

**MANAGEMENT
OBJECTIVE(S)**

To ensure that construction projects achieve a specified level of quality at a minimum of cost, and in compliance with state laws and rules.

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BACKGROUND

A small number of state agencies are responsible for administering the largest portion of the State's construction expenditures. These agencies include: Texas Department of Transportation, General Services Commission, Texas Parks and Wildlife Department, Texas Department of Mental Health and Mental Retardation, Texas Department of Criminal Justice, and the Texas Youth Commission. All institutions of higher education are responsible for their own construction planning and administration. It is therefore critical that adequate controls are in place to ensure the efficient use of these scarce resources.

Management's success in attaining its objectives is achieved by planning efficiently, controlling costs, managing schedules, and performing post-construction reviews.

Most state agencies are required to follow the procedures set out in Vernon's Texas Statutes and Codes Annotated, Civil Statutes, Title 20, Article 601b, State Purchasing and General Services Act for the planning and construction of any state-owned or state-funded facility. Exceptions to these requirements include institutions of higher education, Texas Department of Transportation, Texas Parks and Wildlife Department, Texas Department of Agriculture, and a few others (Sec. 5.13.). The exceptions are addressed in each of the entities' enabling legislation, as well as some other special provisions. Special provisions are included for the Texas Department of Mental Health and Mental Retardation and the Texas Department of Criminal Justice.

Sources of funding for state construction projects include general revenue, bond authorizations and sales, federal and local government grants and/or participation, private funds, endowments, or grants. Except for highway construction, which usually makes up the largest part of construction dollars spent, most major state entity construction projects are financed through bond authorizations and sales. Most institutions of higher education fund construction from sources other than general revenue and state bond sales. These sources usually include the Permanent University Fund (PUF), bonds issued by the institution, private grants and gifts, federal grants, and fees.

This module provides general information related to the construction planning and administration process but will focus on some basic specific controls that should be in place in every construction administration system at state entities. For additional information on contracting for services, see the [Procurement](#) module and [Contracting](#) module.

DEFINITIONS

Adequate price competition exists when two or more responsible, qualified vendors

(in alphabetical order)

submit appropriate, legitimate offers for a contract to be awarded to the lowest responsible bidder (Sharp, p. 166).

Addendum is a written or graphic instrument issued by the architect/engineer prior to the execution of the contract which modifies or interprets the bidding documents by additions, deletions, clarification, or correction. An addendum becomes part of the contract documents when the contract is executed (Thompson, p. 10.2).

Alternate bid is an amount stated in the bid to be added to or deducted from the amount of the base bid if the corresponding change in the work, as described in the bidding documents, is accepted by the entity. There may be multiple alternate bids, deductive as well as additive, on the bid proposal (Thompson, p. 10.2).

Application for payment is the contractor's certified request for payment of amount due for completed portions of the work and, if the contract so provides, for materials or equipment delivered and suitably stored pending their incorporation into the work (Thompson, p. 10.2).

A/E refers to the architect/engineer, usually in the context of the entity contracted with for the design of a facility or project.

Backcharge is a charge against a contract for work performed by others that was the responsibility of the party being charged, or for repair or correction of a situation that was caused by the party being charged.

Base bid specifications are the specifications listing or describing those materials, equipment, and methods of construction upon which the bid must be based (Thompson, p. 10.2).

A **bid** is an offer that, if accepted, binds the offerer to sell services or goods at a specific price, typically in response to a solicitation (Sharp, p. 166).

Bidding documents are the invitation to bid, instructions to bidders, the bid form, other sample bidding and contract forms, and the proposed contract documents including any addenda issued prior to the receipt of bids (Thompson, p. 10.2).

Builder's risk insurance is a specialized form of property insurance which provides coverage for loss or damage to the work during the course of construction. The contract documents will establish whether the contractor or the entity is responsible for providing this coverage (Thompson, p. 10.3).

A **bulletin** is a document issued by the A/E after the contract is awarded. It may include drawings and other information used to solicit a proposal for a change in the work. A bulletin becomes part of the contract documents only after being incorporated into a change order. A bulletin may also be referred to as a **request for change (RFC)** (Thompson, p. 10.3).

Certificate of insurance is a document that shows proof of insurance and is required by all state contracts for construction and design services from the prime contractor or A/E. Insurance coverage required by state construction contracts typically includes: workers' compensation, employers' liability, comprehensive general liability, comprehensive automobile liability, owner's protective liability, builder's risk, or other insurance as specified. (SAO, *Improving*, p. 10)

Certificate of substantial completion is a certificate prepared by the A/E on the basis of inspection stating that the work or a designated portion of the work is substantially complete as of a particular date. This establishes the date of substantial completion with respect to the responsibilities of the entity and the contractor for security, maintenance, utilities, damage to the work, and insurance (Thompson, p. 10.4).

A **change order** is a purchaser's written authorization to modify an existing purchase order or contract (Sharp, p. 166).

A **claim** is a request by a party to a design or construction contract for additional compensation for extra work performed. Extra work cited in a claim often is the result of a physical change or work conditions that prove to be more difficult than described in the solicitation (Sharp, p. 166).

Constructability reviews are the optimum use of construction knowledge and experience in planning, design, procurement, and field operations to achieve overall project objectives. Maximum benefits occur when people with construction knowledge and experience become involved at the very beginning of a project (Construction Industry Institute, *Constructability*, 1986).

A **cost analysis** is a review of the separate cost elements included in an offeror's cost proposal. It provides for the verification of cost data and an evaluation of cost elements including (Sharp, p. 166):

- the necessity for, and reasonableness of, proposed costs
- a technical appraisal of the contracts estimated labor, tooling and facilities requirements, and of the reasonableness of scrap and spoilage factors
- the application of approved rates for labor and other factors, such as indirect costs

Cost breakdown or **schedule of values** is a statement furnished by the contractor to the A/E and/or the entity reflecting the portions of the contract sum allocated to the various portions of the work and used as the basis for reviewing the contractor's application for payment (Thompson, p. 10.13).

