TEXAS
Health and Human Services

ATTACHMENT D

ARCHITECTURAL/ENGINEERING GUIDELINES, HHSC MAINTENACE AND CONSTRUCTION

ARCHITECTURAL/ENGINEERING GUIDELINES

TEXAS HEALTH & HUMAN SERVICES COMMISSION

MAINTENANCE AND CONSTRUCTION

FEBRUARY 2014

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1 GENERAL GUIDELINES

1.1 PURPOSE

The purpose of these guidelines is to assist architects and engineers in delivering to the Texas Health and Human Services Commission (HHSC) professional services which result in:

- **Buildings of high quality**, measured by project objectives, environmental and health impacts, resource efficiency and long-term owner experience;
- **Cost-effective use of professionals services;** and
- **Documentation** that facilitates project decision-making, economy in construction, and continuous, efficient facility management.

The Owner is charged with creating and protecting long term value in the public's investment for housing the functions of government. The Architect/Engineer's (A/E) perspective on state projects shall begin with effectively supporting those functions, and will require awareness and evaluation of life-cycle costs in design. The value expected in public projects includes not only appropriate levels of performance at the best price, but also avoidance of future and indirect public costs from toxic by-products, excessive energy or water consumption and unnecessary waste in manufacturing, transporting, using and maintaining building systems and components.

1.2 ORGANIZATION

The State of Texas acting through the **Texas Health and Human Services Commission** (HHSC) as an agent for the **Owner Agency** is herein called the **Owner** for capital construction projects.

The Owner is represented in its capital construction projects by a **Maintenance & Construction (M&C)** project manager.

Other entities frequently involved in project development:

- **Purchasing & Contracting Services (PCS)** – Directs the purchasing and contracting activities HHSC for M&C projects;
- **State Centers -** Facilities providing mental health services;
- **State Hospitals -** Facilities providing mental health services;
- **State Supported Living Centers (SSLC) –** Residential facilities providing services for people with intellectual and developmental disabilities;
- **Texas Department of Licensing & Regulation (TDLR) -** Architectural Barriers Division is responsible for certification of all plans and specifications for accessibility to persons with disabilities in accordance with the Texas Accessibility Standards (TAS);
- **Texas Department of Aging and Disability Services (DADS) -** responsible for certification of all plans and specifications for Intermediate Care Facilities Serving Persons with Intellectual Disability or Related Conditions for the State Supported Living Centers (SSLC); and

- **Texas Department of State Health Services (DSHS)** - responsible for licensure of private psychiatric hospitals and crisis stabilization units.

1.3 STATUTORY REQUIREMENTS

The A/E shall maintain a general awareness of the governmental environment in which the project develops. A biennial appropriations act establishes the limit of funds that may be available to complete the project. Texas Health and Safety Code, Section 551.007, establishes the authority of the Agency and the activities and limits of the Maintenance & Construction Section.

Items of general interest to the A/E include:

- Owner may under certain conditions grant temporary and permanent easements;
- "The appropriation of funds by the legislature for the construction of a project shall be construed by the Owner as an expression of legislative intent that the project be completed within the limits of the funds actually appropriated...";
- Owner is responsible for ensuring the quality and sufficiency of all plans and specifications; and for the ward of construction contracts through competitive bidding;
- No Change Order may be authorized without approval by the A/E, except for work outside of scope of the A/E contract;
- Owner is responsible for protecting the interests of the state during construction through appropriate levels of review, including very specific responsibilities required of the A/E;
- All construction contracts must incorporate the Owner's Uniform General Conditions, including supplementary and special provisions for trench safety whenever trench excavation will exceed a depth of four (4) feet; and
- All projects require project and construction cost data that permits comparison to other projects.

Other statutes of particular relevance to the A/E:

- **Americans with Disabilities Act**, Title II protects against nondiscrimination on the basis of disability for all activities, services and programs of state and local government entities;
- **Energy Management**, Texas Government Code, Section 447.004, requires compliance with the Texas Energy Conservation Standard for new state buildings or major renovation projects, as defined by the State Energy Conservation Office (SECO). A state agency may not begin construction of a new building or a major renovation project, before the A/E has certified that the design complies with the standards established under this chapter including engineering documentation and provided SECO a copy of the certification;
- **Historically Underutilized Business** (HUB) program promotes equal business opportunities for economically disadvantaged persons to contract with the State of Texas in accordance with the goals specified in the 2009 Disparity Study and as defined in Texas Government Code, Chapter 2161. In accordance with TGC §2161.252 and Texas Administrative Code (TAC) Title 34, Part 1, Chapter 20, Subchapter D, rule §20.284, each state agency (including institutions of higher education) as defined by TGC §2151.002 that considers entering into a contract with an

expected value of $100,000 or more will, before the agency solicits bids, proposals, offers, or other applicable expressions of interest, determine whether subcontracting opportunities are probable under the contract;

The A/E is required to submit a HUB Subcontracting Plan for each Project regardless of A/E's HUB status. The goods and/or services that have been identified as probable subcontracting opportunities are classified under "Professional Services" and the HUB participation goal is 23.7%. FAILURE TO FULLY COMPLY WITH THE POLICY ON THE UTILIZATION OF HISTORICALLY UNDERUTILIZED BUSINESS AND/OR SUBMIT A SUBCONTRACTING PLAN WILL DEEM THE A/E'S PROPOSAL NON-RESPONSIVE AND IT WILL NOT BE CONSIDERED FOR AWARD;

- **Infection Control Risk Assessment (ICRA)** for construction and renovation projects applies to the State Supported Living Centers, State Hospitals, and HHSC Central Office. A/E will prepare an Infection Control Plan outlining the required scope and construction necessary to provide the Facility and residents with protection against odor, vapor, dust and other contaminants per the ICRA;

- **Prevailing Wage Rates,** Texas Government Code Chapter 2258 and Texas Administrative Code Title 1, Part 5, Chapter 123, requires incorporation of a established schedule of locally prevailing wage rates in each construction contract;

- **Recyclable Products and Specifications,** Health & Safety Code, Sections 361.421 - 361.427, requires preference be shown to the use of recycled and recyclable products and provides guidelines for acceptable classifications of 'recycled' products;

- **Texas Accessibility Standards (TAS),** Elimination of Architectural Barriers, administered by the Texas Department of Licensing and Regulation (TDLR) under the authority of Texas Government Code Chapter 469, requires registration; review and certification of compliance of the construction documents from architects, engineers and interior designers to either the Texas Department of Licensing & Regulation or to a Registered Accessibility Specialist (RAS); and inspection of as-built conditions for compliance, certification and acceptance. Fee schedule and additional information can be found at TDLR website (www. tdlr.state.tx.us);

- **Texas Asbestos Health Protection Rules (TAHPR),** Department of State Health Services, Texas Administrative Code, Title 25, Part 1, Chapter 295 establishes the procedures and means of control and minimization of public exposure to airborne asbestos fibers by regulating asbestos disturbance activities in buildings that with public access or occupancy;

- **Texas Hazard Communication Act of 1985,** Texas Health and Safety Code, Chapter 502, requires state and local agency employers to provide employees, local fire departments, the Texas Department of State Health Services, and other interested persons with specific information on the hazards of chemicals in use. Readily available information must include Workplace Chemical Lists, Safety Data Sheets (SDS) and Material Labeling. No chemical products may be specified or brought on site except in compliance with this Act; and

- **Xeriscaping** – Texas Governmental Code 2166.404 and 2166.405 - xeriscaping of state building landscapes, when required.

1.4 POLICY GUIDELINES

It is the policy of HHSC to administer its construction programs and manage the Owner Agency facilities: to minimize harmful environmental and human health impacts; and, to maximize resource-efficient design, materials and methods.

The team of designers, contractors, suppliers and users involved in a capital project shares a responsibility for assisting the Owner in making informed choices to advance these goals. A/E will assure compliance with applicable energy, water and waste management standards. Building system designs must incorporate metering or monitoring capability, when required by Owner, so that performance can be measured to ensure consistency with standards and design criteria for the duration of five (5) years of building operations following completion of the new system.

It is the policy of the Owner to require life-cycle cost analysis and determination throughout design and project development that supports the State's long-term perspective on maintenance and operation costs.

Preference shall be given in design to items on state volume purchasing contract for items which require periodic replacement. The State requires that all component and material selections be standard, competitively available, for the system considered. Exceptions may be made where the State has a reasonable expectation of developing a market for recycled or environmentally sensitive products. Discontinued models, patterns, parts, etc. are not acceptable.

No asbestos or lead-containing products shall be included in specifications or construction of Owner projects. No materials manufactured with hazardous materials in process fuel mix or raw materials shall be included in specifications or construction.

1.5 CODES AND STANDARDS

Policy

All repairs, alterations, renovations, and new construction must be performed in accordance with the applicable codes and accreditation standards. In case of conflict between codes, the most stringent provision of the code shall prevail. The Agency's' Authority Having Jurisdiction (AHJ) for the applicable NFPA codes and Building Official for other applicable codes are the Code Compliance Specialists for DADS and DSHS. The M&C Project Manager will assist in communication with the respective AHJ for the project where required.

National Fire Codes

State Hospitals

- In health care occupancies, the NFPA 101, Life Safety Code, mandatory documents referenced therein, and other referenced publications, apply to Department of State Health Services (DSHS) facilities certified by The Joint Commission (TJC). The NFPA 101 edition shall be as adopted by the Centers for Medicare and Medicaid Services (CMS) (http://www.cms.gov/Medicare/Provider-Enrollment-and-Certification/ CertificationandComplianc/LSC.html) as found in 42 CFR 482.41(b) (http://www.gpo.gov/fdsys/pkg/CFR-2011-title42-vol5/xml/CFR-2011-title42-vol5-sec482-41.xml).

  The NFPA 101, Life Safety Code, mandatory documents referenced therein, and other referenced publications, apply to DSHS facilities inspected by the Texas State Fire Marshal's

Office (SFMO). The NFPA 101 edition shall be as adopted by the SFMO as found in 28 TAC 34.303 http://info.sos.state.tx.us/ pls/pub/readtac$ext.TacPage? sl=R&app=9&p_dir= &p_rloc=&p_tloc=&p_ploc=&pg=1&p_tac=&ti=28&pt=1&ch=34&rl =303).

- In non-health care occupancies, the NFPA 101, Life Safety Code, mandatory documents referenced therein, and other referenced publications, apply to DSHS facilities inspected by the Texas State Fire Marshal's Office (SFMO). The NFPA 101 edition shall be as adopted by the SFMO as found in 28 TAC 34.303 http://info.sos.state.tx.us/ pls/pub/readtac$ext.TacPage? sl=R&app=9&p_dir=&p_rloc=&p_tloc=&p_ploc=&pg=1&p_tac=&ti=28&pt=1&ch=34&rl =303).

State Supported Living Centers

- In health care, day care, residential board and care, and other resident use occupancies, the NFPA 101, Life Safety Code, mandatory documents referenced therein, and other referenced publications, apply to Department of Aging and Disability Services (DADS) facilities certified by DADS Regulatory Services. The NFPA 101 edition shall be as adopted by the Centers for Medicare and Medicaid Services (CMS) (http://www.cms.gov/Medicare/Provider-Enrollment-and-Certification/ Certification andComplianc/LSC.html) as found in 42 CFR 483.470(j) (http://www.gpo.gov/ fdsys/pkg/CFR-2011-title42-vol5/xml/CFR-2011-title42-vol5-sec483-470.xml) and 40 TAC 90.61(e) (http://info.sos.state.tx.us/pls/pub/ readtac$ext.TacPage?sl= R&app= 9&p_dir=&p_rloc=&p_tloc=&p_ploc=&pg= 1&p_tac=&ti=40&pt=1&ch=90&rl=61).

  The NFPA 101, Life Safety Code, mandatory documents referenced therein, and other referenced publications, apply to DADS facilities inspected by the Texas State Fire Marshal's Office (SFMO). The NFPA 101 edition shall be as adopted by the SFMO as found in 28 TAC 34.303 http://info.sos.state.tx.us/ pls/pub/readtac$ext.TacPage? sl=R&app=9&p_dir= &p_rloc=&p_tloc=&p_ploc=&pg=1&p_tac=&ti=28&pt=1&ch=34&rl =303).

- In non-health care and non-resident use occupancies, the NFPA 101, Life Safety Code, mandatory documents referenced therein, and other referenced publications, apply to DADS facilities inspected by the Texas State Fire Marshal's Office (SFMO). The NFPA 101 edition shall be as adopted by the SFMO as found in 28 TAC 34.303 http://info.sos.state.tx.us/ pls/pub/readtac$ext.TacPage?sl=R&app=9&p_dir=&p_rloc= &p_tloc=&p_ploc=&pg=1&p_tac =&ti=28&pt=1&ch=34&rl=303).

The chart below outlines the commonly referenced applicable National Fire Codes. Other specific National Fire Codes may be applicable.

Code	Title of NFPA Standard
1	Fire Code
10	Portable Fire Extinguishers
13	Installation of Sprinkler Systems
13D	Installation of Sprinkler Systems in One- and Two-Family Dwellings
13R	Installation of Sprinkler Systems in Residential Occupancies up to and Including (4) Four Stories in Height
14	Installation of Standpipe and Hose Systems

17	Dry Chemical Extinguishing Systems
17A	Wet Chemical Extinguishing Systems
25	Inspection, Testing, and Maintenance of Water-Based Fire Protection Systems
30	Flammable and Combustible Liquids Code
54	National Fuel Gas Code
58	Liquefied Petroleum Gas Code
70	National Electrical Code
72	National Fire Alarm and Signaling Code
80	Fire Doors and Other Opening Protectives
90A	Installation of Air Conditioning and Ventilating Systems
90B	Installation of Warm Air Heating and Air Conditioning Systems
91	Exhaust Systems for Air Conveying of Vapors, Gases, Mists and Noncombustible Particulate Solids
96	Ventilation Control and Fire Protection of Commercial Cooking Operations
99	Health Care Facilities
101	Life Safety Code
101A	Guide on Alternative Approaches to Life Safety
105	Smoke Door Assemblies and Other Opening Protectives
110	Emergency and Standby Power Systems
220	Types of Building Construction
241	Safeguarding Construction, Alteration and Demolition Operations

Building Codes

Although State construction projects are not subject to local regulation or permitting for the State Hospitals and State Supported Living Centers, the Agencies require the design of projects to comply with local building codes with respect to emergency response and where required to interface with local utility infrastructure beyond the state property. With exception to design for local emergency response and local utility interface, State projects are not subject to local review or inspection. However, limited information and/or courtesy reviews may be needed for effective cooperation. These facilities are exempt from local permit requirements.

The A/E will coordinate with required entities on overall project intent and schedule, fire protection, watersheds and utilities.

Design and construction is required to comply with the 2012 International Building Code (IBC), International Code Council (ICC) and associated Mechanical and Plumbing Codes, unless a later edition has been determined to be the current code by the Agency AHJ.

Other Applicable Codes

- **Americans with Disabilities Act** (ADA) of 2010 (Federal Public Law 101-336);
- **Construction Safety and Health Regulations**, 29 CFR 1926 (OSHA);

- **Energy Conservation Design Standard for New State Buildings and Major Renovations,** latest edition published by the State Energy Conservation Office (SECO), ASHRAE/IESNA Standard 90.1-2010;

- **General Industry Safety and Health Regulations**, 29 CFR 1910 (OSHA);

- **Intermediate Care Facilities for Individuals with Intellectual Disability or Related Conditions,** Texas Administrative Code, Title 40, Part 1, Chapter 90, Subchapter D, General Requirements for Facility Construction, applicable to facilities certified by the Department of Aging and Disability Services (DADS) Regulatory Services;

- **International Energy Conservation Code** – 2009 (IECC), of the International Code Council, as adopted by the State Energy Conservation Office, for low-rise residential buildings;

- **Safety Code for Elevators, Dumbwaiters, Escalators, and Moving Walks,** American National Standards Institute, ANSI A17.1 and ANSI A 17.3; and

- **Texas Accessibility Standards Act** of 2012 (TAS) Elimination of Architectural Barriers, administered by the Texas Department of Licensing and Regulation (TDLR) under the authority of Texas Government Code Chapter 469.

Applicable Accreditation Standard and Rules

- AIA Guidelines for Design and Construction of Health Care Facilities, The American Institute of Architects (State Hospitals);

- Comprehensive Accreditation Manual for Hospitals, The Joint Commission (TJC), and Interim Life Safety Measures (State Hospitals);

- Licensing Standards for Intermediate Care Facilities for Individuals with Intellectual Disability or Related Conditions, Department of Aging and Disability Services (State Supported Living Centers); and

- Licensing Regulations for Intermediate Care Facilities for Individuals with Intellectual Disability or Related Conditions as published by the Centers for Medicare and Medicaid Services (State Supported Living Centers.

Applicable Resources

- Design Guide for the Built Environment of Behavioral Health Facilities, National Association of Psychiatric Health Systems (www.naphs.org).

- Design Guide Mental Health Facilities; Department of Veterans Affairs, Office of Construction & Facilities Management (http://www.cfm.va.gov/til/dGuide/dgMH.pdf).

1.6 SPECIFIC PROJECT CONDITIONS

Certain procedures, items and/or materials shall be given special consideration by the A/E on a project either because of local conditions or maintenance/replacement purposes. Verification shall be obtained from the Project Manager of the need for and suitability of A/E selections and specifications for any of the following:

- Termite treatment;
- Wood treatment and preservation;
- Roofing materials and types;
- Finish hardware where related to existing keying systems;
- Sound transmission qualities of walls, partitions and ceilings;
- Paints and finishes as related to cleaning and maintenance;
- Resilient flooring;
- Carpet;
- Room and building identifying devices;
- Elevators;
- Mechanical items requiring special consideration;
- Energy management;
- Electrical items requiring special consideration;
- Fire protection devices;
- Security systems;
- Extra stock; and
- Indoor air quality.

2 ADMINISTRATIVE GUIDELINES

2.1 PURPOSE

This section provides a brief overview of HHSC business practices and procedures for administering capital construction projects.

2.2 CONTRACTS

The Owner uses standard forms of agreement for A/E Services and for construction, including the State of Texas Uniform General Conditions for Building Construction Contracts. Contract forms used by the Owner are coordinated with the State's Attorney General. **No contract may be awarded to any entity delinquent in state taxes.**

Certification of Child Support Payment Obligor

- Architect certifies that neither the Architect nor any partner, majority shareholder, or substantial owner in this firm, are 30 or more days delinquent in payment of any child support under a court order or a written repayment agreement.

