

## Commonwealth of Virginia



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### Information Technology Resource Management Guideline

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### Model Standard for Large-Scope Projects

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## Preface

### **PUBLICATION DESIGNATION**

COV ITRM Guideline 91-3.

### **SUBJECT**

Large-scope information systems development projects.

### **EFFECTIVE DATE**

January 1, 1992.

### **AUTHORITY**

*Code of Virginia*, § 2.1-563.31 (Powers and Duties of the Council on Information Management).

*Code of Virginia*, § 2.1-563.17 (Powers and Duties of the Department of Information Technology).

### **SCOPE**

This Guideline is applicable to all state agencies and institutions of higher education (hereinafter collectively referred to as "state agencies") that are engaged in such functions as planning, managing, developing, purchasing and using information technology resources in the Commonwealth.

### **PURPOSE**

To provide a model structured approach for defining, developing and implementing large-scope information systems projects in state agencies.

### **OBJECTIVES**

The Commonwealth's Model Standard for Large-Scope Projects Guideline will:

- Define a set of phases, tasks, activities and deliverables that are normally associated with large-scope information systems development projects;
- Identify a minimal set of tasks and activities that can be used to provide required deliverables;
- Provide a flexible set of phases, tasks, activities and deliverables that allow for variations in the size, scope and complexity of projects; and

- Provide a framework that can accommodate the use of various systems development methodologies, tools and techniques.

### **DEFINITIONS**

**Information Systems** are the application programs and databases used by state government to carry out its responsibilities.

**Systems Development** refers to all actions, functions or activities performed by state agencies for the purpose of defining, acquiring, developing, enhancing, modifying, testing, or implementing information systems.

**Maintenance** refers to the necessary activities needed to maintain the functionality, efficiency and effectiveness of existing information systems without changing existing inputs, outputs or calculations.

**Enhancement** refers to those activities needed to create new, or change existing inputs, outputs or processing capabilities to enhance or improve an existing information system's usefulness and functionality.

**Systems Development Methodology** refers to a set of principles, practices and procedures which is used to define, develop, and implement information systems. A systems development methodology guides the sequence of working tasks, defines task prerequisites and results, and establishes key checkpoints. It may also identify the resources, tools and techniques to be used for a task or set of tasks.

**Systems Development Tools and Techniques** refer to specific strategies or standardized methods or procedures to guide the execution of one or more systems development tasks. Prototyping, joint applications design, structured analysis and design, information engineering, object-oriented design, reverse engineering, and structured programming are examples of systems development methods. Computer-aided software (or systems) engineering (CASE) products, fourth-generation languages, and data dictionaries are

examples of automated tools and enabling technologies that are used in conjunction with the methodologies.

### **GENERAL RESPONSIBILITIES**

In accordance with the *Code of Virginia*, the following provisions apply:

#### ***The Council on Information Management (CIM)***

Responsible for:

Directing the development and promulgation of policies, standards, and guidelines for managing information technology resources in the Commonwealth.

#### ***Advisory Committees***

Responsible for:

Meeting, conferring with, and advising the Council in the development of the Commonwealth's policies, standards, and guidelines for managing information technology resources.

#### ***The Department of Information Technology (DIT)***

Responsible for:

Providing administrative support to the Council and performing such other services as the Council may direct in the performance of its powers and duties. Support may include advising the Council in the development, interpretation, and dissemination of its policies, standards, and guidelines, and maintaining records thereon for the Council.

#### ***All State Agencies***

Responsible for:

Cooperating with the Council in the performance of its powers and duties; and

Complying with the Council's policies, standards, and guidelines for managing information technology resources in the Commonwealth.

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## **SECTION 1**

### **INTRODUCTION**

#### **BACKGROUND**

In 1982, the MASD/DIT Standard 82-1 was issued and forwarded to all State agencies and institutions of higher education. This standard provided those persons responsible for evaluating, selecting, and developing Commonwealth data processing systems with specific criteria and a structured approach to assist them in developing and maintaining quality application systems.

When the MASD/DIT Standard 82-1 was issued, both data processing and systems development were oriented towards developing large complex application systems in centralized mainframe computer environments. Since 1982, the proliferation of minicomputers and microcomputers in state government, the type of applications being developed, the methodologies and technologies available to support applications development, and the availability of off-the-shelf software solutions have created the need to revise and update the systems development life cycle concepts presented in MASD/DIT Standard 82-1.

This guideline has been developed as a model standard that can be adopted by state agencies in whole or in part to address systems development for large and/or complex information systems or major enhancements or modifications to such systems.

#### **LARGE-SCOPE PROJECT PHASES**

This model standard uses a phased approach to define, develop and implement large-scope projects. This approach consists of seven logical phases: Project Definition; Requirements Definition; Alternatives and Recommendations; Design; Development; Implementation; and Evaluation.

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## SECTION 2

### USING THE MODEL STANDARD FOR LARGE-SCOPE PROJECTS

This standard identifies project deliverables and provides a structured approach of phases, tasks and activities that will be used to define, develop and implement large-scope information systems. This includes the purchase or development of new application information systems or making major modifications and enhancements to existing information systems.

The following definitions, symbols and terminology are used throughout this standard:

- **Phase** - means a distinct logical stage in the systems development process.
- **Task** - means a logical group of like work within a given phase.
- **Activity** - means a specified logical unit of work within a task. Activities should be defined in small enough increments of work to estimate the resources required to accomplish the activity, and to allow for the measurement of progress for scheduling and reporting on the project. Mandatory activities within a task are preceded by **Activities must include**. Optional activities within a task are preceded by **Activities could include**.
- **Deliverable** - means a resulting product from the activities of one or more tasks that can be stored in electronic or paper form or a combination of the two.
- **Mandatory** - This symbol is used to indicate a task that must be performed or a deliverable that must be developed for all projects.
- **Conditional Mandatory** - This symbol is used to indicate a task or deliverable that is usually considered mandatory for all projects. However, these tasks and deliverables are not applicable to all projects all of the time.

**FOR EXAMPLE:** A purchased software package may not require the development of application program specifications or the corresponding generation of application program code.

The phases and tasks in this standard have been sequentially numbered and the tasks are annotated in bold typeface. The phases within this standard can be logically combined and the tasks can be performed in any logical order that provides the required deliverables and approvals. Descriptive information is provided with each task, including activities and/or examples of potential activities. The project manager has the discretion to include additional tasks and activities not specified in this standard, and to use appropriate systems development methodologies, tools and techniques that will satisfy the intent of a given task. The project manager may substitute tasks and activities within the context of this standard as long as the appropriate mandatory deliverables are developed and approved, and the mandatory approvals to proceed are obtained. The number and level of tasks and activities needed to plan, manage and control a given project will be determined by the project manager and will be commensurate with his/her understanding of the size, scope, and complexity of the project.

In addition to the mandatory tasks and activities for each phase, there are optional tasks and

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activities which may, at the option of the project manager be included in some projects and excluded from other projects, depending upon the size, scope and complexity of a given project. Failure to include one or more of the optional tasks or activities for any given phase does not constitute failure to comply with this standard.

Each phase contains at least one task pertaining to progress reviews and the authorization to proceed. These reviews consist of structured walkthroughs (scheduled, yet informal technical reviews involving appropriate project team members), internal reviews (scheduled, formal reviews involving the project team), and design reviews (scheduled, formal reviews involving agency representatives, to obtain approvals).

Each phase concludes with a task to "manage the project". The specific means for project management should be documented by the project manager. These may vary from phase to phase, and the activities listed for this task under each phase are illustrative.

State regulations require additional approvals under certain conditions.

- All Commonwealth accounting and financial control systems, whether automated or manual, must be approved for adequacy of audit trails and financial controls by the Auditor of Public Accounts. Similarly, any system which in any way involves the disbursing of State monies or impacts a second system involving such disbursement must be reviewed by the Auditor of Public Accounts. It is the responsibility of the developing agency to contact the Auditor of Public Accounts.
- The Code of Virginia (Section 2.1-196.1) requires the Comptroller's approval of all accounting and financial systems. No accounting or financial control systems will be developed without prior approval of the Comptroller. An Office of the Comptroller Directive, entitled: "Required Approval of Agency-Based Accounting Systems", addresses agency procedures for complying with Section 2.1-196.1 of the Code. It is the responsibility of the developing agency to contact the Office of the Comptroller.

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## PHASE 1: PROJECT DEFINITION

This phase covers the tasks, activities and deliverables necessary to evaluate and document proposals to initiate information systems development projects. It covers proposals for such things as feasibility studies, requests to develop or purchase new systems and requests for major modifications or enhancements to existing systems.

The proposed project and its corresponding systems development methodology are defined and the requesting organization, individual or project team will develop a project plan that identifies the initial estimated resources and time required to complete the proposed project.