Critical path method (CPM) is a charting of all events and operations to be encountered

in completing a given process, rendered in a form permitting determination of the relative significance of each event, and establishing the optimum sequence and duration of operations (Thompson, p. 10.6).

An **extra** is a term used to denote an item or work involving additional cost (Thompson, p. 10.7).

Fixed-price contracts contain a "ceiling" beyond which the entity bears no responsibility for payment. Long-term contracts of this type sometimes include escalation factors to allow for inflation (Sharp, p. 166).

Force account is a term used when work is ordered, often under urgent circumstances, to be performed without prior agreement as to lump sum or unit price cost, and is to be billed at the cost of labor, materials, equipment, taxes, insurance, etc., plus an agreed percentage for overhead and profit. May also be used to describe work performed by the entity's own forces in a similar manner (Thompson, p. 10.8).

Historically underutilized businesses, or "HUB", are minority- and women-owned businesses given special consideration under the law for the award of state contracts (Sharp, p. 167).

Indirect expense is overhead expenses such as general office expense indirectly incurred and not directly related to a specific project (Thompson, p. 10.8).

Labor burden overhead is typically the cost of federal and state employment taxes, such as Federal Old Age Benefits (Social Security Tax), state and federal unemployment taxes, and workers' compensation insurance. It can also include employer paid benefits such as holiday and vacation, medical, and retirement or pension programs administered by the employer or others. All of these costs added to the direct wages paid to an employee equal the total cost of the employee. This "burden", or overhead, is generally expressed as a percentage to be added to the direct cost of wages and salaries. As a rule, these costs can be passed on to the entity in contracts for construction and/or design when extra work or change orders are approved that involve direct labor (SAO, *Improving*, pp. 5-7).

Liquidated damages refers to a sum of money agreed by the parties to a contract to be paid as damages by the party who breaches all or part of the contract. The amount paid may be a percentage of a payment due the contractor or a fixed amount of money to be paid by the contractor for every day the breach is in effect (SAO, Contracting Module).

Low bid is a bid stating the lowest price for performance of the work in conformance with the bid documents (Thompson, p. 10.9).

Lowest responsible bidder is a bidder who submits the lowest bona fide bid and is considered by the entity and the A/E to be fully responsible and qualified to perform the work. According to competitive bidding laws applicable to Texas state agencies and

institutions of higher learning, this is the bidder the entity is obligated to contract with (notwithstanding rejection of all bids) (Thompson, p. 10.9).

Mechanic's lien is a lien on real property created by statute in all states in favor of persons supplying labor or material for a building or structure. The value of the lien is equal to the value of the labor or material supplied. Clear title to the property cannot be obtained until the supplier is paid for the labor or materials (Thompson, p. 10.10).

Negotiated procurement is a method of selecting a bid based on factors other than price, such as technical ability. After the bid is selected, negotiation is used to determine the final contract pricing, generally based on cost analysis. This is the prescribed method of procurement for architect/engineer services as well as for consulting services (Sharp, p. 167).

A **non-conforming report (NCR)**, or log, is an official record kept by the entity or the entity's representative at the construction site to record all of the items that are not in conformance or in compliance with the plans and/or specifications (SAO, *Improving*, p. 22).

Owner refers to the party contracting for professional or consulting services and/or construction, and for purposes of discussion here, is the state of Texas.

Owner's representative is the party that represents the Owner in an official capacity during the life of the construction project. It may be the architect/ engineer, or a consultant hired specifically for the purpose of representing the Owner, such as a construction management firm hired to manage the construction contract.

Partnering is a means of early disputes settlement, before claims are actually made by the contractor. It is a method of alternative disputes resolution (ADR) (SAO, *Improving*, p. 13).

Payment bonds are required on all state contracts for construction that exceed \$25,000 in value and are generally furnished only by the prime contractor to the state. This type of bond ensures that any and all outstanding material and labor costs associated with the project will be paid by the contractor's bond insurance underwriter in case the contractor defaults on the contract. (Vernon's Government Code, Title 10, Subtitle F, Chapter 2253, Amended, Sec. 1 of Acts 1993, 73rd Leg., Sec. A of Art. 5160)

Performance bonds are required on all state contracts for construction that exceed \$100,000 in value and are generally furnished only by the prime contractor to the state. This type of bond ensures that the project will be completed by the contractor's bond insurance underwriter, according to the original contract, in the event that the prime contractor defaults. (Vernon's Government Code, Title 10, Subtitle F, Chapter 2253, Amended, Sec. 1 of Acts 1993, 73rd Leg., Sec. A of Art. 5160)

Prequalification of bidders is the process of investigating the qualification of prospective bidders on the basis of their experience, availability, and capability for the contemplated project and approving qualified bidders for participation in the bidding process (Thompson, p. 10.11).

Price analysis is the process of examining and evaluating a proposed price without evaluating its separate cost elements and profit. It may be accomplished by the following comparisons (Sharp, p. 167):

- Comparison with other prices and quotations submitted.
- Comparison with published catalog or market prices.
- Comparison with prices set by law or regulation.
- Comparison with prices for the same or similar items.
- Comparison with prior quotations for the same or similar items.
- Comparison with market data.
- Comparison with independent estimates of cost developed by knowledgeable personnel within the buying organization.
- Comparisons using value analysis.
- Comparisons using visual analysis.

A **price-competitive approach**, in the public sector, is generally accomplished by sealed bids, opened at a specified time and place. This approach usually results in the contract award going to the lowest bidder and a fixed-price contract. This is generally the approach used to contract for the construction of a facility (Sharp, p. 167).

Prime contractor is the contractor awarded the bid and is generally referred to as the general contractor. If the entity decides to split the bid award between two or more contractors, the contractors would be collectively referred to as **multiple primes**.