- Debts or Delinquencies Owed to the State: Any payment due under this Agreement may be withheld and applied toward payment of any debt that is owed to the State of Texas including, but not limited to, delinquent taxes and child support pursuant to Texas Family Code, Section 231.006.

- A false statement regarding this provision will be treated as a material breach of this contract and will constitute grounds for termination.

2.3 CONSULTANTS

The A/E is responsible for the complete design of the Project. All Consultants needed by the A/E to provide complete, necessary and reasonable professional design services to complete the design of the Project must be obtained; and fee must be included in the A/E Basic Services. All contracts for consultants to the A/E shall be coordinated with the prime A/E's Agreement. A/E will provide a list of consultants for Owner approval prior to execution of the A/E Activation. A/E is encouraged to give consideration to Historically Underutilized Businesses.

2.4 CORRESPONDENCE

Communication between all parties involved in the planning and construction of a project is required. Oral communications, instructions, directives, and minutes of meetings shall be confirmed in writing by the A/E and distributed to those involved within seven (7) calendar days following the date the information was obtained. A/E will provide a written record each time the A/E visits the construction site or attends a meeting on the Project. Project Manager will establish the distribution of the reports at the beginning of each Project.

All correspondence and reports will be addressed to the Project Manager and will reference the date and time, project number, project name and location of the project.

2.5 FORMS

The Project Manager will provide all Forms to the A/E by for incorporation in submittals or the contract documents, as appropriate.

2.6 A/E *PAYMENT*

Payments to the A/E for work completed will be made in accordance with the Agreement and as shown in the Activation for A/E services. Generally, payments are made upon completion of the following:

- On approval of Additional Services (or by phase listed herein as appropriate).
- On approval of Schematic Design (SD) Documents.
- On approval of Design Development (DD) Documents.
- On approval of Construction Documents (CD).
- On award of construction contract.
- Progress during the project construction period (generally monthly).
- On completion and acceptance of the project and delivery of the Project Close-out Documents.
- Payments for Basic Services shall be as follows:

Fee Compensation for Each Phase			
Phase	**Typical Project Delivery**	**Condensed Project Delivery**	**Fast Track Project Delivery**
Schematic Design Phase (SD)	5%	N/A	15% (Combined SD & DD)
Design Development Phase (DD)	15%	15%	
Construction Documents Phase (CD)	40%	40%	40%
Bidding Phase	5%	5%	5%
Construction Phase	35%	40%	40%

- To obtain payment, the A/E must have a Vendor Identification Number on file with the State Comptroller of Public Accounts and submit a completed State of Texas Payment Voucher with appropriate support documentation through the Project Manager.

- The Agency qualifies for exemption from State and Local Sales Tax. The A/E may claim exemption from applicable State Sales Tax by complying with procedures of the State Comptroller.

- The A/E Voucher must include the HUB-Subcontracting when applicable.

- Roofing Project Only: Roof Assessment Management Plan

  A/E shall provide a roof assessment for all roof projects. Phase One of the Assessment will be

an Additional Service and scope will be defined in the Activation. This fee is typically based on square footage of each campus. Phase Two is included in the Basic Services Fee. The A/E shall submit a time schedule to perform the work. This schedule will follow the traditional architectural services arrangements stipulated in the Activation.

During the course of the roof project and prior to the completion of the roof project, A/E shall submit updates to the Owners Assessment Management Consultant, administrator of agency's roof assessment management plan. The system is a traditional asset-based program that provides technical and assessment information on each roof area. The roof assessment scope includes the following:

- Phase One:

  Inform the Assessment Management Consultant of building roof areas being incorporated into the Construction Document for the roofing project.

  Provide a comprehensive evaluation on the state of repair of all existing roofs not included in a) FY14-15 capital construction roof repair and replacement project, or b) those completed in the previous biennium. The evaluation shall consist of inspections, roof cores (if needed), photographs of each roof area, measurements, and other field observations as required. Assessment shall identify the current deficient conditions and proposed maintenance repairs. Assessment shall also include recommendations for replacement, anticipated life expectancy of each roof area, and the probably cost of construction for repairs, maintenance and construction. The evaluation data shall be provided to the Owner's Assessment Management Consultants in a format compatible with the database, and shall include a photograph(s) of each roof area. Photographs are limited to 640 dpi x 480 dpi image size.

- Phase Two

  Revise and submit data entry forms on all building roof areas completed within the construction project. Provide data, including photographs, to Owner's Assessment Management Consultant regarding all work (repairs and replacements) implement in the completed project for the Fy14-15 biennium project, including error corrections. Submit all roofing material manufacturer warranties, all contractor warranties and photographs of each roof area completed. If alterations are or have been made to the building, the roof plan should be revised.

2.7 A/E FEE

- Fee shall be as described in the Activation and in accordance with the Agreement.

- When the Construction Contract is amended through a change order and the work is within the A/E's scope of services, the A/E's fee will be adjusted based upon the A/E fee percentage in the Activation or Amendment and the amount of the change order, unless such change is due to A/E's negligence, including but not limited to errors and omissions. Construction Cost shall be adjusted accordingly on the A/E voucher.

- When the Construction Contract is amended through a change order, the work is within the A/E's scope of services and the A/E's fee is a not-to-exceed lump sum, there will not be an adjustment to the A/E fee unless time and materials has been agreed upon and adjusted by amendment as an Additional Service.

2.8 APPROVALS & NOTIFICATIONS

Members of the design team as presented to the Owner may not be changed without the approval of the Project Manager.

The A/E shall receive written authorization from the Project Manager with concurrence from the facility, prior to proceeding to the next phase of the Project. If reviews of documents are required by Federal authorities, or other state agencies, the A/E shall make necessary cooperative presentations. The A/E is responsible for securing all planning permits and approvals from state agencies as may be necessary. If such services are required, A/E will be reimbursed as Additional Services, as approved by Owner by Activation or Amendment, per the terms of the Agreement. Required fees are not included in Basic Services fee.

2.9 CHANGES IN DESIGN

There will not be any changes made in design, usable area or cost without written approval of the Project Manager.

2.10 DISTRIBUTION OF REVIEW COPIES AND BID SETS

The A/E shall furnish the M&C Project Manager a sufficient number of review sets of the Contract Documents as required herein, or as described in the Activation.

- For Schematic Design, Design Development and Construction Documents phases, the A/E will provide the following sets, as included in the Basic Services fee: two (2) full-size sets of drawings to M&C and one (1) full-size set to the Facility.

- The A/E will provide the following final Bid Documents sets, as included in the Basic Services fee: two (2) full-size sets and one (1) half-size set of plans and two (2) sets of specifications.

- The A/E will provide the number of bid documents, as identified in the Activiation. Owner will reimburse the A/E in accordance with the terms of the Agreement.

- The A/E will provide two (2) complete “record drawing” sets of CAD drawings on compact disc (CD), one (1) set of full-sized prints, one (1) set of full-sized permanently fixed photographic positive prints of the original tracings, on a matte-surfaced, clear polyester base film, and two (2) copies of the Specifications and Addenda upon project completion. CAD drawings will be compatible with the current version of AutoCAD used by the Owner. CAD drawings must be submitted unlocked and packaged with AutoCAD e-transmit. A/E will provide PDF files of each record drawing sheet. A/E will submit to Owner a printed list of CD Directories and subdirectories with a statement certifying the files are virus-free. Specifications will be in Microsoft Word or Adobe Acrobat (PDF) format.

2.11 CONTRACTOR PAYMENT REQUESTS

Payment Application

The Contractor must submit a minimum of three (3) Payment Applications signed with original signatures for Owner’s use. Additional signed originals may be submitted by the Contractor for his and the A/E use.

The Payment Application must include the Construction Voucher, a detailed estimate, Monthly Construction Payment Affidavit, HUB-Subcontracting Plan and current contract progress schedule.

The A/E will participate in the review and approval of the Contractors Application for Payment. Except as otherwise indicated, the construction progress payment cycle will be at regular monthly intervals.

A/E will compare the progress of construction with the approved project schedule to determine whether the project is maintaining the schedule. A/E will inform Owner if there are any deviations from the approved schedule, and if necessary, request an action plan from contractor to complete the work within the Project Schedule.

The initial and final payment applications contain additional requirements. The principal administrative actions and submittals which must precede or coincide with the Contractor's payment requests (not necessarily by way of limitation) are summarized as follows:

Initial Payment Application

The following items <u>must be approved</u> prior to the initial pay application to avoid delay in processing the application.

- Listing of subcontractors, principal material suppliers and fabricators;
- Schedule of Values on Detailed Estimate Sheets;
- Work Progress Schedule;
- Schedule of Submittals, including needed approval dates; and

  (A list of required submittals will be supplied to the Contractor by the A/E)
- Initial progress report, including report of pre-construction meeting.

Final Payment Application (in addition to all of the above)

- Completion of project close-out requirements

  Contractor and A/E will review the closeout checklist provided by M&C. Once the A/E verifies receipt of all required closeout documents, A/E will sign and distribute checklist to M&C. If closeout information is incomplete, the A/E will notify the contractor. Once all documents are complete, the A/E will distribute to the Owner;
- Certificates or approvals required to assure the Owner’s full use and access of the completed work;
- Warranties and guaranties, maintenance agreements, and similar provisions;
- Test/balance/adjust records, meter readings, start-up performance reports, Operation & Maintenance Manuals, Record Documents, and other required project construction records to the Owner;
- Training of Facility personnel in operation of all systems and equipment;
- Changeover of door locks and other Contractor’s access provisions to the Owner’s property (if keying instructions are available);

- Removal of temporary facilities, services, surplus materials, recyclable waste and rubbish. Final cleaning of work;
- Verification of the completion of all work as indicated on the final punch list attached to the Owner's Certificate of Substantial Completion;
- Review of the Contractors final pay application and schedule of values;
- Final Affidavit of Bills Paid;
- Consent of Surety to Final Payment and Power of Attorney;
- Written certification that all products incorporated in the construction as part of the Project do not contain asbestos, PCB, CFCs, lead based paint of other hazardous substances; and
- Once all of the above has been completed, the final Payment Application will be approved.

3 PRE-DESIGN GUIDELINES

3.1 PURPOSE

This section describes basic planning information and procedures intended to ensure adequate communication of project directions and expectations, and control of project objectives throughout design and delivery. The program provided to the A/E will establish the Scope, Construction Cost and Schedule for the Project. A/E will verify appropriateness of each, and developed Project in detail based on these Guidelines.

3.2 PLANNING DATES

Relevant planning dates for the project will be determined through consultation with the Project Manager and Facility. The A/E shall verify with the Project Manager (PM) appropriate dates for the following:

The PM, A/E, and Facility will set up a schedule of work, length of time for construction, work time during the day or night , occupancy, interaction between construction and clients, staging of product, equipment storage and personal parking, etc., for the type of project to be designed. The Construction schedule will be incorporated into the Contract Documents and any phasing of work, or Owner required move-out/move-in time will be indicated in the Construction Documents.

3.3 PLANNING ALLOWANCE

Efficient space utilization is critical to containing the overall costs of housing. Criteria will vary depending on specific program requirements. The Project Manager and Facility will provide guidance to the A/E with regard to applicable criteria.

3.4 OFFICE AREA STANDARDS

The A/E is required to develop space standards appropriate to the project which maximizes the utilization of space. Space standards shall be based upon the building module and, where appropriate, perimeter wall conditions as well as on the functional requirements of the office.

3.5 STAFF & SPACE PROJECTIONS

The approximate scope identified in the project program shall be verified by the A/E through detailed analysis of projected needs. When the project is to create/develop office space, the following guidelines apply:

Space Standards

Define space standards appropriate to using agency functions consistent with a planning grid established by the A/E for the particular (existing or proposed) building and interior systems. Any system of standards which results in a larger number of standard office or workspace sizes than applicable guidelines, must be justified in writing and approved by the Project Manager, in consultation with the Facility.

Detailed Requirements

Although adjacency requirements and significant equipment notes may be collected on approved forms, it is required that other details of: tasks; furniture, fixtures and equipment; and ME&P requirements be collected/confirmed separate from the initial scope verification.

3.6 REQUIRED ANALYSIS

The A/E shall collect additional data and conduct such analytical tests as the A/E and Project Manager consider necessary to determine:

Project Objectives

The expressed intentions of the Facility and the Owner, through its Project Manager, shall be recorded, explored in discussion, and exposed to professional judgment, to ensure that: a) the established project justification is attainable; b) the highest achievable level of common goals is established; and c) the criteria, i.e. specific measures of satisfying those goals, are identified and approved by the Owner staff.

Basic Design Issues

Projects designated for each Facility are based upon needs identified by the Facility and entered into the Agency CAFM database. Projects have a defined scope and are limited to the work indicated and approved by the Agency Administration. Change to the scope and/or budget require Agency Administration approval through the Director of M&C.

Site Evaluation

Determine natural site characteristics which the Project can use or address to minimize any harmful environmental impacts. Include topography/drainage, vegetation, solar orientation/access, breezes and microclimate. Determine built characteristics such as existing structures, roadways and neighboring uses that will affect safe and convenient access and pedestrian/vehicular circulation. Obtain data from local sources on regional building materials/methods that could be integrated to reduce energy/transportation costs.

Building Configuration

For new buildings, determine suitable planning module and appropriate space standards relative to building depth, perimeter conditions and material standards. Determine efficient locations for special construction and concepts for physical expansion of the facility, where applicable.

Schematic Relations

Provide sufficient diagrammatic studies to illustrate relevant site features/relationships (for new construction) and opportunities or limits created by existing building configuration, functional relationships, work flow and circulation concepts, (program) expansion concepts and efficient allocation of space over time.

Alteration of Existing Spaces and Equipment

The majority of the M&C project types are repair and renovation projects. Provide design layout of all altered spaces and replacement or relocation of all equipment, including but not limited to the following:

- Review ADA and life safety issues during Schematic Design phase of the project; and
- Evaluate whether like kind of equipment is appropriate where replacement is necessary. Review the system performance and desired results, along with available budget, to determine best course of action.

3.7 PROGRAM DOCUMENTATION

To the extent not included in, or supplemental to, the program, the A/E shall prepare a summary report documenting relevant data collected, analyses performed, and design concepts and criteria recommended. This report shall include:

- A summary problem statement and executive overview;
- Project objectives including statements of intention and measurable criteria;
- Space standards;
- Approved staff and space requirements;
- An illustration of key conceptual issues; and
- Stacking and blocking diagrams showing efficient use of space at dates approved by the M&C Project Manager.

4 PROJECT DATA REQUIREMENTS

4.1 PURPOSE

Information contained herein outlines the procedures to be maintained by or implemented through the A/E in order to provide an adequate record of project development and to ensure integrity of design.

4.2 PROJECT DIRECTORY

Each A/E shall maintain a current Project Directory of key individuals, including name, role, organization, and contact information. Directory will also include mailing address, physical address (for deliveries), and FAX number for each organization. The minimum individual entries will include:

- HHSC MAINTENANCE AND CONSTRUCTION

  Texas Health and Human Services Commission
  P. O. Box 12668 Mail Code 2064
  Austin, Texas 78711-2668
  (909 W. 45th Street, Bldg. 633, Austin, TX 78751)
  FAX (512) 206-5930

Austin	Phone No.
Director	512/206-5888
Assistant Director	512/206-5893
Manager, Construction Services	512/206-5204
Project Manager	*Project Specific*

- FACILITY
  Plant Maintenance Manager — Phone No.

- CONSULTANT(S) TO OWNER (by discipline) — Phone No.

- ARCHITECT/ENGINEER
  Principal — Phone No.
  Project Architect (or Engineer) — Phone No.
  Construction Administrator (if not the Project Architect/Engineer) — Phone No.

- CONSULTANTS TO ARCHITECT/ENGINEER (by discipline) — Phone No.
  Project Engineer or Consulting Principal — Phone No.

- CONTRACTOR
  Contracting Officer — Phone No.
  Project Manager — Phone No.
  Project Superintendent — Phone No.

- SUBCONTRACTORS (List) — Phone No.

4.3 PROJECT DESIGN CRITERIA

The A/E will prepare a checklist of design criteria, including applicable regulatory criteria, tailored to the specific Project for M&C PM review. This checklist will be formatted according to outline described herein.

A/E will complete the checklist of design criteria to assist in design reviews, estimating, bidding, and investigation of any problems that may arise during occupancy. A current checklist shall be made available to the Project Manager prior to each design review, and will be incorporated in the index sheet of the Construction Documents.

A. Civil Design Criteria (when applicable)

The Architect/Engineer will address any concerns regarding water absorption under foundations, water passing across required pedestrian accessways, and any adverse impact on property located downstream due to increased run-off and erosion. MINIMUM design requirements are as follows: 8-inches below building finish floor to top of unpaved grade; five percent (5%) slope (away from building) over unpaved grade for a minimum distance of 10-feet of building perimeter; concentrated surface water flow (swale) to be one percent (1%), if paved, and two percent (2%), if unpaved. Manager of Plant Construction and PM must be notified of any instances where lesser requirements are contemplated.

B. Structural Design Criteria (when applicable)

1. Code Design Specifications
   - a. Building Code: Year and Model Code
2. Design Loads (Per Model Code Used; indicate on Drawings)
   - a. Live Load: Total design with variation noted by an area on Drawings.

C. Architectural Design Criteria

1. Code Classifications
   - a. Occupancy Group
   - b. Type of Construction
   - c. Fire Resistance of Parts (Minimum)
     - 1) Exterior Non-bearing Walls
       - a) Partitions (Permanent)
       - b) Shaft Enclosures
       - c) Floors
       - d) Roof
   - d. Fire Protection System
     - 1) Automatic Sprinkler Systems
     - 2) Standpipes

3) Portable Fire Extinguishers

4) Automatic Extinguishing Systems

5) Fire Alarm System

e. Thermal Envelope

1) R-factor of exterior wall

2) Percentage and type of glazing

3) R factor of roofing assembly

4) Reflectivity of walls/roof

5) Infiltration Requirements, Techniques, Methods

2. Special Construction

D. Mechanical Design Criteria

1. Design Temperature Conditions

a. Outside

Summer

Winter

b. Inside (offices)

Summer

Winter

c. Special areas: (Indicate)

2. Type of System:

a. HVAC

b. Ventilation (type and size)

c. Exhaust

d. Lighting Load Basis: (Watts/square foot) - See Energy Code

e. Air: (Quantity or % of Total) (20 cfm/person/occupancy, Ref. ASHRAE Std. 62, current edition)

f. Total Cooling Capacity: (BTUH)

g. Total Heating Capacity: (BTUH)

h. Total Water-Flow Capacity: (gpm)

i. Required EER - See Energy Code

E. Electrical Design Criteria

1. System Description

a. Service

b. Available Short Circuit

c. Connected Building Load

d. Design Capacity:

e. Service Entrance

f. Emergency Lighting

g. Emergency Power Requirements

h. Relay Coordination

i. Reserve Space Capacity in Lighting and Appliance Panelboards (min 20%)

F. Fire Protection Design Criteria

Applicable Codes and Regulations (Latest Adopted Editions at time of Bidding) - Include list of all applicable codes and regulations from reference codes and standards.

