

**EXHIBIT A**

**ARCHITECT/ENGINEER FEE SCHEDULE**

**THE UNIVERSITY OF TEXAS SYSTEM  
OFFICE OF FACILITIES PLANNING AND CONSTRUCTION**

**ARCHITECT/ENGINEER FEE SCHEDULE**

DECEMBER 1987

<u>Construction Cost of Project</u>	<u>Dormitories Garages Warehouses</u>	<u>Classrooms Offices Other Buildings</u>	<u>Health Research Special Education</u>
Over \$15,000,000	5.0%	5.5%	6.0%
Over 10,000,000	5.5%	6.0%	6.5%
Over 1,000,000	6.0%	6.5%	7.0%
Up to 200,000	7.0%	7.5%	8.0%

Remodeling and Renovation

Over \$5,000,000	7.0%	7.5%	8.0%
Over 1,000,000	8.0%	8.5%	9.0%
Up to 200,000	9.0%	9.5%	10.0%

NOTE: WHEN CONSTRUCTION COST FALLS BETWEEN THE TABULAR LIMITS,  
THE RATE WILL BE DETERMINED BY DIRECT INTERPOLATION.

**EXHIBIT B**

**PERSONNEL TITLES AND HOURLY RATES**

**EXHIBIT C**

**ADJUSTMENT TO BASIC SERVICES COMPENSATION FORM**



**ADJUSTMENT TO BASIC SERVICES FEE**

Date: \_\_\_\_\_

MD Anderson Project Name: \_\_\_\_\_

MD Anderson Project No.: \_\_\_\_\_

MD Anderson Agreement No.: \_\_\_\_\_

To: (state name and address of Project A/E)
 \_\_\_\_\_  
 \_\_\_\_\_  
 \_\_\_\_\_

Attn: \_\_\_\_\_

In accordance with the provisions of the Agreement, Owner hereby amends the Basis of Compensation as described in Article 14.4 to adjust the Basic Services Fee.

The original basis for compensation shall be amended for the following reasons:

[PM describe here deviations resulting from peculiarities encountered in design or other factors altering project scope – see Art. 2.11.]

The Basic Services Fee shall be adjusted as follows. Refer to the interpolation schedule established in Article 14.4.

ORIGINAL CCL:	\$ _____.
ORIGINAL FEE PERCENTAGE:	_____.%
ORIGINAL BASIC SERVICES FEE:	\$ _____.
(as described in Art. 14.4)	

ADJUSTED CCL:	\$ _____.
FEE PERCENTAGE:	_____.%
ADJUSTED BASIC SERVICES AMOUNT	\$ _____.

OWNER'S AUTHORIZED REPRESENTATIVE:

OWNER'S 2<sup>ND</sup> AUTHORIZED REPRESENTATIVE:

By: \_\_\_\_\_

By: \_\_\_\_\_

Name: \_\_\_\_\_

Name: \_\_\_\_\_

Title: \_\_\_\_\_

Title: \_\_\_\_\_

Date: \_\_\_\_\_

Date: \_\_\_\_\_

**EXHIBIT D**

**ADDITIONAL SERVICES PROPOSAL FORM**

**[TO BE SUBMITTED ON PROJECT A/E'S LETTERHEAD.]**

Date: \_\_\_\_\_

Additional Services Proposal No. \_\_\_\_\_

Name of Project A/E firm:

\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

Re: (project name and number)

Refer to the Agreement dated \_\_\_\_\_, 20\_\_ between The University of Texas MD Anderson Cancer Center ("Owner") and the undersigned ("Project A/E") as amended to the date hereof (such agreement as so modified and amended being hereafter called the "Agreement") pursuant to which Project A/E is to perform certain services. The terms which are defined in the Agreement shall have the same meanings when used in this letter. The fee for these requested additional services are in lieu of any other fee adjustment based on an increase to the CCL as related to these services.

1. Owner has requested the performance of the services described below which Project A/E deems to be Additional Services. Refer to "Attachment A" for complete breakdown.

(Detailed description of Services. Use attachment only for additional description)

2. The services are fully described in the following documents: (list sheet #'s and spec sections)
3. Project A/E agrees to perform the Additional Services described above subject to and in accordance with the terms and provisions of the Agreement

a.) for a *lump sum fee* which will be determined in accordance with the Agreement in an amount of:  
\_\_\_\_\_ Dollars (\$\_\_\_\_\_)

OR

b.) an *hourly amount* in accordance with the Agreement, not to exceed \_\_\_\_\_  
Dollars (\$\_\_\_\_\_)

and for reimbursement of expenses in accordance with the Agreement incurred solely in connection with the performance of such Additional Services, but which reimbursement for expenses will not exceed \_\_\_\_\_ Dollars (\$\_\_\_\_\_).

4. Project A/E will perform the services in accordance with any schedule attached hereto (attach schedule if applicable), but in any event not later than \_\_\_\_\_ (\_\_\_\_\_) days after Project A/E is authorized to proceed.

Submitted by:

[Project A/E]

By: \_\_\_\_\_

Name: \_\_\_\_\_

Title: \_\_\_\_\_

### **Current Fee Summary**

ORIGINAL ADDITIONAL SERVICE FEE AMOUNT:	\$ _____.
Previously Approved Additional Services Fees:	\$ _____.
Other Pending Additional Services Proposal Amounts:	\$ _____.
This Proposed Additional Services Fee Amount:	\$ _____.
<b>PROPOSED TOTAL ADDITIONAL SERVICES FEES:</b>	<b>\$ _____.</b>
Current Basic Services Fee Amount:	\$ _____.
Current Maximum Amount for Reimbursable Expenses	\$ _____.
<b>PROPOSED MAXIMUM CONTRACT SUM</b>	<b>\$ _____.</b>

Accepted this \_\_\_\_\_ day of \_\_\_\_\_, 20 \_\_. Project A/E is authorized to commence performance of the Additional Services on \_\_\_\_\_, 20 \_\_

OWNER'S AUTHORIZED REPRESENTATIVE

OWNER'S 2<sup>ND</sup> AUTHORIZED REPRESENTATIVE

By: \_\_\_\_\_

By: \_\_\_\_\_

Name: \_\_\_\_\_

Name: \_\_\_\_\_

Title: \_\_\_\_\_

Title: \_\_\_\_\_

**EXHIBIT E**

**STATEMENT FOR ARCHITECTURAL/ENGINEERING SERVICES RENDERED  
FORM**

[To be submitted on Project A/E's letter head.]

Date:

The University of Texas MD Anderson Cancer Center  
Facilities Planning, Design and Construction  
1515 Holcombe Box 703  
Houston, Texas 77030

ATTN: [\[MD Anderson Project Representative\]](#)

Project Name:  
MD Anderson Project No.:  
MD Anderson Purchase Order No:  
A/E Project No. :

### STATEMENT FOR ARCHITECTURAL/ENGINEERING SERVICES

Statement No. \_\_\_\_\_ for the period ended \_\_\_\_\_, for services provided in accordance with MD Anderson Agreement No. \_\_\_\_\_.

Professional Liability Insurance Policy expiration date: \_\_/\_\_/\_\_\_\_

#### I. BASIC SERVICES

Current Construction Cost Limitation (CCL) \$ \_\_\_\_\_.

Basic Services Fee Percentage \_\_\_\_\_%

Basic Services Fee (CCL x Basic Services Fee %) \$ \_\_\_\_\_.

#### **Services Performed to Date:**

Phase	Fee	Fee Amount	Completed to Date	Fee Earned to Date
Schematic Design	15%	\$ _____.	_____%	\$ _____.
Design Development	20%	\$ _____.	_____%	\$ _____.
Construction Documents	40%	\$ _____.	_____%	\$ _____.
Construction Svcs. Procurement	5%	\$ _____.	_____%	\$ _____.
Construction Administration	20%	\$ _____.	_____%	\$ _____.
<b>Sub-Totals</b>	<b>____%</b>	<b>\$ _____.</b>	<b>____.</b>	<b>\$ _____.</b>
<i>Less Amount Previously Billed</i>				\$ _____.
<b>Net Amount Due for Basic Services This Statement</b>				<b>\$ _____.</b>

**[To be submitted on Project A/E's letter head.]**

**II. ADDITIONAL SERVICES**

Services Performed to Date: (Attach supplemental material to support amounts billed.)

Authorization	Fee Basis	Fee Amount	Complete to Date	Amount Earned to Date
(Approved Additional Services Proposal No.)	(% of CCL, Hourly Rate up to Not-to-Exceed Amount, Fixed Price)	\$ _____.	__%	\$ _____.
(Approved Additional Services Proposal No.)	(% of CCL, Hourly Rate up to Not-to-Exceed Amount, Fixed Price)	\$ _____.	__%	\$ _____.
Insert additional	rows, as needed.	\$ _____.	__%	\$ _____.
Sub-Total Additional Services Fees Earned to Date:				\$ _____.
<i>Less</i> Amount Previously Billed:				\$ _____.
<b>Net Amount Due for Additional Services:</b>				<b>\$ _____.</b>

**III. CHANGE ORDER SERVICES**

Services Performed to Date

Proposed Change/ Change Order No.	Fee Percentage	Value of Changed Work	Fee Amount	Complete to Date	Amount Earned to Date
(Approved Additional Services Proposal No.)	____%	\$ _____.	\$ _____.	__%	\$ _____.
(Approved Additional Services Proposal No.)	____%	\$ _____.	\$ _____.	__%	\$ _____.
Insert additional rows, as needed.	____%	\$ _____.	\$ _____.	__%	\$ _____.
Sub-Total Change Order Services Fees Earned to Date:					\$ _____.
<i>Less</i> Amount Previously Billed:					\$ _____.
<b>Net Amount Due for Change Order Services:</b>					<b>\$ _____.</b>

[To be submitted on Project A/E's letter head.]

#### IV. REIMBURSABLE EXPENSES

Summary of Maximum Reimbursable Expense Amount;

Initial Maximum Reimbursable Expense Amount (Agreement, paragraph 14.4.2) \$ \_\_\_\_\_.

Cumulative Adjustments to Maximum Reimbursable Expense Amounts \$ \_\_\_\_\_.

**Current Maximum Reimbursable Expense Amount** \$ \_\_\_\_\_.

Summary of Reimbursable Expenses Incurred to Date (include details and supporting documentation as an Attachment to this Statement for Services Rendered);

Type	Amount Incurred	Multiplier	Total Incurred to Date
Travel	\$ _____.	1.0	\$ _____.
Reproduction/Postage	\$ _____.	1.0	\$ _____.
Other	\$ _____.	1.0	\$ _____.
Sub-total;			\$ _____.
Less Amount Previously Billed;			\$ _____.
<b>Net Amount Due This Statement;</b>			<b>\$ _____.</b>

#### RECAPITULATION

		Net Amount Due This Statement	Total To Date
I.	Basic Services Fee	\$ _____.	\$ _____.
II.	Additional Services Fees	\$ _____.	\$ _____.
III.	Change Order Services	\$ _____.	\$ _____.
IV.	Reimbursable Expenses	\$ _____.	\$ _____.
	Total Amount Earned as of This Statement		\$ _____.
	Less Total Amount Previously Billed		\$ _____.
	<b>Total Amount Due This Statement</b>	<b>\$ _____.</b>	<b>\$ _____.</b>

I certify that the above Statement for Services Rendered is correct and now due.

\_\_\_\_\_  
Signature

\_\_\_\_\_  
Title

\_\_\_\_\_  
Date

[Attach additional supporting information as appropriate for requested payment item. (e.g. for Additional Services to be compensated on an hourly-rate basis include schedule of personnel for Project A/E and each consultant who provided the service, the hourly rate, and the time expended. For Reimbursable Expenses, include receipts.)]



[To be submitted on Project A/E's letter head.]

## **FINAL PAYMENT CERTIFICATION AND LIEN WAIVER**

The Project Architect/Engineer certifies that all persons, consultants and firms who supplied services to it in connection with this Project have been fully paid for their services or work items, or that they will be fully paid immediately upon receipt of this payment, and that there are no other outstanding debts, obligations or claims related to this Project for which the Owner may be liable or for which the Project Architect/Engineer will look to the Owner for additional payment. **This payment constitutes full and final payment to the Project Architect/Engineer and its consultants for all services provided for this Project and the Owner is not obligated to make any more payments on their behalf.**

In consideration of the payment herewith made, the undersigned does fully and finally release and hold harmless Owner from any and all claims, liens or right to claim or lien, arising out of this Project under any applicable bond, law or statute.

\_\_\_\_\_  
Signature

\_\_\_\_\_  
Date

## **FINAL HUB PLAN**

The HUB Plan form for final payment is included with this Final Payment Request.

Yes \_\_\_\_ No \_\_\_\_

[To be submitted on Project A/E's letter head.]