This phase provides for the following:

Mandatory **DELIVERABLES**

- Project Definition
- Project Systems Development Methodology
- Initial Project Plan
- Written Approval of the Deliverables
- Written Approval to Proceed

**Optional DELIVERABLES**

- Project Team Meeting Documentation

**Task  
Number**

**Tasks/Activities**

**1.10**

**SELECT AND BRIEF THE PROJECT TEAM, AS NEEDED**

Internal agency policies and procedures as well as the size, scope and complexity of the proposed project will be used to determine the need for a project team. When a project team is used, it may be directed in writing to develop all the appropriate deliverables through the Alternatives and Recommendations Phase of the standard, thus treating the first three phases of this standard as a single logical phase. Adopting this approach does not alter the required deliverables, but will eliminate the need for formal stop and approval-to-proceed tasks at the end of the Project Definition and Requirements Phases. When the first three phases are treated as a single logical phase, the project team must ensure that appropriate means are included in the project plan to keep users and agency management informed on the project's progress and the status of deliverables. Users will be represented on all project teams and a user will serve as the project manager whenever practicable.

Activities could include, but are not limited to:

- Reviewing and discussing the team assignment and progress to date.
- Reviewing and discussing the project team objectives.
- Reviewing and discussing project control and reporting requirements.
- Making project team assignments.

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Deliverable: **PROJECT TEAM MEETING DOCUMENTATION**

**1.20** Mandatory **DEFINE/SELECT SYSTEMS DEVELOPMENT METHODOLOGY**

The task will be used to define the systems development methodology that will be used for this project.

Activities could include, but are not limited to:

- Identifying specific systems development tools and techniques that will be used on this project.
- Identifying the specific phases, tasks, activities and deliverables for the specified systems development tools and techniques.
- Documenting the project's systems development methodology.

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Deliverable: **SYSTEMS DEVELOPMENT METHODOLOGY**

**1.30** Mandatory **DEFINE A PROPOSED PROJECT**

This task will be used to define an information systems project. Sufficient information must be developed to define the proposed project to the detailed level necessary to develop a project plan. The project definition and the initial project plan must contain sufficient information for the state agency to understand what the project will accomplish, an estimate of its cost, and how long it will take to complete.

Activities must include, but are not limited to:

- Developing, writing and publishing the statement of the project's objectives and goals including; problems to be solved, general requirements, and anticipated general benefits.
- Developing, writing and publishing the statement of the project's scope including; functions to be examined, the reasons for the project, and anticipated functional units which may be affected.
- Developing, writing and publishing the project's constraints, assumptions, and mandates affecting development including; budgetary, time, resource, and legislative factors.

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Deliverable: **PROJECT DEFINITION**

**1.40** Mandatory **PREPARE INITIAL PROJECT PLAN TO IMPLEMENT THE PROPOSED PROJECT**

The project plan should include phases, tasks, activities, and deliverables with estimated time, cost, and resource (personnel, software and equipment) requirements through the **Alternatives and Recommendations** phase in this standard.

Activities must include, but are not limited to:

- Preparing a list of project tasks, activities and deliverables.
- Preparing time and cost estimates.
- Preparing the initial resource allocation plan.

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Deliverable: ***INITIAL PROJECT PLAN***

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1.50

*Conditional*  
*Mandatory*

**OBTAIN APPROVALS OF DELIVERABLES & APPROVAL TO PROCEED**

Written approval of the mandatory deliverables of this phase and the written approval to proceed with the project are mandatory. These mandatory deliverables can be deferred to the end of the Requirements or the Alternatives and Recommendations Phases with management's specific written authorization.

Activities must include, but are not limited to:

- Presenting the project definition and initial project plan for approval.
- Obtaining approval of the project definition and initial project plan.
- Obtaining approval to proceed. This is the state agency's formal approval that allocates funds and agency resources to proceed with the project.

Deliverable: ***WRITTEN APPROVALS***

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1.60

*Mandatory*

**MANAGE PROJECT**

This is an ongoing task throughout the project. Activities are used to provide control and quality assurance for the project, establish project reporting requirements and milestones, and provide for project administration. Project management activities for this phase should be included in the initial project plan.

Activities could include, but are not limited to:

- Monitoring progress against the plan.
- Revising the project plan(s) as required.
- Monitoring quality.
- Monitoring staff performance and providing supervision and guidance.
- Preparing progress reports and reporting on project progress.
- Scheduling and conducting periodic progress meetings with staff, users and others.
- Providing administrative support, handling correspondence, and scheduling meetings and facilities.

## PHASE 2: REQUIREMENTS DEFINITION

This phase covers the tasks, activities and deliverables necessary to define, finalize and document the functional and informational requirements for the proposed project. Functional and informational constraints and impacts on the current operating environment are also developed during this phase and become considerations in finalizing the requirements.

This phase provides for the following:

Mandatory **DELIVERABLES**

- Functional and Informational Requirements
- Functional and Informational Constraints
- Functional and Informational Project Impact Analysis
- Revised Project Plan
- Written Approval of the Deliverables
- Written Approval to Proceed

**Optional DELIVERABLES**

- Project Team Meeting Documentation

**Task  
Number**

**Tasks/Activities**

**2.10** Mandatory **SELECT AND BRIEF THE PROJECT TEAM**

The requirements definition must always be conducted by a project team. The project team may be the same as a project team created in the Project Definition Phase, or a new team may be constituted. Contract assistance, if used, should be represented on the project team. The project team may consist of one person. Users will be represented on all project teams and a user will serve as the project manager whenever practicable.

Activities could include, but are not limited to:

- Reviewing and discussing progress to date including the deliverables from the Project Definition Phase.
- Reviewing and identifying any systems developmental methodologies, tools and techniques that will be used by the project team in the course of its work.
- Reviewing and identifying any standards, policies or guidelines on documentation, forms, reporting, etc. that are applicable to the project.
- Reviewing and discussing project control and reporting requirements.
- Developing a list of involved user personnel, including management.
- Scheduling interviews to determine perception of needs, requirements, and to gather other information.
- Making project team assignments.

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Deliverable: ***PROJECT TEAM MEETING DOCUMENTATION***

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**2.20 INITIATE THE DATA DICTIONARY**

If a data dictionary is applicable to this project, this task will be used to initiate the process and be an ongoing task throughout the project.

Activities could include, but are not limited to:

- Finalizing the form(s) that will be used to capture data element information.
- Researching and extracting data element information from any existing sources that is applicable to this project.

**2.30** *Mandatory* **DEFINE REQUIREMENTS**

Requirements should be defined in terms of the project scope, objectives and other criteria developed as part of the project definition. Other considerations in developing a requirements definition could include such things as; the agency's overall business objectives, existing systems, data requirements, process requirements and functional requirements. Requirements definition should focus on what needs to be accomplished and **not** how it should be accomplished, nor on what information technology resources may be required. Functional and informational requirements should be developed independent of hardware and software environments.

Activities could include, but are not limited to:

- Conducting interviews to determine perceptions of needs, problems, and to gather information on possible requirements.
- Collecting and documenting functional and informational requirements including all outputs and timing factors. Timing factors could include such things as; updating and reporting cycles, response times, turnaround times, and interface exchange schedules.
- Preparing a list of general financial control, security, backup and audit requirements.

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Deliverable: ***FUNCTIONAL & INFORMATIONAL REQUIREMENTS***

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**2.40** *Mandatory* **DEFINE CONSTRAINTS**

This task should be used to document known or anticipated constraints that may impact the functional and informational requirements identified as part of this project.

Activities could include, but are not limited to:

- Documenting known constraints for such things as:
  - staff limitations;
  - equipment;
  - support facilities;
  - technical and environmental factors; and

- budget/funding limitations.
- Documenting anticipated or potential constraints or issues for such things as:
  - pending legislation;
  - emerging technology; and
  - pending standards, guidelines or policies.

Deliverable: ***FUNCTIONAL & INFORMATIONAL CONSTRAINTS***

2.50

*Mandatory*

**DESCRIBE THE IMPACT OF THE FUNCTIONAL AND INFORMATIONAL REQUIREMENTS AND CONSTRAINTS ON THE CURRENT ENVIRONMENT**

This task will be used as needed to document the likely organizational impacts, costs or savings that will occur as a result of implementing the developed requirements, given the identified constraints.

Activities could include, but are not limited to:

- Preparing a descriptive list of the impacts for such areas as:
  - system functions;
  - information/work flows;
  - decision points;
  - organizational elements involved and affected;
  - personnel resources and duties;
  - equipment;
  - problem areas;
  - planned and desired improvements; and
  - other priority projects.
- Identifying potential required changes to the organizational structure.
- Documenting the estimated (direct and indirect overhead) costs to satisfy the requirements and the estimated savings, given the current environment.
- Documenting any changes that may be required to the agency's approved Information Management Plan that is on file with the Council on Information Management.

Deliverable: ***FUNCTIONAL & INFORMATIONAL IMPACT ANALYSIS***

2.60

**VERIFY REQUIREMENTS**

This task is used to conduct an internal project team review of the requirements, constraints and impact analysis documentation.