G. Vertical Circulation Criteria

1. Applicable sections of ANSI Standards for Elevator Construction

2. Performance Criteria

- Door Opening Time
  Passenger
  Service
- Floor to Floor Time
  Passenger
  Service
- Trip Time
  Low-rise
  High-rise
- 5-minute Handling Capacity
  Low-rise
  High-rise

H. Resource Management Criteria Total Energy Budget

1. Total Material Embodied Energy
2. Total Water Budget
3. Percent Recycled Content Materials
4. Percent Recyclable Materials

4.4 DOCUMENTATION OF DESIGN CONCEPTS

The A/E shall provide five (5) graphic and written reports, in 8 ½ x 11 format, addressing the building spaces, systems selection, water conservation and efficiency, energy conservation and efficiency, and use of recyclable materials for projects with a major re-design of the spaces. The A/E will submit the report with SD, DD and CD phase submittals.

4.5 REVIEW PROCESS

Program and design review procedures assure that program objectives are being met and that all related HHSC Sections, Facilities, and other interested parties have the opportunity for input into the design for projects which may affect their operations.

A. Projects will be reviewed according to these procedures.

B. Minor Construction Projects - Minor construction projects may be excluded from this procedure at the discretion of the Director, Maintenance & Construction.

C. Project reviews will occur at the completion of each design phase. Review period will be established based on the complexity of the project and identified in the Activation.

Milestone	**Estimated Review Period:**
Program	1 week
Schematic Design	2 weeks
Design Development	2 weeks
50% Construction Documents	2 weeks
100% Construction Documents	2 weeks

D. Review Procedures

1. A/E will distribute complete phase submittal sets to the Project Manager, Facility, and related HHSC sections and key agencies involved in the review process as directed by the Project Manager.

2. **TIME IS AN ESSENTIAL ELEMENT OF THE AGREEMENT.** A/E is responsible for maintaining the Project Schedule described in the Activation. The appropriations for capital construction projects are designated for specific projects and timelines. Appropriations are subject to late penalty charges if funds are not expended within the disbursement agreements. Funds not expended within the agreed upon time are subject to expire.

3. The Project Manager and Facility will review the phase submittal package.

4. A review meeting will be held with PM, A/E and Facility personnel to review all comments, changes and corrections. A/E will incorporate revisions into the Documents.

5. A marked-up set of contract documents, including all comments made by reviewers, will be retained by the A/E and brought to the next scheduled review meeting. All such records will be maintained by A/E and available to Owner upon request until end of warranty period. The A/E indicate on the marked up set of drawings that all of comments, changes and corrections have been transferred to the finished set of documents. A/E will notify PM of any comments, changes and corrections not transferred and submit explanation in writing to the PM. Owner will provide any approved deviations from review comments in writing.

E. Submittals for Design Reviews –A/E will submit the following items for design reviews at the respective stage of project development:

1. Program – Report (See Activation for specific requirements)

2. Schematic Design:

   a. Design Criteria;

   b. Schematic Design drawings (See Section 5.3; Requirements by Phase);

   c. Outline Specifications (See Section 6.3; Requirements by Phase);

   d. Cost Estimate - based on area of building and site development to compare the cost of work with the Construction Cost identified in the Activation: Cost Estimate will include a fifteen percent (15%) construction contingency. If Cost Estimate exceeds the Construction Cost, A/E will consult with Owner to identify potential modifications that would result in a Cost Estimate within the established Construction Cost in the Activation, or as approved by the Owner. Approved modifications will be incorporated into the Design Development submitted at no cost to the Owner;

   e. Feasibility study of solar and renewable energy considerations (e.g., daylighting, domestic water heating, photovoltaics, etc.) which life cycle cost estimates indicate to be economically attractive. Include written evaluations if required by the Owner. (when requested by Owner); and

   f. Energy Statement - Provide a statement of probable energy requirements compliance based on preliminary design review.

3. Design Development:

   a. Design Criteria;

   b. Design Development Drawings;

   c. Design Development Outline Specifications;

   d. Life Safety Plans (where applicable);

   e. Cost Estimate - based on major breakdown of the items of construction (not simple square foot unit costs). A/E will identify cost impacts of specific alternative systems upon overall building costs and recommend planning for suitable bidding alternatives as may be needed for budget control. Cost Estimate will include a ten percent (10%) construction contingency. If Cost Estimate exceeds the Construction Cost, A/E will consult with Owner to

identify potential modifications that would result in a Cost Estimate within the established Construction Cost in the Activation, or as approved by the Owner. Approved modifications will be incorporated into the Construction Documents submitted at no cost to the Owner;

f. Energy analysis statement of energy requirements compliance based on preliminary calculations; and

g. Product Data Sheets for products which are to be included in the project.

4. Contract Documents:

a. Design Criteria;

b. Life Safety Plans;

c. Drawings (sealed by professional per registration laws);

d. Project Manual (sealed by professional per registration laws) including list of all required submittals and closeout documents:

The A/E is required to provide a complete summary of the schedule of work, and related submittals in Section 01300 of the Specifications. The A/E shall clearly indicate which submittals must be considered together (Example, Color Schedule, and Ceramic Tile/Carpet Samples) in order to avoid delays in the construction schedule;

e. Final Cost Estimate. Cost Estimate will include a five percent (5%) construction contingency. If Cost Estimate exceeds the Construction Cost, A/E will consult with Owner to identify potential modifications that would result in a base bid package within the established Construction Cost in the Activation, or as approved by the Owner. Approved modifications will be incorporated into the Construction Documents submitted at no cost to the Owner; and

f. Energy Conservation Design Standard Certification Statement, as demonstration of compliance with the Standard, at the completion of the Construction Document Phase.

4.6 *PLAN SUBMISSION REQUIREMENTS - LIFE SAFETY*

At the Design Development phase of each Project, submit single sheet floor plans of both the existing and proposed Life Safety Plans. A/E will update and submit with the Construction Documents phase submittal.

Items to be included on the plans:

- Building Code and Edition, & Life Safety Code and Edition;
- Occupancy per the Building Code (Identify others if mixed);
- Occupancy per the Life Safety Code (Identify others if mixed);
- Construction Type per the Building Code (Both project area and existing);

- Construction Type per NFPA 220 and NFPA 101 Life Safety Code (Both project area and existing);
- Building Area (Overall and area of addition/renovation);
- Extent of Sprinkler System (Both project area and existing);
- Occupancy/Function of Each Space;
- Fire and Smoke Walls with a Legend;
- Exit Lights with directional arrows;
- Fire Extinguishers; and
- U.L. Design No. or equivalent for each fire-rated system.

- ***Items to be included on the plans for new construction or alteration of areas:***

- Building Height (Number of stories and feet);
- Exit Requirements and Capacity Calculations for each fire zone;
- Smoke Compartment Sizes with adjacent compartment refuge capacity;
- Farthest Travel Distance to exits;
- Farthest Travel Distance to smoke barrier doors;
- Width or Capacity of exits; and
- Exit Illumination.

4.7 *AREA CALCULATIONS*

A/E will provide area calculations concerning the Project at each design review and include area calculations in the Cost Estimate. A/E will note any changes on the Construction Documents. A/E will provide the following area calculations:

Site Plan (*when required):*

- Total Site: (in square feet and acres)
- Existing and Proposed Paved Areas

  Sidewalk

  Drives

  Parking

  Equipment Pads

- Existing Unimproved Parking Area (if any)
- Existing and Proposed Pervious Areas
- Existing and Proposed Building Footprint Area
- Existing and Proposed Number of Parking Spaces (Standard, Compact, Accessible Car and Van Spaces)

Building Areas and Building Efficiency

A/E will provide the following summary totals calculated for the building on the Index/Title page of the Drawings and in the Design Criteria, as applicable to the Project:

- Net Assignable Areas: Include the sum of all functional spaces required to serve the basic program. These spaces are identified in the program and their areas are calculated from their interior surfaces (walls are excluded);
- Unassigned Areas: Consist of all other spaces in the building, specifically circulation areas, mechanical areas, general toilets, janitor closets, unassigned storage, partitions and walls (including all of the exterior wall);
- Gross Area: Represents essentially the sum of assignable and unassignable areas;
- Building Efficiency: The ratio of total net assignable area to gross area;
- Heated or Cooled Area;
- Heated or Cooled Volume (cubic feet); and
- Exterior Glazed Area.

Floor Areas

A/E will provide the following areas calculated for each building floor on the respective architectural floor plan, as applicable to the Project:

- Net Assignable Areas: Include the sum of all functional spaces required to serve the basic program. These spaces are identified in the program and their areas are calculated from their interior surfaces (walls are excluded);
- Unassigned Areas: Consist of all other spaces in the building, specifically circulation areas, mechanical areas, general toilets, janitor closets, unassigned storage, partitions and walls (including exterior walls);
- Gross Area: Represents essentially the sum of assignable and unassignable areas;
- Building Efficiency: The ratio of total net assignable area to gross area;
- Heated or Cooled Area (net area: inside face of exterior wall);
- Heated or Cooled Volume (net area); and
- Exterior Glazed Area.

4.8 ENERGY CALCULATIONS

Unless otherwise directed, the A/E will be responsible for design conformance and will incorporate the applicable standards and code provisions into the Construction Documents prior to bidding. Refer to A/E Agreement for specific language on required energy documentation requirements.

4.9 SUSTAINABILITY

The Texas Health and Human Services Commission, Maintenance & Construction, Architectural/Engineering Guidelines incorporates legislative mandates and Owner sustainability initiatives. Design, construction, and facility management practices must use environmental resources wisely. Building practices must avoid depletion or degradation of non-renewable resources, encourage healthy innovations in the building industry and minimize public expense, while maximizing public benefits. Two particular areas which deserve specific mention include:

- Sustainability requires consideration for the boundaries of cost and benefit. Life-cycle cost awareness must be extended to include evaluation of building materials from sourcing to reuse/disposal; and
- Owner intends that public monies expended on its capital projects help direct and stimulate a market for new, safe, more efficient building design and building components.

4.10 LIFE CYCLE COST ANALYSES

For the major system selections, A/E will provide a written evaluation of life cycle costs for alternatives for consideration. Life cycle costs will be considered in all of the choices recommended by the design team. Life cycle cost analysis considerations are to include:

- Product Cost may be weighted (discounted if recycled) to reflect replacement cost of raw materials, energy required in manufacture, and hazardousness/safety of manufacturing byproducts;
- Transportation Cost may be weighted to reflect energy required in transport;
- Installation Cost may include effects on other items of work;
- Use/Operation Cost reflect cost impacts from interaction with other systems; may be weighted for type of energy required and for hazardousness/safety of byproducts;
- Failure in Use Cost (as directed by Project Manager);
- Maintenance Cost may be weighted for labor, energy and hazardous/safety of byproducts;
- Replacement Cost assumes 50-year building life; may be discounted if reusable, recyclable, etc.; and
- Disposal/Renewal Cost may be weighted to include energy use and "permanence" of solid waste.

4.11 COST ESTIMATES

The Owner requires a detailed Cost Estimates for each Project. This data serves as a safeguard for both the Owner and the A/E (who must bear the costs to revise the Design and/or the Construction Documents if the lowest bona fide bid exceeds the total appropriated funds for the project). A/E will prepare Cost Estimates at the end of Schematic Design, Design Development, 50% Construction Documents, and 100% Construction Documents phases. The A/E will incorporate actual current costs in the community where the facility is constructed.

The following general requirements for estimates and record of final cost shall be incorporated in relevant submittals. Format will be approved by the Project Manager.

A. Schematic Design - Early design Cost Estimate will consist of a summary based on CSI format division headings and shall include:

1. Cost Estimate on square foot bases by use types, such as parking, client sleeping spaces, client support spaces, administrative spaces and facility support spaces, utilities, etc. For engineering estimates, incorporate unit costs for specialized projects;

2. Include General Conditions, Bonding, Overhead and Profit, Escalation and Design Contingency as described in the Agreement; and

3. Where requested by the M&C PM, design alternatives shall be explored through the preparation of an economic analysis. This analysis will integrate system comparisons and life cycle costs in which initial investment, operation and maintenance costs are considered during the economic life of the building(s).

B. Design Development- Cost Estimate will be the equivalent of 50% Construction and will be based on the CSI format with corresponding CSI Division headings and will include:

1. Cost Estimates based on system and material selections, based on major breakdown of items of construction. For engineering estimates, incorporate unit costs for specialized equipment and systems; and

2. Include General Conditions, Bonding, Overhead and Profit, Escalation and Design Contingency as described in the Agreement.

C. Contract Documents- Final detailed Cost Estimate will include all design changes made up to bid date and will include:

1. Cost Estimates based on quantities and current prices, summarized by totals and on square foot basis following the format developed for the DD estimate. For engineering estimates, incorporate unit costs for specialized equipment and systems;

2. Include General Conditions, Bonding, Overhead and Profit, Escalation and Design Contingency as described in the Agreement; and

3. A written discussion of market and other specific conditions relating to the project.

4.12 BID ANALYSIS

The A/E will provide a bid analysis and recommendations to the Owner within 48 hours following request by Owner. In order for the Owner to determine the appropriate course of action, the analysis will be a concise evaluation of the apparent low bidder and bid amount(s) and will include the following:

- Investigation of the low bidder's capability, past performance and experience, particularly in the successful completion of a similar project. The A/E will also investigate the financial status of the low bidder;

- Evaluation of the Base Bid and Alternate Bids with respect to the Final Cost Estimate;

- If the apparent low bidder withdraws or does not meet the minimum qualification, the A/E will investigate the next apparent lowest bidder;

- If only one bid is received, the A/E will investigate the bidder as described above; determine the reason for the lack of participation, and recommend whether project shall be awarded, rebid, or other action to be taken. The Owner will determine if the bid will be accepted or rebid at a later date; and

- If no bids are received, the project will typically be readvertised and rebid. In this case, the A/E shall determine the reasons for the lack of bidding and recommend actions that may be taken.

4.13 CONSTRUCTION SUBMITTALS

- Submittals enhance effective project management and provide a consistent framework for quality assurance throughout the project. Minimum requirements are briefly addressed below and in the Specification Guidelines section of this document.

- The A/E is responsible for review and approval of all submittals to determine whether the Contract Documents have been properly interpreted and design requirements met. The A/E will inspect the construction of the work to assure that the materials received and work installed are consistent with the approval submittals. The A/E will submit the shop drawing log at each monthly Construction Voucher review meeting and review submittal schedule.

- The A/E is directed to place particular emphasis on all materials' content, manufacturing process and source. These criteria are essential to the Owner's commitment to safety and sustainability of State facilities and shall be considered equal to color, performance characteristics, etc., relative to acceptability of substitute or alternate materials and equipment for integration into the work.

4.14 OPERATION & MAINTENANCE MANUALS

To ensure a smooth transition from building design & construction to efficient operations and maintenance, the Owner places emphasis on the development and delivery of instructional information. In particular, the Owner requires the Contractor to submit a comprehensive set of Operation & Maintenance Manuals.

The Owner may request the A/E develop a more detailed Procedures and Operation Manuals as an Additional Service to ensure that design criteria is achieved. These manuals shall inform State maintenance and design personnel how to most effectively use the new facility/equipment in a concise, understandable format, and where appropriate for conveying information, utilize diagrams and photographs. The manuals shall reference specific systems and component manufacturer's data and <u>not</u> duplicate it.

Operation and Maintenance Manuals are intended to serve two distinct functions:

A. A technical reference, including a description of equipment systems, design criteria, start-up/shut-down sequences, operation and maintenance sequences, overhaul tasks, renewal parts lists and equipment repair histories; and

B. An instructional manual outlining specific work efforts: what to do, when to do it, how to do it and why to do it.

5 DRAWING STANDARDS

5.1 PURPOSE

The purpose of the drawings is to clearly establish design intent for types of construction and quantities of materials. The organization, comprehensiveness, coordination and quality of the drawings shall facilitate understanding of the design intent by bidders and construction trades as well as provide a readily retrievable record of the completed project for ongoing facility management.

5.2 GENERAL FORMAT REQUIREMENTS

- The A/E shall follow the United States National CAD Standard, National Institute of Building Sciences.
- Cover page must have the Project Title, Facility Name and Location. Department Project Number shall be in a conspicuous location with text not less than one-inch in height and must include a map of the facility delineating the area(s) included in the scope of work. Include Project Directory (See Section 4.2; Project Directory). Phase and date of submittal must be clearly identified.
- All drawing sheets must include the Department Project Number, Project Title, Facility Name, Date, Sheet Number, A/E Name and Contact Information of the responsible Design Professional. Affix seal, sign and/or date in accordance with licensing requirements at appropriate phases.
- Drawing set shall include an index of drawings with a description by discipline and building number(s).
- All floor plans and site plans shall include drawing scale and compass points.
- Show room titles and numbers on all rooms and principal areas.
- Smaller Construction projects may have all or portions of the items noted. The A/E and PM will determine which items will be used for the project.

5.3 REQUIREMENTS BY PHASE

A. Schematic Design Drawings

1. Drawings of each floor shall show the relationship of the various departments or services to each other and the room arrangement in each department.

2. Proposed roads and walks, service and entrance courts, parking and orientation may be shown on either a small plot plan or the first floor plan. Contour lines of the site must be shown in simplified fashion on the plot plan with notes as required to define drainage and an indication of the approximate location of utilities. A copy of the topographic map may also be included with the other drawings.