# HUB Subcontracting Plan (HSP) Prime Contractor Progress Assessment Report

***This form must be completed and submitted to the contracting agency each month to document compliance with your HSP.***

Contract/Requisition Number: \_\_\_\_\_ Date of Award: \_\_\_\_\_ Object Code: \_\_\_\_\_  
(mm/dd/yyyy) (Agency Use Only)

Contracting Agency/University Name: \_\_\_\_\_

Contractor (Company) Name: \_\_\_\_\_ State of Texas VID #: \_\_\_\_\_

Point of Contact: \_\_\_\_\_ Phone #: \_\_\_\_\_

Reporting Period: ☐ - Jan. ☐ - Feb. ☐ - Mar. ☐ - Apr. ☐ - May ☐ - Jun. ☐ - Jul. ☐ - Aug. ☐ - Sept. ☐ - Oct. ☐ - Nov. ☐ - Dec.  
(Check only one Month)

Total Contract Amount Paid this Reporting Period to Contractor: \$ \_\_\_\_\_

## ***Report HUB and Non-HUB subcontractor information***

Subcontractor's Name	Subcontractor's VID or HUB Certificate Number	Total Contract \$ Amount from HSP with Subcontractor	Total \$ Amount Paid This Period to Subcontractor	Total Contract \$ Amount Paid to Date to Subcontractor	Object Code (agency use only)
		\$	\$	\$	
		\$	\$	\$	
		\$	\$	\$	
		\$	\$	\$	
		\$	\$	\$	
		\$	\$	\$	
		\$	\$	\$	
		\$	\$	\$	
<b>TOTALS:</b>		\$	\$	\$	

Signature: \_\_\_\_\_ Title: \_\_\_\_\_ Date: \_\_\_\_\_

Printed Name: \_\_\_\_\_ Phone No. \_\_\_\_\_

**EXHIBIT F**

**PROJECT MILESTONE SCHEDULE**

## PROJECT MILESTONE SCHEDULE

Activities shown in bold below must have the associated dates identified and included with this Agreement and represent services to be performed by Project A/E pursuant to this Agreement. Supplemental activities shown on the schedule below, for which dates are not yet defined, shall be determined at the completion of the Pre-design Phase or at such time when both parties mutually agree that the project is sufficiently developed and documented.

Activity:	Completion Date:
<b>Pre-design Phase</b>	
Owner Authorizes Project A/E to begin Pre-design Phase	December 28, 2020
Project A/E Submits Facility Program for Owner Review	February 10, 2021
Joint Review Meeting for Owner Comments	February 19, 2021
Project A/E Revises and Resubmits Facility Program	March 5, 2021
Owner Approves Facility Program	March 18, 2021
<b>Agreement for Construction Manager-at-Risk Executed</b>	<b>March 1, 2021</b>
<b>Schematic Design Phase</b>	
Owner Authorizes Project A/E to Begin	March 19, 2021
Project A/E Submits SD Package for 95% Review	May 17 2021
Joint Review Meeting for Owner Comments	June 2, 2021
<b>Owner Approves Schematic Design</b>	<b>June 11, 2021</b>
<b>Design Development</b>	
Owner Authorizes Project A/E to Begin	June 14, 2021
Project A/E Submits DD Package for 95% Review	August 9 2021
Joint Review Meeting for Owner Comments	August 26, 2021
<b>Owner Approves Design Development</b>	September 13, 2021
<b>Board of Regents Approval</b> ( <i>New Construction Projects Only</i> )	August 11, 2021
<b>Owner Accepts Guaranteed Maximum Price Proposal</b> ( <i>CM at Risk Projects Only</i> )	March 18, 2022
<b>Construction Documents Phase</b>	
Owner Authorizes Project A/E to Begin	September 14, 2021
Project A/E Submits CD Package for 50% Review	November 9, 2021
Joint Review Meeting for Owner Comments	December 14, 2021
Project A/E Submits CD Package for 95% Review	January 24, 2022
Joint Review Meeting for Owner Comments	February 17, 2022
Project A/E Submits CD Package for 100% Review	April 8, 2022
Joint Review Meeting for Owner Comments	May 10 , 2022
<b>Owner Approves 100% Construction Documents</b>	
<b>Construction Phase Activities</b>	
Commencement (Construction Start) Date	May 10, 2022
Substantial Completion	June 10, 2024

## **EXHIBIT G**

### **PRE-DESIGN PHASE DOCUMENTATION REQUIREMENTS**

**Facilities  
Programming  
Guidelines**

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**The  
University of  
Texas  
System**

Office of  
Facilities  
Planning and  
Construction

# F

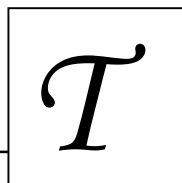
# Foreword

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The *Facilities Programming Guidelines* is a tool designed to help the Component Institutions of The University of Texas System program their capital improvement projects (CIP).

These guidelines are generic in nature and are intended to be used for both academic and health affairs projects, including projects of primarily an engineering nature. This document is a checklist of possible deliverables that may be found in a completed facility program, and contains definitions for programming deliverables that may be required in a professional agreement for programming services.

The *Guidelines* have been designed so they may be referenced in an agreement for programming services, but such an agreement should specifically identify the programming deliverables to be provided under the agreement. Appendix D provides such a checklist.



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**The following chapters contain guidelines for producing the actual chapters that should be included in a facility program:**

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# *i*

# Purpose of this Document

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In December 1994, The Board of Regents of The University of Texas System implemented a new process for the delivery of capital improvement projects. A key element of this process is the need for the institutions to prepare a comprehensive program of requirements for each project before the Chancellor appoints the project architect/engineer, or additional services are requested.

This document is designed as a tool to help the institutions program the requirements for their capital improvement projects. The Board of Regents' decision to require more complete facility programming is an attempt to reduce the amount of changes and cost increases that occur during the life of a project. Other benefits from programming are:

- All interested parties have an early opportunity to provide input and discuss issues.
- Consensus can be obtained and project needs can be converted into hard requirements before design begins.
- Different concepts can be tested and options can be evaluated very inexpensively during programming.
- Before engaging architects and engineers to design a project, the institution can clearly define what it wants.
- All of the necessary information is collected at the beginning of a project and is resident in the program and its supporting appendices, and is available for everyone involved with the project to use.



## **Definition of Facility Programming**

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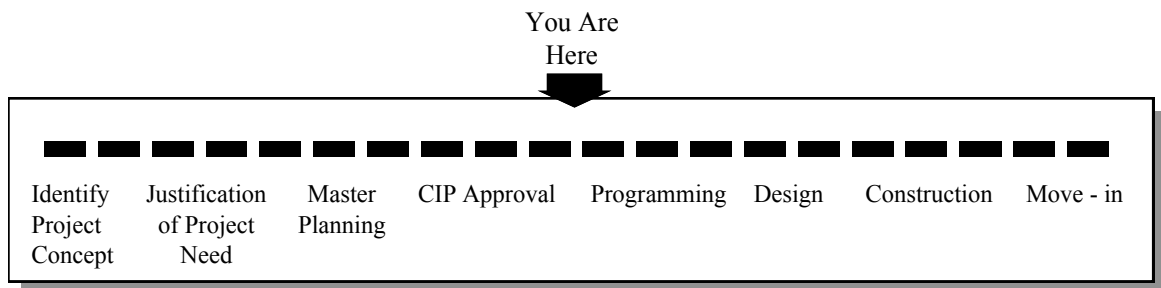
Facility programming is the process of collecting, analyzing, synthesizing and documenting all (or most) of the requirements for a capital improvement project prior to beginning design.

A facility program contains the information needed to design a project. Facility programs generally do not contain information that defines the need for the project (such as academic requirements), unless this information is needed by the architects and engineers to design the project.

By following the steps outlined in these guidelines, the institution will be able to develop a complete facility program ready to be submitted to the Office of Facilities Planning and Construction (OFPC) and then to the Chancellor for selection of the project architect-engineer.

### You Are Here

These guidelines are a tool to prepare a facility program for projects that have already been approved by the Board of Regents. This document does not address “**pre-CIP issues**” such as project justification, academic programming, master planning or CIP approval. These and other pre-CIP issues should already be in place and approved before beginning a facility program.



The Board of Regents recognizes that the institutions may hire outside consultants to assist them in preparing facility programs. Also, OFPC is available to assist the institutions through every step of a project.

When reading and applying these guidelines, remember that each project and each institution is unique, and this manual cannot apply equally to every project. Use these guidelines as a checklist, not as a substitute for the skills and knowledge needed to prepare a specific facility program at a specific institution.

Research conducted by the Construction Industry Institute (CII) indicates that well developed facility programming coupled with good schematic design and design development may result in:

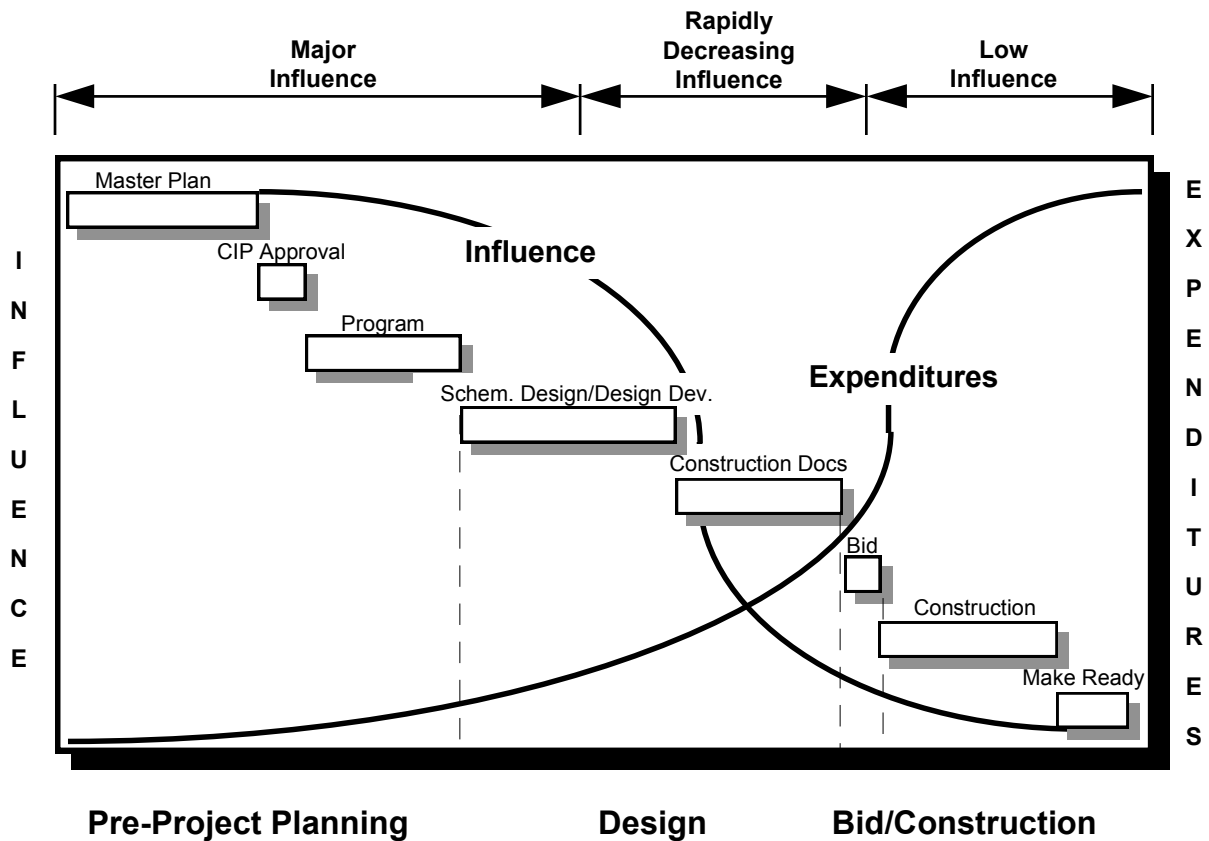
- Reduced project costs by an average of twenty percent
- Less project variability in terms of cost, schedule, and operating characteristics
- Increased probability of the project meeting desired goals

The results also indicate a direct relationship between project success and the level of early project planning. Therefore, it is important that institutions understand the underlying programming process and act quickly to effectively embrace its use.

## **Why Do Facility Programming?**

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Programming has a significant impact on the outcome of the construction of a capital improvement project (CIP). *Figure ii.1* graphically illustrates this concept. As the diagram indicates, it is much easier to influence a project's outcome during the early stages of a project (when expenditures are relatively minimal) than it is to affect the outcome as the project moves forward.



**Figure ii.1:** The curve labeled “influence” reflects an institution’s ability to affect the outcome of a project during the various stages of a project.

An analysis of projects completed during the three-year period, FY93, FY94 & FY95, by The University of Texas System indicates there is room for improvement. Construction change orders totaled approximately \$33 million; these occurred over \$425 million of projects constructed. Scope changes, which typically are a result of incomplete planning, have led to cost increases on 26 percent of the construction contracts and 64 percent of design contracts during the same period. Scope changes have also led to schedule increases on approximately 20 percent of construction and design projects during that time interval.

## The Process

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The Board of Regents has adopted a process for capital projects. This process has the following goals:

- To reduce the probability of changes and delays during design and construction
- To streamline the approval process for capital projects
- To reduce the length of time required to deliver a capital project

The process is diagrammed in *Figure ii.2*.

***The CIP process requires each institution to submit a facility program to the Chancellor, via the appropriate executive vice chancellor, for approval before the project architect-engineer may be selected.***

The Chancellor will then appoint the project architect-engineer after selection following the Professional Services Procurement Act, Texas Government Code. (The facility program will be included as a part of the A-E Agreement.)