Activities could include, but are not limited to:

- Verifying the requirements documentation to ensure that the content is sound, logical, and complete.
- Verifying the constraints and impact analysis documentation to ensure that the content is sound, logical, and complete, and that positions and conclusions are supportable and documented.
- Revising all deliverables as needed.

**2.70** *Mandatory* **REVIEW AND AS NEEDED REVISE THE PROJECT PLAN**

The project plan will be reviewed and revised as needed to include all appropriate tasks, activities, deliverables and revised estimates on the time, cost, and resource (personnel, software and equipment) requirements needed through the Alternatives and Recommendations Phase of this standard.

Activities must include, but are not limited to:

- Reviewing and as needed revising the project tasks, activities and deliverables list.
- Reviewing and as needed revising the time and cost estimates.
- Reviewing and as needed revising the resource allocation plan.

Deliverable: **REVISED PROJECT PLAN**

**2.80** *Conditional  
Mandatory* **OBTAIN APPROVALS OF DELIVERABLES & APPROVAL TO PROCEED**

Written approval of the mandatory deliverables of this phase and the written approval to proceed with the project are mandatory. These mandatory approvals can be deferred to the end of the Alternatives and Recommendations Phases with management's specific written authorization.

Activities must include, but are not limited to:

- Presenting appropriate deliverables from prior phases for approval.
- Presenting functional and informational requirements, constraints and a revised project plan for approval.
- Obtaining approval of the functional and informational requirements, constraints and the revised project plan.
- Obtaining approval to proceed. This is the agency's formal approval to allocate funds and resources to continue this project.

Deliverable: **WRITTEN APPROVALS**

**2.90** *Mandatory* **MANAGE PROJECT**

This is an ongoing task throughout the project. Activities are used to provide control and quality assurance for the project, establish project reporting requirements and milestones, and to provide for project administration. Project management activities should be referenced and evaluated against the project plan.

Activities could include, but are not limited to:

- Monitoring progress against the plan.
- Revising the project plan(s) as required.
- Monitoring quality.
- Monitoring staff performance and providing supervision and guidance.
- Preparing progress reports and reporting on project progress.
- Scheduling and conducting periodic progress meetings with staff, users and others.
- Providing administrative support, handling correspondence and scheduling meetings and facilities.

### PHASE 3: ALTERNATIVES AND RECOMMENDATIONS

This phase covers the tasks and activities needed to analyze the requirements and develop various alternatives which satisfy the defined requirements and objectives. Based on the advantages and disadvantages of each alternative, a recommended course of action is developed which includes resource requirements. Recommendations are provided to agency management for review and approval. As appropriate, a conceptual model is developed.

Questions answered during this phase should include: what is the alternative that best satisfies the requirements and objectives; should the project be developed in-house; can a software package be used as a partial or complete solution; what is the required hardware and software environment needed to support the recommendations; and is a phased development and/or implementation needed or desirable.

This phase provides for the following:

Mandatory **DELIVERABLES**

- Analysis Documentation
- Alternatives Documentation
- Recommendations Document
- Recommendations Review Documentation
- Revised Project Plan
- Written Approval of the Deliverables
- Written Approval to Proceed

**Optional DELIVERABLES**

- Conceptual Systems Model
- Project Team Meeting Documentation

**Task  
Number**

**Tasks/Activities**

**3.10**

**BRIEF THE PROJECT TEAM**

This phase must always be conducted by a project team. The project team may be the same as a project team created in the Requirements Definition Phase, or a new team may be constituted. Contract assistance, if used, should be represented on the project team. The project team may consist of one person. Users will be represented on all project teams and will serve as the project manager whenever practicable. This task will be used as needed to schedule any project team meetings deemed necessary by the project manager and to record the results of such meetings.

Activities could include, but are not limited to:

- Reviewing and discussing progress to date including the deliverables from previous phases.
- Reviewing and discussing project control and reporting requirements.

- Reviewing and identifying any systems developmental methodologies, tools and techniques that will be used by the project team in the course of their work.
- Reviewing and identifying any standards, policies or guidelines on documentation, forms, reporting, etc. that are applicable to the project.
- Making project team assignments.

Deliverable: ***PROJECT TEAM MEETING DOCUMENTATION***

### 3.20

*Mandatory*

#### **ANALYZE REQUIREMENTS, CONSTRAINTS & IMPACTS**

This task is used to analyze all previous deliverables and document the analysis results. The resulting documentation may include a conceptual systems model which can be used as a basis for developing alternative solutions to meet the defined requirements.

Activities could include, but are not limited to:

- Analyzing which functions should be performed manually, which functions should be automated, and which functions will be a combination of manual and automated operations.
- Analyzing file requirements.
- Analyzing processing requirements.
- Evaluating the potential use of centralized, decentralized, distributed, or shared processing.
- Evaluating who will manage the hardware and associated information technology resources.
- Documenting the results of the analysis and as appropriate, developing a conceptual systems model.

Deliverable: ***ANALYSIS DOCUMENTATION***

Deliverable: ***CONCEPTUAL SYSTEMS DESIGN***

### 3.30

*Mandatory*

#### **DEVELOP THE ALTERNATIVES**

This task is used to develop information on viable alternatives that can be used to meet the defined requirements and objectives. The deliverable for this task is the primary supporting documentation for the project recommendations deliverable.

Activities could include, but are not limited to:

- Evaluating development and acquisition options for each viable alternative. The evaluation should consider whether the alternative should be (1) developed internally, (2) developed externally, (3) acquired internally, (4) acquired externally, (5) acquired and modified internally, or (6) acquired and modified externally.
- Evaluating vendor capabilities and acquisition alternatives.
- Defining the information technology resources required to develop, acquire, implement and operate each alternative. Anticipated or estimated requirements should be defined during this activity. These anticipated or estimated requirements may be stated in general terms, such as: number of user access

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points; general telecommunications requirements; number of terminals, microcomputers, workstations, printers, etc.; number of copies of software packages, site licenses, etc. Considerations should include, but are not limited to:

- identifying appropriate existing information technology resources that will be needed to implement the proposed alternative;
  - identifying additional information technology resources that will be required including resources for systems development, systems conversion, users and operations training and for ongoing operations; and
  - as appropriate, developing an information technology resources implementation schedule. As needed, coordinate the installation and schedule requirements with appropriate organizations to ensure that the information technology resources will be available when needed.
- Developing cost estimates for each alternative. These estimates should include considerations for the cost of development and/or acquisition, and for ongoing operations.
  - Defining the advantages and disadvantages of each alternative.

**Deliverable: *ALTERNATIVES DOCUMENTATION***

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**3.40** *Mandatory* **PREPARE RECOMMENDATIONS**

This task and its associated activities are used to produce a document containing specific recommendations on the best way to meet the defined requirements and objectives, given the constraints.

Activities must include, but are not limited to:

- Documenting the best alternative(s).
- Documenting any additional rationale for the alternative specified.
- Developing and documenting appropriate cost justification information for the recommended alternative.

**Deliverable: *RECOMMENDATIONS DOCUMENT***

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**3.50** **VERIFY RECOMMENDATIONS**

This task can be used to conduct an internal project team review of the recommendations. This review could be accomplished by peer reviews or structured walk-throughs.

Activities could include, but are not limited to:

- Verifying the recommendations document to ensure that the content is sound, logical, and complete, and that positions and conclusions are supportable and documented.
- As appropriate, verifying the conceptual model to ensure that the content is sound, logical, and complete.

**3.60** *Mandatory* **CONDUCT FORMAL REVIEW OF RECOMMENDATIONS**

This task will be used to conduct a formal agency review of the recommendations. This review could be accomplished using such things

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as steering committee reviews, external reviews or independent reviews. Participants could include management, user(s), information processing professionals, the project team, auditors, or contractors.

Activities could include, but are not limited to:

- Reviewing the analysis and alternatives documentation.
- Reviewing the recommendations document.
- As appropriate, reviewing the conceptual model.

Deliverable: **RECOMMENDATIONS REVIEW DOCUMENTATION**

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**3.70** Mandatory **REVIEW AND AS NEEDED REVISE THE PROJECT PLAN**

The project plan will be reviewed and revised as needed to include all appropriate tasks, activities, deliverables and revised estimates on the time, cost, and resource (personnel, software and equipment) requirements needed to implement the recommendations. Depending on the recommendations, the project plan may include tasks, activities and deliverables through the Evaluation Phase of this standard, or at a minimum, through the Implementation Phase. The project plan may also need specific tasks and activities to handle any related procurement activities indicated by the recommendations.

Activities must include, but are not limited to:

- Reviewing and as needed revising the project tasks, activities and deliverables list.
- Reviewing and as needed revising the time and cost estimates including reasonable time increments for implementing long-term projects.
- Reviewing and as needed revising the resource allocation plan.

Deliverable: **REVISED PROJECT PLAN**

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**3.80** Mandatory **OBTAIN APPROVALS AND APPROVAL TO PROCEED**

Formal agency approval of this phase's appropriate deliverables is required and this approval must include any deferred deliverables from previous phases for this project.