Project cost is the total cost of the project including construction cost, professional and consulting fees, land cost, furnishings and equipment, financing and other charges.

A **proposal** is a written description of an offer by a contractor to perform specific services for a specified price and terms. A proposal is typically presented in response to a solicitation. A solicitation can also be referred to as a **request for proposal (RFP)** (Sharp, p. 167).

A **punch list** is an official detailed listing of items that need to be corrected, repaired, or added to bring the nearly completed facility in compliance with the contract. The listing is prepared by the entity and/or the A/E for the prime contractor near the end of the construction project, prior to the end-user occupying the facility. Failure of the prime contractor to address the items on the list would generally not preclude the end-user from occupying or making use of the facility. However, the entity would not release final funds to the prime contractor until all items were

satisfactorily addressed.

Reasonableness tests are administered to costs to determine whether their nature or amount does not exceed what would be incurred by an ordinarily prudent person in the conduct of competitive business (Sharp, p. 167).

Record set of drawings (also called “as-builts”) are the official file set of plans for the project. The contractor is usually required to maintain and update these plans monthly. These plans will document all deviations or changes made to the original plan design during the course of construction. They are used for maintenance, utility line locations, and future construction planning and are turned over to the entity at the conclusion of the project.

Request for change (RFC) see **bulletin**.

A **request for information (RFI)** is a written request from the prime contractor to the entity and/or the A/E seeking clarification of the intent of the plans and/or specifications, or seeking direction on matters that affect the construction which may not have been addressed by the plans or specifications.

Schedule of values (see **cost breakdown**).

(NOTE: For additional related information on definitions, see the SAO Methodology [Contracting](#) Module)

OVERVIEW OF THE PROCESS

The basic phases of the construction planning and administration process are described below:

1. PLAN THE INITIAL IDEA (Conceptual Planning Phase)

The **conceptual planning phase** is where the initial idea is conceived and feasibility studies, budgeting, and finance strategies are worked out. In this phase, the entity’s project management team is selected, conceptual designs are formulated and the professional design team, usually the A/E, is

selected.

2. DEVELOP PROJECT REQUIREMENTS (Project Development Phase)

In the **project development phase** (also called the planning and design phase), the entity's management team communicates the project's program requirements to the A/E. Subsequent planning documents are developed in predetermined stages, each stage with a higher degree of detail and completeness, until the plan meets the project objectives.

3. DEVELOP THE CONTRACT (Contract Development Phase)

The **contract development phase** actually is part of the project development phase. It is treated as a separate phase here because of important contract considerations that need to be included in the entity's agreements.

4. COLLECT AND EVALUATE BIDS (Bidding Phase)

In the typical fixed price construction contract, the **bidding phase** begins after all construction plans and specifications are completed. The entity begins soliciting qualified contractors to bid the project. When bids are received, they are tabulated and reviewed, contractors are evaluated for capability to perform the work, and a contract is awarded.

5. ADMINISTER THE CONSTRUCTION (Construction Admin. Phase)

The **construction administration phase** begins the actual building of the project and management and control of the process. Billings from the contractor, payments to the contractor, and changes to the contract are considered and dealt with according to the contract documents.

6. CLOSE OUT THE CONTRACT (Contract Closeout Phase)

The **contract closeout phase** occurs when the project is substantially completed or finished. This process begins with procedures that ensure the contractor has met all of the contractual requirements including satisfactory completion of punch lists, submittal of accurate record drawings, warranties, operation and maintenance manuals, final lien waivers, final accounting and settling the account.

PROCEDURES

Suggested procedures, organized according to the elements of a finding, are listed below. They should be expanded or tailored to fit the specific entity being reviewed.

Note: The following procedures and the process described above are normative, rather than prescriptive. That is, they represent "average" or baseline thinking since they assemble information which repeatedly appeared in the various resources used to prepare this module. Do not be too hasty or literal in applying a given criterion or procedural step to a specific entity. While omissions or variations may be obvious, judgment must still be used to determine whether such omissions or variations are material.

**Review criteria:
General criteria**

In general, the criteria established in V.T.C.S. Article 601b outlines the process that is required of all entities intending to construct a facility or facilities except those specifically exempted by the Article (Sec. 5.13.). General Services Commission (GSC) is charged with coordinating planning and administering all state construction projects for the entities that fall under 601b. For those exempted entities, a similar policy and procedure should be in place that at the minimum contains the same elements as 601b.

Vernon's Texas Statutes and Codes Annotated, Civil Statutes (V.T.C.S.)

Relevant Legislation

Relevant Legislation	Pertains to:
State Purchasing and General Services Act, V.T.C.S. Art. 601b (especially Article 1, General Provisions; Article 5, Building Construction Administration; and Article 15, Council on Competitive Government Definitions)	<ul style="list-style-type: none"> · Procedures which all state agencies (except those specifically exempted) must adhere to when planning to construct or renovate a facility(ies). · Includes requirements for contracting for construction services. · Outlines the entire planning process through completion of construction. · GSC authority to acquire real property and build or remodel for state buildings Historic structures consideration
Government Code Ch. 2251, Payment for Goods and Services	<ul style="list-style-type: none"> · Sets out the allowable time period the governmental entity has in which to make payment for goods and services, including contracts for construction, and professional and consulting services contracts. · Also outlines time requirements for vendors/contractors to make payments to their subcontractors (or suppliers) involved in the same contract with the state, discusses penalties for non-compliance, and discusses disputed payments
Government Code Ch. 2253, Public Work Performance and Payment Bonds	<ul style="list-style-type: none"> · Outlines requirements for performance and payment bonds to be furnished on public works projects, sets contract dollar limits for bond requirements. · Outlines information required to be obtained from the contractors or subcontractors. · Claim procedures defined. · Requires all bond forms used by the contracting entity to be approved by the Department of Insurance.
Local Government Code Ch. 271, Purchasing and Contracting	<ul style="list-style-type: none"> · Purchasing and contracting authority of municipalities, counties, and certain other local governments. (This includes school districts also.)
Family Code Ch. 14, Conservatorship, Possession and Support of Children	<ul style="list-style-type: none"> · Ineligibility of a person (or principal in a proprietorship, partnership or corporation) to bid or enter into state contracts to provide property, materials or services if that person is more than 30 days delinquent in paying child support.
V.T.C.S., Art. 249a, §§ 14-16	<ul style="list-style-type: none"> · Requirement of the state to hire professional architects and engineers for certain types of facilities rather than design without services of a professional