3. If the project is an addition, or is otherwise related to existing buildings on the site, the plans will show the facilities and general arrangement of those buildings, including single line floor plans with all spaces clearly titled.

4. If the project scope is small, the plans will show the proposed scope of the project and/or the location of equipment such as generators, AHU's, etc. to provide documentation of the project scope.

B. Design Development Drawings (represents approximately 50% of the completed Construction Documents).

1. Architectural

   a. Plans of all levels and roofs. Provide net area, dimensions and indication of fixed and movable equipment in each room.

   b. All elevations and typical sections (showing ceiling heights and framing).

   c. Where required, plot plan showing streets, highways, property lines, parking, walks, drives, location of utilities, existing and proposed contours and preliminary landscaping with plants list.

   d. Areas and occupancy capacities by floors.

   e. Perspective sketches or other means to convey design concepts.

2. Structural - Indicate all structural systems by way of plans and key details.

3. Mechanical

   a. Layouts all ductwork (including air supply ducts, return air system, and ventilating system) and piping systems.

   b. Scale layout of boiler rooms and major associated equipment and central heating, cooling, and ventilating units in their respective rooms.

4. Plumbing

   a. Show major plumbing fixtures in plan, and identify fixtures in plumbing fixture schedule by manufacturer number and type.

   b. Riser diagrams for multi-story construction, and where required to show routing of proposed piping for estimating and review purposes. Indicate each typical fixture or fixture group and each non-typical installation.

5. Electrical

   a. Show typical room layouts, bedrooms, offices, dayrooms, and any special rooms. Layouts shall indicate lighting, location of outlets, intercom, etc.

   b. Where service connection at site boundary is required, provide a site plan with service connection design.

6. Telecommunications

   a. Show typical layouts and elevations for telephone rooms. Depict locations for chases, distribution equipment, telephone and data jacks.

b. Where service connection at site boundary is required, provide a site plan with service connection design.

7. Life Safety

a. Provide items as indicated in Section 4.6; Plan Submission Requirements - Life Safety.

C. Construction Documents Drawings

Drawings shall be complete and adequate for bidding, contract, and construction purposes. They shall include the following, as appropriate:

1. Civil Drawings

Plot plan showing benchmarks, topography, newly established levels and grades, existing structures on the site (if any), new buildings and structures, roadways, walks, and the extent of the areas to be seeded. All structures and improvements which are to be removed under the construction contract shall be shown. A print of the site survey drawing shall be included with the Contract Documents for the information of bidders only, or original site data may be included as part of the project plot plan.

2. Architectural Drawings

a. Plan of each basement, superstructure floor and roof.

1) Provide cross sections of all fire rated assemblies on drawings and annotate with testing agency/laboratory, i.e., UL, GA or ETL along with applicable assembly Code or number.

b. Elevations of each facade.

c. Sections through building.

d. Required scale and full-size details.

e. Schedule of doors, windows, and finishes.

f. Fixed equipment location. Layout of typical and special rooms indicating all fixed equipment and major items of movable equipment. Equipment not included in the contract shall be so indicated.

g. Conveying systems. Details of construction; size and type of equipment; length and route of travel; machine and control spaces necessary; and utility requirements; for the following:

1) Conveyors - gravity and power-driven;

2) Elevators - freight, passenger and patient;

3) Hoists - electric, hand, hydraulic and pneumatic;

4) Loading dock devices;

5) Material handling systems;

6) Pneumatic tube systems; and

7) Stairs, escalators.

h. Penetrations

1) Provide penetration details of all fire rated assemblies and annotate with testing agency/laboratory, i.e., UL, GA, or ETL. along with applicable assembly code or number.

2) When penetrations are in walls containing asbestos, refer to M&C asbestos consultant.

3. Structural Drawings

a. Plans for all foundations, floors, roofs, and all intermediate levels with sizes, sections, and the relative location of the various structural members.

b. Schedule of all beams, girders, and columns.

c. Dimensions between floor levels, column centers, and offsets.

d. Dimensions of all special openings and pipe sleeves.

e. Details of all special connections, assemblies, and expansion joints.

4. Mechanical drawings

a. Plans and schedules for all heating, and air conditioning and refrigeration systems with unit types and sizes; and duct and distribution layouts and sizes. Provide schedules for all equipment required for the complete operating system and necessary details to convey the proper coordination and installation of the mechanical scope of work.

5. Plumbing Drawings

a. Size and elevation of street sewer, house sewer, house drains, street water main, and water service into the building.

b. Location and size of soil, waste, and vent stacks with connections to house drains, fixtures, and equipment.

c. Size and location of hot, cold, and circulating mains, branches, and risers from the service entrance, and tanks.

d. Riser diagram of all plumbing stacks with vents, water risers, and fixture connections.

e. Gas, oxygen, and special connections.

f. All fixtures and equipment that require water and drain connections.

6. Fire Protection Drawings

a. Provide a copy of performance specifications for fire protection equipment to the State Fire Marshal, M&C Project Manager and the DADS or DSHS AHJ for review.

b. Standpipe and sprinkler systems (performance specification).

c. Detection and alarm systems (performance specification).

d. Fire protection equipment (performance specification).

7. Electrical Drawings

a. Electric service entrance with switches and feeders to the public service feeders; characteristics of the light and power current; transformers and their connections, if located in the building.

b. Location of main switchgear, power panels, light panels, equipment, one line diagram of feeders and conduits with schedule of feeder breakers or switches.

c. Light outlets, receptacles, switches, power outlets, and circuits.

d. Telephone layout showing service entrance, telephone switchboard, strip boxes, telephone outlets, and branch conduits.

e. Nurses' call and/or intercom systems with outlets for beds, duty stations, and door signal lights, annunciators, and wiring diagrams.

f. Emergency electrical system with outlets, transfer switch, sources of supply, feeders, and circuits.

g. Security surveillance, controlled access and monitoring systems.

h. All other electrically operated systems and equipment.

5.4 AS-BUILT GUIDELINES

A/E will incorporate all as-built notes and revisions, including change orders, into the AutoCAD record drawing files to accurately reflect the constructed architectural, structural, mechanical, electrical, plumbing and fire protection systems and site utility conditions. A/E will deliver to Owner all required closeout documents within thirty (30) calendar days of issuance of Final Acceptance to the Contractor and prior to final payment to A/E.

A/E will submit the following to the Owner with each clearly labeled “As-Builts”:

- Two (2) sets of CAD drawings on compact disc (CD) in AutoCAD and pdf formats.
- One (1) set of full-sized prints;
- One (1) set of full-sized permanently fixed photographic positive prints of the original tracings, on a matte-surfaced, clear polyester base film; and
- Two (2) copies of the Project Manuals and Addenda in Microsoft Word or pdf format.

As-built CD Media standard:

- Ensure CD is virus-free and provide written certification to that effect.
- Label the disk with the following information as a minimum:
  - Project number;
  - Project name;

- A/E name;
- Contractor name;
- PM name; and
- Date recorded.

- Include a printed file directory with the disk.
  - Identify with same information as disk label.
  - Identify the entire disk directory, including contents through all subfolders.
  - Package the printed directory with the CD.

As-built CD minimum contents for CAD files:

- Computer-aided drawings are required for all projects and shall follow the United States National CAD Standard.
- Drawings will be compatible with the current version of AutoCAD used by the Owner.
- Package CAD files, unlocked, using AutoCAD eTransmit without any intervening steps or routines. Include all reference files with working links so that Drawing files are correct when opened on any computer.
- Label each sheet “As-built”.
- Indicate as-built conditions with accepted alternates and change orders. Identify variances using revision clouds.
- File format: Drawings in other file formats, such as .dxf, .dwf, .tiff, .dgn and .jpg, are not acceptable. These formats may only be used as support files for drawing files.

6 SPECIFICATION GUIDELINES

6.1 PURPOSE

Specifications shall supplement the drawings to fully describe types, sizes, capacities, workmanship, finishes, and other characteristics of all materials and equipment.

6.2 GENERAL FORMAT REQUIREMENTS

- Cover page shall have the A/E Name, Project Title, Facility Name and Location. Department Project Number shall be shown in a conspicuous location with text not less than ½-inch in height. Phase and date of submittal must be clearly identified.

- Inside cover page must repeat information above and include Project Directory (see Paragraph 4.2 Project Directory). Affix seal, sign and/or date in accordance with licensing requirements at appropriate phases.

- Provide Department Project Number, Project Title, Facility Name, Specification Section Number, and Page Number in the footer of the technical specification sections.

- The A/E shall follow the Construction Specification Institute's (CSI) Manual of Practice for the technical specification portion of the project manual. The use of CSI specification standards allows production flexibility within an ordered framework for the A/E and a system for locating information on any project by Owner and facility staff. Each specification section shall be titled and numbered according to the 50 divisions and six (6) digit section numbers in the 2004 CSI Master Format.

- A/E shall provide at each phase of design, copies of manufacturer's cut sheets for products or equipment shown or specified, indicating applicable parts, colors, patterns, components, etc., in a binder organized by specification section and submitted.

6.3 REQUIREMENTS BY PHASE

Specification data shall be submitted in three stages as follows:

A. **Schematic Design Phase** (SD) - Outline specifications shall concisely outline the required CSI divisions and the general types of systems to be incorporated into the facility, including site development, structural, roofing, walls, partitions, ceilings, heating, cooling, lighting, power distribution and plumbing.

B. **Design Development Phase** (DD) – The completion of this phase represents approximately 50% of the completed Construction Documents.

   1. Specifications shall be numerically organized according to the 50 Division, six digit CSI format with a table of contents indicating only those applicable sections. Each section shall have the headings and requirements formatted for final information and editing. Include any Owner requirements specific to the Facility (Infection Control Plan, etc.)

2. Layout of the construction, including interior finishes; type and locations of acoustical material and special floor covering.

3. Layout of the air conditioning, heating, and ventilation systems and their controls; exhaust systems; duct work, pipe and fittings; kitchen, laundry and sterilizing; and other special equipment.

4. Manufacturer's cut sheets on recommended products/materials.

C. **Contract Documents Phase**

Specifications may be in narrative or outline form. The use of Cash Allowances is prohibited. Make sure provisions for material testing do not conflict with Uniform General Conditions, Article 8 Quality Control and supplement thereto.

Specifications shall be incorporated into a project manual. Project manual shall include:

1. Cover Sheet
2. Table of Contents
3. HHSC Procurement and Contracting Requirements

   Invitation and Instructions to Bidders

   Bid Opening Location Map

   Contractor’s Bid Proposal*

   Contractor's Qualifications*

   Historically Underutilized Business (HUB) HUB Subcontracting Plan (HSP) Forms:*

   - HSP Quick Checklist
   - HSP Forms
   - HSP Subcontracting Opportunity Notification Form
   - HSP Prime Contractor Progress Assessment Report

   2010 Edition of Uniform General Conditions & Supplementary General Conditions for Construction Contracts

   Performance Bond

   Payment Bond

   Performance and Payment Bond Attachment

   Instructions for the Insurance Form

   Certificate of Insurance Sample

   Construction Agreement

   Forms:

   - Construction Voucher
   - Schedule of Values
   - Submittal Coversheet
   - Change Order Parts A-D

- Change Order Routing Information
- Change Order Time Extension
- Interim Change Authorization
- Monthly Construction Payment Affidavit
- Contractor's Affidavit of Bills Paid
- Application for Texas Identification Number
- Vendor Change Request Form 74-157

Prevailing Wage Rates

Soils Report

***** These items and the Bid Security as per Invitation and Instructions to Bidders are to be included in the Bid Submission.

4. General Requirements

- Special Conditions
- Summary of Work
- Unit Prices
- Alternates
- Submittals
- Infection Control & Safety Plan, Infection Control Risk Assessment & Infection Control Construction Permit
- Temporary Facilities & Controls
- Closeout Procedures
- Cleaning
- Other sections as required.

5. Existing Condition Assessments & Remediation

6. Detailed Technical Specifications:

6.4 GENERAL REQUIREMENTS

A. Special Conditions

1. Must not conflict with Uniform General Conditions and Supplementary General Conditions unless required by Federal agency participating in cost of project.

2. Contractors must comply with all applicable codes and regulations, including Occupational Safety and Health Act (OSHA) of 1970.

3. Construction coordination and phasing.

4. Compliance with Facility safety and personnel rules and regulations.

5. Occupancy by Facility of new or renovated structures.

6. Recertification by DADS Regulatory for the reoccupation of SSLC residences and possible suspension of work during Owner move-in/ move-out.

7. Any other special requirement of the project affecting cost of the work which is not noted on drawings nor described in other sections of the specifications, including coordination with public utilities.

B. Submittals

1. Contractor shall submit the following items within 21 calendar days of the effective date of the Notice To Proceed (and shall receive approval by ODR and A/E prior to first Pay Voucher):

a. Contractor's staffing and organizational plan for the project.

b. Contract Price Breakdown (Schedule of Values).

1) Contractor shall submit Schedule of Values (SOV) to the A/E and Owner’s Designated Representative (ODR), for approval. The SOV shall be accurately itemize materials and labor for each trade, separately for each building, in sufficient detail as acceptable to the A/E and OCR.

c. List of Historically Underutilized Businesses (HUBs) Subcontractors and Material Suppliers (with dollar amount and percent of total contract).

d. List of Proposed Subcontractors and Materials

1) At the direction of the A/E, the Contractor shall submit the names of subcontractors and material suppliers tabulated by relevant specification section in duplicate. Upon review by the A/E and the ODR, the A/E shall notify the Contractor, in writing, if the Owner or the A/E have objections to any parties on the list. No objections constitutes acceptance. However, acceptance of any subcontractor or materials supplier will not relieve the Contractor from responsibilities called for in the Contract Documents, nor will acceptance of a subcontractor establish approval of any particular process or material.

2) The Contractor shall submit to the A/E a list of the following types of materials proposed for installation:

a) Materials not specified.

b) Materials selected from a specification citing more than one manufacturer.

c) Material selected to conform to reference specifications.

3) The list shall be tabulated by specification section and include the name and manufacturer of each material. The Contractor's delay in submitting this list may result in the A/E imposing a "no substitution" designation on the relevant items. For materials specified by reference standards, also include the following:

a) Address of Manufacturer.

b) Trade Name.

c) Model and Catalogue Number.

d) Manufacturer's Data: Performance & test data; Reference Standards.

e. Submittal Delivery Schedule

1) The Submittal Delivery Schedule prepared by the Contractor shall contain the project number, project title, facility name, date, category; name of the subcontractor; description of work and/or material; related section numbers; Work Progress Schedule activity or event identification; and dates scheduled for first submission, resubmittal and final approval.

2) The Contractor shall indicate in the Submittal Delivery Schedule deadlines for submittal of all items to the A/E and deadlines for receipt back from the Owner in order for the Contractor to meet the construction schedule. Submittals shall be delivered to the A/E a minimum of 30 days prior to the time approval is required by the Contractor, unless otherwise noted.

2. A/E shall include a complete schedule of work-related submittals in the specifications including product data, shop drawings, samples and mock-ups.

3. Submittals shall be sent to the A/E's office. The Contractor shall use the Owner Submittal Routing Cover Sheet which identifies the contents of each submittal.

4. Submittals shall contain the project number, project title, facility name, date, category; specification section and names of the Contractor, subcontractor and fabricator. Submittals shall be complete in their entirety, and include a completed standard title/action block.

5. Submittals for all Plumbing, Mechanical and Electrical items in each individual Section shall be submitted together with a Table of Contents and each item clearly identified and separated with extended tabs. Partial submittals will not be considered.

6. All Product Data submittals of written data shall be on 8-1/2" x 11" paper, typed and shall contain all product information, safety data sheets (SDS), certifications (when required), and warranty related information (when required).

7. Shop drawings shall be completely detailed and dimensioned with types, sizes, gauges of materials noted and location of installation noted. Where shop coat of paint is

required on materials, brand name and chemical content shall be noted on drawings. Each sheet shall contain the date and shall be numbered consecutively.

8. Samples shall include full color range of options. All samples required in the Specifications, and any others directed, shall be submitted and resubmitted until approval is obtained. The Contractor shall submit samples in a timely manner to the A/E, allowing for the possibility of resubmissions without adversely affecting scheduled fabrication and delivery requirements. No color selection will be released until all colors are approved in the comprehensive color schedule.

9. After receipt of all color samples, the A/E shall present the ODR with a proposed comprehensive color schedule for review and approval by the ODR and facility. The approved color schedule will then be released to the Contractor for ordering materials.

10. The Contractor shall erect and maintain mock-ups and field samples as required by the specifications, the A/E and the OCR. Mock-ups shall be erected at location instructed by the OCR. Contractor shall request the A/E's review and approval of the mock-up or field sample prior to beginning actual construction.

11. No 'or equal' substitutions shall be submitted by the Contractor prior to Bid date, without exception.

12. The Contractor shall not submit any material for approval that cannot be verified as still in production; no discontinued materials shall be specified or submitted. The Contractor shall provide adequate proof of product availability at the request of the Owner.

13. The Contractor shall submit the Submittal Delivery Schedule monthly at each Construction Voucher Meeting.

14. Fabrication shall begin only after A/E has reviewed and approved shop drawings marked, "Approved as Noted".

C. Construction Schedules and Reports

1. Monthly Updated Schedule

a. Submit a detailed analysis describing deviations from the previous month's schedule as follows:

1) Description of the critical path and network diagram changes;

2) Additions/deletions of activities;

3) Reasons and impact of activities not starting or finishing on projected early/late dates; and

4) Reasons and remedies for activities which adversely affect the Contract Completion Date.

2. Daily Reports

a. The Contractor shall prepare a daily report concerning construction site events and submit copies to the A/E and Project Manager on a weekly basis or as otherwise designated. These reports shall contain the following information:

1) List of subcontractors on site;

2) Approximate count of personnel on site;

3) General weather conditions, with high and low temperatures;

4) Meetings and significant decisions;

5) Accidents and unusual events;

6) Stoppages, delays, shortages and or losses;

7) Meter readings and similar recordings;

8) Orders/requests from governing authorities;

9) Change Orders received and/or implemented;

10) Services connected or disconnected;

11) Equipment or system tests or start-ups; and

12) Partial completions, occupancies.

D. Temporary Facilities & Controls

1. Describe prime considerations of project coordination as affected by:

a. Use of existing site facilities, including storage space, paved drives and parking areas, utility connections, and toilets;

b. Interruption of Facility utility services; and

c. Temporary offices, telephone service and toilet facilities.