Activities must include, but are not limited to:

- As appropriate, presenting the project definition for approval.
- As appropriate, presenting the functional and informational requirements, objectives and constraints for approval.
- Presenting the analysis documentation, alternatives and recommendations for approval. As appropriate, presenting the conceptual model, information technology resources implementation schedule, and the revised project plan for approvals.
- Obtaining approval to proceed. This is the agency's formal approval to allocate funds and resources to continue this project.

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Deliverable: **WRITTEN APPROVALS**

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**3.90** Mandatory **MANAGE PROJECT**

This is an ongoing task throughout the project. Activities are used to provide control and quality assurance for the project, establish project reporting requirements and milestones, and to provide for project administration. Project management activities should be referenced to, and evaluated against, the project plan.

Activities could include, but are not limited to:

- Monitoring progress against the plan.
- Revising the project plan(s) as required.
- Monitoring quality.
- Monitoring staff performance and providing supervision and guidance.
- Preparing progress reports and reporting on project progress.
- Scheduling and conducting periodic progress meetings with staff, users and others.
- Providing administrative support, handling correspondence and scheduling meetings and facilities.

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## PHASE 4: DESIGN

This phase covers the tasks, activities and deliverables required to develop/purchase information systems software and documentation to meet the project's defined functional and informational requirements. This phase should not be initiated prior to obtaining the required approvals in Phase 3.

This phase provides for the following:

Mandatory **DELIVERABLES**

- User Interface Documentation
- Back-up and Recovery Specifications
- Information Security Documentation
- Unit, System and Integrated Systems Test Plan
- Systems Design Overview Documentation
- Revised Project Plan
- Written Approval of the Deliverables
- Written Approval to Proceed

Conditional  
Mandatory **DELIVERABLES**

- Logical File Structures/Database Design
- Systems Interface Documentation
- New Organizational Structure, Functions, and Personnel Documentation
- Application Program Specifications
- Initial Conversion Plan
- Conversion Specifications

**Optional DELIVERABLES**

- Project Team Meeting Documentation
- Initial Draft User Documentation
- Initial Draft Operations Documentation
- Design Review Documentation

**Task  
Number**

**Tasks/Activities**

**4.10**

**BRIEF THE PROJECT TEAM**

This phase must always be conducted by a project team. The project team may be the same as a project team used for previous phases, or a new team may be constituted. Contract assistance, if used, should be represented on the project team. The project team may consist of one person. Users will be represented on the project team and will serve as the project manager whenever practicable. This task will be used as needed to schedule any project team meetings deemed necessary by the project manager and to record the results of such meetings.

Activities could include, but are not limited to:

- Reviewing and discussing progress to date including the deliverables from previous phases.
- Reviewing and discussing project control and reporting requirements.
- Reviewing and identifying any systems developmental methodologies, tools and techniques that will be used by the project team in the course of their work.
- Reviewing and identifying any standards, policies or guidelines on documentation, forms, reporting, etc. that are applicable to the project.
- Making project team assignments.

Deliverable: ***PROJECT TEAM MEETING DOCUMENTATION***

**4.20 PERFORM THE APPROPRIATE PROCUREMENT PROCEDURES, IN ACCORDANCE WITH COMMONWEALTH OF VIRGINIA AGENCY PROCUREMENT AND SURPLUS PROPERTY MANUAL**

The project may include information technology resource requirements that are subject to the Commonwealth's procurement laws, procedures, policies and regulations. This task will be used to initiate and follow through on all necessary procurement activities. As needed, all appropriate activities and realistic time frames should be identified for this task.

**4.30 PREPARE OR MODIFY THE DATA DICTIONARY**

This is an ongoing task that allows for the continual definition and refinement of information associated with data elements needed for this project effort.

Activities could include, but are not limited to:

- Identifying new data elements.
- Developing information on a data element concerning its form and content. This includes such things as; format, content, size, values, structure, edit criteria and purpose.
- Identifying and defining information on a data element concerning its maintenance responsibilities and any limitations on its accessibility.
- Identifying and defining any relationships between data elements.
- Identifying and defining any security or confidentiality requirements.

**4.40** *Conditional*  
*Mandatory* **DEVELOP AND DEFINE LOGICAL FILE STRUCTURES**

This task will be used as needed to design logical file structure(s) to meet the defined requirements. For purchased software packages, this task should also be used to perform necessary validation of the package(s) file structures or databases.

Activities could include, but are not limited to:

- Designing logical databases.
- Developing file layouts for system files and tables.

- Developing file structures, dependencies, and interfaces.
- Documenting needed changes to purchased file structures.

Deliverable: **LOGICAL FILE STRUCTURES/DATABASE DESIGN**

**4.50** Mandatory **DEVELOP USER INTERFACES DESIGN**

This task will be used as needed to define and document all user interfaces (including screens, forms and reports) to meet the defined requirements. This task should focus on the content, placement, order and sequence of information on needed user interfaces. If one or more software packages were purchased, this task will be used to validate the user interfaces and document any enhancements or changes that are necessary to meet the defined requirements.

Activities could include, but are not limited to:

- Identifying, defining and finalizing each input source document and/or form.
- Identifying, defining and finalizing each output document and/or form that must be generated.
- Identifying, defining and finalizing each input screen that will be needed to add, modify or delete information.
- Identifying, defining and finalizing each output (inquiry, help, menu, etc.) screen that must be generated.
- Identifying, defining and finalizing each output report that must be generated.
- Documenting any needed enhancements or changes to user interfaces on all purchased software systems.
- Identifying, defining and finalizing other types of user interactions such as voice, LCD display, optical character formats, touch-tone or debit card usage.

Deliverable: **USER INTERFACE DOCUMENTATION**

**4.60** Conditional  
Mandatory **DEVELOP SYSTEMS INTERFACE DESIGN**

This task will be used as needed to define and document all interfaces with other existing or planned systems.

Activities could include, but are not limited to:

- Identifying, defining and finalizing all messages, flags and communication formats needed for inter-system communication.
- Identifying, defining and finalizing all file interchange formats and interfaces, including timing considerations.
- Identifying, defining and finalizing each input screen that will be needed to add, modify or delete information.
- Identifying, defining and finalizing any protocols needed to interact with other systems.

Deliverable: **SYSTEMS INTERFACE DOCUMENTATION**

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**4.70** *Conditional*  
*Mandatory* **DOCUMENT NEW/MODIFIED ORGANIZATIONAL STRUCTURE**

This task will be used as needed to document required additions or changes to the agency's organizational structure to support the end result of this project. The results of this effort may require the agency to establish new positions, reclassify positions, or change existing job descriptions.

Activities could include, but are not limited to:

- Documenting the organizational structure that will be required to support the new or enhanced system including users, operations, and maintenance staff.
- Identifying new positions and defining the functional responsibilities for each position.
- Identifying new or additional functional responsibilities for existing positions.
- Initiating the process to create new positions, reclassify existing positions, or develop new job descriptions for existing positions.

Deliverable: *NEW ORGANIZATIONAL STRUCTURE, FUNCTIONS, AND PERSONNEL DOCUMENTATION*

**4.80** *Conditional*  
*Mandatory* **DEVELOP APPLICATION PROGRAM SPECIFICATIONS**

This task will be used as needed to develop applications program specifications to support the defined requirements. Conversion and back-up and recovery specifications are not included in this task. At a minimum, program specifications must be developed to support all the user and system interfaces identified in this phase. User interfaces that are part of a purchased software package normally will not require the development of corresponding application program specifications. Program specifications should be developed to provide the necessary detail to accomplish their stated purpose.

Activities could include, but are not limited to:

- Developing specifications to support required on-line transaction processing.
- Developing specifications to support required batch reporting, extracting or updating processes.
- Developing specifications to support required interfaces with other systems.
- Developing specifications to support other types of user interfaces or interactions.
- Developing specifications to support required ad hoc, decision support, and forms generation requirements.

Deliverable: *APPLICATION PROGRAM SPECIFICATIONS*

**4.90** *Conditional*  
*Mandatory* **DEVELOP CONVERSION PLAN**

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This task will be used as needed to document the resources needed for conversion efforts and to develop plans to convert required data to the new environment in a timely, scheduled manner. A conversion plan should address all the necessary data that must be converted to meet full production-mode operation. Data needed during program and system testing tasks should also be addressed in this plan on an as-needed basis.

If conversion efforts are needed, activities must include, but are not limited to:

- Preparing a list of conversion tasks and activities.
- Preparing a conversion schedule that identifies the data sources (documents, files, databases, etc.) that are to be converted and the personnel responsible for the conversion effort.
- Preparing time and cost estimates including reasonable time increments for phased conversions.