## The Buyer Benefit

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1. Programming provides a **forum to debate** what should be included in a project. Issues can be discussed and alternatives considered quickly and inexpensively. (This is not true once design begins.)
2. A facility program can **build consensus** and cause decisions to be made in a logical sequence.
3. The programming process will **separate “needs” from “wants”** with respect to space, equipment, and other related issues.

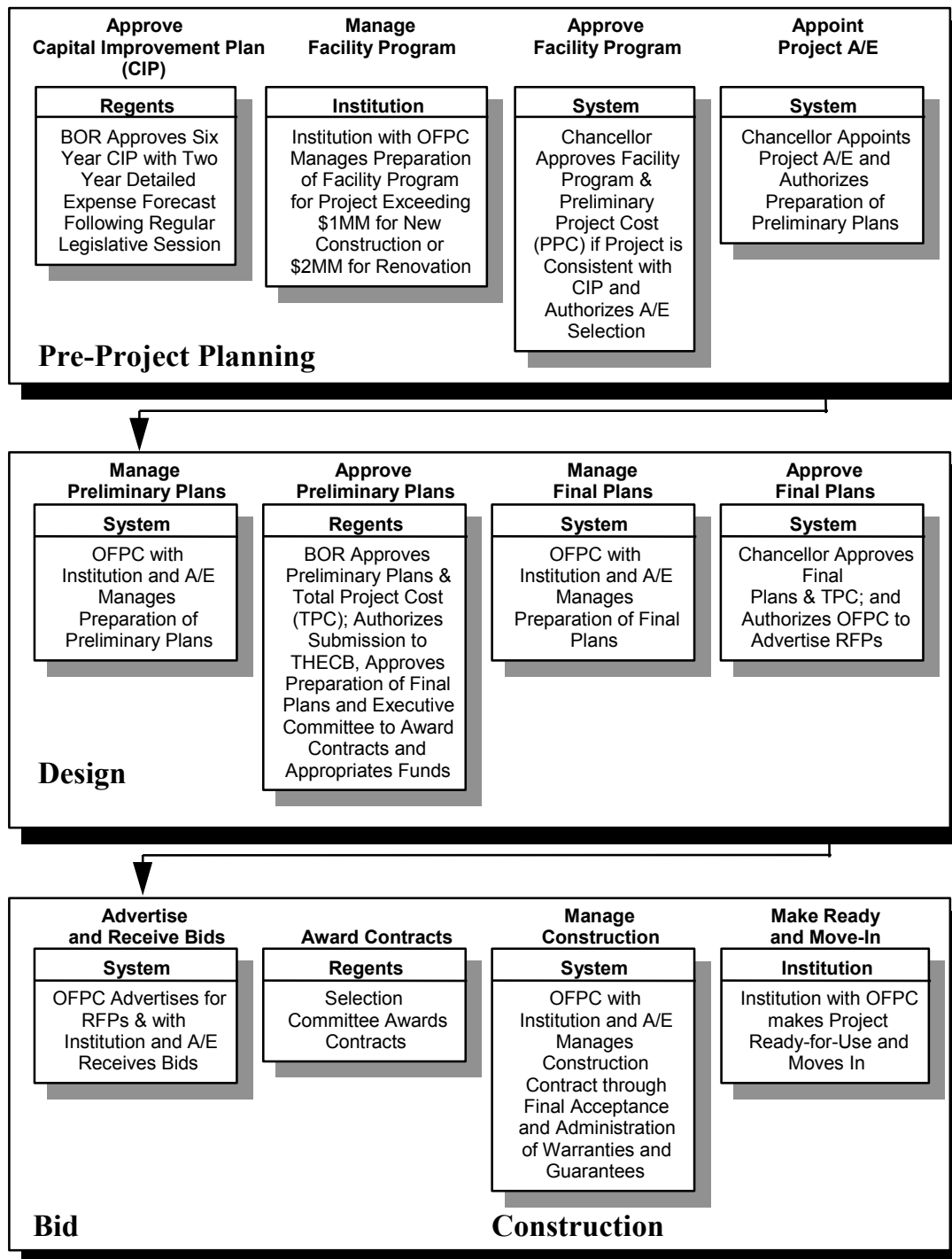


Figure ii.2: Diagram of the Capital Improvement Program project delivery process

4. The facility program is the road map for the **architects and engineers** who will design the project. Without a program, designers may deviate from the actual requirements and produce a building that does not meet the institution's needs.

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### **What a Program Will Do**

When the programming is complete, the institution will have a program document that communicates the following to key members of the project team:

- Strategic and master planning requirements for the project (*A facility program should comply with and expand upon the already approved campus master plan*)
- Space and functional relationships
- Site selection
- Determination of the cost and schedule for the project
- Intermediate and final recommendations presented in a clear and succinct manner
- Required expertise for the project team
- Investigation of permit process
- Concerns among all interested parties to the project scope, cost, schedule, risks and plan of execution
- The Chancellor's requirements and concerns in the authorization process

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### **How to Use These Guidelines**

**This document is a checklist for what should be contained in a typical building program.** By addressing all of the applicable parts of these guidelines, the institution will have a facility program ready to submit to the Office of the Chancellor.

**The guidelines are intended to help the *Ad Hoc* Building Committee complete its task.** The



committee chair can use these guidelines to measure the progress of the committee and make assignments to gather missing information.

The business environment at each institution is different, and every project differs in terms of size, complexity and cost. **Each institution must adapt these guidelines to meet its own needs.**

**These guidelines are generic. There are probably parts that do not apply to a particular project. If this is the case, skip over those items in the guidelines.** If this situation occurs, see if other information that is project specific should be substituted. Similarly, some of the terminology used in this manual may be different from what is used at each institution. When this occurs, use the more familiar terms.

**Like most guidelines, this document cannot address every possible issue at each institution.** Consider them a set of minimum acceptable responses for developing a facility program.

**When preparing the program, follow the chapter sequence developed in this document and retain the chapter numbering.** It will help keep track of any missing data yet to be gathered. It will also help The U.T. System Administration review all of the program submittals from each institution (and approve them to move into design).

If a chapter or section does not apply; state so in the program and then skip over that part, but do not re-number the chapters.

A good place to start is by reviewing the List of Programming Tasks in Chapter *iv*.

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**OFPC is Ready to Help**

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The Office of Facilities Planning and Construction is responsible for reviewing each program before it is forwarded to the Chancellor for approval. As the institution is preparing the program, OFPC is available to answer questions about these guidelines, provide technical support, and otherwise help the institution develop a complete program.

There are five critical steps to getting started with the programming process.

1. The President of the institution should appoint a team to provide data and review conclusions.
2. When appropriate, select outside consultants to assist in preparing the program. (Unless the institution has experienced staff available to devote time to the task, outside consultants are required for most programming assignments.)
3. Prepare a schedule of what will occur during the programming process and review it with OFPC. This will allow OFPC to participate at appropriate times during programming. An example of a programming schedule is included later in this chapter.
4. Identify all of the participants that should be involved in the programming process within the institution and OFPC. Typical institution participants might include representatives from user groups, Physical Plant, Business Affairs, EH&S, Capital Projects, etc. Consider involving the participants in a team building process to facilitate team performance.
5. Document the decision making process. Identify who is responsible for each action and who has the authority to approve information and make each decision.

### **Skills Required to Prepare a Facility Program**

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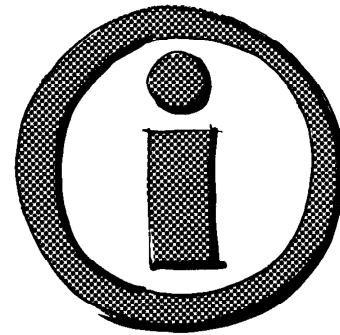
Whether the facility program is prepared internally or with the assistance of outside consultants, be prepared to assemble a team with skills in each of the following areas:

- Space requirements, functional relationships between areas, room sizes, and detailed equipment needs for each room (*see chapter 4*)
- Supporting requirements relating to access, site development, parking, etc. (*see chapter 5*)
- Evaluation and analysis of existing sites and buildings (*see chapters 6 & 7*)
- Technical building standards, engineering requirements, and building design criteria (*see chapter 8*)
- Preparing a project budget and schedule (*see chapters 9 & 10*)
- Dealing with specialized requirements included in this project
- Ability to facilitate and draw information out of people, and lead the project team

Although consultants and other experts may be significantly involved in this process, the owner must assure that it is being performed properly and follows the particular needs of the institution.

## **Professional Assistance**

If an institution does not have qualified in-house staff who are skilled in providing the information asked for in these guidelines, outside consultants should be retained. These consultants are called “facility programmers.” They are the individuals who will expand the project outline into a fully defined set of requirements for use by the project architect-engineer in design of the project. Ideally, the programmer should also be skilled at building and leading teams. There are two types of facility programmers:

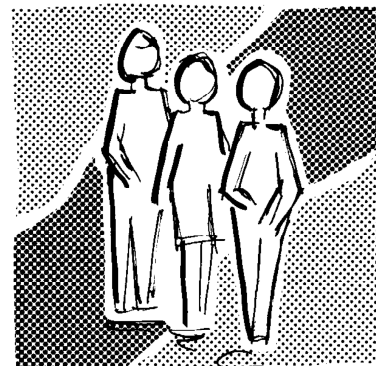


### **1. Programming Consultants:**

Although usually trained as architects, facility programming consultants do not design buildings. They specialize in defining and organizing the project’s requirements. The advantage to using a separate programming consultant is their *expertise and focus on programming*. The programming consultant can also serve as a check and balance after the design architect-engineer is selected to assure the requirements contained in the program are being incorporated in the design.

### **2. Architects/Engineers:**

Many architects and engineers are also trained in programming. An advantage of selecting an architect-engineer to prepare the program is continuity when the project later moves into design. A disadvantage of using an architect is a tendency to begin designing the project before the program is complete. In other words, the architect may try to find a design solution before fully understanding the needs of the project.



OFPC can provide guidance and help an institution select the right consultants for each project.

The most common scenarios for preparing a program are:

- The program is prepared in-house or a specialized programming consultant is engaged by the institution to help prepare the program. Once the program is complete, and is approved by the Chancellor, OFPC and the institution may undertake the A/E selection process. The Chancellor will then appoint the selected A/E.

-or-

- OFPC and the institution may undertake the A/E selection process to select an A/E to prepare the program. The Chancellor will then appoint the selected A/E. Once the program is complete, the A/E's contract may be extended for design, or a new A/E may be selected.

-or-

- OFPC and the institution may undertake the A/E selection process with the A/E using a specialized programming consultant as a sub-contractor to prepare the program. Once the program is complete, the A/E's contract may be extended for design, or a new A/E may be selected.

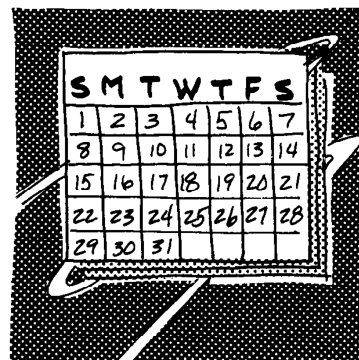
***Note: The A/E selection process must follow the Professional Services Procurement Act, Texas Government Code.***


## The Programming Schedule

The most difficult step in any project is getting started. The best way to begin developing a facility program is to agree on the following:

- ☐ **What** tasks need to be done?
- ☐ **Who** will be doing each task?
- ☐ **When** will they be doing them?

The answers to these three questions comprise the programming schedule.



 *The institution must prepare a schedule of the activities that will occur during programming, including who will be responsible for each activity. Please send a copy of this schedule to OFPC so they can participate at key dates. OFPC wants to help the institution.*

### *The programming schedule should include:*

- Start of Programming
- Key meetings and workshops
- Periods for gathering data
- Site visits
- Presentations
- Review of the draft document
- Delivery of the final document

The programming schedule differs from the Project Schedule described in chapter 10 of this manual. The programming schedule deals only with activities that will occur during programming. A mock-up of a programming schedule is shown in *Figure iii.1*.

The length of time required to complete a program is a function of the complexity of the project and the availability of participants to provide information and make decisions. Typically, a facility program can be developed in 3-6 months; complex projects will take longer.

Programming Schedule														
Task	Assigned to:					Timeline								
	Chair	Committee	Subcommittee	Consultant	OFPC	Weeks								
						1	2	3	4	5	6	7	8	9
Pre-programming conference with: • OFPC • Institution • Facility Programmer  To review the scope of work and develop this schedule of what needs to be done														
Facility programmer to develop and complete a list of tasks to get to the 1 <sup>st</sup> project review meeting  Submit deliverables required for the 1 <sup>st</sup> project review meeting  1 <sup>st</sup> project review meeting at 50% completion of the program ( <i>usually to approve physical requirements and initial interpretation of the analysis</i> )														
Facility programmer to develop and complete a list of tasks to get to the 2 <sup>nd</sup> project review meeting  Submit deliverables required for the 2 <sup>nd</sup> project review meeting  2 <sup>nd</sup> project review meeting at 90% completion of the program ( <i>usually to review a draft program</i> )														
Facility programmer to develop and complete a list of tasks to get to the 3 <sup>rd</sup> project review meeting  Submit deliverables required for the 3 <sup>rd</sup> project review meeting  3 <sup>rd</sup> project review meeting at 100% completion of the program														

Figure iii.1 Mock-up of a programming schedule



Remember that the programming process is not linear. Functions can be occurring concurrently; interaction, feedback, and iteration are inherent within the process.