2. The A/E shall present the Project Manager with a comprehensive list of proposed recyclable materials and an estimate of probable cost impact on the project if recycling of construction debris is required.

3. Designate a locked area on site plan for construction debris recycling and disposal to provide protection and to prevent misuse.

a. Provide area for collection, storage and retrieval of separated debris for recycling. These bins or roll-offs shall be clearly marked for:

1) Wood;

2) Concrete;

3) Metal;

4) Cardboard (covered); and

5) Trash

E. Closeout Procedures

1. A/E shall include a complete list of all required closeout documents in the specifications including all Operation & Maintenance Manuals and Warranties.

2. Operation & Maintenance Manuals:

a. Submit manual two weeks prior to start-up and testing and prior to Substantial Completion Inspection. If changes/updates are required, resubmit prior to Final Inspection.

b. Submit three (3) 3-ring binders with 8-1/2 x 11 inch pages. Binder spine and front cover page must have the Project Title, Facility Name and Location. Department Project Number, date, name of Contractor, "OPERATION & MAINTENANCE INSTRUCTIONS", and subject matter of each binder, if more than one is required.

c. A complete set of equipment operating and maintenance manuals with parts lists and all guarantees and warranties shall be delivered to the Owner prior to final payment of the contract.

d. Each binder shall have a Table of Contents with a complete listing of contents and each shall contain a Directory, listing names, addresses and telephone numbers of the A/E, Contractor, Subcontractors and material and equipment suppliers. The binder(s) shall be internally subdivided with dividers, logically organized according to required information with tab titles clearly printed.

e. The first section of the Operation and Maintenance Manuals shall consist of a copy of the final Operating Concept Analysis to serve as an introduction to the new/renovated facility.

f. Operations and Maintenance Manuals shall address the following systems:

1) Refrigeration Plant;
2) Boiler Plant;
3) Air Handling Systems;
4) Other HVAC Systems;
5) Storm Water System;
6) Sanitary Drainage System;
7) Waste Gas Vacuum System;
8) Domestic Hot Water System;
9) Fire Protection System;
10) Electrical Systems;
11) Security Systems;
12) Energy Systems;
13) Transport Systems; and
14) HVAC Control System or EMS as applicable.
15) For each of these systems, the following sections shall be produced:
    a) Introduction;
    b) Startup Procedures;
    c) Engineering Data;

d) Flow Diagrams;

e) System Operation;

f) Areas Served By System;

g) Troubleshooting Procedures;

h) Emergency Procedures;

i) Automatic Control Center Information;

j) Maintenance Information and Data;

k) Preventative Maintenance;

l) Corrective Maintenance; and

m) Record Filing System.

3. For projects where Intermediate Care Facilities for Individuals with Intellectual Disability or Related Conditions certification is required, the Contractor shall submit certifications, letters, affidavits, etc., as follows:

a. In addition to submittals required by this section, Contractor shall provide all submittals required by governing authorities;

b. Contractor shall submit all keys and keying schedule; certificates of inspection by governing authorities on major items of equipment and service;

c. Contractor shall submit Affidavit of Payment of Debts and Claims Affidavit of Release of Liens and Consent of Surety to Final Payment;

d. Provide Form FML009 - Fire Alarm Installation Certificate, provided by the licensed Fire Alarm Contractor;

e. Provide a Certificate of Inspection by a licensed Fire Sprinkler Installer, with a material list and test certificate. Attach “green tag” issued by the local Fire Marshal to the sprinkler riser;

f. A licensed fire alarm company shall test all smoke/heat detectors and provide stickers on each device noting test dates and status;

g. Provide a letter from the local fire department certifying that the water pressure is adequate to support the fire sprinkler system;

h. Provide an inspection report from a licensed electrician stating that all electrical work was performed in compliance with the National Electrical Code;

i. Flooring material flame spread and smoke generation certificate; and

j. Coordinate with the ODR and Agency AHJ to obtain ICF-IID certification inspection for facilities certified by DADS Regulatory Services.

F. Substantial Completion Inspection

1. The A/E, and the Owner will make an observation within fourteen (14) calendar days from the date the Contractor has notified the ODR in writing that the Work will be substantially complete and that the Project will be ready for use as intended.

2. If the A/E and the Owner determine that the Work is not substantially complete, the A/E shall immediately notify the contractor in writing and the Contractor shall complete the Work as directed and send second notice and request for Substantial Completion inspection. A/E will schedule a second inspection.

G. Site Cleaning

1. All walks, drives and streets outside the project site shall be kept clean of dirt, mud, debris, building materials, tools, etc., at all times.

2. The Contractor will immediately clean any mud tracked out of the site by vehicles and equipment.

3. The Contractor will periodically inspect, tighten and realign construction/tree protection fencing.

H. Final Cleaning

1. Employ experienced labor or professional cleaners for final cleaning.

2. Prior to Final Inspection and the State's acceptance of the project, clean all areas of the building and project site, performing all operations called for in various sections of these specifications including, but not limited to:

   a. Cleaning of all resilient flooring and brick pavers;

   b. Cleaning of all ceramic tile walls and floors;

   c. Vacuuming of all exposed concrete floors;

   d. Cleaning of all glass and mirrors;

   e. Cleaning of all plumbing and electrical fixtures;

   f. Cleaning of all exposed metals;

   g. Removing all trash and debris of any nature from the site;

   h. Cleaning all exposed surfaces including lens of all lighting fixtures, removing construction dust, paint overspray and hand prints;

   i. Vacuum all carpeted surfaces; and

   j. Broom clean paved surfaces; rake clean other surfaces of grounds.

3. Existing Areas of building interior and exterior which are outside contract limits, but are soiled or damaged as a result of the work under this contract shall be cleaned and restored to original condition prior to the contract.

I. Record Documents and Shop Drawings

1. Maintain the following record documents on site, record actual revisions to the work and submit the following prior to Final Inspection:

   a. Contract Drawings;

   b. Specifications;

   c. Addenda;

   d. Change Orders and other Modifications to the Contract; and,

   e. Reviewed shop drawings, product data and land samples.

2. Store Record Documents separate from documents used for construction.

3. Record information concurrent with construction progress.

4. Specifications: Legibly mark and record at each Product section description of actual Products installed, including the following:

   a. Manufacturer's name and product model and number;

   b. Product substitutions or alternates utilized;

   c. Changes made by Addenda and Modifications; and

   d. Material Safety Data Sheets and/or material content analysis.

5. Record Documents and Shop Drawings: Legibly mark each item to record actual construction including:

   a. Measured Depths of foundations in relation to finished main floor datum;

   b. Measured horizontal and vertical locations of underground utilities and appurtenances, referenced to permanent surface improvements;

   c. Measured locations of internal utilities and appurtenances concealed in construction, referenced to visible and accessible features of the work;

   d. Field changes or dimensions and detail; and,

   e. Details not on original Contract Drawings.

6.5 TECHNICAL DESIGN STANDARDS

Building contamination via volatile organic compounds (VOC) shall be addressed in the specification of furniture, finishes, cleaning compounds, adhesives, and sealants. Although reduction or elimination of the sources of VOCs through selection of low-emitting materials is preferred, special ventilation protocols such as increased ventilation during material installation and/or prior to building occupancy may be appropriate. When accelerated emission of VOCs is necessary, prior to building occupancy, a detailed "bake-out" procedure shall be specified to include the following: "With maximum outside air flow the floor(s) shall be brought to the maximum allowable ambient condition for the building materials and furnishing specified for a period of at least 24 hours (or as may be approved by Agency staff). Appropriate exhaust of the air shall be provided such that no other floor(s) of the building are contaminated. All landscape furniture for the space shall be installed and all finish work complete before the bake-out process is begun". (See Appendix B; Indoor Air Quality

Guidelines).

A. **Termite Control** (Direction to be provided by Project Manager)Soil treatment, using least toxic treatment methods and materials for termite control, including, but not limited to, installation of physical controls.

1. Use only termiticides which are not injurious to plants and bear a Federal registration number of the U.S. Environmental Protection Agency.

2. Submit complete technical data, Safety Data Sheets and application instructions.

3. In the event that any chemicals are used, signs shall be posted in English and Spanish in areas of application to warn workers that soil termiticide treatment has been applied. Signs may be removed after treated areas are covered by other construction.

4. Recommend specifying use of a termite sand barrier with anti-termite sand capable of controlling pests in project locality. This barrier shall have particles of approximately 1 to 3 millimeters in size.

   a. Do not apply sand barrier until excavating, filling and grading operations are completed, except as otherwise required in construction operations.

   b. Do not apply sand barrier to frozen or excessively wet soils or during inclement weather. Comply with handling and application instructions.

   c. Require written warranty certifying that applied sand barrier treatment method will prevent infestation of subterranean termites and, that if subterranean termite activity is discovered during warranty period, Contractor will retreat soil and repair or replace damage caused by termite infestation.

   d. Surface Preparation: Remove foreign matter which could decrease effectiveness of treatment. Loosen, rake and level soil.

   e. Application Rates: Apply sand barrier treatment as follows:

      1) Under slab-on-grade structures, treat soil before concrete slabs are placed, using the following method:

         a) Install four inches of sand of recommended size;

         b) Dump from truck to center of lot and rake out towards edges; and

         c) Footings shall also have a layer of the barrier around them before they are poured.

      2) At hollow masonry foundation grade beams, treat the first course of blocks with the sand barrier.

      3) At expansion joints and areas where slabs will be penetrated, treat the first course of blocks with the sand barrier.

B. **Building Insulation**

1. Use of Chlorofluorocarbons (CFCs): The manufacturer shall not use CFCs as a blowing agent in the manufacturing process of the material. Affected materials include isocyanurates, urethanes, and phenolic rigid foams and some extruded polystyrene products.

2. If specifying rigid boardstock, choose rigid fiberglass or expanded polystyrene (also referred to as EPS or beadboard) foamed with pentane.

3. Pentane Abatement: The manufacturer shall collect a maximum amount of the pollutant (pentane) and reuse it with appropriate abatement procedures and destruction equipment meeting Texas Quality Control Standards.

4. Recommended Products

   a. Cellulose insulation

      1) Minimum 85% post-consumer waste recycled content.

      2) Treated with non-toxic fire retardants.

   b. Mineral Fiber Insulation

      1) Completely seal from inhabited spaces to prevent exposure to fibers.

   c. Cotton Insulation

      1) Treated with non-toxic fire retardants.

   d. Extruded Polystyrene Board Insulation

      1) Provide boards with 50% recycled material content (polystyrene resin), consisting of post-consumer and recovered resins.

   e. Expandable Polystyrene Board Insulation - Manufactured in block form and cut to desired thickness with or without foil facing.

      1) Type IX (ASTM 578): 25.0-33.0 psi compressive strength.

C. **Roofing Guidelines**

1. Typically, the age of the roofs at HHSC facilities vary significantly based on the function of the building, the year built and the type of construction. These buildings come from various original sources from old military bases re-commissioned after the military leaves to post Victorian style buildings in some of the earlier campuses.

2. Design Criteria

   a. A/E is to take into account the existing systems on each campus. The design shall include but is not limited to vapor barriers, insulation values, building codes, hail and impact resistance, puncture resistance, HVAC location(s) and fire resistant assemblies.

   b. A/E must be aware of the wind loads in the area of the new roof installation. Factory Mutual publishes data in their bulletins on the area uplifts for use by

the A/E in the design of the roof. Normal uplift for Austin is I-90 whereas uplift along the coast is I-120.

c. Include the fastening system for the specific design when designing for wind uplift. The roofs at the different facilities range in age from 10 years to 100 years and the materials are often old and some materials are no longer produced. The A/E must be aware of the existing conditions and design to meet the required criteria for fastening the membrane to the substrate or provide a new substrate as the design dictates.

d. Color selection, when required, will be the Facilities selection. All color required products are to be submitted for Facility and PM approval prior to A/E approval of the submittal. Metal shall be pre-painted at the factory. On site painting of any metal will not be permitted.

e. Repair of existing roofs is usually part of all roof projects. Flashings, pitch pans, expansion joints, scuppers, piping supports, walk treads, etc. are items that may be included in the project. These areas are to be repaired using the latest roofing methods for such work. A/E shall address each in the drawings and/or specifications, clearly defining the method of repair.

f. Water ponding is not allowed. All roofs are to have positive drainage. The minimum slope is one-quarter inch per foot for new construction with the provision that all roofs must have positive drainage.

g. Gutters and downspouts shall remove the water from the roof where new roofs are installed. The gutters and down spouts shall be designed for the area where the roofs are being installed, taking area rainfall account. The downspouts shall be sized to remove the water from a 100-year storm.

h. Required warranties shall as follows:

1) Two (2) years labor and material warranty for the roofing contractor;

2) Twenty (20) years for roofing system, whether a membrane or metal roofing system; and

3) Other warranties as the design requires.

i. Roof projects located at the DSHS State Hospitals and the DADS State Supported Living Centers are on existing, occupied buildings. A/E shall take into consideration that odors produced by asphalt and coal tar pitch are offensive and can cause problems with the facilities personnel and/or clients. The staging of the cookers is important to not disturb the day-to-day Facility operations. Provisions as such shall be noted in the specifications.

3. Low Slope Assemblies

a. Flat to Low Slope Coal Tar Pitch based built-up roofs with flood coat and gravel over insulation assemblies.

b. Low slope asphalt based built-up roofs with flood coat and gravel over insulation assemblies. These multiple labor-intensive assemblies are becoming scarce on the flat to low slope structures.

c. Replacements of these built-up roof assemblies have been performed with primarily two-ply SBS Modified Bitumen membranes. The roof coverings have been installed over both lightweight insulating concrete fill and rigid board insulations. Insulation assemblies have complied with code required thermal-resistant characteristics and code required slope. Roofs that have been "dead" level incorporated positive slope to accelerate the drainage of storm water. The Agency does not allow roof overlays on low slope roofs. An exception may be considered when a coal tar based membrane was adhered directly to an underlying concrete deck. In these instances, the coal tar is spudded smooth and utilized as a temporary roof beneath the lightweight insulating concrete fill.

d. Some facilities have required the use of single-ply membranes. These are discouraged due to the abuse the roof incurs from maintenance of roof-mounted equipment and debris thrown onto the roofs by clients. However, where appropriate, the installed PVC-based membranes are performing well. It is highly recommended that single-ply membrane be supported by rigid roof cover boards when used.

4. Steep Slope Roofing

a. These assemblies primarily include asphalt based shingled and metal roofing panels. In a few random locations, slate tiles and "S" shaped clay tiles have been installed.

b. The shingles have been installed over sloped wood decks with proper underlayment of either mechanically attached felt or self-adhered rubberized asphalt membranes. The existing materials vary from 25-year three-tab to 40-year laminated shingles.

5. Metal Roofing

Metal roof products vary greatly. Many existing structures are 20-years or older and include:

a. Mechanically fastened corrugated metal panels installed over open air structures;

b. Mechanically fastened metal "R" panels on open air structures. Framing for these include steel tubing and wood framing;

c. Recent replacements have included mechanically fastened "R" panel over self-adhered membranes on wood decking;

d. Concealed fastener architectural standing seam metal roof panels of self-adhered membranes on wood decking;

e. Concealed fastened "structural" metal roof panels over pre-engineered metal building frames;

f. Metal finished depending upon the color palette of the individual facility; and

g. To extend service life of some metal roof panel roofs, high performance coatings have been applied.

6. Qualifications of the Roofing Contractor

Roofing contractors have a wide variety of certifications and approvals which can be critical in determining the lowest, best bid. The following list includes desirable certifications and qualifications:

7. Certifications

a. The contractor shall be approved as an installer for the Roofing Material Manufacturer. In most cases a manufacturer will not provide a warranty if the Roofer is not licensed or certified to install their material.

1) Previous experience in the form of a set number of completed projects should be shown. There should also be a prior date of set up with the manufacturer. This has traditionally been a period of two to three years. Contracts shall not be issued to companies that have no previous experience with the manufacturer, or to companies that have been set up only for the specific project being bid. The consultant it to verify that the Contractor has been certified to use the manufacturer's product before approval can be given.

2) A minimum of 5 years as a roofing contractor installing the types of roofs in this contract shall be required.

b. Bonds shall be required from prime Contractor and subcontractor.

c. Subcontractor shall carry the same limits of insurance as the prime in all areas other than builder's risk and general liability. The subcontractor shall be required to carry general liability, but the limits may be less depending on the value of their proposed work.

d. Contractor shall submit a resume listing the project manager and project superintendent with the bid documents. These individuals will ultimately be responsible for ensuring the work is in compliance with the design intent. These individuals shall indicate at least five (5) projects of comparable scope, monetary size and complexity.

e. The Contractor and his forces shall be responsible for a minimum of 50% of the work.

f. The Contractors shall submit with bid documents, a list of least five (5) references including name of contact person with telephone number, fax number and address; and project with date of completion. A/E shall contact each prior to recommending a contract award. Recommended questions to the reference are:

1) Did the work proceed in a satisfactory manner and complete on time?

2) Who was the superintendent at the project site, and did that person perform satisfactorily? If the reference does not know who the

superintendent was there may have been a problem with communication.

3) Were there any liens or other indications that bills were not paid? If so, how were they resolved?

4) What problems occurred during the work and how were they handled? Was the contractor prompt in addressing the issues?

5) Will they use this contractor again?

g. After reviewing the Contractors Qualifications and contacting the references, the A/E shall provide the Project Manager, a recommendation on company letterhead of approval or disapproval of the Contractor with their reasons and justifications.

D. **Metal Doors and Frames**

1. Exterior entrances shall have vestibules with single-leaf doors sized for Code egress, etc., or other means of controlling air infiltration.

2. Door frame facing shall be 2 inches in width.

3. Minimum Gauges:

a. Frame

1) Exterior Opening - 14 gauge

2) Interior Opening - 16 gauge if 4-foot wide or less

3) Interior Opening - 14 gauge if over 4-foot wide

b. Doors

1) Exterior Doors - 16 gauge

2) Interior Doors - 18 gauge

E. **Wood and Plastic Doors**

1. Wood doors shall be solid slab, lumber core. Particle board core will not be accepted. Mineral core doors will not be accepted unless required by code.