Deliverable: ***INITIAL CONVERSION PLAN***

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**4.100** *Mandatory* **PREPARE BACK-UP AND RECOVERY SPECIFICATIONS**

This task will be used to develop back-up and recovery specifications to support the defined requirements. At a minimum these specifications must address data backup, frequency of backups, retention requirements, and appropriate data recovery procedures.

Activities could include, but are not limited to:

- Developing specifications for automated data backup that include the frequency and retention requirements. This should include backups for such things as:
  - databases;
  - each data file, including interface files;
  - on-line or batch transaction files; and
  - temporary files.
- Documenting retention requirements for such things as:
  - system generated output reports or forms; and
  - source documents used as system inputs.
- Documenting information system recovery requirements and developing specifications and procedures to restore all or part of the information system using the automated data backups. Procedures may be required to use input source documents for recovery purposes.
- Defining and documenting backup and recovery duties and responsibilities.

Deliverable: ***BACK-UP & RECOVERY SPECIFICATIONS***

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**4.110** *Mandatory* **PREPARE INFORMATION SECURITY DOCUMENTATION**

This task will be used to identify and develop all security requirements, specifications and procedures that are required to meet the

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Commonwealth's ITRM Information Security Policy, Standards and Guidelines and the agency's corresponding ITRM Security Program.

Activities could include, but are not limited to:

- Defining known and anticipated security and confidentiality requirements.
- Developing information security specifications to meet the defined security requirements.
- Documenting the proposed procedures for meeting the security requirements of the system.

Deliverable: ***INFORMATION SECURITY DOCUMENTATION***

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4.120 *Conditional*  
*Mandatory*

**DEVELOP CONVERSION SPECIFICATIONS**

This task will be used as needed to develop conversion program specifications. Conversion program specifications should be developed or written to provide the detailed information required to accomplish their stated purpose.

Activities could include, but are not limited to:

- Developing specifications to convert data from existing automated files.
- Developing one-time specifications to convert data from manual reports or source documents.
- Developing one-time specifications to manipulate or correct converted data.
- Developing specifications to initially load new files or databases.

Deliverable: ***CONVERSION SPECIFICATIONS***

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4.130

**DEVELOP INITIAL DRAFT USER DOCUMENTATION**

This task can be used as needed to begin the development of draft user documentation. This could include documentation needed to train and support user personnel during implementation and production-mode operations.

Activities could include, but are not limited to:

- Preparing draft users instructions covering all needed informational and functional requirements provided for in the program specifications. These could include such things as; adding, modifying or deleting information; retrieving or displaying information; and instructions on requesting or using ad hoc or scheduled reports.
- Preparing draft training materials including such things as handouts, instruction or training outlines, and presentations.

Deliverable: ***DRAFT USER DOCUMENTATION***

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4.140

**DEVELOP INITIAL DRAFT OPERATIONS DOCUMENTATION**

This task can be used as needed to begin the development of draft operations documentation. This could include documentation needed to

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train and support operations personnel during implementation and production-mode operations.

Activities could include, but are not limited to:

- Preparing draft operations instructions for support during conversion and production usage.
- Preparing draft training materials including such things as handouts, instruction or training outlines, and presentations.

Deliverable: ***DRAFT OPERATIONS DOCUMENTATION***

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**4.150** *Mandatory* **DEVELOP UNIT, SYSTEM AND INTEGRATED SYSTEMS TEST PLAN**

This task will be used to develop a test plan for unit application program testing, systems testing and as needed, integrated systems testing. This test plan must address all the testing requirements needed by the developer to ensure that the system will perform as specified.

Activities could include, but are not limited to:

- Developing a unit test plan for each application program including:
  - defining the levels of testing to be performed and the sources and types of test data required;
  - preparing a unit testing schedule which identifies needed equipment and the personnel responsible for the testing; and
  - preparing documentation that defines the anticipated and critical test results.
- Developing a systems test plan including:
  - defining the levels of testing to be performed and the sources and types of test data required;
  - preparing the testing schedule which identifies the application programs to be tested, the needed equipment and the personnel responsible for the testing; and
  - preparing documentation that defines the anticipated and critical test results.
- Developing an integrated systems test plan as needed, including:
  - defining the levels of testing to be performed and the sources and types of test data required;
  - preparing the testing schedule which identifies the application programs to be tested, other information systems applications programs to be tested, the needed equipment and the personnel responsible for the testing; and
  - preparing documentation that defines the anticipated and critical test results.

Deliverable: ***UNIT, SYSTEM & INTEGRATED SYSTEMS TEST PLAN***

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**4.160** *Mandatory* **DEVELOP SYSTEMS DESIGN OVERVIEW DOCUMENTATION**

This task will be used to develop comprehensive overview documentation for the entire information systems design.

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Activities could include, but are not limited to:

- Developing systems flowcharts that show how the applications programs work together.
- Developing narratives and/or graphics that explain the major functions and processes of the designed system.
- Developing a comprehensive list of application programs, conversion programs, etc.
- Developing other documentation deemed necessary to explain what the system does and how it works.

**Deliverable: *SYSTEMS DESIGN OVERVIEW DOCUMENTATION***

#### **4.170 VERIFY DESIGN DOCUMENTATION**

This task can be used to conduct an internal project team review of the design documentation and deliverables. This review could be accomplished by peer reviews or structured walk-throughs.

Activities could include, but are not limited to:

- Verifying that the design documentation is sound, logical, and complete. The design documentation includes such things as; purchased software packages, logical file structures, databases, screens, forms, reports, application program specifications, conversion specifications and backup/recovery specifications.
- Verifying draft users and/or operations documentation to ensure that the content is sound, logical, and complete, and that it accurately reflects the contents of the verified design documentation.
- Verifying that the requirements in the agency's information security procedures and plans have been adequately addressed.

#### **4.180 CONDUCT FORMAL REVIEW OF DESIGN DOCUMENTATION**

This task can be used to conduct a formal agency review of the design documentation. This review could be accomplished using steering committee reviews, external reviews or independent reviews. Participants could include management, user(s), information processing professionals, the project team, auditors, or contractors.

Activities could include, but are not limited to:

- Reviewing the systems design overview documentation.
- Reviewing the design document including: any changes or enhancements to purchased software packages; all developed or modified specifications, screens, forms, reports; appropriate data dictionary information; and draft user and operations documentation.
- Reviewing the conversion plan.
- Reviewing information security procedures.

**Deliverable: *DESIGN REVIEW DOCUMENTATION***

#### **4.190 Mandatory REVIEW AND AS NEEDED REVISE PROJECT PLAN**

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The project plan will be reviewed and revised as needed to include all appropriate tasks, activities, deliverables and revised estimates on the time, cost, and resource (personnel, software and equipment) requirements needed to implement the recommendations.

Activities must include, but are not limited to:

- Reviewing and as needed revising the project task, activities and deliverables list.
- Reviewing and as needed revising the time and cost estimates including reasonable time increments for implementing long-term projects.
- Reviewing and as needed revising the resource allocation plan.

Deliverable: **REVISED PROJECT PLAN**

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4.200 *Conditional*  
*Mandatory*

#### **OBTAIN APPROVALS AND APPROVAL TO PROCEED**

Written approval of the mandatory deliverables of this phase and the written approval to proceed with the project are mandatory. These approvals can be deferred to the end of the Development Phase with management's specific written authorization. If the approvals are deferred, the project manager will ensure that appropriate review and presentation meetings are included in the project plan to keep users and agency management informed of the project's progress and deliverables.

Activities must include, but are not limited to:

- Presenting all appropriate deliverables and plans for approval.
- Obtaining approval(s) to proceed. This is the agency's formal approval to allocate funds and resources to continue this project.

Deliverable: **WRITTEN APPROVALS**

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4.210 *Mandatory*

#### **MANAGE PROJECT**

This is an ongoing task throughout the project. Activities are used to provide control and quality assurance for the project, establish project reporting requirements and milestones, and to provide for project administration. Project management activities should be referenced to, and evaluated against, the project plan.

Activities could include, but are not limited to:

- Monitoring progress against the plan.
- Revising the project plan(s) as required.
- Monitoring quality.
- Monitoring staff performance and providing supervision and guidance.
- Preparing progress reports and reporting on project progress.
- Scheduling and conducting periodic progress meetings with staff, users and others.

- Providing administrative support, handling correspondence and scheduling meetings and facilities.

## PHASE 5: DEVELOPMENT

The physical development and testing of a system requires a known hardware and software environment (database, operating systems, minicomputer, LAN, etc.). The tasks and activities in this phase are used to create or modify application or conversion programs, files or databases, and to make any necessary modifications to purchased software packages. Documentation is generated or prepared for the new/modified programs as they are developed. As needed, data conversion programs are developed, tested, and validated for subsequent use during implementation. Testing is performed as the information system is developed to ensure that it will perform as specified.