**Note:** The programming schedule should call for at least three project review meetings:

- at 50% complete
- at 90% complete
- at 100% complete

Progress review meetings should occur at least once each month during programming. If the programming takes longer than three months, increase the number of meetings accordingly.



Develop a staffing and team building plan that outlines the roles and responsibilities of each participant in the project during programming and beyond.

---

### **Tips for Successful Programming**

- Responsibility matrices highlighting the tasks and schedule to accomplish major programming activities help retain control of the process.
- Participants should report the facts concerning the financial viability of the project. In other words, “don’t shoot the messenger” when contradictory information is produced.
- Believing that a project is a “copy-cat” of a previous project can be a hazardous assumption. All projects are different and need some amount of programming.
- Be careful when making assumptions. Bad assumptions can cripple projects very quickly: investigate the assumption for proof that it is true.

## **The Rest of this Manual**

---

The Introductory Materials chapter has been written to introduce the concept of programming to the institution. Each of the following chapters in this document are mock-ups of what needs to be submitted in a facility program. From this point forward, this manual becomes a storyboard of the work to be done.

## **Text Notation Marks**

---

There are three types of graphic “bullets” used in this manual. The bullets are adjacent to the text to inform the user of important information that needs to be noted. The following is an example of each type of bullet and a description of what it means:



Tells the reader that a page (or pages) needs to be included in the submitted program.



Identifies specific information the submitted program should contain.

- Further defines a preceding concept.

# List of Programming Tasks

---

Below is a list of items that are typically included in a facility program. Obviously every item on this list will not apply equally to each project. Use this list as a checklist for determining which tasks need to be performed during the programming phase. Some items may not be appropriate for all projects. Prior to beginning the programming exercise, the institution and OFPC should meet and review the following checklist and determine which items need to be included in the facility program.

When determining what items need to be done, it is also wise to assign who will be responsible for completing each item. The chapter listed after each item refers to chapter in these *Facilities Programming Guidelines*.

Appendix D contains a copy of this list that can be used as an attachment to an Agreement for Programming Services.

---

## **Programming Schedule** (*chapter iii*)

---



A schedule of tasks to be done during the programming phase

---

## **Project Goals** (*chapter 3*)

---



A statement of agreement with the institution's mission and objective.



A statement of agreement with the institution's strategic plan.

- ☐ A statement that the project follows the institution's master plan
- ☐ A description of the programs and curricula to be housed in this project
- ☐ A summary of the need for the project
  - A brief description of the intent of the project
  - A discussion of alternative solutions that have been considered
- ☐ The objectives for the outcome of the project
- ☐ A statement that this project follows or deviates from the Coordinating Board's space model for this institution

---

**Space and Adjacency Requirements** (*chapter 4*)

---

- ☐ A summary space list of all areas in the project
- ☐ At least one overall adjacency diagram
- ☐ At least one stacking diagram (if appropriate)
- ☐ A discussion of future growth and phased development
- ☐ Detailed requirements for each room:
  - Space detail sheet
  - Functional relationship diagram
  - Room data sheet
  - List of furnishings and equipment
  - Description of finishes
  - Description of special access issues

**Supporting Requirements** (*chapter 5*)

---

- ☐ A list of any additional EHS requirements applicable to the project
- ☐ The requirements for site development
- ☐ A list of any additional requirements applicable to the project
- ☐ A description of the security needs of the project

**Existing Site Studies** (*chapter 6*)

---

*(May not apply to interior renovation projects)*

- ☐ An analysis of the site or sites under consideration
- ☐ An analysis of site- or institution-specific environmental or safety considerations

**Existing Facilities Studies** (*chapter 7*)

---

*(May not apply to new projects on new sites)*

- ☐ Make copies of all available drawings for the current building
- ☐ Define the extent of the renovation
- ☐ A list of items that need to be reused after the renovation
- ☐ A list of areas in the building that are known not to comply with current building codes
- ☐ A list of any known hazardous materials in the building
- ☐ Discussion of any temporary or interim facilities that are required

**Design Parameters** (*chapter 8*)

---

- ☐ List of all of the applicable codes and standards
- ☐ List of governmental agencies that have jurisdiction over the project
- ☐ List of the U.T. System's technical and design standards that apply to this project
- ☐ List of the institution's technical and design standards that apply to this project

---

**Preliminary Project Cost** (*chapter 9*)

---

- ☐ A preliminary project cost estimate using the OFPC format

---

**Project Schedule** (*chapter 10*)

---

- ☐ A preliminary schedule for the project using the OFPC format

---

**Implementation Approach** (*chapter 11*)

---

- ☐ A written plan that outlines how the project will be organized and delivered

---

**Information Specific to this Institution** (*chapter 12*)

---

- ☐ Any institution requirements that will have an impact on the project

---

**Selecting a Project Delivery Method** (*chapter 13*)

---

- ☐ Any institution requirements that will have an impact on the project

---

**Executive Summary** (*chapter 2*)

---

- ☐ A synopsis of all areas in the program

### **Sign-Offs** (*chapter 1*)


---



A sign off page with appropriate approval signatures.

# 1

# Sign-Offs

 This page contains the needed signatures approving the accompanying facility program and is to be completed when programming is finished.

<b>Project Institution</b>	
<b>RECOMMENDED FOR APPROVAL:</b>	
_____	_____
_____	_____
_____	_____
President of the Institution	Date
_____	_____
Assistant Vice Chancellor for Facilities Planning & Construction	Date
<b>APPROVED:</b>	
_____	_____
Executive Vice Chancellor for Academic or Health Affairs The University of Texas System	Date


The Institution may also obtain the signatures of key project participants as appropriate

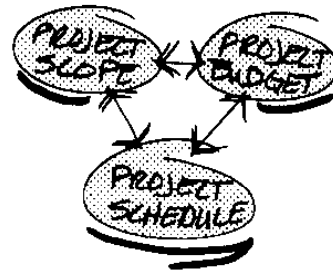
**Figure 1.1** Format for the program sign-off sheet.



# 2

## Executive Summary

 The executive summary of the facility program document should be a *one-page synopsis* of the major points contained in the program. It should provide the reader with a quick understanding of the project scope, budget, and schedule. Write the executive summary after completing all of the other chapters of the facility program.






### Project Description and Scope

Give an overview of the proposed project. Address the following (as appropriate):

- ☐ Name of the project
- ☐ Description (new building, restoration and expansion of the ..., etc.)
- ☐ Purpose of the project (to replace the..., to house a new ..., etc.)
- ☐ Primary activities to be housed and the primary users
- ☐ Shared facilities included with this project (such as classrooms, labs, meeting rooms, etc.)
- ☐ Projected size in assignable and gross sq.ft.
- ☐ Proposed location and why this site was selected



### **Project Budget**

---

-  List the preliminary project cost (PPC) from Chapter 9
-  List the preliminary project cost per gross sq. ft. (if appropriate)
-  Identify any unusual costs that are included in the PPC (such as land purchase, demolishing existing facilities, expenses for environmental remediation, etc.)

### **Project Schedule**

---


-  Summarize the milestone dates associated with the project including:
  - Chancellor's appointment of the project Architect/Engineer to prepare preliminary plans
  - FPCC Approval
  - Board of Regents' approval of preliminary plans and authorization to begin final plans
  - THECB Approval
  - Construction Notice To Proceed
  - Construction Substantial Completion
  - Owner Operational Occupancy/Move-in
-  Identify any major stages of the project:
  - To pre-purchase equipment such as boilers, chillers, cooling towers, etc.
  - Advertise for Request For Qualifications and/or Request For Proposals, and award within the overall project such as site

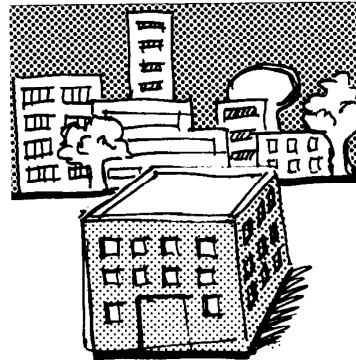
- preparation, demolition, infrastructure contracts, etc.

# 3

## Project Goals

---

 This chapter of the facility program establishes the basis for the project. It describes why the project is required and affirms that it is in keeping with the stated direction of the institution. This chapter should also address the requirements of the Texas Higher Education Coordinating Board.



### **Institution's Mission Statement and Objectives**

---



Briefly explain how this project complies with the stated mission and objectives of the institution.

### **Compliance with the Institution's Strategic Plan**

---



Briefly explain how this project fits into the context of the institution's strategic plan. Note how it will support the academic direction of the institution, and how this project is rationalized in terms of overall need for at least the next five years.

### **Compliance with the Institution's Master Plan**

---



Show that this project complies with all aspects of the master plan, or provide rationalization to deviate from the master plan. Use illustrations and text to demonstrate that this project has been properly sited and is otherwise appropriate for the intended site.

## Functional Programs Curricula Descriptions and Projections



Interpret how the institution's academic program will be supported by this project. Describe which functional programs will be housed in this project, the courses to be taught, and the numbers of students projected.

## Project Need



This section should include a **brief** description of the intent of this project. It should summarize the *status quo* and explain why the project is needed. It should also present the benefits to be gained by this project and the probable impact if it is not built. If it is necessary to include a lengthy discourse to present additional background material, move it to chapter 12 of the program or to an appendix.



List any current facilities that will be vacated (or will change occupants) as a result of this project. Explain why these facilities are no longer adequate.



Describe any alternative solutions for providing the needed additional space, (other than the proposed project), that were studied and judged as less acceptable including:

- Sharing other facilities
- Renovating an existing building instead of building new
- Using additional technology to reduce the need for more space
- Other sites

If appropriate, use a campus map or other graphics to convey information.

OPTION	~~~~~	~~~~~	~~~~~
A	✓	✗	
B		✗	
C	✓+		

## Project Objectives

---



Project objectives are different from the institution's objectives listed above. Project objectives state in very concise terms what results the project is intended to achieve. The program should include enough objectives to describe the important, "big-picture" aspects of the project. Each objective should only deal with a single subject. Avoid objectives that state the obvious or reflect "motherhood and apple pie."



Project objectives can be either **outcome** objectives (*what the project accomplishes*) or **process** objectives (*how the project is accomplished*) or both. Examples of written objectives include:

- To make this large new building appear to be a similar scale to its much smaller neighbors
- To make the new building harmonious with the existing campus by using similar materials, colors, and finishes
- To foster interaction between faculty from different departments
- To maintain ongoing facility activities during the renovation
- To minimize vehicular traffic on an already congested part of the campus

The project objectives should be prioritized from most to least important.

### Compliance with THECB Space Model

The Texas Higher Education Coordinating Board (THECB) has the statutory authority to approve or disapprove new construction, renovations, and property acquisitions funded with state money at public institutions of higher education.

The *Space Projection Model for Higher Education Institutions in Texas* guides the Coordinating Board in its approval or disapproval of new construction and renovation projects at academic and health-related institutions.



The facility programmer and institution should include a statement in the facility program affirming that the **assignable** square footage for the proposed project does not cause the institution's actual **assignable** square footage to exceed the predicted **assignable** square footage in the Model, (or if an excess of space for one factor can be justified by looking at the totals for the entire campus).



The facility program should be prepared using the Coordinating Board's definitions for square footage given in Appendix C.



The program must clearly summarize in table form, the number of rooms and assignable square footages for each of the rooms. The room types and CIP codes should be taken from *The Texas Higher Education Facilities Inventory Procedures Manual*.

#### Allocation of Assignable Sq.Ft. in the Project

Number of Rooms	Room Type	CIP Code	Total ASF



The facility programmer should work with the institution's office of institutional research (or studies) to determine the room type and CIP code for the rooms in the proposed project. They are familiar with the Coordinating Board's policies and procedures and maintain the institution's facilities inventory.



# 4

## Space & Adjacency Requirements

---

This chapter deals with the space requirements and functional relationships portion of the program. It can be considered the “*meat and potatoes*” of a facility program because this chapter describes a project in physical terms, including:

- ☐ A brief description of each room
- ☐ The number of occupants of each room
- ☐ The quantity and square footage of each room
- ☐ Affinity relationships between each room and any other
- ☐ Diagrams that locate each area on the desired floors
- ☐ Lists of furnishing and equipment for each room, along with any special requirements that need to be accommodated during the design

The space and adjacency requirements chapter will serve as a checklist for the architects as they design and lay out the interior of the building. It must be clearly organized and easy to understand.

For most projects, the following chapter relies heavily on the academic or functional programming used to justify the project. For example:

- Number of full-time equivalent students
- Class size and courses offered
- Number and frequency of medical procedures
- Business plan, etc.

If any of this background programming is incomplete or needs to be revisited, do so before continuing to prepare a facility program.

Facility programs for The University of Texas System projects should include each of the following topics, preferably in the order listed below. Each of these topics will be explained on the following pages.

---

**Related to the Entire Building:**

- Summary space list
- Overall adjacency diagrams
- Stacking diagrams
- Growth and phased development

---

**Room-by-Room Requirements:**

- Space detail sheets
- Functional relationships diagrams
- Room data sheets including furnishings, equipment and built-ins for work areas and storage, such as laboratory casework

## Summary Space List



*The first component of the space and adjacency requirements chapter of a program is the summary space list.* It summarizes on a single page all of the space requirements for the project. For each line item on the summary space list there is at least one space detail sheet that further describes the requirements.