2. All windows and doors shall be properly gasketed and sealed for infiltration control as per NWMA IS-2, IS-3.

3. Ensure building envelope can control infiltration and exfiltration levels.

F. **Special Doors**

1. Handicapped door(s): Single-leaf sliding operation preferred.

2. Adjustable optical and movement sensing devices and/or push plates are preferred over mat-operated doors.

G. **Aluminum Entrances and Store Fronts**

1. Metal framed glazed entrance assemblies shall have stiles of sufficient width to receive lock sets, panic hardware and appropriate weather stripping.

2. All window and door assemblies shall be properly gasketed and sealed as per ANSI 134.1 and 134.2, 1972.

H. **Finish Hardware**

1. Keying shall be as determined by each individual Facility.

2. Locks to be used with ASA standardized strikes (4-7/8 x 1-1/4).

3. Closers to be surface-mounted by Norton, Sargent or Corbin; equal quality hardware of other manufacturers will be acceptable subject to approval.

4. Specify ball bearing or oilite hinges on all doors with closers.

5. Do not specify pivot hinges, concealed closers or balanced doors on any opening.

6. Panic hardware to be push bar type similar to Von Duprin #33.

7. Recommend specifying cylindrical locksets, or heavy duty mortise locksets by Sargent, Corbin, Best, Russwin or other comparable manufacturer (Standardized ASA strikes to be used 4-7/8 x 1-1/4).

8. Doors and frames shall be consistent, throughout project, i.e., hinge location, strike and lock location, etc.

I. **Glazing**

1. All exterior windows to be fixed unless required by building program, or as determined below.

2. Access for cleaning must be provided.

3. An analysis of exterior windows shall consider their function according to use and evaluate the value of operable versus fixed windows.

4. Shading coefficients and U-values shall be determined by energy modeling.

J. **Carpeting**

1. Glue down only unless dictated by program requirements. Must meet State of Texas Carpet Specifications Class A (0-25) Flame Spread Ratio, 100 or less Smoke Development; Anti-static.

2. Labeling: All production of certified qualities of carpeting shall be back printed for identification. The imprint must carry the identification of the quality both by name or code number(s), the Federally Registered Certification Mark assigned to the

manufacturer as well as the shield with the letters of the testing agency used to indicate that the carpet is certified under the program which is validated. The following testing agencies are acceptable for the certification of carpets: ALI-Associated laboratories, Inc., MEA--Metallurgical Engineers of Atlanta, Inc., and ETL-Electrical Testing Laboratories, Inc. Furnish test results.

K. **Painting**

1. Semi gloss finish.

2. Wall texture shall be rolled on so that it can be matched readily by building maintenance personnel.

3. All paints shall be selected for lowest level of emission of VOCs and other pollutants available to achieve satisfactory performance.

4. Interior of all cabinets shall be sealed or painted.

5. Specify tinted lacquer or sealer used to seal top and bottom of wood doors to aid visual inspections.

6. Specify all field painting of mechanical and electrical items, except for prime coats on mechanical installation.

L. **Toilet Room Accessories**

1. Soap dispensers shall be stainless steel dispensers designed for liquid soap. Dispensers cantilevered from wall on projected brackets are not acceptable.

2. Comply with the requirements of Texas Accessibility Standards of 2012 (TAS), and the ADA Accessibility Guidelines.

3. Waste receptacles shall be integral with the paper towel dispenser. Minimum dimensions of waste receptacle shall be 8-inches x 16-inches x 24-inches.

4. Stainless Steel or baked enamel pre-finished sanitary napkin receptacles will be required in each water closet enclosure in women's toilet rooms equal to Bradley No. 426. Provide one sanitary napkin dispenser per women's toilet room.

5. Specify roll paper holders for water closet enclosures. Minimum two-roll units.

M. **Toilet Partitions**

1. Partitions shall be supported at floor and braced from ceiling and/or wall. Finish shall be graffiti resistant.

2. Metal or Recycled Content.

N. **Fire Extinguishers and Cabinets**

1. Where not provided by the Facility, install fire extinguishers in cabinets except in service areas such as mechanical rooms where they may be bracket mounted. Specify all fire extinguishers, brackets and cabinets. Verify types of extinguishers required

with appropriate fire/safety official at each Facility.

2. Fire extinguisher cabinets shall not require a key to open, except in areas subject to theft or vandalism, i.e., parking garages, loading docks, etc. Where subject to vandalism, cabinets shall be "Break Glass" type with tamper alarms signaling local alarm and signal to the central alarm system.

3. Fire extinguishers for projects to be ICF-IID certified will meet ICF-IID criteria.

O. **Elevators**

1. Elevators shall comply with the ANSI A17.1, Elevators, Dumbwaiters, Escalators and Moving Sidewalks and the Texas Accessibility Standards Act of 2012 (TAS)

2. Elevators shall service every floor level in the structure.

3. Provide key access at all hoistway entrances for service and emergency access.

4. Elevators shall be numbered from left to right.

5. Temperature in all machine rooms shall be kept between 70 - 80 degrees F.

6. Electrical lighting fixtures shall be located over all machines, in pits and in the front and back of all controllers.

7. 110V outlet shall be installed in each elevator car and on top of each cab.

8. If microprocessor controller is used, installer shall provide the following items:

   a. A complete source code listing of all software;

   b. Commercially available parts that are not proprietary to the elevator equipment vendor;

   c. All tools required to set-up and troubleshoot the elevator. Provide maintenance tapes for diagnostics purposes;

   d. Provide a complete set of marked-up wiring diagrams for each elevator; and

   e. Maintenance: initial installation contract shall include 12 months maintenance under terms of the State Maintenance Contract.

9. Interior cab finish shall be laminated plastic. Elevator fronts and doors shall be stainless steel.

P. **Mechanical Standards Checklist**

1. Check List at Proposed Site - Verify:

   a. Water main - location, size, pressure, elevation;

   b. Natural gas main - location, size, pressure, elevation;

   c. Sanitary sewer - location, size, invert elevation(s);

d. Storm sewer - location, size, and invert elevation;

e. Availability of and cost effectiveness of using existing "on Complex" services, i.e., chilled water and steam versus a "stand-alone" system or partial stand-alone system, i.e., use available chilled water and building's own heating stand-alone system; and

f. Prevailing wind directions and air current patterns around buildings.

2. Riser diagrams and/or schematic diagrams for all piped systems.

a. Sanitary waste and vent

b. Domestic hot and cold water

c. Steam and condensate

d. Heating water system

e. Chilled water system

f. Condenser water system

g. Natural gas

h. Fire protection

i. HVAC control diagrams with sequence description

3. Others

a. Connecting to existing systems, e.g., Facility chilled water system: Specify time frames for downtime on any project that will interfere with any system presently operating, and point out any work to be scheduled as night, weekend or holiday. Plant Maintenance Manager's office is to be notified before any mechanical equipment is turned off prior to disconnection or removal. Plant Maintenance Manager's office will make arrangements for personnel to be present and notify occupants of any area affected.

b. Equipment schedules on drawings: Place on appropriate drawing.

1) Plumbing fixtures

2) Handicapped fixture heights in accordance with state regulations: Texas Accessibility Standards (TAS) of 2012, and the ADA Accessibility Guidelines, rules and regulations including standards and specifications available from the Department of Licensing & Regulation. List or tabulate mounting heights on drawing with fixture schedule.

3) Chillers

4) Cooling towers

5) Boilers

6) Pumps

7) Air handling units, air rate, entering/ leaving DB/WB, air side, coils, water rates, and temperature control valve Cv, outside air CFM, etc.

8) Mixing boxes, cfm range, cfm set point, etc.

9) Water heaters

10) Air compressors

11) Others as required

12) Summer and winter indoor/outdoor design conditions.

4. Codes and Standards: Provide design of building heating, ventilation and air-conditioning systems (HVAC) consistent with standards set forth in ANSI/ASHRAE 62, including ANSI/ASHRAE Addendum 62a "Ventilation for Acceptable Indoor Air Quality" to ensure Owner facilities provide both comfortable and safe indoor air.

Identify in Operating Concept Analysis allowances made for both prevention and treatment methods to eliminate potential viral contamination of cooling coil drain pans and cooling tower systems. Acknowledge the potential problems of design selections and present their solutions.

Project shall conform to the published rules and regulations of the National Board of Fire Underwriters, National Electrical Code, public utility companies and all local, state and national authorities having lawful jurisdiction over the work. This shall include local building codes. Interpretation of all Code requirements shall be made by HHSC, the Authority Having Jurisdiction. Reference to technical societies, organizations or bodies is made in these specifications by the following abbreviations:

ACI: American Concrete Institute

AEIC: Association of Edition Illumination Companies

AGA: American Gas Association

AISC: American Institute of Steel Construction

AMCA: Air Moving and Conditioning Association

ARI: Air Conditioning and Refrigeration Institute

ASHRAE: American Society of Heating, Refrigerating and Air Conditioning Engineers

ANSI: American National Standards Institute

ASME: American Society of Mechanical Engineers

ASTM: American Society for Testing Materials

AWWA: American Water Works Association

CSI: Construction Specifications Institute

FIA: Factory Insurance Association

FM: Factory Mutual

IEEE: Institute of Electrical and Electronic Engineers

IBC: International Building Code

IMC: International Mechanical Code

IPC: International Plumbing Code

IES: Illuminating Engineering Society

MSS: Manufacturer's Standardization Society of the Valve and Fitting Industry

NFPA: National Fire Protection Association

NBS: National Bureau of Standards

NEC: National Electric Code

NEMA: National Electric Manufacturer's Association

NSF: National Sanitation Foundation

OSHA: Williams-Steiger Occupational Safety and Health Act

PDI: Plumbing and Drainage Institute

SMACNA: Sheet Metal and Air Conditioning Contractor's National Association, Inc.

In each section, when appropriate, state the applicable codes and/or standards. Also state that when conflicts exist between codes, the most stringent requirements shall prevail.

5. Training - Specify Contractor to provide training of building operations personnel concerning operation and maintenance of environmental systems.

6. Piping - suitable for application requirements.

7. Air Distribution System

   a. Air Handling Units. The design selected will be appropriate to the use. For residential use, a three deck air handler is preferred as it inherently precludes simultaneous heating and cooling. Systems such as high velocity dual duct with terminal mixing and terminal reheat systems are not to be used.

   b. Coils. Wherever possible, hot water coils will be used for heating and chilled water coils for cooling.

   c. Furnaces. Direct fired furnaces shall only be used for greenhouse applications. Heat exchanger type furnaces shall only be used on residential buildings as a last resort.

   d. Ductwork. Shall be metal with exterior insulation. Ductwork shall be designed in accordance with SMACNA standard for duct construction. Ductwork system shall be designed where possible to avoid crossing fire and/or smoke walls to avoid having to use excessive fire/smoke dampers. Return ductwork is preferred over plenum return.

   e. The use of roof top units is to be avoided wherever possible.

   f. Mark thermostats on the inside with identifying numbers to match mixing boxes, zone, or A/C unit controlled.

   g. Housekeeping pads shall be four (4)-inch to xix (6)-inch thick. Provide for air handlers, pump, chillers, boilers, compressors, etc.

h. Vibration Isolators - Provide for all rotating equipment; isolate from structure, from ducting, from piping, etc.

i. Provide duplex receptacles in equipment areas for drop lights, tools, test equipment, etc.

j. Provide equipment room sound insulation when adjacent to occupied areas. Air flow attenuators - return air into equipment rooms, etc.

k. AHU Filters – Suitable for application for ASHRAE Standard Min. Merv 7.

l. Outside Air (O/A) Introduction - Locate outside air intakes to prevent re-entrainment of contaminated outside air. Units to include air filtration system suitable for application for ASHRAE Standard Min. Merv 7.

m. Provide source exhaust ventilation at critical containment points such as blue print machines, copying equipment, smoking areas, etc.

n. Air handling equipment rooms used as plenum space for supply or return air shall comply with NFPA 90A, 2-3.2 and NFPA 90A, 2-3.10.4.

o. The use of air handling rooms, ducts or chases for EDP or Telecommunication cable networking is prohibited. In the case of suspended ceiling plenum, UL classified cables labeled with UL910 and/or cabling complying with NEC, Article 725; ANSI/UL 1581-1985; or CSA C22.2 No.0.3-M-1985 will be permissible. Provisions for distribution of EDP and Telecommunication cabling shall be provided through dedicated rooms, risers and conduit.

p. Provide enough O/A to maintain positive pressure – If VFD are used, verify positive pressure at all speeds.

8. Pumps

a. Appropriate configuration for the intended service and available space. 1750 rpm. Bronze-fitted for hydronic systems, all-bronze in potable water systems.

b. Large Pumps - Long coupled, integral cast iron or steel base, coupling guard, end suction or double suction as appropriate, housekeeping pad.

c. Smaller Pumps - long couples, short coupled, or in-line as appropriate, with mechanical seals.

9. Chillers

a. Each chiller will be performance-tested at the factory and a manufacturer's certification of the test results given to the Owner. Chillers will be tested in accordance with the latest version of the applicable ARI standards. A/E shall specify a minimum efficiency for standard ARI rating conditions and application specific conditions, including efficient operations under partial load conditions in accordance with State Energy Standards. A/E shall specify a minimum IPLV and APLV. Manufacturer shall submit the specific test data and calculation formulae used in determining the IPLV and APLV.

b. Centrifugal - to carry standalone building system. Two of equal capacity with reserve for possible and probable computer installation. Design to allow economic operation at partial load.

c. Computer rooms with 40 tons or under load: consider separate system, with air-cooled chiller. Liebert A/C units preferred in computer room with microprocessor based control system. Temperature and humidity control required. Isolate computer rooms from building air conditioning systems to minimize moisture transfer thus reducing latent load in computer rooms. Supply conditioned air from building system for ventilation.

d. Include in chiller specifications a requirement for a complete one year warranty service inspection and checkout by a factory trained service specialist.

10. Cooling Towers

a. Cooling towers shall be certified by the Cooling Tower Institute (CTI).

b. Ground level installation preferred subject to land space availability and aesthetic considerations.

c. Ground level units located as close to the chilling station as practicable; concrete water basins; debris screens or covers are required; separate basins and sumps for each cell for cleaning pump out and maintenance on a per cell basis; 3/4" marine plywood cover over distribution pan; trash and/or garbage pick-up not in close proximity to tower, and downwind from tower.

d. Above ground level units: Epoxy lined basins.

e. All units: Fan and pump motors not over 1750 rpm; specify ceramic or PVC fill; vertical air discharge. Units shall have temperature-activated basin heaters and pipe heat tracing. The intent is to eliminate the need for manual draining to prevent freeze damage.

11. Air Compressors

Air compressor for pneumatic control system. Preferred: Dual compressors with alternator mounted on receiver. One compressor capable of carrying normal load operating approximately 35% of the time. Automatic receiver drain trap; oil and particulate filter; refrigerated drier; minimum 3/4" high pressure riser to all floors; reducing station and filter at each floor.

12. Controls

The HVAC control system shall be a distributed processing system capable of integrating multiple building functions including equipment supervision and control, alarm management, energy management and historical data collection and archiving. The system will consist of:

a. Standalone DDC Panels;

b. Personal Computer Operator Workstations; and

c. Lap Top PC’s.

Specify required functions of the environmental control system and sequence of operation desired. Required complete control diagrams and actual detailed operations sequence(s) from controls subcontractor. Instruction period for owner's operating

personnel required. Fire alarm diagrams and operation description required.

13. Miscellaneous

a. Control valve provisions at heating and cooling coils and other heat exchangers to maintain adequate water flow through the heat generating and rejection equipment during light load periods. Balancing valve in coil bypass line, flow metering device in coil supply or return line to aid in balancing hydronic systems. Unless a written variance is granted, only two-way flow control valves are allowed on HVAC hydronic systems.

b. Insulate chilled and hot water pump housings. Generally use closed cell elastomeric (Araflex) on refrigerant lines. Do not use fiberglass insulation on chilled water systems. Specify polyurethane, polyisocyanuerate, or foamglass. All exterior insulation shall be protected by stainless steel or aluminum jacketing. Internally lined ducts are not acceptable. Ducts in mechanical rooms shall be insulated with rigid board. All pieces used for insulating pipe fittings shall be factory pre-formed.

c. Detail method of insulating chilled water strainers with removable insulating cup so that basket can be cleaned without destroying insulation job.

d. Valve tags and identification list for all valves.

e. Butterfly and ball valves preferred for throttling applications. Butterfly valves for throttling applications shall have latch lock handles/memory stops.

f. Isolating gate valves to allow servicing individual units at air handler coils, control valves, pumps; all operating pieces of equipment. Install unions for individual item removal and replacement. Non-rising stem gate valves are prohibited.

g. Drain valves at low points.

h. Vents at high points. Automatic vents only in accessible locations and pipe discharge to drain.

i. Check valves - place where required in all systems. Non-slam checks in pumped systems and in others as appropriate.

j. Balancing valves where required.

k. Expansion loops or joints, guides and anchors where required.

l. Dielectric unions where required.

m. Pipe thermometers - red reading mercury; separable socket with lagging extension; adjustable angle; temperature range to suit application; scale length to be read from the floor; stem length to suit pipe size. Suitable locations to indicate operation of equipment. Use at locations where frequent checks are desirable. At locations where occasional checks are appropriate and sufficient, use "Pete's plugs." See below.

n. Duct thermometers - as above except for duct mounting.

o. Thermometers and temperature sensors shall be accurate to within 1 degree F.

p. All temperature sensors in hydronic systems shall be installed in suitable brass wells, packed/filled with appropriate thermal conducting material.

q. Pressure gages – Four and one half (4-1/2)-inches dial minimum, size to read from the floor, range to suit so that indication would be near mid-range; /- 1% of full scale accuracy; configured for pipe mounting; snubber; shut-off cock; locate at pump suction and discharge and wherever required to indicate system component operation. Siphons on steam gages and other hot fluids. Steam raps shall be installed such that proper operation may be easily verified.

r. Pete's plugs - locate in piping where temperature and pressure checks will occasionally be required. Provide appropriate test kits.

s. System integrity tests - Tests to require that pressure fluid and duration suitable for the system. Test systems prior to connection to equipment that has been tested and/or constructed in accordance with ASME code or other governing body.

t. System cleaning - Clean all hydronic systems prior to putting them into service. Use suitable detergent or other chemicals to remove oils and other residue. Clean strainers during circulation process and at end after draining and flushing cleaning solutions. Clean and sterilize potable water systems. (Give detailed instruction in specification).