Relevant Legislation

Education Code, §§ 51.907	· Requires all contracts for construction at state colleges or universities to be competitive bid.
Government Code, Ch. 2254	· Professional and consulting services, definitions of professional services verses consulting services, requirements of selection of professional services verses consulting services, publication in Texas Register requirements, conflicts of interest.
Texas Administrative Code, TAC §§ 123.15.-16	· Selection of architect/engineer for professional services procedures.
S.B. 5, Acts 1993, 73rd Leg., Ch. 1051, Art. V, §§ 41, (General Appropriations Act)	· 73rd Legislature-Regular Session, maximum allowable fee schedule for architect/engineer contracts based on type of construction and size of project.
V.T.C.S. Art. 5159a	· Title 83, Labor. Note new law applicable to all contracts entered into on or after September 1, 1993. · Outlines requirements of the prevailing wage rate for labor in state contracts for construction
V.T.C.S. Art. 601b, § 1.03	· Historically Underutilized Businesses - HUB - Certification Procedures. Note GSC Certification Procedures and HUB Resources Directory

In any case, all construction administration systems should go through the same basic steps in the planning of any size project. At conceptual planning, a management team should be selected that will stay with the project through completion and closeout. This team should include at least one person with a considerable amount of first hand construction knowledge and experience. This person should be intimately involved in the planning process and provide feedback continually through the process as the official construction reviewer.

The construction reviewer performs the constructability function of the planning process. Constructability review is one of the most important functions of this process and it should be implemented at the earliest stage of planning. The Constructability review function is one of the key controls over project cost containment.

Throughout the planning stages, cost estimates should be continually developed and analyzed. The A/E should be charged with the responsibility to furnish cost estimates unless the entity has specific staff expertise in cost estimating. As cost estimates are prepared at each phase of the process, the costs should become more and more accurate as the level of plan detail increases. On projects in excess of \$2-\$5 million in value, or projects that are unusually complicated, costs estimates should be verified by independent consultants, in addition to the A/E estimates.

Realistic project schedules should be prepared. A combination of factors, not limited

to the following, should be included in all schedule preparations:

- soil conditions as determined by a soils test
- weather conditions specific to the geographical location of the project, taking into consideration the season in which the project will begin construction
- skilled labor availability relative to the geographical area
- equipment and material availability relative to when these will be needed in the schedule
- construction methods to be used

Every entity should have a project planning and management manual which is regularly reviewed and updated. Written policies and procedures should be in place for every step of the construction process. This includes specific documentation requirements for all phases.

Continuing training should be provided for all management staff and especially for inspection staff if the entity performs its own inspections. Communication and sharing of problems, solutions, and ideas should take place among the project management and inspection staff regularly.

Provision should be included in the contract with the A/E to hold the A/E accountable for gross design errors and omissions. These errors and/or omissions are determined throughout the bidding, construction administration, and contract closeout phases. The A/E should be back charged for costs incurred by the entity due to gross design errors and/or omissions.

A "lessons learned" file should be kept throughout all phases of the construction process so that mistakes, discrepancies, problems, etc., can be formally documented. The information accumulated in this file should be used in all subsequent project planning as applicable.

Specific criteria

The detailed criteria related to the phases below are discussed in Appendix A: Detailed Specific Criteria.

1. PLAN THE INITIAL IDEA (Conceptual Planning Phase)

There are several steps included in the **conceptual planning phase**. Specific criteria are listed here for each of these steps. These steps include:

- 1.A. *select management team*
- 1.B. *establish a constructability review program*
- 1.C. *develop a needs assessment*
- 1.D. *define the project objectives*
- 1.E. *perform feasibility studies and a project analysis*
- 1.F. *considerations for design team contracts*
- 1.G. *select design team*

2. DEVELOP PROJECT REQUIREMENTS (Project Development Phase)

The next phase is the **project development phase**. When this phase begins, the A/E has already been selected. The steps in the phase are spelled out in the A/E's contract. The A/E systematically follows a series of steps that become increasingly detailed. The A/E begins with the programmatic needs of the entity or the end user, which may only be a listing of building use areas and number of people occupying those spaces. The A/E translates the programmatic needs into scaled drawings. These steps include:

- 2.A. *programmatic needs development*
- 2.B. *schematic design*
- 2.C. *design development*
- 2.D. *specification development*
- 2.E. *construction drawings*

3. DEVELOP THE CONTRACT (Contract Development Phase)

The **contract development phase** overlaps with the project development phase. This phase includes the following steps:

- 3.A. *select type of contract*
- 3.B. *contract language development*

4. COLLECT AND EVALUATE BIDS (Bidding Phase)

There are two general steps in the **bidding phase**:

- 4.A. *solicit bids*
- 4.B. *award bids.*

5. ADMINISTER THE CONSTRUCTION (Construction Admin. Phase)

The **construction administration phase** contains key controls to help ensure effective project management. The steps in this phase include:

- 5.A. *Development of written policies and procedures*
- 5.B. *Documentation and filing systems*
- 5.C. *Claims review*
- 5.D. *Statutory compliance monitoring*
- 5.E. *Inspections*
- 5.F. *Change order processing*
- 5.G. *Monitoring the schedule*
- 5.H. *Communication with end-user*

6. CLOSE OUT THE CONTRACT (Contract Closeout Phase)

The three steps of the contract closeout phase include:

- 6.A. closeout procedures
- 6.B. final accounting
- 6.C. project evaluation

**Assess Condition:
Determine the actual
process used**

Conduct interviews, observe operations, and identify and collect available documentation in order to gain an understanding of the entity's actual construction planning and administration process and controls. Included in the actual process are both official/unofficial and formal/informal processes and controls. An official process may exist even if it is not documented. Possible procedures include, but are not limited to:

- Determine where the construction planning and administration process resides in the entity, who participates in the process, and how the participants are selected.
- Obtain and review any manuals, policies, and forms that document any phase of the construction planning and administration process, including its relationship to entity goals, objectives, strategies, and plans.
- Determine if and how management consciously selects and employs the assumptions, criteria, methods, processes, and techniques used in the construction planning and administration process. Obtain and review available documentation on the assessment of risks, costs, and benefits.