There is not a right or wrong way to present a summary space list. The spreadsheet (*Figure 4.1*) on the next page should be considered a guide. Later in this chapter is an explanation of the space detail sheets that are used to make up each line of the summary space list.

The program should contain requirements for **all** spaces in the building, **both assignable and non-assignable** (refer to Appendix C for definitions). The assignable and non-assignable spaces are combined to obtain gross square feet.

Identify any specific programming requirements associated with non-assignable areas, such as extra wide corridors. List assumptions made during programming with regard to non-assignable areas.

It may be difficult to predict the size of certain non-assignable areas, such as corridors and wall thickness, during programming. The square footages for undefinable areas may be calculated as a percentage of the total building area. **Do not** however, rely only on a multiplier to convert assignable square footage to gross square footage.

Remember, in most cases, according to a Coordinating Board goal, gross square feet should be less than or equal to assignable square feet multiplied by 1.67.

Summary Space List		
Space	Assignable Square Feet	Refer to Page No.
<b>Assignable Spaces</b>		
Administrative Offices	4,600	69
Auditorium	2,800	23
Building Lounge	1,600	21
Center for Urban Research	1,240	43
Classrooms	19,900	28
Commons	1,800	58
Computing Facility	5,000	53
Faculty Offices	6,000	45
Food Service Cafeteria	2,500	56
Furniture and AV Storage	800	28
Library	5,000	49
Maintenance	1,860	74
Multi-purpose Room	1,600	26
Office of Extended Education	400	72
Student Services & Bursar's Office	3,000	65
Study Alcoves	1,600	68
Vending Alcoves	400	62
<b>Total Assignable Sq.Ft.</b>	<b>60,100</b>	
<b>Non-assignable Spaces</b>		
Janitor closets (1 per floor)	400	75
Mechanical rooms (1 per floor)	1,000	76
Communication / Data closets (1 per floor)	400	77
Electrical closets (1 per floor)	400	78
Elevators, passenger (4) + lobbies	3,000	80
Elevators, freight (1) + vestibules	1,000	83
Stairs (3)	3,600	84
Toilet rooms	3,000	
Loading dock	1,000	
Corridors and wall thicknesses	22,000	
<b>Total Non-assignable Sq.Ft.</b>	<b>35,800</b>	
<b>Total Gross Sq.Ft.</b>	<b>95,900</b>	

This column refers to page numbers in the programming document

Figure 4.1 Example of a typical Summary Space List Spreadsheet

## Overall Adjacency Diagram

As its name implies, an *overall adjacency diagram* capsules the most important adjacencies for the building as a whole.

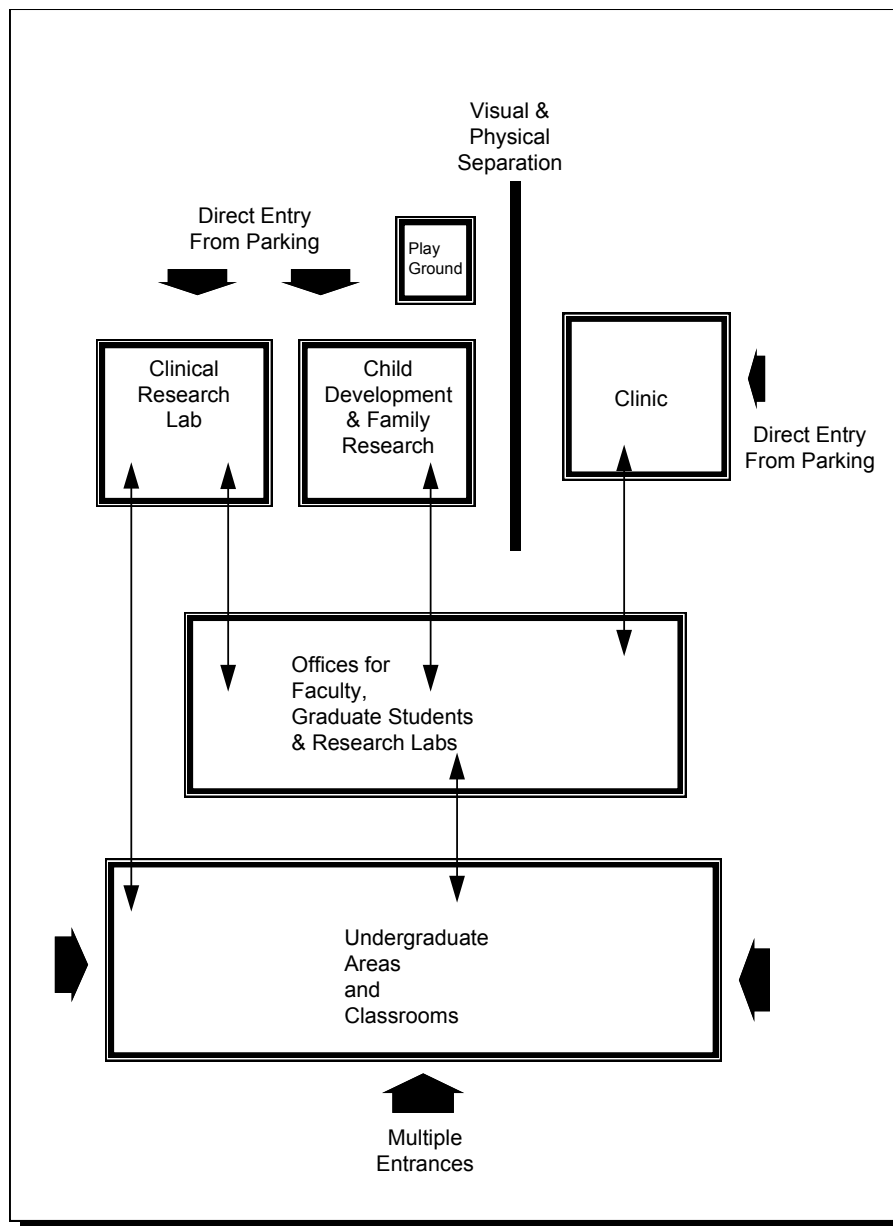


Figure 4.2 Example of an Overall Adjacency Diagram

**The program should contain enough adjacency diagrams to adequately convey the overall relationships between functional areas within the facility.**

Each major component of the building is represented using circles or rectangles. If two components should be next to each other, the shapes representing those rooms should be drawn next to each other. Movement, or a sequence of events, can be conveyed with arrows.

### **Stacking Diagram**

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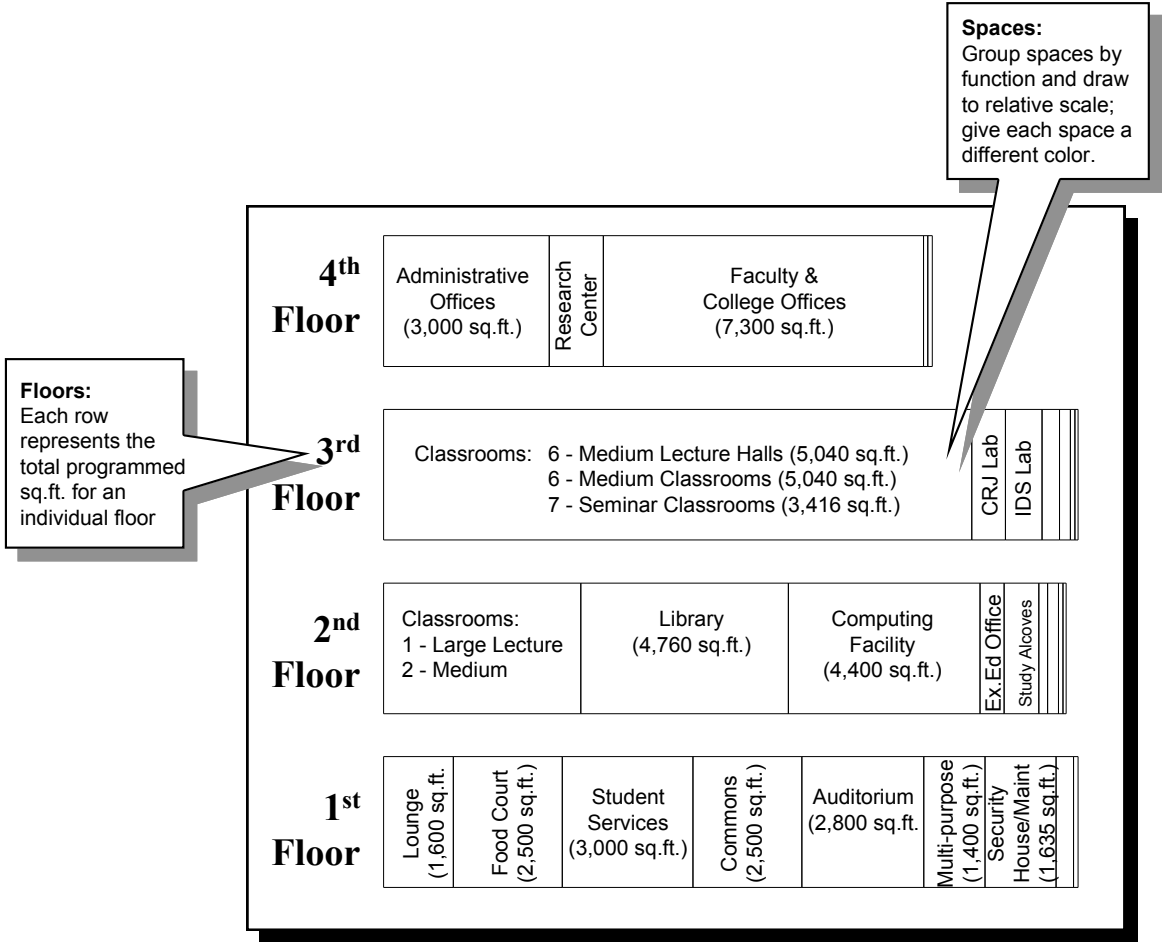


A stacking diagram is a tool to illustrate conceptually where each department or functional unit is placed, or “stacked,” vertically in a multi-story building.

***If the building is more than one story, the program should contain at least one stacking diagram. If multiple stacking alternatives are acceptable, additional stacking diagrams may be included.***

A stacking diagram is drawn to scale, with the length of each rectangle representing the square footage required for that particular component. If it is difficult to predict how the non-assignable area will be distributed throughout the building. (Example: how much of the mechanical equipment will be on a single floor?), the stacking diagram may show only non-assignable areas.

The stacking diagram can help to establish key elements of the building design, such as floor size and setbacks on upper floors.




**Figure 4.3** Example of a Stacking Diagram

Although combining functional adjacencies and space requirements drives a stacking diagram, many times it should also reflect the probable site of the project and the campus master plan. For example, the functional requirements may call for large floor plates, but contextual studies may suggest a smaller building footprint. (Refer also to chapters 5, 6 & 7.)



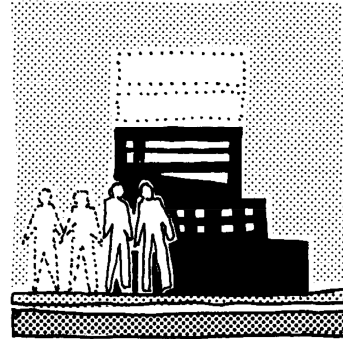
## Growth and Phased Development

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 Many buildings are designed for expansion during a future phase. The design of the first phase requires an understanding of what will need to be accommodated in later construction.


*The program must address the following issues related to phasing:*

- ☐ Will this building likely be expanded in a future phase?
- ☐ If yes, are departments or functional areas intended to “grow in place” during the future phase?
- ☐ Compare the additional costs involved with making the building “expandable” versus the probability of the future expansion occurring as envisioned.
- ☐ If there will probably not be a future expansion of the building, how will departments or functional areas expand?
- ☐ Are any functional areas more likely than others to move out of the building in the future to allow others to expand?




## Room-by-Room Requirements

---

 All of the following room-by-room information should be presented together for each room. After one room is complete, begin on another room.

## Space Detail Sheet

 A **space detail sheet** contains the supporting information needed to build the summary space list described earlier in this chapter. The space detail sheets will usually contain a secondary spreadsheet describing several different spaces, or a suite of rooms that together make up a line item entry on the summary space list. **Space detail sheets are required for assignable and non-assignable areas.**

Classrooms: Summary				
Description of Space Requirements				
	Name of Room	Seating Capacity	Sq.Ft. per Room	Total Area
Classrooms:	1 Large Lecture Hall	120	1,928	1,928
	2 Medium-large Lecture Halls	65	1,300	2,600
	6 Medium Lecture Halls	42	540	5,040
	6 Medium Classrooms	42	540	5,040
	7 Seminar Classrooms	25	488	3,416
			Sub-total	18,824
Specialized Classrooms:	1 Forensics Instructional Lab	40	776	776
	1 Technology/Science Laboratory	32	840	840
			Sub-total	1,616
			<b>Total Sq.Ft.</b>	<b>19,630</b>

**Group by function:**  
Multiple spaces of different types, but of similar function can be grouped together on the same Space Detail Sheet

**Figure 4.4** Example of a Space Detail Sheet

In *Figure 4.4*, to support a line item entry on the summary space list entitled “**classrooms**,” the space detail sheet contains information about the capacity, quantity, and mix of each different type of classroom, plus a description of the size and desired configuration of each of the classrooms.