14. Fire protection systems - In accordance with NFPA and codes listed herein.

15. Piping Systems Color Coding – Provide use and direction signage every ten (10) feet above ceilings, unoccupied spaces and mechanical rooms, and every twenty (20) feet in occupied spaces visible from the floor.

16. Energy Management - Connect data points to designated system.

a. For the building - building systems supply and return water temperatures, flow rates and any other data necessary to determine building loads.

b. Equipment

Status - On/Off

Remote Start/Stop and On-Off-Auto local switching air handling units - supply and return air temperatures.

c. Fire alarm - All stations

d. Software modifications and/or additions in order to interpret and utilize data transmitted and achieve the present type of control for new systems.

17. Calculations and report to be completed as early in the Design Development Stage as practicable to determine the envelope energy indices (EEI) for the building. Calculations and report to be in accordance with "State of Texas, Energy Conservation

Design Standards for New State Buildings", and/or Model Energy Code (if applicable), latest version.

Q. **Packaged Chiller Guidelines**

1. Safely recover and legally dispose of refrigerant and oil from existing unit.

2. Remove the existing chiller and place the new chiller on properly sized vendor supplied elastomeric isolation pads, including all cranes, trucks, rigging, etc.

3. Provide licensed electricians to perform all electrical work. All electrical and instrumentation wiring shall comply with the manufacturer's requirements and shall be in accordance with local and state electrical codes. The contractor shall provide all necessary electrical upgrades.

4. Seven working days prior to mobilization, the contractor shall provide a plan for the protection of grounds, sidewalks, roadways, etc. from heavy equipment such as cranes, trucks, etc. The contractor shall repair all damage to the facility caused by heavy equipment.

5. Provide all labor, piping and material to connect chilled water piping to new chiller.

6. Provide all labor and materials to insulate new chilled water lines. Insulation shall be 1-1/2" fiberglass with FSK jacket and finished with an aluminum jacket and stainless strapping.

7. Provide 1/2 inch P/T Plugs with extensions and caps in the CHWS & CHWR pipes if the chiller doesn't come standard with them.

8. Provide 5-year parts, labor, and refrigerant warranties on the entire chiller and a 1-year parts and labor warranty on all else.

9. Provide the communication module needed for communication with on-site controls. Controls shall be removed and replaced by others (facility option to have the contractor hire the facility's control contractor).

10. Provide additional valves and tee in supply and return water piping for emergency connection of emergency chilled water unit (if needed, facility option).

11. Provide 10-inch non-mercury thermometers with wells in the CHWS & CHWR pipes (if needed, facility option).

12. Provide 4-inch dial pressure gauges with extensions and cocks in the CHWS & CHWR pipes (if needed, facility option).

13. Provide heat trace on exposed piping (for all latitudes from San Antonio and North, facility option).

14. Provide electric circuits for heat traces (as required, facility option).

15. Other requirements if the equipment provided does not come standard with these items (facility options):

a. Hail guards;

b. Single point power connection;

c. Factory installed water strainer;

d. Heat trace on chiller;

e. Low ambient cooling (0 deg F);

f. Freeze protection (T-stat control);

g. High Efficiency; and

h. Factory Insulation on all cold parts.

R. **Plumbing Checklist**

1. All exposed metal work at fixtures must be brass with chromium plate.

2. All faucets, fittings, supply stops for fixtures and similar devices shall be of one manufacturer unless otherwise required. Each fixture shall contain standardized interchangeable operating units made up of separate renewable stem, seat, washer retainer and nut. All faucets and fittings must close with water pressure. All fixtures shall be installed with supply stops/valves accessible at the fixture. Specify water saving flush valves and faucet aerators.

3. Other than exceptions listed, all fixtures to be of single manufacturer, where possible, and of white vitreous china; wall-hung; with appropriate concealed carriers. American Standard, Eljer, Kohler and Crane are preferred manufacturers.

4. Floor-mounted water closets (with rear spud), urinals and lavatories and drinking fountains are recommended. Coordinate with Facility for special fixtures for hospital client use.

5. Water closets shall be syphon-jet action, elongated bowl, open-front seat, no cover, flush valve, vacuum breaker, screwdriver angle stop. Coordinate with Facility for special fixtures for hospital client use.

6. Urinals shall be of the visible water level type with flooded outlets; washout action, flush valve, vacuum breaker, screwdriver angle stop. Coordinate with Facility for special fixtures for hospital client use.

7. Lavatories shall be concealed arm carrier or self-rimming countertop unit as appropriate, suitable faucet assembly with pop-up drain, loose key-stop valves. Coordinate with Facility for special fixtures for hospital client use.

8. Breakroom sinks shall be self-rimming single compartment stainless steel counter type, sound dampened, gooseneck spout, aerator, crump cup strainer, loose key stops.

9. Flush valves as manufactured by Sloan are preferred. Flush valves for water closets are to be located in accordance to TAS and ADA standards.

10. Janitor closets containing any plumbing fixtures shall be equipped with a floor drain - cast iron grate is acceptable. Service sinks shall be acid-resisting enameled cast iron, three (3) inch pedestal trap with cleanout, wall hanger, rim guard, faucet assembly with pail hook, hose thread spout, vacuum breaker, integral stops or cross handles. Cast

floor sinks are acceptable in janitor closets.

11. All main water supplies to rest rooms shall be readily accessible and shall contain ball valves for main supply shut off.

12. The use of liquid-carrying piping smaller than one-half inch, except gauge lines, air vents, or between wall stops and fixtures is unacceptable.

13. Pressure piping shall not be placed under concrete ground slabs. Where such placement is absolutely unavoidable, no joints will be permitted below the slab, and suitable materials shall be identified in design submittals. This applies to all hydronic systems.

14. Sizing of branch lines or run outs to plumbing fixtures shall be in accordance with the International Plumbing Code and other recognized practices and standards.

15. Shock Absorbers - Hydraulic shock absorbers may be used in accordance with Water Hammer Standard, PDI-WH-201, latest revision. Commercial units, not air chambers. Stainless steel welded construction throughout, permanently charged, P.D.I., sized and rated, accessible for replacement. Provide access panels if required.

16. Provide chrome plated Escutcheon Plates around all piping exposed to view in occupied spaces, passing through walls, floor partitions or ceilings. Escutcheons at all wall, floor and ceiling pipe penetrations. Applies to other piped systems also.

17. Cleanouts: Provide the following for cleanouts:

    a. Provide cleanouts at each corner and at high points on subsurface perimeter drainage system;

    b. Provide cleanouts at each change of direction (45 degrees) of soil lines; every fifty (50) feet on long runs; at the end of each continuous waste line; and at the foot of each riser;

    c. Cleanouts that occur in pipe chases or other inaccessible locations shall be brought through the walls and provided with a cover plate(s). Provide chrome covers at finished areas; and

    d. Cleanouts in floor slabs shall be adjustable type flush with the floor and provided with covers. Floor cleanouts in finished areas with scoriated polished brass cover; cast iron cover in service areas; extension with cover encased in 18"x8"x6" concrete slab at grade in earthen areas.

18. Floor Drains - One minimum per toilet area, pitch floor to drain, polished brass top in finished areas. One minimum in equipment rooms, trash rooms, cast iron top in service areas. Hub drain for domestic water heater P & T relief discharge and auxiliary drain pan. Generally, any location where water connected equipment could need service, draining, repair, replacement, etc.

19. Provide a grease interceptor where waste discharge from fixtures and equipment in establishments which may contain grease, i.e., cafeterias, snack bars, etc. Interceptor design and specifications must be approved prior to CD approval.

20. Hose bibs: Provide a minimum of one hose bib adjacent to the loading dock to be used

for wash down, and in trash rooms, equipment rooms. Hose bibs shall be freeze-proof, flush assembly, loose key operated, vacuum breaker, chrome box and cover, vandal-proof cover (if outside).

21. Water Heaters

    a. A written evaluation of energy alternatives that meet or exceed the performance of point of use gas water heaters shall be prepared by the A/E, as per Texas Government Code 2166, Sections.401, 403 and.408, including information about the economic and environmental impact of various energy alternatives.

    b. When a central water heater system uses a storage tank, a hot water boiler will be used instead of a tank type water heater.

    c. The heater shall be equipped with an A.S.M.E. properly rated pressure and temperature relief valve with the outlet pipe downwards to a floor drain or other building waste line. Provide emergency drain pan when required.

22. Flashing – As appropriate for application.

23. Electric Water Cooler - wall hung, self-contained, stainless steel, handicapped and regular each floor.

24. Landscape Irrigation - Suitable for intended function; PVC piping acceptable with thrust blocks. Provide stem protection. Separate irrigation system onto a dedicated, city-approved water meter.

25. Toilet group shut-off ball valves accessible above ceilings or behind access panels.

26. Air Vents - generally, all air vents shall be of the automatic type. All vents shall be located in accessible areas, or access made possible. Auxiliary manual vents shall be installed, in conjunction with automatic vents, to accommodate fill-up and drain- down procedures.

27. Hangers - Suitable types, spacing, saddles on insulated lines, expansion-contraction movement, etc.

28. System Integrity Tests - Suitable for system under test. Describe tests, head or pressure, duration, etc.

S. **Electrical**

1. Electrical Rooms - The A/E shall include the following criteria in evaluating conductors and equipment for electrical or mechanical rooms: See “Requirements for Electrical Installation” current edition, NEC.

    a. Suitability for installation and use in conformity with the provisions of NEC.

    b. Mechanical strength and durability, including parts designed to enclose and protect other equipment.

    c. Wire-bending and connecting space.

d. Electrical insulation.

e. Heating effects under normal conditions of use and under abnormal conditions likely to arise in service.

f. Arcing effects.

g. Classification by type, size, voltage, current capacity and specific use.

2. Other factors that contribute to the practical safety of operations and maintenance staff:

a. Electrical Busways shall be open, visible and accessible for maintenance and repair. See current edition of NEC for exceptions.

b. Raceways shall not be used as a means of support for other raceways, cables or equipment. See "Wiring Methods" current NEC.

c. All penetrations of fire barriers shall be filled with a fire rated material that meets or exceeds the rating of the fire barrier.

d. Sufficient access and working space shall be provided for all electrical or mechanical equipment and comply with the current addition of the National Electrical Code. See "Working Clearances" current NEC.

e. Only wiring methods and materials properly listed, labeled and approved by the current addition of the National Electrical Code shall be installed in ducts and plenums specifically fabricated to transport environmental air. See "Wiring in Ducts, Plenums, and Other Air Handling Spaces" current NEC.

f. Temporary electrical power and lighting installations shall not exceed 90 days. Specify a panel board, with an isolated grounding bar, for data processing equipment, so that isolated circuits may be provided. See "Temporary Wiring".

3. Equipment Standards

a. Specify a panel board, with an isolated grounding bar, for data processing equipment, so that isolated circuits may be provided.

b. Design that each panel board has a minimum 20% spares at occupancy. This is based on the total circuit capacity of the panelboard. See "Wiring Planning" current edition NEC.

c. Provided schematic on emergency lighting systems.

d. Provide schematic, when an emergency power supply is required, to include total load of connected equipment.

e. Fluorescent lamps & ballast shall meet current energy standards.

f. Use standard color coding of wires for Owner buildings as follows:

1) 2-wire circuit: grounded neutral-white; ungrounded leg-black. Each modular zone shall have a zone disconnect to silence each zone for

maintenance or repair. Add 10% spare modules for expansion capability;

2) 240/120V, 3-wire, single-phase circuit. Grounded neutral-white; one hot leg-black; the other hot leg-red;

3) 208Y/120V, 3-phase, 4-wire: grounded neutral-white; one hot leg-black; one hot leg-red; one hot leg-blue;

4) 240V Delta, 3-phase, 3-wire: one hot leg-black; one hot leg-red; one hot leg-blue**:** and shall be used for total building alarm;

5) 240V/120V, 3-phase, 4-wire, high-leg delta: grounded neutral-white; high leg (208V to neutral) orange; one hot leg-black; one hot leg-red;

6) 480/277V, 3-phase, 4-wire: grounded neutral-gray; one hot leg-brown; one hot leg-orange; one hot leg-yellow; and

7) 480V Delta, 3-phase, 3-wire: one hot leg-brown; one hot leg-orange; one hot leg-yellow. Color coding will be consistent for each phase, i.e., A-brown, B-orange, C-yellow.

g. Flexible metallic conduit shall have ground wire on ALL lengths.

h. Specify wiring used in plenums, return air and/or environmental air comply with the current edition of the National Electrical Code.

i. Specify a separate subpanel board for all areas that have cooking facilities. This panel shall be located in the area it serves.

j. Specify that NFPA 75, Data Processing Systems for Computer Environments be used in conjunction with Article 645, NEC.

k. Specify panel boards and circuit breakers that bolt on, no plug on type breakers will be accepted - Exception: residential.

l. Specify outlets for clocks, not a clock system. Install an outlet in each elevator lobby.

m. A ground wire will be run in all types of conduit. A two-wire system will not be acceptable.

n. Color code outlets connected to isolated ground circuits.

o. A separate isolated ground electrical distribution system will be required for computer equipment.

p. Recommend no incandescent lighting be permitted; use color corrected P.L./Q.N. is warm color is needed.

q. Only copper conductors will be allowed. No aluminum conductors will be allowed in any location.

4. Evaluate use of infra-red passive lighting controls for all specifications which are not assigned to individuals, such as conference rooms, mechanical/electrical/telephone rooms, janitor closets, break rooms, etc.

5. Provisions for individual metering of building tenants where applicable.

T. **Emergency Generator**

1. The new generator shall be compliant with NFPA 110-Level 1, Type 10, Class X.
2. Muffler rated “critical” or “hospital”
3. Digital electronic controller
4. Remote annunciator and remote emergency stop located 24 hour attendant area.
5. Flexible fuel lines
6. Vibration isolation of the unit
7. Three (3) sets of comprehensive operation and maintenance manuals
8. Factory training
9. Three (3) copies of the test reports.
10. The generator location shall be provided with battery-powered emergency lighting at 30 foot-candles. The charging system for the emergency lighting shall be supplied by the load side of the automatic transfer switch. The exception for exterior generators is NOT allowed by the State Licensing Rules.
11. A duplex outlet served by the load side of the ATS is required near or within the cabinet of the generator.
12. If a new transfer switch is provided with the generator, it shall be the same manufacturer as the generator and have the same warranty time period as the generator.
13. The automatic transfer switch is required to have 30-inch wide clearance of six (6) feet in front of the ATS cabinet (rather than the normal three (3) feet).
14. If a day tank for diesel or gasoline is used, it must hold enough fuel for at least 12 hours of running at full power. The day tank shall be double wall with a leak sensor between the walls.
15. Minimum warranty parts, labor, fluids, and other expendables for a period of two (2) years (longer period is recommended if reasonably priced or if generator is within 100 miles of the coast).

U. **Fire Alarm and Detection Systems**

1. Standards (Sample specification)

a. This section covers the minimum requirements pertaining to the design, manufacture and installation of the Fire Alarm Systems. The systems shall be integrated, proprietary, monitoring and control systems, using distributed processing and digital transmission techniques with solid state components. Equipment shall include, but not be limited to, the following:

1) Fire Alarm Control Panels (FACP);

2) Manual Fire Alarm Stations;

3) Smoke Detectors;

4) Heat Detectors;

5) Audible and Visible Notification Appliances;

6) Relays, Emergency Control Functions, Fan Shutdown and Computer Room System Interface;

7) Water-Flow Switches;

8) Supervisory Switches; and

9) Annunciator Panels.

b. The use of flashing exit signs will be acceptable.

c. All building systems will be tied into the building fire alarm. This shall include any subsystem such as automatic data processing (ADP) areas and telecommunication areas.

d. The work covered by this specification includes the system equipment specified, installation and necessary control wiring to insure a fully operable system. In addition, the installation shall include all memory, software, push buttons, indicator lamps, electronic hardware and accessories for a completely operable system in accordance with the "Operations" paragraph of this guideline.

e. The system shall be fully usable as a UL listed Fire Alarm/Life Safety System, and all system devices shall bear the UL label. In addition, the system shall conform to the requirements of the publications listed below:

1) Factory Mutual Engineering Corp., Factory Mutual System Publication, “Factory Mutual Approval Guide," latest edition.

2) NFPA Standards:

a) No. 70 National Electrical Code as applicable for Health Care Occupancies and non- Health Care Occupancies.

b) No. 72 National Fire Alarm and Signaling Code as applicable for Health Care Occupancies (1999 edition) and non-Health Care Occupancies.

c) No. 101 Life Safety Code as applicable for Health Care Occupancies and non-Health Care Occupancies.

f. Basic Design: The systems shall be modular design to allow future expansion with a minimum of hardware additions. The systems shall be equipped with primary and secondary power supplies in accordance with NFPA 72. The secondary power supply shall be by dedicated batteries, or by connection to an emergency generator serving the fire alarm branch circuit, and shall provide 24 hours of quiescent (non-alarm) load plus 5 minutes of operation in alarm.

Transfer to emergency generator power shall occur within 10 seconds of loss of primary power minimum line voltage required for operation. If an emergency generator is used as the secondary power supply, dedicated batteries for the fire alarm system with 4 hours of capacity shall be provided. Transfer to battery power shall occur instantly upon loss of primary power minimum line voltage required for operation or if emergency generator fails to start so that an alarm signal is not interrupted or lost.

g. Operation:

1) An integrated control system in each building shall provide all power, annunciation, supervision, controls and standby emergency battery power for the detection and alarm system. The control panels shall be modular in construction, containing all necessary modules to operate with capability of being expanded at any time up to the predetermined system maximum capacity.

2) The system shall consist of all detection devices, control equipment, audio-visual devices, fan shutdown relays, elevator capture provisions, remote annunciators installed, wired and connected in accordance with the drawings and specifications for function as specified, herein.

3) The system shall be electrically supervised. Zone receiving circuits shall be individually supervised for open wiring, ground faults, the loss of battery or fuse, low battery and module replacement. Detection of an input zone trouble condition shall be individually annunciated by an appropriate L.E.D. Signal circuits shall be supervised for open circuits, shorts, and general faults. Circuit trouble shall be individually annunciated. Fire alarm signals shall override trouble signals.