Obtain documents from each phase of the construction planning and administration process and review for content and quality. The following listing, by phase, may be helpful in gaining an understanding of the condition. Note that this is not a complete listing of all documentation. There may be variations of the following documents, as well as other project specific documents. This is the basic listing of documents to look for:

PLAN THE INITIAL IDEA (Conceptual Planning Phase)

- policies and procedures manual relating to planning, site selection, and selection of architects and engineers
- project analysis
- all preliminary project planning files, including feasibility studies, alternative plans, cost estimates, and correspondence
- documentation of the A/E selection process used
- geotechnical reports on the proposed site
- documentation of the project site selection process
- contracts with A/E and other professional or consulting services
- site acquisition analysis
- planning meeting minutes
- board/commission meeting minutes if applicable

DEVELOP PROJECT REQUIREMENTS (Project Development Phase)

- schematic design planning documents and cost estimates
- design development planning documents and cost estimates
- documentation of significant design changes that have occurred after the design development documents have been finalized or nearly finalized
- A/E billings, invoices, and contracts as well as other professional and consulting services invoices and contracts
- planning meeting minutes
- board/commission meeting minutes if applicable

DEVELOP THE CONTRACT (Contract Development Phase)

- all internal and external correspondence and communication, especially with board/commission, general and legal entity staff

COLLECT AND EVALUATE BIDS (Bidding Phase)

- invitation to bid
- instruction to bidders
- contractor prequalification files (if required for bidding project) or contractor qualification evaluation (if required after bidding project for contract award)
- documentation of bid advertisements and public notices
- bid set of drawings and specifications, including general and supplemental general conditions
- contract addendum
- successful and unsuccessful bidders proposals
- bid tabulation sheet
- executed construction contract
- documentation of bid analysis for determination of the lowest and best bidder
- modifications, exhibits, attachments, etc.
- originals of all executed bonds required
- pre-award submittals
- minutes of any pre-bid conferences
- minutes of bid opening meeting
- official notice to proceed document
- board/commission meeting minutes where bid award action occurred

ADMINISTER THE CONSTRUCTION (Construction Admin. Phase) (Note: Some documents will be located at the project site, unless the project is complete, in which case all documents would be located at a central filing point.)

- construction administration, inspection, and testing manuals (the entity's written policies and procedures)
- records showing all project expenditures
- schedule of values or bid breakdown form the contractor

- change orders with supporting data and analysis attached
- field order schedule
- pricing proposal log and status
- contractor/subcontractor labor overhead break down schedule
- contract payment applications with supporting documentation, from the contractor, the A/E, and any consultants involved
- A/E bulletins and/or supplemental instructions
- daily job report or log (located at project site)
- photographic records of inspections
- non-conformance or non-conforming report (NCR) (usually located at project site)
- request for information (RFI) log and files (usually located at project site)
- prevailing wage verification documents, certified payrolls
- HUB monitoring documents
- deviation request file (record of requests for deviation from the plans and/or specifications by the contractor)
- inspection reports (sometimes will be included in the daily job report, usually located at project site)
- submittals, shop drawings, cut sheets and the submittal tracking log (usually at the project site)
- record drawings or "as-builts" (usually located at the project site or turned over to the end-user at completion)
- partial and final lien waivers from contractors and subcontractors
- all project correspondence
- scheduling documentation (CPM schedules or Pert charts) and evidence of regular updates
- monthly project reports
- safety logs or reports (usually located at the project site)
- claims files and correspondence
- minutes from weekly or monthly project meetings (usually located at the project site)
- contractor and subcontractor payroll reports showing spot checks by the entity indicating wage rate compliance
- insurance certificates, policy endorsements, or policies
- insurance certificate policy monitoring schedule
- test results from material testing labs, such as: soil quality, soil compaction results, concrete strength, weld quality and any other materials or processes that the specifications require to be tested

CLOSE OUT THE CONTRACT (Contract Closeout Phase)

- contractor/subcontractor warranties
- checklist of all warranties and operating and maintenance manuals required by the contract showing verification that these items have been received
- punch list showing satisfactory completion or resolution of all items
- all applications for payment and final accounting documents

- design evaluation
- documentary evidence that the end-user received all warranties, operating and maintenance manuals, required training or instruction in operation of equipment, and finish material schedule
- notice of completion, certificate of substantial completion, or certificate of beneficial occupancy
- correspondence with contractors and manufacturers

In addition to gaining an understanding of the actual process, also try to find out:

- how the participants view the actual process
- what parts of the process they see as successful or unsuccessful and why
- what they think is important about the process and why

This information may help identify causes and barriers.

Determine the strengths and weaknesses of the actual process

Using the tailored criteria, the understanding of the entity's process gained above, and the procedures in this section, analyze the actual process to determine if it:

- is designed to accomplish the management objective(s) (this module, page 1)
- has controls that provide reasonable assurance that the process will work as intended
- is implemented and functioning as designed
- is actually achieving the desired management objective(s)

Suggested procedures for each of these four analysis steps are detailed below. In executing these procedures, remember to identify and analyze both strengths and weaknesses.