Like the summary space list, there is no set format for the space detail sheets, except they should be consistent throughout the program.

***There should be at least one space detail sheet (or more) to clarify and define each entry on the summary space list.***

If many rooms have the same requirements, it may be easier to note which rooms are similar instead of generating duplicate pages (as long as this shortcut does not become confusing to the reader).

### **Room-by-Room Functional Relationship Diagram**

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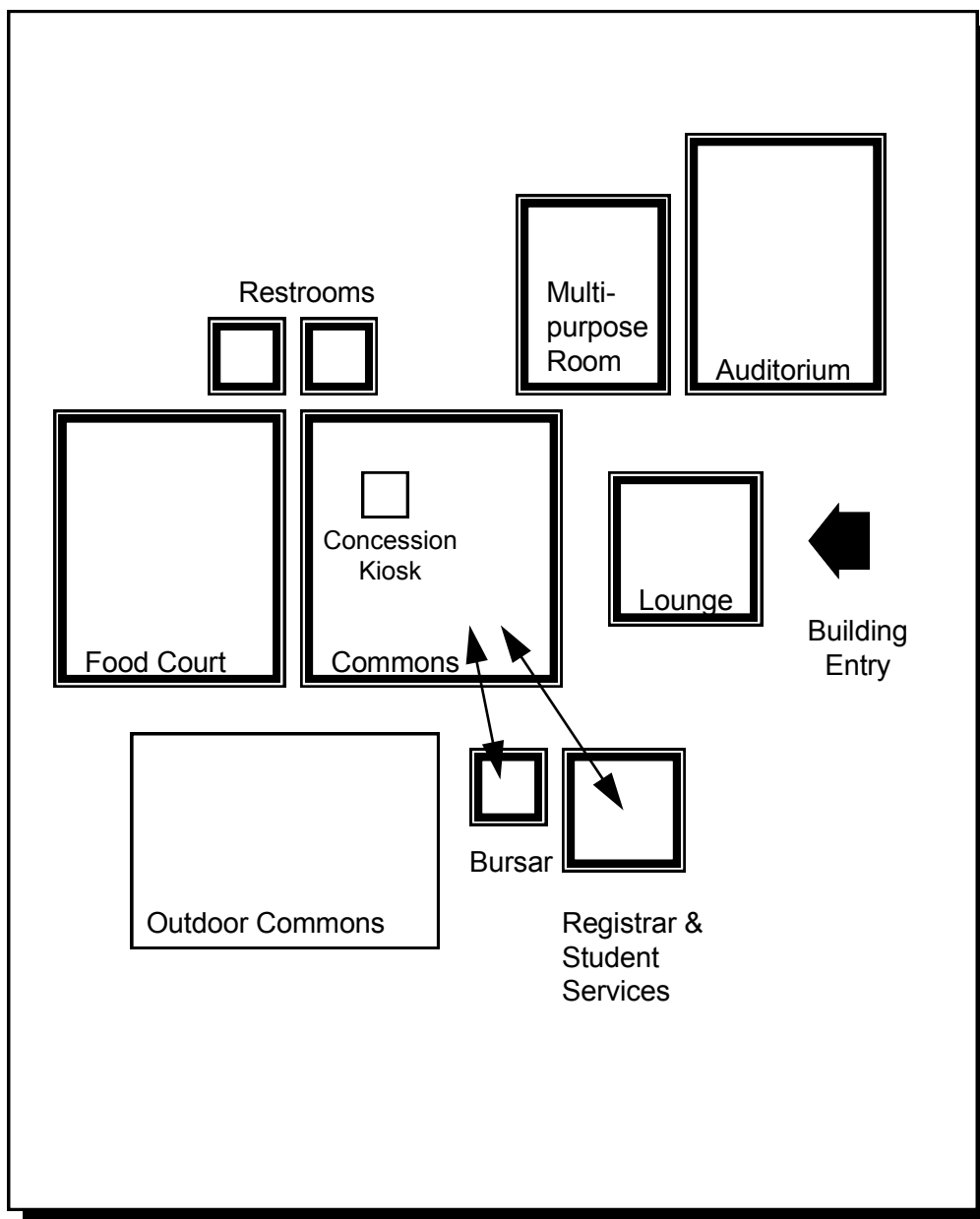
 Functional relationship diagrams, similar in concept to the example shown in *figure 4.5* are a key part of any design program.

A functional relationship diagram illustrates the hierarchy of adjacencies within a department or grouping of rooms. It is much easier to convey these adjacency requirements with a picture than with words. Once the desired adjacencies are diagrammed, it is easy for the architects to convert the diagram into an actual floor plan that maintains all of the relationships.

***There should be at least one functional relationship diagram in the program immediately following each space detail sheet.***


The graphic appearance of a functional relationship diagram is not important. Sometimes they are drawn using circles or “bubbles,” sometimes with squares and rectangles.

Large rooms should be represented with bigger squares or bubbles than small rooms. If two rooms should be next to each other, the squares or bubbles representing those rooms should be drawn next to each other. Movement or a sequence of events can be conveyed with arrows.



**Figure 4.5** Example of a Room-by-Room Functional Relationship Diagram

## Room Data Sheets

 Room data sheets, similar in concept to the example in **Figure 4.6**, contain specific requirements for each room, including furnishings and equipment.

*There should be a room data sheet for each room listed on the space detail sheet.*

Computer Classroom	
<b>Special Technical Requirements:</b>	<ul style="list-style-type: none"> <li>• Raised computer flooring</li> <li>• No carpeting</li> <li>• Sufficient power and cooling for 120 computers</li> <li>• Controlled access</li> <li>• 24-hour per day operation</li> <li>• Step-switched lighting to allow different illumination levels</li> </ul>
<b>Special Furnishing Requirements:</b>	<ul style="list-style-type: none"> <li>• 120 desks for student stations</li> <li>• 120 chairs for student stations</li> <li>• Service area for 3 staff</li> </ul>
<b>Special Equipment Requirements:</b>	<ul style="list-style-type: none"> <li>• 120 student personal computers</li> <li>• one or two server systems</li> <li>• High speed laser printer</li> <li>• Approx. 20 lower speed printers</li> <li>• 2 workbenches and storage cabinets in work room</li> <li>• Electrical outlets above workbench for testing and repair</li> </ul>

**Figure 4.6** Example of a Room Data Sheet

All of the room data sheets should have the same general format, to make it easy for the architects and engineers to find and use the information. Also, by using a consistent format it is easy to identify places where information is missing and still needs to be collected.

### **Furnishings, Equipment, and Built-ins**



The room data sheets should contain all of the moveable furnishings, equipment and built-ins planned for each room. Refer to the applicable codes identified in Chapter 8 Design Parameters, to determine the maximum capacity in a room.

The program must distinguish between items that are new and those that are being moved from another location. Classify each item listed on the room data sheet as one of the following:

#### **New Items:**

- Contractor furnished and contractor installed
- Owner furnished and contractor installed
- Owner furnished and owner installed

#### **Existing Items:**

- Relocated as is and contractor installed
- Refurbished and installed by contractor
- Relocated as is and owner installed
- Refurbished and installed by owner

Distinguish between equipment that is moveable and equipment that is fixed in place.

The quantities of each classification of furnishings and equipment are used to prepare lines 9 and 10 of the Preliminary Project Cost in chapter 9.

Technical requirements for equipment are needed to properly engineer the project's mechanical, electrical and plumbing systems.

For each major piece of existing equipment to be reused include a manufacturer's cut sheet that lists the model number, dimensions, weight and technical specifications (electrical load, plumbing required, heat generated, exhaust required, data or communication cabling, etc.). This information can be obtained by calling the manufacturer. For new equipment provide a *generic* description, (not sole source unless justifiable), of the item and estimate its technical requirements based on existing equipment.

List any building modifications that are required to house a piece of equipment, such as strengthening the floor, extra high ceilings or extra wide access doors.

Also, identify any new items that have a long delivery time and should be ordered early.

---

## Finishes



Develop several levels of typical room finishes that describe the quality and type of finish that are appropriate for each room. For example:

### **Type A Finishes** (might be the most utilitarian)

- Floor: vinyl composition tile
- Walls: painted

### **Type B Finishes** (might be somewhat upgraded)

- Floor: direct glue carpet
- Walls: vinyl wall covering


### **Type C Finishes** (might be even more upgraded)

- Floor: carpet over pad
- Walls: wood paneling

List the level of finish that is appropriate for each room on the room data sheet.

### **Window Coverings**


---

 Note if any special window coverings are required for each room. For example:

- Ability to black-out natural light
- Need to reduce glare for windows
- Etc.

### **Special Access**

---

 List any special access requirements on the room data sheets. Examples might include:

- This room is open 24 hours
- This room is used by students during the evenings
- This room is used after normal hours but only by authorized graduate students or faculty
- This room is secured when the building is closed
- This room can only be used by students if a faculty member is present
- Etc.



# 5

## Supporting Requirements

There are other project requirements that affect the design of a building in addition to the space needs and adjacencies already discussed. This chapter identifies those supporting requirements.

The requirements contained in this chapter are driven by the nature of the project regardless of its ultimate site. Evaluation of specific characteristics of a given site is documented in *Chapter 6*.

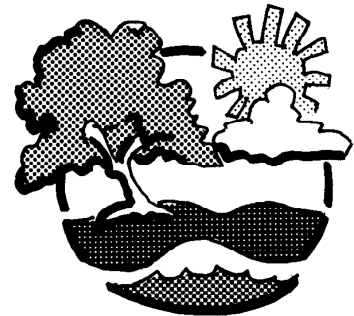
 ***In this section of the program, provide a descriptive answer for each of the following issues:***

### EHS Requirements



With input from the Institution's EHS group, describe this project's needs in the following areas as they apply to this project:

- Air
  - New Construction – New Source Review
  - Operating Permits
  - State Air Quality Codes
- Water
  - No unauthorized discharges
  - TPDES MS4 & Construction
  - Indirect discharge permits
- Waste
  - Storage and Disposal
- Endangered species, historical, archaeological
  - Survey, findings & mitigation

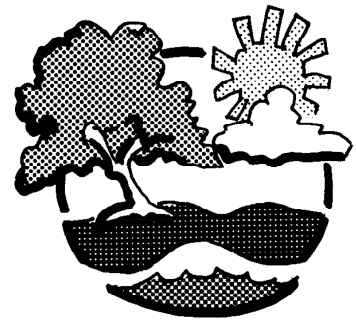


- Special BSL3 & BSL4 Lab
  - Design issues and security controls
- Asbestos and Lead
  - Survey and abatement
- Emergency Response
  - Who to Contact
  - What to do

### **Site Development & Landscaping Requirements**

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- ☐ Discuss how the spaces around the outside of the building should be designed. Are there any unusual site requirements that should be dealt with in a particular way?
- ☐ Should the project include any covered loggias or exterior plazas? If so, describe the activities that may occur in them.

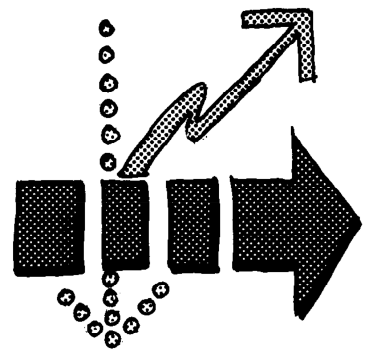


- ☐ Describe how pedestrians should access the building.
  - Students and faculty
  - The general public
- ☐ Describe how vehicles should access the building;
  - VIPs
  - The general public
  - Service vehicles
  - Delivery trucks
  - Emergency vehicles
- ☐ Is a drop-off area for busses or private cars needed near the building?
- ☐ What are the parking requirements associated with this project?
- ☐ Define any other unique site development issues that are related to this program.

### **Requirements for Support Services**

---

- ☐ How should trash, special, and/or hazardous waste products be held prior to pick-up? How should they be disposed of or recycled?
  - General building trash
  - Radioactive
  - Infectious
  - Corrosive
  - Etc.
- ☐ Describe any fuel tank storage requirements or specialized materials storage.
- ☐ Estimate this project's need for utilities. In order to provide adequate utility service to the project from campus infrastructure, the programming



team should identify and communicate to the Owner an order of magnitude anticipated utility demand (volumes, rates and pressures) for the project for the following utility systems:

- Thermal energy (chilled water & steam)
- Electricity
- Water (potable, fire and irrigation)
- Sanitary sewer
- Storm sewer and detention
- Natural gas
- Etc.



Will utilities be available when this project requires them?



Describe the audio-visual, data and telecommunication links required for this project.

### **Security Requirements**

---



Refer to the U. T. System OFPC Security Planning and Design Guidelines (latest edition). Complete the Chapter 1 – Security Assessment process in the guidelines and record the findings in this chapter of the program. Review Chapter 2 – Security Planning and where possible determine the preliminary security mitigation measures and record those recommendations in this chapter of the program. Estimate the anticipated cost for these measures and include in the Preliminary Project Cost (PPC) budget in program Chapter 9.

