic, real-time environment. |  |
| **ST-4** | Verify that test scripts are complete, with step-by-step procedures, required pre-existing events or triggers, and expected results. |  |
| **ST-5** | Verify that test results are verified, that the correct code configuration has been used, and that the test runs are appropriately documented, including formal logging of errors found in testing. |  |
| **ST-6** | Validate that the system test plan satisfies the following criteria: Traceable to the software requirements and design; External consistency with the software requirements and design; Internal consistency between unit requirements; Test coverage of requirements in each component; Feasibility of software integration and testing; and Feasibility of operation and maintenance (e.g., capability to be operated and maintained in accordance with user needs). |  |
| **ST-7** | Verify that the test organization has an appropriate level of independence from the development organization. |  |
| **ST-8** | a. Validate that the results of the System Testing of each software configuration item indicates that the item correctly implements the software design for the item as documented in the software design documentation for that item.  b. Document the results as required by the test plan.  c. Validate that the results of the System Testing of each software configuration item satisfies the test acceptance criteria as specified in the System Test Plan.  d. Document discrepancies between actual and expected test results. |  |
| **Interface Testing** | **IT-1** | Evaluate the plans, requirements, environment, tools, and procedures for interface testing of the system. |  |
| **IT-2** | Evaluate the level of automation and the availability of the system test environment. |  |
| **IT-3** | Verify that a sufficient number and type of case scenarios are used to ensure comprehensive but manageable testing and that test are run in a realistic, real-time environment. |  |
| **IT-4** | Verify that test scripts are complete, with step-by-step procedures, required pre-existing events or triggers, and expected results. |  |
| **IT-5** | Verify that test results are verified, that the correct code configuration has been used, and that the test runs are appropriately documented, including formal logging of errors found in testing. |  |
| **IT-6** | Validate that the interface test plan satisfies the following criteria: Traceable to the software requirements and design; External consistency with the software requirements and design; Internal consistency between unit requirements; Test coverage of requirements in each component; Feasibility of software integration and testing; and Feasibility of operation and maintenance (e.g., capability to be operated and maintained in accordance with user needs). |  |
| **IT-7** | Verify that the test organization has an appropriate level of independence from the development organization. |  |
| **IT-8** | a. Validate that the results of the Interface Testing of each software configuration item indicates that the item correctly implements the software design for the item as documented in the software design documentation for that item.  b. Document the results as required by the test plan.  c. Validate that the results of the Interface Testing of each software configuration item satisfies the test acceptance criteria as specified in the Interface Test Plan.  d. Document discrepancies between actual and expected test results. |  |
| Acceptance Testing | **AT-1** | Evaluate the plans, requirements, environment, tools, and procedures for acceptance testing of the system. |  |
| **AT-2** | Verify that acceptance procedures and acceptance criteria for each product are defined, reviewed, and approved prior to tests and that test results are documented. Acceptance procedures must also address the process by which any software product that does not pass acceptance testing will be corrected. |  |
| **AT-3** | Verify that a sufficient number and type of case scenarios are used to ensure comprehensive but manageable testing and that tests are run in a realistic, real-time environment. |  |
| **AT-4** | Verify that test scripts are complete, with step-by-step procedures, required pre-existing events or triggers, and expected results. |  |
| **AT-5** | Verify that test results are verified, that the correct code configuration has been used, and that the test runs are appropriately documented, including formal logging of errors found in testing. |  |
| **AT-6** | Validate that the acceptance test plan satisfies the following criteria: Traceable to the software requirements and design; External consistency with the software requirements and design; Internal consistency between unit requirements; Test coverage of requirements in each component; Feasibility of software integration and testing; and Feasibility of operation and maintenance (e.g., capability to be operated and maintained in accordance with user needs). |  |
| **AT-7** | Verify that the acceptance test organization has an appropriate level of independence from the subcontractor. |  |
| **AT-8** | Validate that appropriate acceptance testing based on the defined acceptance criteria is performed satisfactorily before acceptance of software products. |  |
| **AT-9** | Verify that the process by which any software product that does not pass acceptance testing should be corrected has been defined and documented. |  |
| **AT-10** | a. Validate that the results of the Acceptance Testing of each software configuration item indicates that the item correctly implements the software design for the item as documented in the software design documentation for that item.  b. Document the results as required by the test plan.  c. Validate that the results of the Acceptance Testing of each software configuration item satisfies the test acceptance criteria as specified in the Acceptance Test Plan.  d. Document discrepancies between actual and expected test results. |  |
| **Implementation** | **I-1** | Review and evaluate implementation planning. |  |
|  | **I-2** | Verify that all software products required to install and operate each software component being implemented by the project are present in the software component’s installation package. |  |
|  | **I-3** | Validate that all site-dependent parameters or conditions to verify supplied values are correct. |  |

