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**ETS IT System Quality Assurance Program**

The purpose of the State of Hawaii Enterprise Technology Services Information Technology System Quality Assurance Program is to provide State-wide QA Standards to

* Encourage the use of best practices for IT Systems in development and operation
* Improve the success rate of Design, Development, and Implementation (DD&I) of new state IT systems;
* Ensure production systems continue to be reliable, effective and secure in maintenance and operations (M&O); and
* Plan for updates, upgrades or replacement of systems in a timely and appropriate manner.

Implementation of the QAP is tailored based on the cost, duration, complexity and business impact of a system.

QA Program Elements Currently in Place

* Strategy and Governance (SG)
  + SG1: IT Strategy and Governance Process & Program Approval Committee (PAC) - ETS’ IT Governance (ITG) assists the CIO with developing, implementing, and managing statewide information technology governance. ETS’ IT Governance implements and coordinates the governance process required by the [Administrative Directive No. 18-03 – Program Governance and IV&V Requirements for Enterprise IT Projects](https://budget.hawaii.gov/wp-content/uploads/2018/10/AD-18-03-Program-Governance-and-Independent-Verification-and-Validation-Requirements-for-Enterprise-IT-Projects.pdf). The state’s IT project portfolio governance consists of project phase review gates to ensure project execution and associated expenditures are sufficiently evaluated and receive approval by the appropriate state governing bodies. More information is available on the ETS website at [Office of Enterprise Technology Services | IT Governance (hawaii.gov)](https://ets.hawaii.gov/it-governance/).
  + SG2: Lean IX Portfolio Management and Roadmap of Systems and Projects - Aligning with the [State of Hawaii IT Strategic Plan](https://ets.hawaii.gov/wp-content/uploads/2019/05/ETS-Strategic-Plan-website-4.25.19.pdf), ETS coordinates management of the statewide IT Portfolio. The state executive branch departments work with ETS to maintain a portfolio of major IT applications and projects for each department, along with a roadmap of planned update, upgrade or replacement projects. A summary version of the portfolio can be found at [Office of Enterprise Technology Services | State of Hawaii IT Portfolio and Roadmap](https://ets.hawaii.gov/state-of-hawaii-it-portfolio-management/).
  + SG3: Independent Verification & Validation (IV&V) – HRS §27-43.6 gives the CIO discretion to require IV&V on certain DD&I projects based on criteria in the statute. The state defines IV&V as "independent verification and validation of an information technology project" means a rigorous independent process that evaluates the correctness and quality of the business product of the project to ensure that the product is being developed in accordance with customer requirements and well-engineered. IV&V reports are posted publicly on the ETS website to enhance transparency and accountability in IT projects.
  + SG4: Earned Value Management (EVM) - Earned value management (EVM) is a project management methodology that integrates schedule, costs, and scope to measure project performance. Based on planned and actual values, EVM predicts the likelihood that a project will meet its goals and enables project managers to adjust accordingly. ETS is incorporating EVM into the IV&V process, but it may also be used as a best practice on projects without IV&V.
* Expert Assistance (EX)
  + EX1: ETS Enterprise Subject Matter Experts (ESMEs) – ETS staff provide subject matter expertise in many areas including project management, strategy and governance, enterprise architecture and portfolio management, business analysis, technical analysis, cybersecurity, identity and access management, procurement process and data. Department or Agency projects can request assistance from any of the ESME areas.
  + EX2: ETS as a Broker and Success Partner – ETS serves as a broker of information to agencies regarding IT trends and resources, vendor capabilities and projects in other departments. Each department has an assigned ETS analyst to help them work through governance processes and find helpful information. ETS also manages an IT Coordinating Council comprised of IT staff from each department. The ITCC meets monthly to share information from ETS and between departments.