Identify and review the steps in the actual process to determine if the process is designed to accomplish the management objective(s). Possible procedures include, but are not limited to:

- Determine if all major steps in the criteria are included in the actual process. If steps are missing, determine if their absence is likely to have a materially negative effect on the construction planning and administration process at the entity you are reviewing.
- Determine if all the steps in the process appear to add value. If there are steps that do not appear to add value, try to get additional information on why they are included in the process.
- Review the order of the steps in the process to determine if it promotes productivity.
- Review the level of technology used in the process to determine if it is up-to-date and appropriate to the task. Besides computer, electronic, communications, and other mechanical technology, you should also consider what kinds of management technology are used (Gantt charts, process maps, decision matrices, etc.). See the [appendix](#) to the module on Problem-Solving and Decision-Making for more information.

Identify the controls over the process to determine if they provide reasonable assurance that the process will work as intended. These controls should be appropriate, placed at the right point(s) in the process, timely, and cost effective.

Possible procedures include, but are not limited to:

- Draw a picture of the process, the controls, and the control objectives (see the graphic of the procurement process in the [Introduction](#) for an example). Flowcharts of the construction planning and administration process can help identify inputs, processes, and outputs.
- Determine if the control objectives are in alignment with the overall management objective(s) (this module, page 1).
- Identify the critical points of the process (i.e., those parts of the process most likely to determine its success or failure or expose the entity to high levels of risk) and the controls related to them. Consider whether the controls are:
 - in the right location within the process (input, operations, output)
 - timely (real time, same day, weekly, etc.)
- Compare the cost of the control(s) to the risk being controlled to determine if the cost is worth the benefit.
- Determine what controls are in place for monitoring and evaluating the overall effectiveness of the construction planning and administration process and making sure that changes are made in the process if it does not yield the desired results.
- Identify, describe, and assess the process used to gather input from employees who might reasonably discover flaws in the process.

Review observations, interviews, documentation, and other evidence and design specific audit procedures as needed to determine if the process and/or the controls have been implemented and are functioning as designed. Depending upon the objectives of the project, these procedures may include both tests of controls and substantive tests. Possible procedures include, but are not limited to:

- Determine if any evidence of management override exists.
- Walk through the actual process, i.e., follow a transaction through the people and documents involved, and compare to the official process.

Review and analyze any reports used by the entity to monitor the outcome(s) of the construction planning and administration process and/or any other information available to determine if the process is actually achieving the desired management objective(s) (this module, page 1). Possible procedures include, but are not limited to:

- Analyze these process reports over time for trends.
- Discuss any apparently material negative or positive trends with management.
- Determine if and how management acts upon these trend reports and what changes, if any, were made in the process or controls as a result. Some process refinements, especially those affecting entity mission, goals, and

outcome measures, may need to wait until the next appropriation cycle.

Red Flags

Following is a listing of some potential weaknesses that are not uncommon in each of the six phases of the construction planning and administration process (*Improving*, pp. 33-34.):

Plan The Initial Idea (Conceptual Planning Phase):

- Controls over selection process for professional and consulting services are inadequate and documentation is lacking.
- There is no evidence of fee negotiations with professional and/or consulting service providers - the entity may be paying too much in fees compared to other entities.
- Formal conflict of interest policies have not been developed.
- Relationships with contractors or professional and consulting service could be a basis for conflict of interest.

Develop Project Requirements (Project Development Phase):

- Labor burden overhead rates for additional services provided and billed by the architect/engineer or consultant are not verified.
- Specifications contain restrictive requirements for the source of products which could lead to potential sole-source purchasing violations.
- Billings for additional services and/or reimbursibles from the architect/engineer or consultant lack supporting documentation, or are not in accordance with the contract provisions.
- Relationships with contractors or professional and consulting service could be a basis for conflict of interest.

Develop The Contract (Contract Development Phase):

- Right of audit provision in the contract is non-existent or needs strengthening.
- Formal conflict of interest policies have not been developed.
- Contract definitions and terminology are not written adequately to protect the entity's interests.
- Relationships with contractors or professional and consulting service could be a basis for conflict of interest.
- Language in the insurance certificates may not obligate the carriers to notify the entity of cancellation or material changes to the policy.
- Contract language regarding insurance notification needs to be strengthened.
- Policy endorsements naming the entity as additional insured are not required.
- Boilerplate specifications are used and are not adequately adapted to the specific needs of the project.

Collect and Evaluate Bids (Bidding Phase):

- No written procedures exist for the competitive bidding process.
- Procedures for the bidding process are in place but they are not used or are

- circumvented.
- Staff does not keep adequate documentation due to the large number of projects it's managing.
- The entity only uses the contractor's ability to bond a project as the determining factor for allowing it to bid or to enter into contract with.
- Relationships with contractors or professional and consulting service could be a basis for conflict of interest.
- The entity does not adequately analyze the contractor's ability to complete the project (e.g. contractor size, experience, and/or other qualifications).

Administer The Construction (Construction Admin. Phase):

- Material, equipment, and labor costs are not properly or accurately recorded on in-house remodeling/repair/construction projects (projects performed by the entity's maintenance staff).
- Inspectors' daily reports are incomplete and do not document all inspections because of heavy workload.
- Change order pricing is not properly analyzed: "it looks like the cost is in line".
- Staff reviewing change orders do not have sufficient training in cost estimating.
- There is no dollar amount threshold for staff to approve change orders.
- Labor burden overhead rates are accepted from contractors without verification because "it looks in line".
- Change orders are not being priced in accordance with the procedure in the specifications.
- Labor burden overhead rates are not being checked on A/E or consultant billings for additional services or time and material billings.
- Construction products or methods are informally being approved without checking to see if any credits are due the entity.
- Relationships with contractors or professional and consulting service could be a basis for conflict of interest.
- Contract deficiencies are not being resolved and have the potential to negatively affect the schedule.
- Workers' compensation insurance policies for the contractor and major subcontractors are not being monitored for expiration dates.