This phase provides for the following:

Mandatory **DELIVERABLES**

- Physical Files and/or Databases
- Tested (executable code) Application Programs with Documented Test Results
- Users Documentation
- Operations Documentation
- User Acceptance Test Criteria, Plan and Data
- Tested Information System with Documented Test Results
- Formal Review Comments and Documentation
- Revised Project Plan
- User Acceptance Test Documentation and Approvals
- Written Approval of the Deliverables
- Written Approval to Proceed

Conditional  
Mandatory **DELIVERABLES**

- Tested Source and Executable Conversion Programs
- Conversion Data
- Application Programs Source Code
- Training Plan
- Final Organizational Structure, Functions and Personnel Documentation
- Tested Integrated Information Systems with Documented Test Results

**Optional DELIVERABLES**

- Project Team Meeting Documentation

**Task  
Number**

**Tasks/Activities**

**5.10**

**BRIEF PROJECT TEAM**

This phase must always be conducted by a project team. The project team may be the same as a project team used for previous phases, or a new team may be constituted. Contract assistance, if used, should be represented on the project team. The project team may consist of one person. Users will be represented on all project teams and a user will serve as the project manager whenever practicable. This task will be

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used as needed to schedule any project team meetings deemed necessary by the project manager and to record the results of such meetings.

Activities could include, but are not limited to:

- Reviewing and discussing progress to date including the deliverables from previous phases.
- Reviewing and discussing project control and reporting requirements.
- Reviewing and identifying any systems developmental methodologies, tools and techniques that will be used by the project team in the course of their work.
- Reviewing and identifying any standards, policies or guidelines on documentation, forms, reporting, etc. that are applicable to the project.
- Making project team assignments.

**Deliverable: *PROJECT TEAM MEETING DOCUMENTATION***

**5.20 MODIFY TECHNOLOGY ENVIRONMENT**

This task is used as needed to modify the operating environment (e.g.: hardware, operating systems, database management systems, etc.) to meet the requirements of the system. Changes to the environment must be subjected to acceptance testing.

Activities could include, but are not limited to:

- Coordinating the installation of new information technology resources.
- Designing acceptance testing criteria.

**5.30 TEST TECHNOLOGY ENVIRONMENT**

This task is used as needed to subject the agency's revised operating environment to acceptance testing.

Activities could include, but are not limited to:

- Generating the test data and performing the acceptance testing.
- Verifying the suitability, completeness and accuracy of the information technology environment.

**5.40 Mandatory GENERATE PHYSICAL FILE STRUCTURES**

This task will be used as needed to design and create new physical file structures or modify existing file structures to meet the system requirements for the selected hardware and software environment.

Activities could include, but are not limited to:

- Designing and generating new test/production physical databases.
- Modify and generating revised test/production physical databases.
- Designing and creating or modifying test/production physical system files and tables.

- Installing purchased test/production file structures.

Deliverable: ***PHYSICAL FILE STRUCTURES***

**5.50**

*Conditional*  
**Mandatory**

**PERFORM DATA-CONVERSION**

This task will be used as needed to complete all items on the Conversion Plan developed in the Design Phase. Records and files are converted to the format and structure required by the new/modified application programs. Once converted, the completeness, accuracy and consistency of the new files are verified.

Activities could include, but are not limited to:

- Installing and testing the data conversion equipment.
- Developing, testing and documenting any data conversion programs.
- Developing, testing and documenting any data entry conversion programs.
- As appropriate, training users on the use of the data entry programs.
- Converting existing records and files as required by the conversion schedule.
- Developing procedures which will ensure that the data conversion is orderly and timely and that the converted data are complete and accurate.

Deliverable: ***DATA FOR TEST AND/OR PRODUCTION FILES/DATABASES***

Deliverable: ***TESTED CONVERSION PROGRAMS***

**5.60**

*Conditional*  
**Mandatory**

**GENERATE APPLICATION PROGRAMS**

This task will be used to create all the needed new application programs, modify existing programs as documented, or to customize/modify purchased software as documented and generate the corresponding executable code. The amount of effort required to generate application programs is dependent on the number and complexity of the application programs to be created or modified and the availability, selection and use of systems development methodologies, tools and techniques. The use of automated tools in this task could be a continuation of the use of such tools from previous phases. Alternatively, such tools can be introduced to expedite the generation of application programs. Depending on the systems development methodologies, tools and techniques used, source code for some application programs may also be an appropriate deliverable for this task.

Activities could include, but are not limited to:

- Completing the detailed design documentation of all application program specifications.
- Developing new or modified application programs code.
- Modifying or customizing purchased software as needed.
- Generating machine executable code.

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Deliverable: *APPLICATION PROGRAMS SOURCE CODE*

Deliverable: *APPLICATION PROGRAMS EXECUTABLE CODE*

**5.70** *Mandatory* **PERFORM UNIT APPLICATION PROGRAM TESTING**

This task will be used to test each application program (developed, modified, purchased) for accuracy, completeness and reasonableness to ensure that it performs in accordance with the specifications and requirements. There are four steps to this task: preparing for the test; conducting the test; measuring the results of the test; and, as required, modifying the program and performing another test iteration.

Activities could include, but are not limited to:

- Preparing for the test as indicated and scheduled on the Unit, System and Integrated Systems Test Plan, including:
  - verify the availability of interfacing files, programs, and support software; and
  - preparing test data which checks normal conditions, error conditions, recovery capabilities, security factors, and timing requirements.
- Conducting the test by executing each program according to its unit test plan.
- Measuring and evaluating the test results, including:
  - verifying that each application program performs as specified; and
  - obtaining appropriate approvals for task completion.
- Modifying the program and its corresponding user/operations documentation and performing the necessary retests to verify that all identified problems or errors have been resolved.

Deliverable: *TESTED APPLICATION PROGRAMS EXECUTABLE CODE WITH DOCUMENTED TEST RESULTS*

**5.80** *Mandatory* **FINALIZE USER DOCUMENTATION**

This task will be used to finalize the content and format of user documentation (paper and/or automated) required to support the new, modified or purchased application programs.

Activities could include, but are not limited to:

- Revising and finalizing the content and format of user instructions on how to effectively use the new, modified or purchased application programs. User instructions should address such things as:
  - how to sign on or off the system;
  - how to invoke a transaction or program;
  - sample documents, forms, reports and screens;
  - data input edit criteria;
  - requesting information via inquiries or ad hoc reporting capabilities;

- how to exit from the application programs; and
- how to handle error or failure conditions.

Deliverable: ***USER INSTRUCTIONS DOCUMENTATION***

**5.90** *Mandatory* **FINALIZE OPERATIONS DOCUMENTATION**

This task will be used to finalize the content and format of operations documentation (paper and/or automated) required to support the new, modified or purchased application programs.

Activities could include, but are not limited to:

- Revising and finalizing the content and format of operations instructions for the new, modified or purchased application programs. Operations instructions should address such things as:
  - run instructions;
  - error codes and correction procedures;
  - work flows, including sample output reports and distribution lists; and
  - back-up and recovery instructions.

Deliverable: ***OPERATIONS INSTRUCTIONS DOCUMENTATION***

**5.100** *Conditional*  
*Mandatory* **DEVELOP TRAINING PLAN**

This task will be used as needed to develop a training plan that identifies who must be trained and when they must be trained. The scope of the training plan, the level of detail and the number of individuals that must be trained will be dependent on the number, size and complexity of the new, modified or purchased application programs.

Activities could include, but are not limited to:

- Determining training requirements including:
  - who must be trained (management, users, operations and maintenance staff);
  - what type of training is needed for each group;
  - the contents of the training for each group;
  - where the training will take place;
  - what equipment and facilities will be required; and
  - who will conduct the training.
- Preparing a user training plan that includes tasks, schedules, controls, responsible personnel and personnel to be trained.

Deliverable: ***TRAINING PLAN***

**5.110** *Mandatory* **DEVELOP USER ACCEPTANCE TEST CRITERIA, PLAN AND DATA**

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This task will be used to define the user acceptance test criteria and to develop the acceptance test plan. Normally this plan will be developed by users, with appropriate assistance from the development project team and should be similar to the Unit, Systems and Integrated Systems Test Plan.

Activities could include, but are not limited to:

- Identifying and documenting the acceptance testing criteria.
- Identifying the sources and types of data that are needed to meet the defined criteria.
- Defining and developing the actual test data and documenting the expected results for the acceptance test.
- Identifying the personnel, locations and equipment that will be included in the acceptance test.
- Developing the user acceptance test plan. The plan should specify personnel tasks, intervals of time, and testing dates.

**Deliverable: *USER ACCEPTANCE TEST CRITERIA & PLAN***

**Deliverable: *USER ACCEPTANCE TEST DATA***

**5.120** *Mandatory* **PERFORM SYSTEM LEVEL TESTING**

This task will be used to test all new, modified or purchased application programs as a group for accuracy, completeness and reasonableness to ensure that they perform in accordance with the specifications and requirements. There are four steps to this task: preparing for the test; conducting the test; measuring the results of the test; and, as required, modifying the programs and performing another test iteration.