| Data Management | | | |
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| **Review Area** | **IV&V Task #** | **Task Description** | **Applicable**  **(X)** |
| Data Conversion | **DC-1** | Evaluate the agency’s existing and proposed plans, procedures and software for data conversion. |  |
| **DC-2** | Verify that procedures are in place and are being followed to review the converted data for completeness and accuracy and to perform data cleanup as required. |  |
| **DC-3** | Determine conversion error rates and if the error rates are manageable. |  |
| **DC-4** | Make recommendations on making the conversion process more efficient and on maintaining the integrity of data during the conversion. |  |
| **Database Design** | **DBD-1** | Evaluate new and existing database designs to determine if they meet existing and proposed system requirements. |  |
| **DBD-2** | Recommend improvements to existing designs to improve data integrity and system performance. |  |
| **DBD-3** | Evaluate the design for maintainability, scalability, concurrence, normalization (where appropriate) and any other factors affecting performance and data integrity. |  |
| **DBD-4** | Evaluate the project’s process for administering the database, including backup, recovery, performance analysis and control of data item creation. |  |

| Operating Environment | | | |
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| **Review Area** | **IV&V Task #** | **Task Description** | **Applicable**  **(X)** |
| System Hardware | **SH-1** | Evaluate new and existing system hardware configurations to determine if their performance is adequate to meet existing and proposed system requirements. |  |
| **SH-2** | Determine if hardware is compatible with the agency’s existing processing environment, if it is maintainable, and if it is easily upgradeable. This evaluation should include, but is not limited to CPUs and other processors, memory, network connections and bandwidth, communication controllers, telecommunications systems (LAN/WAN), terminals, printers and storage devices. |  |
| **SH-3** | Evaluate current and projected vendor support of the hardware, as well as the agency’s hardware configuration management plans and procedures. |  |
| **System Software** | **SS-1** | Evaluate new and existing system software to determine if its capabilities are adequate to meet existing and proposed system requirements. |  |
| **SS-2** | Determine if the software is compatible with the agency’s existing hardware and software environment, if it is maintainable, and if it is easily upgradeable. This evaluation should include, but is not limited to, operating systems, middleware, and network software including communications, file-sharing protocols, etc. |  |
| **SS-3** | Current and projected vendor support of the software should also be evaluated, as well as the agency’s software acquisition plans and procedures. |  |
| **Database Software** | **DBS-1** | Evaluate new and existing database products to determine if their capabilities are adequate to meet existing and proposed system requirements. |  |
| **DBS-2** | Determine if the database’s data format is easily convertible to other formats, if it supports the addition of new data items, if it is scaleable, if it is easily refreshable and if it is compatible with the agency’s existing hardware and software. |  |
| **DBS-3** | Evaluate any current and projected vendor support of the software, as well as the agency’s software acquisition plans and procedures. |  |
| **Hardware and Software Environment Capacity** | **HSEC-1** | Evaluate the existing processing capacity of the planned hardware and software environment and verify that it is adequate for projected system. |  |
| **HSEC-2** | Evaluate the historic availability and reliability of the current hardware and software environment, including the frequency and criticality of failures. |  |
| **HSEC-3** | Evaluate the results of any volume testing or stress testing. |  |
| **HSEC-4** | Evaluate any existing measurement and capacity-planning program and evaluate the hardware and software environment’s capacity to support future growth. |  |
| **HSEC-5** | Make recommendations on changes in processing hardware, storage, network systems, operating systems, COTS software, and software design to meet future growth and improve system performance. |  |

| Operations | | | |
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| **Review Area** | **IV&V Task #** | **Task Description** | **Applicable**  **(X)** |
| Change Tracking | **CT-1** | Evaluate the system change request and defect tracking processes. |  |
| **CT-2** | Evaluate the implementation of the product change request and defect tracking process activities and request volumes to determine if processes are effective and are being followed. |  |
| **User Satisfaction** | **US-1** | Evaluate user satisfaction with the product to determine areas for improvement. |  |
| **Goals**  **and**  **Objectives** | **GO-1** | Evaluate impact of the product on operational goals and performance objectives. |  |
| **Documentation** | **DOC-1** | Evaluate operational documentation. |  |
| **Operational Processes** | **OP-1** | Evaluate the implementation of operational processes including backup, disaster recovery and day-to-day operations to verify the processes are being followed. |  |