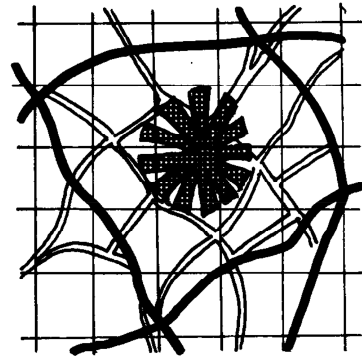


# 6

## Existing Site Studies

**This chapter of the program deals with an analysis of the proposed site (or sites if more than one are being considered) for the project.** It should address all of the factors acting upon each site that will somehow affect the design of the building. For example:

- Do the proposed sites comply with the institution's master plan?
- What impact will this project have on the campus?
- Is the project compatible with adjacent land use? Traffic patterns? Way-finding? etc.



If several sites are being considered, provide a consistent level of detail and apply uniform evaluation criteria for each site.



***This chapter on site studies should address (at least) the topics contained in the following list.*** In some cases, the detailed information may not be available. When this occurs, note that the specific information is not available, (or not appropriate), and include as much substitute information as possible. (For example, if a topographical survey has not been prepared yet, include a site plan in the program.)



Study of alternative sites



Description of who owns the proposed site(s)



Aerial photograph of the proposed site(s)

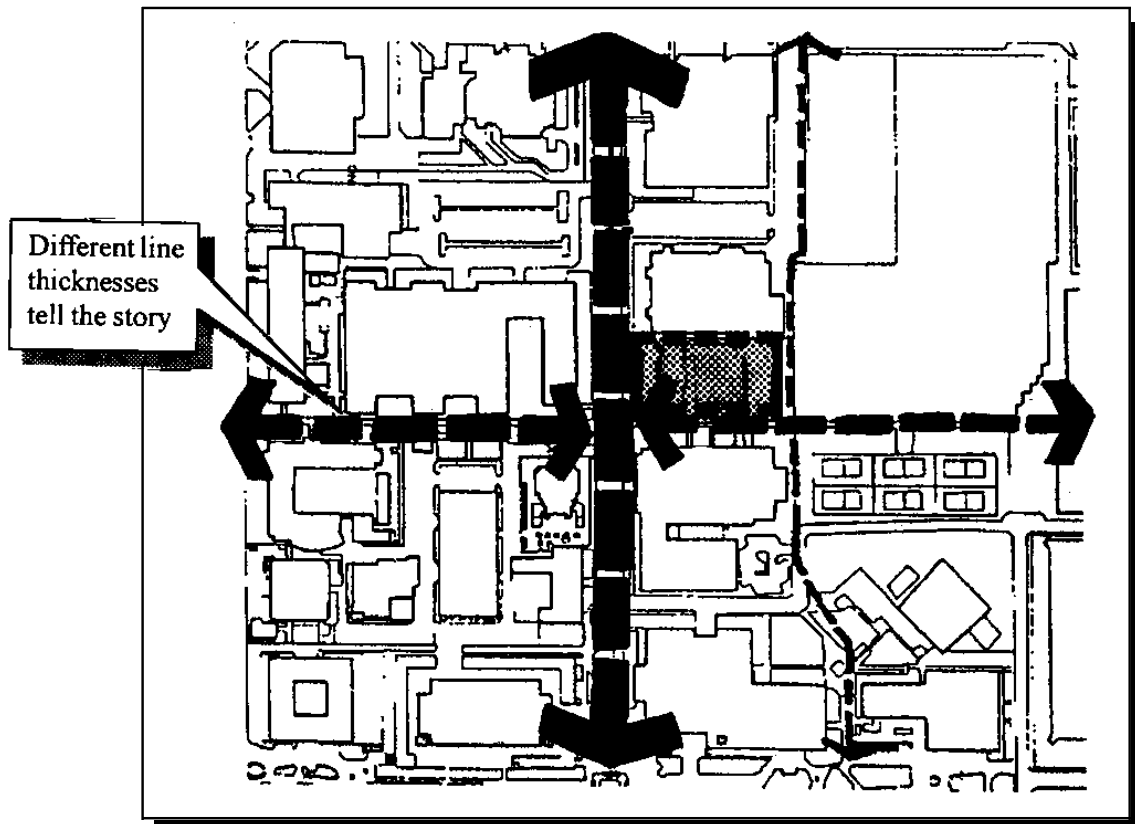


A comprehensive Category 1A Land Title Survey, showing vesting deed(s) information, all

easements, including visible and apparent, other matters of records, site boundaries, and applicable setbacks, if any. This may require a title commitment or other title investigation. Please call The University of Texas System's Real Estate office if you have questions or need help. The Real Estate office may have access to deeds or other title information.

- ☐ Topographical survey
- ☐ Geotechnical survey
- ☐ Description of existing landscaping
- ☐ Extrordinary drainage requirements and a plan to contain storm water runoff
- ☐ Any existing construction or utilities on the site
- ☐ Description of any known prior uses of the site
- ☐ Description of any known environmental issues that would limit use of the site, necessitate additional project costs such as hazardous waste cleanup, or require development of special operating protocols
- ☐ Plan to dispose of any contaminated soil
- ☐ Archeology survey
- ☐ Clearances from:
  - State Historical Commission
  - Texas Antiquities Commission
- ☐ Plan to relocate any existing occupants or equipment off of the site
- ☐ Diagram showing the intended expansion during any future phases
- ☐ Other significant site influences on the design

Figure 6.1 shows an example of a site analysis diagram illustrating pedestrian flow.




**Figure 6.1** Example of a Site Analysis Diagram for Pedestrian Flow.



# 7

## Existing Facilities Studies

This chapter deals primarily with projects that involve renovation of existing facilities. However, many aspects of this chapter will also apply if interim space will be used before the new facility is completed.

 *In this section of the program provide a descriptive answer for each of the following issues:*

### Existing Drawings and Specifications



Assemble accurate floor plans and other as-built drawings and specifications of the existing building showing the latest renovations. Make reproducible copies of these drawings for later use.

### Extent of the Remodeling

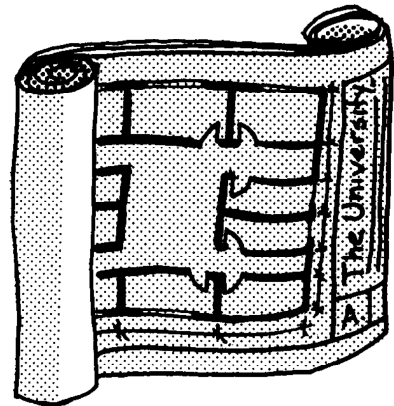


Include a reduced copy of the floor plans in the program. Outline portions of the building to be remodeled. Note where any addition to the building is most likely to occur.



List what furnishings, equipment and other items need to be salvaged for re-use after the renovation. Chapter 4, Space and Adjacency Requirements, contains a suggested format for tracking these items.

### Code Compliance

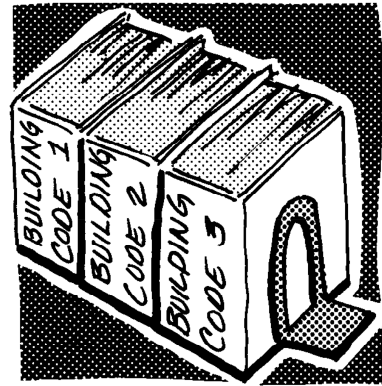


- ☐ Identify those parts of the existing building that are known not to comply with current building codes and statutory requirements. Describe what work is needed to bring the current building into compliance. See Chapter 8 for a detailed discussion on this subject.

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### Hazardous Materials

- ☐ Determine if any portions of the building to be remodeled contain any hazardous materials such as asbestos, PCB's and lead. Identify the extent of the hazardous materials.



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### Temporary Facilities

- ☐ Describe any temporary or interim facilities that will be required until the project is completed. These might include:
- Space for faculty and staff
  - Classrooms and labs
  - Storage space for boxed files, newly ordered equipment, etc.
  - Data and telecommunication links to other locations
  - Parking
- ☐ If specific interim facilities have been identified, include information about those facilities.

### Existing Utilities Studies

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Is the existing facility served by sufficient utility capacity for:

- water
- sanitary sewer
- storm sewer or detention
- natural gas
- electricity
- thermal energy
- (chilled water and steam)
- data
- communications
- etc.



Does the proposed project conflict with any existing utility lines?

# 8

## Design Parameters

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The **design parameters** are the standards and constraints that will control the project. This chapter of the program should address each of the following issues:

### Codes and Regulations

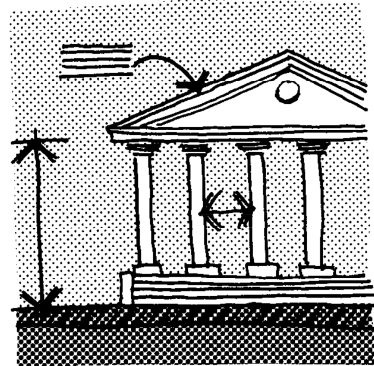
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The program should include a preliminary code analysis, which identifies major provisions of all the codes and regulations that directly influence the design and construction of the proposed facility. ***Those codes, which would have a significant impact on the project scope, cost or schedule should be investigated and explained in detail.***

There are three reasons to identify these regulatory and code requirements during programming:

- They may have a considerable effect on the physical characteristics of the project that have been developed in chapters 4, 5 & 6
- They may affect the Preliminary Project Cost (chapter 9)
- Regulatory approval processes may affect the project schedule (chapter 10)

The State Fire Marshall is the code authority having jurisdiction (AHJ) for all issues pertaining to NFPA 101 Life Safety Codes. The U.T. System Office of Facilities Planning and Construction is the code authority having jurisdiction (AHJ) for U.T. System construction projects constructed on land owned by the state for all codes other than NFPA 101 Life Safety Codes. OFPC is responsible for facilitating resolution of conflicts and



interpretations for these non-NFPA 101 codes after a thorough and joint discussion with the Institution. Construction on land not owned by the state is under local jurisdiction. OFPC reviews projects for compliance with the current OFPC approved editions of the following codes and standards. Refer to the Owner's Design Guidelines Appendix C for a current codes and standards list:

- National Fire Protection Association (NFPA) Standards, with emphasis on NFPA 101 Life Safety, including all referenced standards
- International Building Code
- International Mechanical Code
- International Plumbing Code
- National Electric Code
- Texas Department of Licensing and Regulation, Elimination of Architectural Barriers Act
- Americans with Disabilities Act, 28 CFT Part 35
- ACI - 318, building code requirements for reinforced concrete
- AISC, specifications for the Design, Fabrication and Erection of Structural Steel
- FEMA 100 year flood
- Energy Conservation Design Standards for New State Buildings, State Comptroller's Office, State Energy Conservation Office.

The nature of a project may dictate that other more specific codes, regulations or standards would apply. Compliance with these requirements would also be reviewed by OFPC. These might include:

- NFPA 45 Standard on Fire Protection for Laboratories Using Chemicals
- National Institutes of Health (NIH) Standards
- Joint Council for the Accreditation of Hospital Organizations (JCAHO) Standards
- ANSI Standards
- ASTM Standards

Many governmental authorities also have jurisdiction over typical U.T. projects and may regulate the design

and construction of the facility. The authority having jurisdiction will review compliance with these requirements, and their review processes shall be investigated and identified. OFPC will provide assistance to the institution in achieving compliance, if requested. Examples of these include:

- **Environmental Protection Agency**, for compliance with environmental protection requirements
- **Texas Department of Licensing and Regulation, Elimination of Architectural Barriers Division**, for compliance with state requirements and the Americans with Disabilities Act
- **Texas Commission on Environmental Quality**, for environmental conservation and management (i.e.: TPDES Storm Water, Air Permit, Water Pollution Abatement Plan & FEMA Flood Plain Management Standards)
- **Texas Historical Commission**, for historic landmark designation
- **Texas Antiquities Commission**, for archeologically significant sites
- **Texas Department of Health**, asbestos or lead paint abatement
- **U.S. Fish and Wildlife Service**, threatened & endangered species
- Local land use restrictions (for example, Texas Medical Center deed restrictions)
- Community fire protection requirements (U.T. System component institutions enjoy fire protection provided by the local jurisdictions and therefore must coordinate requirements with the local fire department)
- Local historic districts
- Others

## Technical Standards

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The technical standards listed below should be reviewed. The impact that these standards and their associated review processes will have on the project scope, cost, and schedule should be incorporated into the program.



### U.T. System Standards

OFPC has developed the following technical standards that apply to the design and construction of U.T. System projects and will provide assistance in interpreting these standards, if requested. OFPC maintains these standards in a document titled *A-E Design Guidelines*, which are included by reference in the A-E Agreement.