  + EX3: Project Transformation Office – The Program Transformation Office (PTO) provides centralized consulting services to assist with department-led IT projects. The PTO is comprised of experienced professionals who work collaboratively with and provide guidance and support to departments and agencies. The scope of services provided depends on customer needs and may include self-service project management tools and a la carte consulting services.   The PTO also has a website with guidance, useful information and prebuilt forms for use in managing an IT project. More information is available at [Office of Enterprise Technology Services | Program Transformation (hawaii.gov)](https://ets.hawaii.gov/pt/).
  + EX4: Organizational Change Management (OCM) – Implementation of change in government can be very hard when status quo is in our DNA. Disruption of the status quo is often difficult for leadership and the workforce to accept. OCM is a process of planning and implementing new ways of operating within an organization by preparing everyone for the change and getting buy-in. ETS has OCM resources to assist departments with the change that comes with IT system modernization and strongly encourages departments to engage in OCM as part of modernization.
  + EX5: National Association of Chief Information Officers (NASCIO) – ETS is a member of NASCIO. NASCIO is a resource for information on what other states are doing on modernization and other major topics and a forum for discussion of common problems and potential solutions.
  + EX6: Central Purchase Contracts and Procurement Price Lists – Central contracts and price lists simplify and speed up procurement of IT systems and products. National price lists are available through the National Association of State Procurement Officials’ ValuePoint and the United States General Services Administration. In addition, the state has price list for cloud services and other IT services purchased by departments.
  + EX7: Procurement Advisory and Assistance Services – ETS and departments can utilize IT advisory and assistance companies to assist with procurement and operations. Commonly used companies include InfoTech and Gartner. These services often provide best practice information to the state and can assist with every stage of procurement planning and execution.
  + EX8: Special Assistant Attorney Generals IT Specialty List – ETS encourages agencies engaging in significant procurement to use attorney from the IT specialty list of Special Assistant Attorney Generals. The list may also be useful if significant contract disputes develop. [Notice-to-Attorneys-Interested-in-Providing-Legal-Services-FY2023-2024](https://ag.hawaii.gov/wp-content/uploads/2023/04/Notice-to-Attorneys-Interested-in-Providing-Legal-Services-FY2023-2024.pdf)
* Procurement (PR)
  + PR1: IT Request for Proposal (RFP) Checklist and Review– ETS IT Governance developed a standardized RFP checklist with over 60 items to ensure that RFP packages include important IT-related conditions and requirements. ETS provides the checklist to departments and helps review the draft RFP for inclusion of checklist items.
  + PR2: Rigorous Vendor Presentation Requirements – Vendor written responses and oral presentations in response to an RFP need to be rigorously planned and analyzed by the purchasing agency. ETS is encouraging departments to dedicate significant time and effort to vendor selection considering the large investment and long-term investment of IT system change.
  + PR3: Early Return on Investment - Staging and Minimum Viable Product – ETS recommends IT projects be built in stages to allow agency use of each stage of the IT system as early as possible to begin receiving a return on investment. This also helps to evaluate the project’s likelihood of success. The first usable part of the project should be an early, basic version of a product that meets the minimum necessary requirements for use but can be adapted and improved in the future, known as the minimum viable product (MVP) or initial operating capability (IOC). Often this allows the agency to turn off all or part of an existing system and thereby reduce expenses to maintain and operate the old system.
  + PR4: Fixed Price Contracts and Contract Payments Based on Deliverables – IT implementation projects for major systems should be fixed price contracts. If contract payments are appropriate before contract completion, ETS recommends agencies tie any partial payments to completion of significant deliverable items or milestones in the statement of work and Work Breakdown Structure and that a percentage of the payment be withheld until final completion and acceptance. These payments must be commensurate with level of effort and actual work accomplished and not for actual time and materials. Deliverables must meet the quality standards established under the contract.