Activities could include, but are not limited to:

- Preparing for the test as indicated and scheduled on the Unit, System and Integrated Systems Test Plan including:
  - verifying the availability of interfacing files, programs, and support software; and
  - preparing test data which checks such things as;
    - normal conditions,
    - error conditions,
    - recovery capabilities,
    - security factors,
    - timing requirements, and
    - user and operations instructions documentation.
- Conducting the test by executing each program according to its unit test plan.
- Measuring and evaluating the test results, including:

- verifying that each application program performs as specified; and
- obtaining appropriate approvals for task completion.
- Modifying the program and its corresponding user/operations documentation and performing the necessary retests to verify that all identified problems or errors have been resolved.

Deliverable: ***TESTED INFORMATION SYSTEM WITH DOCUMENTED TEST RESULTS***

5.130 *Conditional*  
*Mandatory*

### **FINALIZE ORGANIZATIONAL STRUCTURE AND PROCEDURES**

This task will be used as needed to finalize the agency's organizational structure required to support the new, modified or purchased applications programs.

Activities could include, but are not limited to:

- Finalizing and documenting the organizational structure needed to support the new or enhanced system.
- Completing the documentation for new positions including defining each position's functional responsibilities.
- Completing the documentation for new or additional functional responsibilities for existing positions.
- Preparing new and/or modified organizational charts and related descriptions.
- Documenting new and revised operating procedures for the organization.

Deliverable: ***FINAL ORGANIZATIONAL STRUCTURE, FUNCTIONS, AND PERSONNEL DOCUMENTATION***

5.140 *Conditional*  
*Mandatory*

### **PERFORM SYSTEM INTEGRATED TESTING**

This task is used as needed to verify the new, modified or purchased application programs perform as specified with other information systems. There are four steps to this task: preparing for the test; conducting the test; measuring the results of the test; and, as required, modifying the programs and performing another test iteration.

Activities could include, but are not limited to:

- Preparing for the test as indicated and scheduled on the Unit, System and Integrated Systems Test Plan including:
  - verifying the availability of interfacing files, programs and support software; and
  - preparing test data which checks such things as;
    - normal conditions,
    - error conditions,
    - recovery capabilities,
    - security factors,

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- timing requirements,
  - user and operations instructions documentation,
  - input data from other information systems is accurate and can be processed correctly,
  - output data from the new, modified or purchased application programs can be created and accepted and processed correctly by other information systems, and
  - procedures and timing considerations effecting interfaces with other information systems are complete and correct.
- Conducting the test by executing each program according to its unit test plan.
  - Measuring and evaluating the test results, including:
    - verifying that each application program performs as specified; and
    - obtaining appropriate approvals for task completion.
  - Modifying the program and its corresponding user/operations documentation and performing the necessary retests to verify that all identified problems or errors have been resolved.

Deliverable: **TESTED INTEGRATED INFORMATION SYSTEM WITH DOCUMENTED TEST RESULTS**

#### 5.150

#### VERIFY DEVELOPMENT

This task can be used to conduct an internal project team review of the development effort and its deliverables. This review could be accomplished by peer reviews or structured walk-throughs.

Activities could include, but are not limited to:

- Verifying the design and creation of the physical file structures.
- Verifying the results of the conversion task (test and production) are accurate and complete and that the conversion schedule will meet the implementation and training plans needs.
- Verifying that the users and operations instructions documentation is accurate and complete.
- Verifying systems test results to ensure the new, modified or purchased applications programs meet the defined requirements.
- Verifying any new organizational structure and procedures are consistent with the requirements and capable of handling the new or modified applications processing and maintenance requirements.

#### 5.160

Mandatory

#### CONDUCT FORMAL REVIEW

This task is used to conduct a formal agency review of the development effort. This review could be accomplished using steering committee reviews, external reviews or independent reviews. Participants could include management, user(s), information processing professionals, the project team, auditors, or contractors.

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Activities could include, but are not limited to:

- Reviewing the results of the development effort including:
  - test results; and
  - final users and operations instructions documentation to ensure completeness and accuracy.
- Reviewing the implementation and training plans including:
  - cost estimates; and
  - resource allocations.

**Deliverable: *FORMAL REVIEW COMMENTS AND DOCUMENTATION***

**5.170** *Mandatory* **REVIEW AND AS NEEDED REVISE PROJECT PLAN**

The project plan will be reviewed and revised as needed to include all appropriate tasks, activities, deliverables and revised estimates on the time, cost, and resource (personnel, software and equipment) requirements needed to complete the project. This project plan should include tasks and activities through the Evaluation Phase.

Activities must include, but are not limited to:

- Reviewing and as needed revising the project task, activities and deliverables list.
- Reviewing and as needed revising the time and cost estimates including reasonable time increments for implementing long-term projects.
- Reviewing and as needed revising the resource allocation plan.
- Reviewing and verifying that tasks, activities and deliverables required by other plans (training, implementation) are accurately reflected in the project plan.

**Deliverable: *REVISED PROJECT PLAN***

**5.180** *Mandatory* **CONDUCT USER ACCEPTANCE TESTING**

This task will be used to conduct user acceptance testing as specified in the User Acceptance Test Plan.

Activities could include, but are not limited to:

- Conducting the test by executing all application programs according to the test plan.
- Measuring and evaluating the test results including:
  - verifying that all programs perform as specified; and
  - documenting all variances from expectations in programs or user instructions documentation.

**Deliverable: *USER ACCEPTANCE TEST DOCUMENTATION AND APPROVALS***

**5.190** *Mandatory* **OBTAIN APPROPRIATE APPROVALS TO ESTABLISH A PRODUCTION SYSTEM**

This task will be used to obtain the required agency approvals of this phase's deliverables, any deferred deliverables from the previous phase, and the approval to proceed with this project.

Activities must include, but are not limited to:

- Presenting all appropriate deliverables for approval.
- Obtaining approval to proceed. This is the agency's formal approval to allocate funds and resources to implement the new, modified or purchased application programs as a production system.

Deliverable: ***WRITTEN APPROVALS***

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**5.200** Mandatory **MANAGE PROJECT**

This is an ongoing task throughout the project. Activities are used to provide control and quality assurance for the project, establish project reporting requirements and milestones, and to provide for project administration. Project management activities should be referenced to, and evaluated against, the project plan.

Activities could include, but are not limited to:

- Monitoring progress against the plan.
- Revising the project plan(s) as required.
- Monitoring quality.
- Monitoring staff performance and providing supervision and guidance.
- Preparing progress reports and reporting on project progress.
- Scheduling and conducting periodic progress meetings with staff, users and others.
- Providing administrative support, handling correspondence and scheduling meetings and facilities.

## PHASE 6: IMPLEMENTATION

The tasks and activities in this phase are used to implement the accepted deliverables from previous phases into the agency's production environment. This phase should not be initiated prior to obtaining the required approvals from Phase 5.

This phase provides for the following:

Mandatory **DELIVERABLES**

- Pre-Production Verification Criteria and Plan
- Pre-Production Verification Data
- Pre-Production Verification Documentation or Check-List of Completed Activities
- Documented Pre-Production Verification Results
- Production Information System
- Written Implementation Complete Approvals

**Optional DELIVERABLES**

- Project Team Meeting Documentation
- Revised Project Plan

**Task  
Number**

**Tasks/Activities**

**6.10**

**BRIEF THE PROJECT TEAM**

This phase must always be conducted by a project team. The project team may be the same as a project team used for previous phases, or a new team may be constituted. Contract assistance, if used, should be represented on the project team. The project team may consist of one person. Users will be represented on the project team and a user will serve as the project manager whenever practicable. This task should be used as needed to schedule any project team meetings deemed necessary by the project manager and to record the results of such meetings.

Activities could include, but are not limited to:

- Reviewing and discussing progress to date including the deliverables from previous phases.
- Reviewing and discussing project control and reporting requirements.
- Reviewing and identifying any systems developmental methodologies, tools and techniques that will be used by the project team in the course of their work.
- Reviewing and identifying any standards, policies or guidelines on documentation, forms, reporting, etc. that are applicable to the project.
- Making project team assignments.

Deliverable: **PROJECT TEAM MEETING DOCUMENTATION**

**6.20**

Mandatory

**PREPARE PRE-PRODUCTION VERIFICATION CRITERIA, PLAN AND DATA**

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This task will be used to develop the plan and data needed to verify that the accepted information system's programs, files and databases have been properly established in the production environment.

Activities could include, but are not limited to:

- Developing the criteria and a pre-production verification plan. This could include such things as:
  - identifying and documenting on-line transactions codes that must be properly registered and executable and documenting add, retrieve, modify and delete actions that should be verified for all record types in the system's file structures; and
  - identifying the sources and types of data that are needed to verify the specific functions.
- Defining and developing the actual data needed for verification purposes.

Deliverable: ***PRE-PRODUCTION VERIFICATION CRITERIA & PLAN***

Deliverable: ***PRE-PRODUCTION VERIFICATION DATA***

### 6.30

*Mandatory*

#### **PREPARE FOR PRODUCTION**

This task will be used to make the final preparations for releasing the accepted information system for production use.