4) The fire alarm system shall be provided with 24 hour battery by connecting to the emergency power system in the building. The system shall function as follows upon activation of any automatic device (smoke detector, heat detector, water-flow switch) or activation of a manual pull station.

a) Flash the respective zone L.E.D. at the Fire Alarm Control Panel and at the remote annunciator.

b) Activate audio-visual signal units only on the floor of alarm initiation.

c) Transmit a signal to the Management System.

d) Shut down HVAC units.

e) Computer room alarm panels shall be connected to the building fire alarm system. Upon activation of an automatic or manual alarm device within the protected computer room area, the local panel shall activate alarm signal devices on the respective floor and shall be annunciated at the respective building annunciator.

f) Provide two (2) sets of dry contact in the main building(s) fire alarm control panel(s) for interface of systems for remote signal monitoring.

g) Fire alarm control panels shall be equipped with a coded module signal initiating circuit capable of manual operation at the control panel. The device shall sound an alarm signal distinct from the normal fire alarm signal and shall be used as designated by the Owner.

h) Provisions shall be included for future elevator capture in the buildings as scheduled on the Drawings.

5) Activation of the alarm silence/acknowledge switch shall silence the alarm signal and cause the flashing L.E.D. to revert to a steady state of illumination. Upon occurrence of a subsequent alarm in a different zone, the alarm signal shall resound until silenced.

2. Products

a. Smoke detectors shall be solid state, photoelectronic type operating on the light scattering principle. Detector shall be factory preset to detect smoke at a nominal one and one-half percent (1.5%) light obscuration per foot, equipped with self-compensating circuitry for maximum stability. An alarm condition shall be indicated by a red L.E.D. capable of being remote annunciated. Unit shall have a 135-degreeF fixed thermal detector built-in, which shall have a built-in calibrated test feature, and shall be UL listed and F.M. approved.

b. Air duct smoke detectors shall operate on a cross-sectional air sampling principle to compensate for and overcome stratification and the skin effect. Duct detector shall consist of a standard photoelectric detector mounted in an air duct sampling assembly and tube that extends across the duct or plenum of the ventilating unit. The air duct detector shall be installed in the duct where indicated on the drawings in accordance with the manufacturer’s instructions, and NFPA 90A Methods. Air duct detector shall be UL listed and F.M. approved.

c. Thermal (heat) detectors shall be fixed temperature only or combination fixed temperature/rate of use devices as indicated on the drawings. The fixed temperature portion shall operate when the device reaches its rated temperature. The rate of rise portion of the detector shall operate when its temperature is increased at the rate of rise 15-degreeF/minute, or greater. Thermal detector shall be UL listed.

d. Manual pull stations shall be non-coded, dual-action type. The station shall provide mechanical indication of operation. Operating handle shall be recessed to prevent accidental operation, and shall be UL listed and F.M. approved.

e. Horn/strobe alarm devices shall be white lens with the word "FIRE" lettered, thereon, visible through 180-degree field of view. Where construction restrictions prohibit full recessing, a semi-flush (SF) plate shall be provided. Mounting of units shall be on a standard 4" square electrical box.

f. Relays shall be 30 ampere rated, 24 volt D.C. coil voltage, single pole, double throw, Detral Series Model 900, mounted in a Hoffman 6" x 6" x 3" hinged cover cutout box, catalog number AHE, gray enamel finish. Provide 12 volt D.C. coils where required to accommodate existing computer room alarm panels.

g. Water-flow switches shall be suitable for wet pipe installation with a built-in time delay to prevent activation by water hammer or surges.

h. Tamper switches shall be S.P.D.T., suitable to coordinate with type of valve where installed.

i. Annunciators (remote) shall be zone supervision for all zone circuits as shown on the drawings, and shall contain accommodations for ten (10) future zone expansions. Annunciators shall be serial type. Mounting shall be flush or semi-flush as designated, housed in a custom-hinged cabinet. The unit shall include supervised alarm indicators with audible alarm and key reset/key lamp switch.

    1) End of line devices (E.O.L.) shall be provided as required to ensure system integrity.

j. Installation:

    1) All wiring system junction and outlet boxes, tamper switches, flow alarm switches, duct-mounted smoke detectors shall be identified by means of self-adhesive-backed, preprinted, color-coded, vinyl labels indicating system and function. "Dymo" type labeling machine strips will not be acceptable unless riveted or screwed to surfaces.

    2) All fire alarm system wiring shall be installed in conduit and shall be isolated from other systems. It shall be the explicit responsibility of the Contractor to verify that adequate wire quantities are provided so as to fulfill the "Operations" paragraph of the specification.

    3) The work shall be carefully laid out in advance, and where cutting, chasing or drilling of floors, walls, partitions, ceilings or other surfaces is necessary for the proper installation, support or anchorage of the conduit or other work, this work shall be carefully done, and any damage to the buildings, piping or equipment shall be repaired and refinished by skilled mechanics of the respective trade required, at no additional cost to the Owner.

k. Submittals, Shop Drawings:

    1) Shop drawings and product data for the fire alarm system shall be submitted as required under the Electrical General Provisions Section and shall include:

Trunk cable schematic showing transponder locations and all trunk data.

2) List of connected data points, including transponders to which they are connected, and input devices.

3) Technical specification data sheets of each system component.

l. Maintenance Manuals and Instructions

1) Provide maintenance manuals as specified in the Electrical General Provisions Section and include final corrected copies of system diagrams that include all changes and additions made prior to completion of the installation.

2) Furnish necessary sessions of instruction for the Owner's maintenance and system operating personnel.

3) Tests: After installation is complete and at such time as directed by the owner, the Contractor shall conduct a complete system operating test. The test shall demonstrate that the system meets the operating requirements of this specification; that individual conductors of all circuits are free of grounds, shorts and breaks. This test shall include the complete cycling of all fire, smoke, flow, etc. The test shall be repeated at a later date for the State.

3. Execution

a. General:

The entire installation shall comply with N.E.C. and all applicable provisions of Section 16. All wiring shall be in E.M.T. conduit. Wherever possible, the existing conduit in the respective facilities shall be reused.

b. Qualifications of Installer:

The system shall be installed by an experienced firm regularly engaged in the installation of automatic fire-detection and alarm systems in accordance with the National Fire Protection Association. Approval of the installer will not relieve the Contractor from his responsibilities to perform all work in accordance with the specifications and contract terms.

c. Installing Contractor:

The fire alarm equipment supplier shall be licensed by the State of Texas to sell service and install fire alarm systems and shall have been engaged in the business on a full-time basis for a minimum of five (5) years. The alarm system shall be installed under the supervision of a licensed fire alarm system installation superintendent.

d. Record and As-Built Drawings:

Upon completion of the installation and prior to final inspection, the Contractor shall furnish four (4) copies of as-built drawings that show where detectors are installed. The "as-built" drawings shall show by number, the detectors in the exact sequence in which they are installed on the circuit.

e. Guarantee:

The fire alarm system(s) shall be guaranteed for a period of one (1) year from date of acceptance. The guarantee shall include equipment and systems parts, and all labor and workmanship.

At the time of bidding, furnish a quotation for providing a one (1) year maintenance agreement for all building fire alarm systems within the scope of these guidelines and a subsequent quotation for an additional one (1) year renewal of the maintenance agreement.

In Addition to the requirements of Article 700 Emergency Systems, National Electric Code, Applicable Building Code and NFPA 101 Life Safety Code, Emergency Lighting shall be provided in the following areas:

1) Main Electrical Switchgear Room;

2) Mechanical and Central Power Plant Rooms; and

3) Emergency Generator Room when applicable.

V. Telephone Rooms and Closets

1. Standards

a. Service Entrance

1) The quantity of entrance pathways using 4-inch PVC Type C conduit or sleeves shall be: one per 50,000 usable square feet of the facility, plus two spares for a minimum of three pathways. All pathways shall be firestopped and plugged to prevent the infiltration of gas, water and vermin.

2) Underground conduit shall be installed such that a slope exists to allow drainage away from the facility.

3) Except for tunnel entrances, 4-inch metal conduit shall be the only pathway used at the facility entrance point.

b. Entrance Room

1) For buildings exceeding 20,000 usable square feet, an enclosed room shall be provided.

2) Entrance room shall be located in a dry area, as close to the vertical backbone pathways as possible.

3) A minimum of two walls shall be covered with 3/4 inch A/C plywood, 4' x 8', painted white.

4) Lighting shall provide a minimum of 50 foot-candles at 3-feet off the floor.

5) Door shall be 3' x 7' minimum, lockable and outward opening.

6) Finishes shall be treated to eliminate dust and preferably painted white.

7) Provide two dedicated 20 amp, 120VAC duplex convenience outlets, each on separate circuit; convenience outlets shall be placed around the room at 6'-0" intervals.

8) Provide a 3/4 trade size conduit for the entrance room to the main building ground.

c. Equipment Room

1) The room shall house only telecommunications equipment and its environmental support systems.

2) Floor loading capacity shall be for a concentrated load 1000 lbf greater than the heaviest imposed equipment load.

3) The room shall be located from sources of electromagnetic interference, with maximum allowable interference of 3.0V/m.

4) The room shall be connected to the backbone pathways of the building.

5) Finishes and lighting shall be consistent with Entrance Room.

6) The room shall have its own dedicated electric panel.

7) Doors shall be double, 3'x7' each, without sill plates, lockable and outward opening.

8) A 1-1/2 trade size conduit shall be provided from the equipment room to the building ground.

d. Backbone Pathways

1) The vertical backbone pathway consists of telecommunications closets located on each floor, vertically stacked and tied together by sleeves or conduit.

2) Pathways shall not be located in elevator shafts or mechanicals.

3) Pathways using 4-inch conduit or sleeves shall be allocated one sleeve for every 50,000 usable square feet, plus two spares for a minimum of three.

4) All pathways shall be fire stopped.

e. Telecommunications Closets

1) Telecommunications closets shall be dedicated to telecommunications functions only.

2) Closets shall be located on floor with a minimum of 50lbf/sq.ft. loading capacity.

3) A minimum of two (2) walls shall be covered with 3/4" A/C plywood, 4'x8", painted white.

4) Finishes shall be treated to eliminate dust and preferably painted white.

5) Provide two dedicated 20 amp, 120V ac duplex convenience outlets, each on separate circuit; convenience outlets shall be placed around the room at 6'-0" intervals.

6) Provide a 3/4 trade size conduit for the entrance room to the main building ground.

f. Telecommunications Outlets

1) Cable trays shall be placed from the telecommunications closet through all major hallways on a floor to support all necessary wire pulls to the outlets.

2) All cable trays shall be grounded to meet NEC codes.

3) Two 3-inch EMT conduits shall be placed over doorways in different locations on each floor. These conduits shall allow access through fire walls in hallways to provide service to office space and be adequately fire stopped.

4) 3/4-inch conduit shall be attached to each outlet box and be stubbed out at 6" above the ceiling.

5) Install pull wire in all conduits.

6) Provide at least one station outlet facility at each area designated by the Project Manager. Each station outlet facility shall consist of the following:

a) One (1) standard outlet box for telephone service.

b) One (1) standard outlet box for computer (EDP) service.

c) One (1) 20 amp, 120 VAC, grounded fourplex convenience outlet.

7) Provide a single line diagram for all telecommunications service on each floor.

8) Multiple closets on a floor shall be connected by a minimum of two, 4-inch conduit.

9) The horizontal distance from the closet to station outlets shall not exceed 300 feet.

2. Recommendation/Suggestions

a. Electronic Data Processing (EDP) Rooms and Closets

1) Main Computer Room (where applicable)

a) The room shall house only EDP equipment and its environmental support systems.

b) Floor loading capacity shall be for a concentrated load 1000 lbf greater than the heaviest imposed equipment load.

c) The room shall be located from sources of electromagnetic interference, with maximum allowable interference of 3.0V/m.

d) The room shall be connected to the backbone pathways of the building.

e) Finishes and lighting shall be consistent with Entrance Room.

f) The room shall have its own dedicated electric panel.

g) Doors shall be double, 3'x7' each, without sill plates, lockable and outward opening.

h) A 1-1/2 trade size conduit shall be provided from the equipment room to the building ground.

2) Backbone Pathways

a) The vertical backbone pathway consists of EDP closets located on each floor, vertically stacked and tied together by sleeves or conduit.

b) Pathways shall not be located in elevator shafts or mechanical chases.

c) Pathways using 4-inch conduit or sleeves shall be allocated one sleeve for every 50,000 usable square feet, plus two spares for a minimum of three.

d) All pathways shall be fire stopped.

3) EDP Closets

a) EDP closets shall be dedicated to EDP functions only.

b) Closets shall be located on floor with a minimum of 50lbf/s.f. loading capacity.

c) A minimum of two walls shall be covered with 3/4" A/C

plywood, 4'x8", painted white.

d) Finishes shall be treated to eliminate dust and preferably painted white.

e) Provide two dedicated 20 amp, 120V AC duplex convenience outlets; convenience outlets shall be placed around the room at 6'-0" intervals.

f) Provide a 3/4 trade size conduit for the entrance room to the main building ground.

4) EDP Outlets

a) Cable trays shall be placed from the EDP closet through all major hallways on a floor to support all necessary wire pulls to the outlets.

b) All cable trays shall be grounded to meet NEC codes.

c) Two (2) 3-inch EMT conduits shall be placed over doorways in different locations on each floor. These conduits shall allow access through fire walls in hallways to provide service to office space and be adequately fire stopped.

d) 3/4-inch conduit shall be attached to each outlet box and be stubbed out at 6" above the ceiling.

e) Install pull wire in all conduits.

f) Provide at least one station outlet facility at each area designated by the Project Manager. Each station outlet facility shall consist of the following:

- One (1) standard outlet box for telephone service;
- One (1) standard outlet box for computer (EDP) service; and
- One (1) 20 amp, 120 VAC, grounded fourplex convenience outlet.

g) Provide a single line diagram for all EDP service on each floor.

h) Multiple closets on a floor shall be connected by a minimum of two (2), 4-inch conduit.

i) The horizontal distance from the closet to station outlets shall not exceed 300 feet.

7 CONTRACT ADMINISTRATION GUIDELINES

7.1 PURPOSE

Professional services during the construction phase of a project are generally intended to assure that the Contract with the Contractor is being faithfully executed to protect the health, safety and welfare of the public in use of the building. This section outlines some performance standards for contract administration.

7.2 REQUIREMENTS

Please note the following requirements defined in Texas Government Code Title 10, Subtitle D, Subchapter H:

Section 2166.351 (3) Professional inspection shall mean the periodic examination of all elements of the project to reasonably insure that these meet the performance and design features and the technical and functional requirements of the contract documents.

Section 2166.355 (a) The design professional or the design professional's authorized representative shall perform professional inspection.

Section 2166.355 (b) The design professional or the design professional's authorized representative shall:

A. Assist the Owner in obtaining proposals from contractors and in awarding and preparing construction contracts;

B. Be responsible for interpretation of contract documents and changes made to the contract documents;

C. Provide an interpretation of plans and specifications as required during construction;

D. Check and approve samples, schedules, shop drawings, and other submissions only for conformance with the design concept of the project and for compliance with the information in the contract documents;

E. Approve or disapprove all change order requests and, subject to the provisions of Section 2166.257, prepare all change orders;

F. Assemble all written guarantees required of the contractors;

G. Make periodic visits to the project site to become generally familiar with the progress and quality of the work and to determine in general if the work is proceeding in accordance with the contract documents;

H. Make a written inspection report after each visit to the project site and send a copy of the report to the Contractor, the Project Manager, A/E Construction Administrator, and the Plant Maintenance Manager;

I. Keep the Project Manager informed of the progress of the work and endeavor to guard against defects and deficiencies in the contractor's work;

J. Determine periodically the amount owing to the contractors and recommend to the Owner payment of that amount; and

K. Conduct inspections to determine the dates of substantial and final completion and notify the Owner and the using agency of the determination.

7.3 WORK PLAN

A work plan for contract administration shall be developed and reviewed with the M&C Project Manager. The A/E shall conduct the following, but not limited to, the minimum responsibilities:

A. Participate in a Pre-Construction Conference after award of the Contract and prior to the Contractor commencing work;

B. Perform site visits as required by the particular phase of the work in progress, but not less than provided in the A/E Agreement. Initiate and maintain an on-site log to record at the time of each visit all pertinent observations, including deficiencies in the work;

C. Attend and conduct a regularly scheduled progress meeting with Contractor and, if possible, an Owner's representative. At one of these meetings each month, the Contractor's Payment Application will be presented and reviewed. The Contractor’s Progress Schedule shall be reviewed at each meeting. The A/E shall remind Contractor of Liquidated Damages provisions of the Contract. All of these items shall be included in the written minutes of the meeting;

D. Provide minutes of all meetings and reports of all project observations. Minutes shall be typed in a format acceptable to the Owner, such as that used in the design phases;

E. Perform professional inspections on a scheduled basis to reasonably assure that all requirements of the Contract are met prior to the cover-up of each element of the work, especially as enumerated below:

1. Forms allow for proper sized beams, slab depths, etc., and are clean, straight, true and plumb;

2. Reinforcing steel is installed which complies with the design and approved submittals. Cast-in-place items are in place;

3. Concrete complies with the specifications and is placed in an approved and /timely manner. Attendance at the initiation of each concrete placement is required, but possibly not continuous attendance through the placement;

4. Curing procedures are installed as specified;

5. Steel and concrete structure is installed as designed and submitted. Connections are made as designed. Members are installed straight, true, plumb (or appropriately sloped) and have no damage from handling;

6. Plumbing, mechanical and electrical rough-ins, fixtures, equipment and accessories are installed as designed and submitted;

7. Blocking and other hidden work is installed in the walls and ceilings meeting the design criteria prior to the installation of wall surfaces on both sides and ceilings or

ceiling panels;

8. Roofing is installed as designed and submitted. This requires attendance at the initial roofing installation, and attendance at major milestones of the roofing installation;

9. Finishes are installed to meet the design and submittals; and

10. As-built conditions are faithfully recorded (not less than monthly);

F. Review and approve submittals. Where source, raw material or manufacturing process limitations are specified, provide assurance that contractor maintains records to show that delivered and placed materials comply;

G. Review and recommend payment requests and change proposals consistent with professional observations and judgments of work completed, work required, and reasonableness of costs;

H. Participate in substantial completion and final completion/acceptance inspections;

I. Review all close out materials and approve prior to sending to M&C Project Manager;

J. Review and approve final payment from Contractor;

K. Complete as-built drawings and specifications and send final reproducible, prints and discs to M&C Project Manager; and

L. Participate in Warranty Inspection one month prior to warranty expiration.