- Workers' compensation, general liability, auto and/or other insurance coverage amounts required by the contract are not being provided by the contractor or architect/engineer.
- Contract requires policy endorsements naming the entity as additional insured, but the entity does not monitor or enforce these provisions.
- Clerical staff responsible for maintaining insurance files are not sufficiently trained or are unfamiliar with what the contract requires.
- Oversight of construction activities is weak due to inadequate inspection staff. Staff are overloaded with too many projects to inspect.
- Project managers have too many projects to adequately handle.

- The project is schedule driven. Management's focus is on schedule completion and not on oversight, cost control, quality assurance and quality control.
- Deviations from the contractual requirements occur without proper documentation.
- Management relies too heavily on the A/E to administer the contract and make decisions on contract changes.
- Management does not identify and quantify the cause of change orders.

Close Out The Contract (Contract Closeout Phase):

- Equipment/furnishings provided in the construction contract are not capitalized.
- Relationships with contractors or professional and consulting service could be a basis for conflict of interest.
- Closeout procedures in the manual are thorough, but in practice, are not consistently followed.
- Closed out project field files are not promptly sent to the central office for permanent filing.

Determine causes

Determine what circumstances, if any, caused the identified weaknesses in the construction planning and administration process. Possible procedures include, but are not limited to:

- Determine if the participants in the construction planning and administration process understand the entity's mission, goals, and values and support them through their management of the construction planning and administration process.
- Determine if the participants understand both the purpose of and their role in the Construction planning and administration process.
- Determine if the relationship between the construction planning and administration process and other entity processes is clear.
- If the process occurs at multiple locations, determine the nature and scope of the communication and coordination among them.
- Determine if the construction planning and administration process has adequate human, dollar, time, information, and asset resources. If they appear inadequate, determine if entity resources have been allocated according to the materiality of the construction planning and administration process relative to other entity processes.
- Determine if the entity has considered using alternative resources such as industry associations, non-profit organizations, academic institutions, or other governmental entities to meet its resource needs.
- Determine if resources available to the construction planning and administration process have been allocated and used in a manner consistent with the importance of that resource to the construction planning and administration process.
- If there are negative trends in the reports used to monitor the outcome(s) of

the construction planning and administration process, determine if these reports are communicated to and used by the appropriate parties to modify the process.

Determine what internal or external constraints or barriers, if any, must be removed in order to overcome these identified weaknesses. Possible procedures include, but are not limited to:

- Review the applicable entity, state, or federal laws or regulations to determine if any of them prevent the necessary changes from being made in the construction planning and administration process.
- Determine if any key employees are unwilling to change the process and why they are unwilling.

Determine effect

Compare the actual entity process to a recommended alternative process(es) and determine if each weakness in the entity process is material. Alternatives can be developed by using the criteria contained in this module, applying general management principles to the process, using the processes at comparable entities, etc. Materiality can be measured by comparing the dollar cost, impact on services (either quantity or quality), impact on citizens, impact on the economy, risks, etc., of the actual process to the recommended alternative process(es). Measurements can be quantitative, qualitative, or both. Possible procedures include, but are not limited to:

- Identify performance benchmarks (industry standards, historical internal data, other comparable entities, etc.) for the process in question and compare to actual performance. Measure the difference, if possible. Include the cost of the additional controls or changes in the process.
- Estimate the cost of the actual process and the alternative process(es) and compare.
- Estimate the quantity and/or quality of services provided by the actual process and by the alternative process(es) and compare.
- Identify the risks associated with the actual process and with the alternative process(es). Measure and compare the risks.

Develop recommendations

Develop specific recommendations to correct the weaknesses identified as material in the previous section. In developing these recommendations, consider the tailored criteria, kind of process and control weaknesses identified, causes and barriers, effects, and additional resources listed at the end of this module. Possible procedures include, but are not limited to:

- Identify alternative solutions used by other entities.
- Identify solutions for removing barriers.
- Provide general guidelines as to the objectives each solution should meet; then the entity can tailor the solution to its specific situation.
- Provide specific information, if available, on how each recommendation can be implemented.

RESOURCES

The Construction Industry Institute (CII). *Constructability, A Primer*. Austin, July 1986. Available from CII or the University of Texas at Austin Engineering Library.

Books

A Report from Texas Performance Review: Behind the Walls, The Price and Performance of the Texas Department of Criminal Justice. Texas Comptroller's Office, John Sharp, April 1994. Location: SAO Library.

The Construction Industry Institute. *Guidelines For Implementing A Constructability Program*. Third printing, Austin, 1990. Location: CII or the University of Texas at Austin Engineering Library.

Courtenay Thompson & Associates and R. L. Townsend & Associates. *Effective Auditing of Construction Activity*. Dallas, 1993. Location: SAO Library.

Courtenay Thompson & Associates and R. L. Townsend & Associates. *Controlling Construction Costs*. Dallas, 1994. Location: SAO Library.

Fisk, Edward R., P.E. *Construction Project Administration*. Third edition, New York: John Wiley & Sons, 1988. Available from the University of Texas at Austin Engineering Library. (Excerpts from this book are located in the Methodology Project Information Resources Folders.)

Tenah, K. A., Ph.D., M.ASCE. *How Is An Excellent Inspector Developed?*. From *Quality of Inspectors - In Search of Excellence*. New York: American Society of Civil Engineers, 1986. Available from the University of Texas at Austin Engineering Library.

Pecarich, Frank J. *A Breakthrough In Training Construction Inspectors*. From *Quality of Inspectors - In Search of Excellence*. New York: American Society of Civil Engineers, 1986. Available from the University of Texas at Austin Engineering Library.

The Business Roundtable. *Administration And Enforcement Of Building Codes And Regulations*. Report E-1, New York, 1982. Location: Lucien Hughes' files.