Activities could include, but are not limited to:

- Installing and testing any necessary equipment including;
  - coordinating the installation of all required equipment; and
  - coordinating and/or conducting tests of the equipment to verify fault-free operation.
- Implementing any new user organization changes and procedures.
- Training users and operations staff.
- Establishing a production implementation date.
- Establishing a backout strategy.
- Loading the new, modified or purchased programs and files and/or databases into the production environment in preparation for conducting the pre-production verifications.

Deliverable: ***PRE-PRODUCTION VERIFICATION DOCUMENTATION OR CHECK-LIST OF COMPLETED ACTIVITIES***

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**6.40** Mandatory **PERFORM PRE-PRODUCTION VERIFICATIONS**

This task will be used to perform all necessary verifications as specified in the pre-production verification plan.

Activities could include, but are not limited to:

- Executing the pre-production verification plan.
- Verifying systems operations and outputs are as specified and anticipated.
- Reviewing and verifying all results to ensure that the final supporting documentation is complete and that the accepted information system is ready to be released for production use. Documentation reviewed during this activity should include such things as:
  - the pre-production verification check-list;
  - user guides;
  - operations documentation; and
  - information systems documentation.

**Deliverable: *DOCUMENTED PRE-PRODUCTION VERIFICATION RESULTS***

**6.50** Mandatory **ESTABLISH A PRODUCTION SYSTEM**

This task will be used to implement the final procedures and the accepted information system into the agency's production environment.

Activities could include, but are not limited to:

- Implementing any needed security procedures.
- Establishing a production schedule.
- Establishing a reports distribution schedule.
- Implementing any needed back-up and recovery procedures.
- Establishing point-of-contact for problem determination and resolution.

**Deliverable: *PRODUCTION INFORMATION SYSTEM***

**6.60** **PERFORM PHASED IMPLEMENTATION, AS APPROPRIATE**

This task is used as needed to schedule any activities required for the phased implementation of the accepted information system.

Activities could include, but are not limited to:

- Installing and testing any necessary equipment including:
  - coordinating the installation of all required equipment; and
  - coordinating and/or conducting tests of the equipment to verify fault-free operation.
- Implementing new user organization changes and procedures.

- Training users and operations staff.
- Loading data into the new or modified files and/or databases, as scheduled.

#### **6.70 REVIEW AND AS NEEDED REVISE PROJECT PLAN**

The project plan should be reviewed and revised as needed to include all appropriate tasks, activities, deliverables and revised estimates on the time, cost, and resource (personnel, software and equipment) requirements needed to complete the project.

Activities could include, but are not limited to:

- Reviewing and as needed revising the project tasks, activities and deliverables list.
- Reviewing and as needed revising the time and cost estimates including reasonable time increments for implementing long-term projects.
- Reviewing and as needed revising the resource allocation plan.
- Reviewing and verifying that the tasks, activities and deliverables required by other plans (training, implementation) are accurately reflected in the project plan.

**Deliverable: REVISED PROJECT PLAN**

#### **6.80 Mandatory OBTAIN APPROPRIATE APPROVAL AND SIGN-OFF.**

This task will be used to obtain agency concurrence and approval that the implementation has been completed.

Activities must include, but are not limited to:

- Presenting all appropriate deliverables and plans for approval.
- Obtaining approval to proceed with the evaluation phase.
- Obtaining final approvals on successful implementation.

**Deliverable: WRITTEN IMPLEMENTATION COMPLETE APPROVALS**

#### **6.90 Mandatory MANAGE PROJECT**

This is an ongoing task throughout the project. Activities are used to provide control and quality assurance for the project, establish project reporting requirements and milestones, and to provide for project administration. Project management activities should be referenced to, and evaluated against, the project plan.

Activities could include, but are not limited to:

- Monitoring progress against the plan.
- Revising the project plan(s) as required.
- Monitoring quality.
- Monitoring staff performance and providing supervision and guidance.
- Preparing progress reports and reporting on project progress.

- Scheduling and conducting periodic progress meetings with staff, users and others.
- Providing administrative support, handling correspondence and scheduling meetings and facilities.

## PHASE 7: EVALUATION

This phase covers the tasks, activities and deliverables that are used to evaluate, measure and document the actual benefits of the accepted information system relative to the anticipated benefits. As a result of this evaluation, recommendations may be developed to enhance the usefulness or increase the effectiveness of information systems for the organization.

This phase provides for the following:

Mandatory **DELIVERABLES**

- Evaluation Plan
- Written Approval of the Evaluation Plan
- Written Approval to Perform the Evaluation
- Evaluation Report

**Optional DELIVERABLES**

- Evaluation Team Meeting Documentation
- Cost/Benefits Analysis Documentation

**Task  
Number**

**Tasks/Activities**

**7.10** Mandatory **PREPARE EVALUATION PLAN**

This task is used to define what is to be evaluated, how it will be evaluated, when it will be evaluated, and who will perform the evaluation. An individual, functional unit, or project team will be assigned responsibility for the evaluation.

Activities could include, but are not limited to:

- Preparing the evaluation task list and schedule.
- Preparing the time and cost estimates needed to conduct the evaluation.
- Preparing a list of special considerations, schedule changes or unique measurement tools and/or criteria that are applicable to the evaluation.

**Deliverable: *EVALUATION PLAN***

**7.20** Mandatory **OBTAIN APPROVAL OF EVALUATION PLAN AND AUTHORIZATION TO PROCEED**

This task will be used by agency management to review the evaluation plan, accept the plan (with amendments as needed), and to authorize the evaluation team to proceed with the evaluation.

Activities could include, but are not limited to:

- Presenting evaluation plan for approval.
- Obtaining approval to proceed.

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Deliverable: ***WRITTEN APPROVALS***

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**7.30** *Mandatory* **CONVENE THE EVALUATION TEAM**

This task will be used to assemble and orient the evaluation team. End users must be included on the evaluation team.

Activities could include, but are not limited to:

- Reviewing and discussing progress to date including the deliverables from previous phases.
- Reviewing and discussing project control and reporting requirements.
- Reviewing and identifying any systems developmental methodologies, tools and techniques that will be used by the evaluation team in the course of their work.
- Reviewing and identifying any standards, policies or guidelines on documentation, forms, reporting, etc. that should be considered as part of the evaluation process.
- Making assignments for accomplishing the evaluation tasks and activities.

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Deliverable: ***EVALUATION TEAM MEETING DOCUMENTATION***

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**7.40** **PREPARE A COST/BENEFITS ANALYSIS**

This task can be used as needed to develop a cost/benefits analysis of the accepted information system.

Activities could include, but are not limited to:

- Determining operational costs and estimated maintenance costs, for such things as:
  - hardware usage and/or maintenance;
  - operating systems and database software, etc.;
  - new or modified application programs maintenance;
  - personnel;
  - data preparation;
  - supplies;
  - telecommunications; and
  - utilities (air conditioning, electricity, etc.).
- Determining benefits including:
  - tangible and intangible benefits; and
  - providing a comparison to the original projected benefits.
- Comparing current costs versus current benefits.
- Comparing current cost/benefits analysis and original cost/benefits analysis projections.

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Deliverable: ***COST/BENEFITS ANALYSIS DOCUMENTATION***

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**7.50** Mandatory **EVALUATE EFFECTIVENESS**

This task will be used to evaluate the overall efficiency and effectiveness of the information systems as specified in the evaluation plan. This evaluation should include an overall assessment of the information systems capabilities to meet the users requirements and expectations.

Activities could include, but are not limited to:

- Executing the evaluation plan.
- Identifying major strong points.
- Identifying major and minor deficiencies.
- Identifying potential enhancements or recommendations that could correct identified deficiencies.

**7.60** Mandatory **PREPARE AND SUBMIT EVALUATION REPORT**

This task will be used to prepare the evaluation report for agency management.

Activities could include, but are not limited to:

- Preparing the evaluation report that documents such things as:
  - recommendations for improving performance and effectiveness;
  - major and minor deficiencies; and
  - cost/benefits analysis comparisons.
- Submitting the report to agency management and participating in the report review process.
- Obtaining approval(s) and taking appropriate action to implement the accepted recommendations.

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Deliverable: ***EVALUATION REPORT***

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**7.70** Mandatory **MANAGE PROJECT**

This is an ongoing task throughout the project. Activities are used to provide control and quality assurance for the project, establish project reporting requirements and milestones, and to provide for project administration. Project management activities should be referenced to, and evaluated against, the project plan.

Activities could include, but are not limited to:

- Monitoring progress against the plan.
- Revising the project plan(s) as required.
- Monitoring quality.
- Monitoring staff performance and providing supervision and guidance.

- Preparing progress reports and reporting on project progress.
- Scheduling and conducting periodic progress meetings with staff, users and others.
- Providing administrative support, handling correspondence and scheduling meetings and facilities.

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