Planned Improvements – These items are being used or tested in systems currently under development or in operation but are not standardized:

* Strategy and Governance (SG)
  + SG5: Risk Analysis Response System – Risk Analysis on IV&V Reports will be standardized to allow for agencies to respond with appropriate corrective actoin to various levels of risk.
  + SG6: Thresholds for Quality Assurance Requirements – All ETS guidance for quality will be based on the size and scope of the IT system including costs to develop and operate, development time, expected operating life, impact on residents, business operations and other users, complexity and integration with other systems.
* Procurement (PR)
  + PR5: Guidelines for PMO Staffing – Each IT Project should be assigned to a Project Management Office within the department. The system RFP should describe the leadership, business, and IT staff available full- and part-time to work on the project and any time when they will not be available. Vendors generally expect they will not have to pause their work due to unavailability of government staff and that government staff will be reasonably available as needed. Vendor expectations should be addressed through the procurement and contracting process to ensure that there is agreement on access to employees. Generally, you can expect to need one full-time staff person to match each full-time project staff member of the vendor to stay on the development schedule. ETS is preparing a guide for establishing and sizing your project management office.
  + PR6: Special Project IT Modernization Staffing – Some projects have established PMOs using the Governor’s authority for cases where existing positions to modernize the system do not exist. ETS has a template available for requesting the Governor’s approval.
  + PR7: RFP as Contract Document – The RFP is often used as a part of the contract and therefore it must be written with that in mind. Chapters or sections describing the RFP and procurement process, including RFP response format, content or timing should be clearly separated from requirements and terms and conditions that will apply as part of the contract. Any language that may be referenced in the contract needs to be clear and unambiguous as should anything submitted by the respondent.
  + PR8: IT Contract Language Standards – ETS is planning to prepare recommended standard clauses for IT contracts.
  + PR9: Phase Gates in Development as Off-Ramps (PAC approval) – ETS is currently reevaluating the PAC approval process to determine if additional approvals should be required at other development or operations lifecycle stages.
  + PR10: Guidance for Vendor Presence on Island, US, and Overseas (TBD)
* Expert Assistance (EX)
  + EX9: ETS as IV&V – ETS plans to develop the ability to provide IV&V services for non-ETS systems.
  + EX10: Backfill for Business Staff – Vendors may expect that key state staff will be available full-time as needed to answer questions about business processes. Ideally, you should add staff during a project to make the most knowledgeable staff available. Failure to do so could result in delayed implementation and increased cost. If you do not have adequate staff, you must have clear and unequivocal availability information in your procurement documents and in your contract.
* Lifecycle (LC)
  + LC1: Project Charters – Charters are short documents that outline the details and potential benefits of a project and help teams and customers better understand its purpose. The document provides key information about a project and provides approval to start the project and criteria for acceptance by the business.
  + LC2: RACI Charts with Significant Detail - A RACI chart (sometimes called a Responsibility Assignment Matrix) is a way to identify your project teams' and stakeholders’ roles and responsibilities for any task, milestone, or project deliverable. By following the RACI acronym, you can clarify responsibility and reduce confusion. RACI stands for Responsible, Accountable, Consulted and Informed. With a RACI chart, you can prevent poor decision making and avoid roadblocks in the approvals process that could impact overall project success.
  + LC3: User Stories and Outcome analysis - Choosing User Stories to define requirements demonstrates an intention to work collaboratively with the users to discover what they really need and to measure the result user benefits as outcomes.
  + LC4: State Data ETL Analysis and Plan including Vendor Role – extract, transform, load (ETL) is a three-phase process where data is extracted from the existing system, transformed (cleaned, sanitized, scrubbed) and loaded into new system. This process is a key to the success of a modernization project. Vendor and government ETL roles and responsibilities must be carefully explained in RFP documents, including who will provide and apply ETL tools. A RACI matrix is a good way to lay out detailed responsibility for ETL. In the absence of a state-provided ETL tool, the vendor must provide a tool-set for ETL.
  + LC5: Automated Testing Program – Automated testing is essential to running modern IT systems both during development and operations. In automated testing, tests are executed automatically via test automation tools and software. In manual testing, a human performs the tests step by step, with or without test scripts. Manual Testing shows lower accuracy and takes significant amounts of workforce time. However, manual testing still needs to be done as part of user acceptance testing to ensure the system works well and interface to users is appropriate. Automated testing requirements should be included in RFP and contract language including who will do what and who will provide the tooling. Automated testing is also needed after development due to regular system upgrades. It may be necessary for the vendor to provide user stories or test scripts for upgrades and enhancements during the maintenance and operation phase.
  + LC6: Documentation - Business Process and Technical Documentation must be a requirement in the development and operation of any system. Both As-Is and To-Be should be described in system runbooks. Runbooks provide IT system teams with contextual documents that increase consistency and efficiency through standardization. They act as a walkthrough or step-by-step guide for both new and experienced professionals working on or using the system. They are also useful for training, testing, trouble-shooting and incident management and help reduce down-time. IT Infrastructure Library (ITIL) protocols and Business Process Management Notation protocols should be adhered to in the documentation.
  + LC7: Configuration Control Board (CCB) – During development and operations, it will be important to have a process to evaluate and execute system changes systematically. The group is responsible for recommending or making decisions on requested changes to baselined work. These changes may affect requirements, features, code, or infrastructure and may also impact planned shut-downs of operating systems. The group should have a Change Control Plan and may be advised by a lower-level working group. The CCB should include IT and business leaders.
  + LC8: Backup and Disaster Recovery – Each IT system must have a documented backup and disaster recovery process that is tested as appropriate.
  + LC9: Lifecycle Planning – Each IT system must have a lifecycle plan for regular business and technology architectural reviews with projected modernizations or replacement of the system.
  + LC10: Technical Debt - Technical debt is an accumulation of design or implementation artifacts that can make future changes more costly or impossible. Technical debt may limit future maintainability and evolvability. Technical debt may be known or unknown and may build during development or operations based on expediency, or a lack of resources, knowledge or capabilities. Known technical debt should be logged and considered during development and during regular architectural reviews.
  + LC11: RIOD Management – IT Systems and projects should keep a log of significant risks, issues, opportunities, and decisions (RIOD) made during development and operations. The quality of thinking and judgment applied to these areas often will determine whether a program meets its objectives throughout the life cycle.
  + LC12: Automation and AI Focus - New or modified systems should consider how data, automation and artificial intelligence (AI) can be used in an ethical manner to enhance the IT system. Vendors should be required to disclose how they use AI in completing work under the contract.
  + LC13: Security Standards – ETS is planning to create a security standards guideline and evaluation checklist for systems during development and operations. Systems must be developed and operated using good cybersecurity practices and in accordance with any federal or state laws or rules that apply.