Hawkins, Harold L., Ed.D., Texas A & M University and H. Edward Lilley, Ph.D., West Virginia University. *Guide For School Facility Appraisal*. Council of Educational Facility Planners, International, Columbus, 1992. Location: Methodology Project Information Resources Folders.

Construction Law for the Public Sector, The Office of the Attorney General, May 1994 Conference. Available from the SAO Library.

The Office of the Attorney General, *Construction Law for the Public Sector*, November 1993 Conference. Available from Lucien Hughes' files.

Other documents to look at: The General Services Commission Standard Form of Agreement Between Architect/Engineer; The General Services Commission Uniform General Conditions for Construction Contracts. Location: Methodology Project Information Resources Folders.

Construction publications source: Construction Bookstore, Box 2959, Gainesville, Florida, 32602-2959, (800) 253-0541 (catalog of publications - *Construction Savvy*) Location: Methodology Project Information Resources Folders (copy of one sample catalog).

FMI Corporation. *Partnering Challenge*. 1993. Location: Methodology Project Information Resources Folders.

Brown, Douglas S., *An Audit Approach for Construction Project Subcontracts*, Internal Auditor, April 1987, pp. 34-37. Location: Methodology Project Information Resources Folders.

Hubling, Paul R., *Auditing Time and Material Contracts at Bethlehem Steel*, Management Accounting, September 1994, pp. 52-55. Location: Methodology Project Information Resources Folders.

Townsend, Richard L., *Contracting for Construction Projects*, Internal Auditor, June 1993, pp. 41-45. Location: Methodology Project Information Resources Folders.

Tarricone, Paul, *Howdy, Partner*, Civil Engineering, March 1992, pp. 72-74. Location: Methodology Project Information Resources Folders.

Business Roundtable, *Improving Construction Safety Performance*, Report A-3, January 1982.

The National Institute of Governmental Purchasing, Inc., *Public Purchasing and*

Articles

Materials Management, 1983.

Courtenay Thompson & Associates, *Agreement Between Owner and Contractor*, AIA Document A111 Revised

Human Resources

The following staff members have specialized training or ongoing interest in the construction process:

SAO Employee	Title/Function
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Will Hirsch, CPA Robin Key, CPA	Module Writers/Editors
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Professional Associations and Research Entities

Project Management Institute, P.O. Box 43, Drexel Hill, Pennsylvania, 19026-0043, (215) 622-1796. Austin chapter meets monthly, various seminars offered throughout the year on project management. Local address: P.O. Box 151254, Austin, Texas 78716-1254.

Construction Industry Institute (College of Engineering, The University of Texas at Austin), 3208 Red River, Austin, Texas, 78705-2650, (512) 471-4319. NOTE: This is an excellent resource for every facet of the construction process.

American Society of Civil Engineers, 345 East 47th Street, New York, New York, 10017-2398

Associated General Contractors (AGC), 609 S. Lamar, Austin, Texas, 78704, (512) 442-7887 (Austin chapter).

Institute of Internal Auditors, 249 Maitland Avenue, Altamonte Springs, Florida, 32701-4201, (407) 830-7600.

American Institute of Architects (AIA), 1206 W. 38th Street, Austin, Texas, 78705, (512) 452-4332 (Austin Chapter).

Texas Engineering Extension Service (The Texas A&M University System), College Station, Texas, 77843-8000, (409) 845-2559.

The National Institute of Governmental Purchasing, Inc., 115 Hillwood Avenue, Falls Church, Virginia, 22046, (703) 715-9400.

Southern Building Code Congress International, Inc., Southwest Regional Office, 3355 Bee Caves Road, Suite 202, Austin, Texas, 78746, (512) 327-8278

Building Officials Association of Texas, 1601 Rio Grande St., Austin, Texas 78701, (512) 479-0425.

Council of Educational Facility Planners, International, 941 Chatham Lane, Suite 217, Columbus, Ohio, 43221, Ph. (614) 442-1811.

Related Modules and Reports

Contracting
Procurement

SAO Report 95-031: *Improving the Construction Process*, November 1994.

SAO Report 95-033: *The Life Management Center for Mental Health and Mental Retardation Services of El Paso*, December 1994

SAO Report 94-142: *Follow-Up on Prison Construction in Texas*, August 1994.

SAO Report 94-135: *Follow-Up on Management Controls at the State Preservation Board*, July 1994.

SAO Report 3-033: *Prison Construction in Texas*, January 1993.

SAO Report 92-021: *Follow-Up Report to the Management Control Process at the State Preservation Board*, November 1991.

SAO Report 92-039: *An Overview of Construction in Texas: Getting the Most for Our Dollars*, January 1992.

SAO Report 90-016: *A Briefing Report to the State Preservation Board*, 1989.

Training

Construction Industry Institute, College of Engineering, University of Texas at Austin, 3208 Red River, Suite 300, Austin, Texas 78705, phone (512) 471-4184. Various courses offered throughout the year for owners, architects, engineers and people in project management.

Courtenay Thompson & Associates, 10,000 North Central Expressway, Suite 1006, Dallas, Texas 75231, phone (214) 361-8346. Construction auditing and consulting, training courses held in Dallas at various times during the year. This firm is contracted by the IIA to do training at its seminars and conferences. Important courses to consider:
Effective Auditing of Construction Activity
Controlling Construction Costs

Institute of Internal Auditors (IIA), 249 Maitland Avenue, Altamonte Springs, Florida 32701-4201, phone (407) 830-7600. Check courses offered throughout the year in Texas and other states.

Office of the Attorney General of Texas, Price Daniel Sr. Building, Austin, Texas 78701, phone (512) 463-2100. *Construction Law for the Public Sector*, annual conference held in Austin. Call to get information on the next session.

Project Management Institute (PMI), P. O. Box 43, Drexel Hill, Pennsylvania 19026-0043, phone (215) 622-1796. Austin chapter meets monthly, various seminars offered throughout the year on project management. Local address: P.O. Box 151254, Austin, Texas 78716-1254. Local phone number 385-3646.