- Acoustical Design - Background Noise Design Criteria For Typical Occupancies
- Civil Engineering Criteria
- Construction Criteria
- Electrical Criteria and Guideline Specifications
- Furniture, Furnishings & Accessories Criteria
- Guidelines for Architect-Engineer Services Preparation of Project Manuals
- Constructability Standards
- Sustainable Design Criteria
- Landscape - Site Development Criteria
- Mechanical Criteria and Guideline Specifications
- Structural Criteria



### Institution Standards

In addition, each component institution has locally generated technical standards or adaptations of the OFPC standards to suit the unique requirements of their campus and/or climate, which are typically maintained by the institution's Physical Plant. Institutional

standards that have a significant impact on the design and construction of the facility should be described in the program. These might include:

- Equipment or system specifications or standards
- Existing special purchase arrangements with vendors for certain equipment/systems
- Sole source requirements for equipment or systems (to be compatible with existing systems)

### **Institutional Design Standards**

---

Many institutions have aesthetic design standards and processes, which can significantly impact the project scope, schedule and budget. Definition of these requirements and the review and approval processes associated with each should be identified in the program. Examples include:

- Building design guidelines (from the institution's Campus Master Plan)
- Landscape/open space standards
- Color/material standards
- Furnishing standards
- Donor or benefactor requirements

The *design parameters* discussed in this chapter will likely have a significant affect upon the program for the project and in how the project will be accomplished. A strategy for how to manage these parameters is contained in detail in Chapter 11, Implementation Approach.



# 9

## Preliminary Project Cost (PPC)

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This Chapter deals with developing a preliminary project cost for the project. It should address all of the costs required to complete the project.

The purpose of this chapter is to offer guidance in developing a preliminary project cost estimate that is as accurate as possible. It will also serve as a checklist for the elements to be considered in developing the Preliminary Project Cost.

### **Types of Cost Estimates**

---

The U. T. System Capital Improvement Program process requires that project cost estimates be prepared at various stages throughout project development. The scope, budget, and schedule for a project is first identified in the Capital Improvement Plan (CIP), with additional cost estimates planned at intervals throughout design to ensure that the project can be completed within the budget.

## Preparing the Preliminary Project Cost

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The Preliminary Project Cost (PPC) is a prediction of all costs involved in the project. It includes all of the following:

- Estimates for the construction contract award amount, including escalation and contingencies
- Professional fees
- OFPC or Institution managed furnishings
- Other work, outside of the construction contract award amount, managed by OFPC or the Institution
- Miscellaneous expenses
- Contingencies
- Administrative costs

The facility programmer should prepare the second project cost estimate (the first estimate was included in the CIP) using the OFPC format and include it in the facility program. The format for the Preliminary Project Cost sheet is shown in *Figure 9.1* and a full-size sheet is given in *Appendix D*.

Notes for preparing the Preliminary Project Cost: Refer to the OFPC format:

- The facility programmer and OFPC should work together to develop the Preliminary Project Cost
- Include adequate notes in this chapter describing how each line of the PPC was derived
- Unit costs of comparable work may be used to prepare the cost estimate for new construction

- For renovations to existing construction (which also may be found associated with some new work and additions) the cost estimate is usually the result of estimating the cost of components, systems or even labor and materials for accuracy

Preliminary Project Cost	
Preliminary Project Cost As of: _____	
1. Base Proposal	_____
2. Alt. Proposals	_____
3. <b>Sub-total (CCL)</b>	_____
4. Special Cash Allowances	_____
5. Construction Contingency	_____
6. <b>Contract Award</b>	_____
7. Bid Contingency	_____
8. A/E Fees	_____
9. Movable Furnishings, OFPC Managed	_____
10. Movable Furnishings, Institution Managed	_____
11. Other Work, OFPC Managed	_____
12. Other Work, Institution Managed	_____
13. Miscellaneous Expenses	_____
14. Project Contingency	_____
15. <b>Sub-total</b>	_____
16. OFPC Management Fee	_____
17. <b>Total Project Cost</b>	_____
<b>Cost Per Gross Square Feet</b>	
22. Construction (line 6)	_____
23. PPC (line 17)	_____
<b>PROJECT SCOPE</b>	
24. New / Addition ASF	_____
25. New / Addition GSF	_____
26. Renovated ASF	_____
27. Renovated GSF	_____

**Construction Cost:**  
Buildings w/fixed equipment, sitework, infrastructure, thermal energy

**Special Cash Allowances:**  
Allowances, assigned proprietary work (EMS)

**Other Work, Institution Managed:**  
Equipment systems, make-ready other contracts

**A/E Fees:**  
Basic fee, additional services, as-builts, reimbursable expenses & contingency

**Other Work, OFPC Managed:**  
Materials testing, TAB, ROCIP, Interiors

**Miscellaneous Expenses:**  
Surveys, soils tests, ads, printing, partnering, & contingency

**Figure 9.1** Format for a Preliminary Project Cost Project Information Form (PIF).

\*\* If the Preliminary Project Cost exceeds the approved PPC, the Program shall identify areas of scope that may be reduced.

- ☐ Line 1, **Base Proposal**, is the estimated costs incurred to perform the Work in compliance with the Contract Documents, less Owner's Special Cash Allowances and Construction Contingency.
- ☐ Line 2, **Alternate Proposals**, is the estimated cost of alternates identified by the Owner prior to issuing a Request For Proposals, or the total of the alternates accepted by the Owner after receipt of CSPs.
- ☐ Line 3, **Construction Cost Limitation (CCL)**, is the subtotal for lines 1 and 2. The CCL is normally included in the A/E Agreement and is the project Architect/Engineer's design budget.
- ☐ Line 4, **Special Cash Allowances**, is the allowance for specific work identified by the PM that may not be fully scoped by the User at bid time, or may be part of a larger system that requires a proprietary product or system.
- ☐ Line 5, **Construction Contingency**, is an OFPC controlled contingency for unforeseen conditions and error/omission change orders that occur during construction.
- ☐ Line 6, **Subtotal (Contract)**, is the subtotal for lines 3 through 5. This is the amount expected from the Contrator, Construction Manager or Design-Build Contractor.
- ☐ Line 7, **Bid Proposal Contingency**, is an Owner controlled contingency to cover bid/proposal over-runs. Use 5% of line 3. *This contingency is contained within the Guaranteed maximum Price for projects using Construction Manager at Risk or Design-Build.*
- ☐ Line 8, **A/E Fees**, is the A/E fee for Basic Services as determined from the Construction Cost Limitation (Line 3 above) times the interpolated percentage (*The University of Texas System, Office of Facilities Planning and*

*Construction, Architect/Engineer Fee Schedule).*  
Also include amounts for additional services, reimbursable expenses, record drawings and contingency. *This fee is included in Preconstruction Services for Design-Build.*



Line 9, **Movable Furnishings, OFPC Managed**, is the bare costs associated with furnishings and accessories managed by the OFPC Interiors Group. A budget should be established using the following 3 step process:



Line 10, **Movable Furnishings, Institution Managed**, is the cost associated with furnishings and accessories managed by the Institution (breakdown provided by User).



Line 11, **Other Work, OFPC Managed**, is the Costs associated with additional “large” contracts and other project costs managed by OFPC, which includes:

- Rolling Owner Controlled Insurance Program (1.76% of Line 6 above)
- Material Testing (\$0.50-1/Gsf - New)
- Test & Air Balance (\$1.50-2.50/Gsf - New)
- Interior Design Production Fee (12% of Line 9 above)
- Other costs as agreed to by OFPC Accounting



Line 12, **Other Work, Institution Managed**, is the cost associated with equipment, security systems, make project ready costs, asbestos/lead abatement, telephone/data/ communications, interior remodeling, commissioning, parking, move from existing space, artwork, graphics, easements, vending machines, outside consultants, computers, etc... (breakdown provided User).

☐ Line 13, **Miscellaneous Expenses**, is the cost associated with site surveys, geotechnical reports, cast bronze plaque (material only), soils testing, printing, partnering, postage/over-night deliveries, advertising, constructability reviews, VOC testing, hazardous materials testing/monitoring, permits, additional consultants.

☐ Line 14, **Project Contingency**, is a contingency jointly controlled by OFPC and the User to protect the project against claims and to cover unforeseen project expenses not included in lines 1 through 15.

- The contingency shall be no less than 3% of the subtotal of lines 6 thru 13.

☐ Line 15, **Subtotal**, is the subtotal for lines 6 through 15.

☐ Line 16, **OFPC Management Fee**, is the OFPC Administration Fee equals the Total Project Cost less Institutionally Managed budget line items (Lines 10 and 12 above) times the interpolated OFPC Fee Percentage, per the schedule below. (Refer to “A/E & OFPC Fee Matrix” as PAGE 4 of the PIF)

☐ Line 17, **Total Project Cost**, is the total for lines 15 and 16.

☐ Lines 22 & 23 **Per Gross Square Foot**, is the quotient of either line 6 or line 17 divided by the total GSF from lines 25 and 27.

☐ Lines 24-27, **New/Renovated ASF & GSF**, divides the project into four classifications. Divide the total GSF for the project among the categories for *New/Addition ASF and GSF* and *Renovated ASF and GSF* as appropriate.


# 10 Project Schedule

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This chapter deals with the factors that affect the time required to complete a project and must be addressed if a project is to be completed in a timely manner. Every facility program includes the preparation of a schedule for design and construction of the project.

## **Preparing the Project Schedule**

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 The facility programmer should develop the project schedule in consultation with OFPC and the institution. The schedule will include various milestones, any unusual schedule considerations, and submissions/ approvals by the Chancellor, FPCC, The Board of Regents, and The Texas Higher Education Coordinating Board. Following the Chancellor's appointment of the project Architect/Engineer, OFPC will work with the institution and the project Architect/Engineer to refine the schedule.


The facility programmer should document the project schedule in the facility program using the OFPC format for the Project Schedule. The format is shown in *Figure 10.1* and a full-sized sheet is given in *Appendix D*.


CSP & CM	Select A/E	Advertise Request For Qualifications (RFQ)	mm/dd/yy
		Receive RFQs	mm/dd/yy
		Interview A/E	mm/dd/yy
		Appoint A/E - Chancellor	mm/dd/yy
		Execute A/E Contract - AVC FPC	mm/dd/yy
CM & DB	Select CM or DB	Advertise Request For Qualifications (RFQ)	mm/dd/yy
		RFQ Pre-Proposal Conference	mm/dd/yy
		Receive RFQs	mm/dd/yy
		Issue Request For Proposals (RFP)	mm/dd/yy
		Receive RFPs	mm/dd/yy
		Interview CM/DB	mm/dd/yy
		Approve Award - EVCBA	mm/dd/yy
		Issue NTP - Part I Services (Preconstruction)	mm/dd/yy
CSP, CM & DB	Schematic Design	Authorize A/E/DB Start	mm/dd/yy
		Submit for Owner Review - A/E/DB	mm/dd/yy
		Joint Review for Owner Comments	mm/dd/yy
		Approve Schematic Design - OFPC ADPM	mm/dd/yy
	Design Development	Authorize A/E/DB Start	mm/dd/yy
		Submit for Owner Review - A/E/DB	mm/dd/yy
		Joint Review for Owner Comments	mm/dd/yy
		FPCC Meeting Project Submission Deadline	mm/dd/yy
		FPCC Meeting Approval	mm/dd/yy
		Approve TPC & Design Development - BOR/Chancellor	mm/dd/yy
		Approve DD Documents - OFPC ADPM	mm/dd/yy
	THECB	Submit Construction Application - Component	mm/dd/yy
		Approve Construction Application - THECB	mm/dd/yy
CM & DB	GMP	Receive GMP	mm/dd/yy
		Approve GMP - EVCBA	mm/dd/yy
CSP, CM & DB	Construction Document	Authorize A/E/DB Start	mm/dd/yy
		A/E/DB Submit _____ CD for Review	mm/dd/yy
		Joint Review for Owner Comments	mm/dd/yy
		A/E/DB Submit _____ CD for Review	mm/dd/yy
		Joint Review for Owner Comments	mm/dd/yy
		A/E/DB Submit _____ CD for Review	mm/dd/yy
		Joint Review for Owner Comments	mm/dd/yy
CSP	Request For Proposals	Approve 100% Construction Documents - OFPC ADPM	mm/dd/yy
		Advertise for Proposals	mm/dd/yy
		Pre-Proposal Conference	mm/dd/yy
		Receive Proposals	mm/dd/yy
CSP, CM & DB	Construction	Award - EVCBA	mm/dd/yy
		NTP for Construction & Updates	mm/dd/yy
		Substantial Completion	mm/dd/yy
		Final Completion	mm/dd/yy
		Start Furniture Move-In / Make Ready	mm/dd/yy
CSP, CM & DB	Construction	Operational Occupancy	mm/dd/yy


Figure 10.1 Format of Preliminary Project Schedule




 **Select A/E Phase:** The projected/actual dates for advertising, reviewing, interviewing, selecting and executing a contract with the Project A/E.

 **Select CM/DB Phase:** The projected/actual dates to advertise a Request For Qualifications (RFQ), hold a Pre-Proposal Conference, receive RFQs, issue Request For Proposals (RFP), receive RFPs, interview CM/DB, approve the award, and issue NTP for Preconstruction Services.

 **Schematic Design Phase:** The projected/actual dates to prepare, review, submit and approve the Schematic Design for the entire project.

 **Design Development, FPCC & BOR Approval Phase:** The projected/actual dates to prepare, review and submit the Design Development for review and approval by the Facilities Planning and Construction Committee and the Board of Regents.

- These dates must coincide with regularly scheduled FPCC and BOR quarterly meetings.
- The FPCC meets quarterly on the second week of January, April, July and October. The deadline to request a FPCC agenda item is approximately two weeks prior to the meeting.
- The Board of Regents meets quarterly on the second week of February, May, August and November.
- The projected/actual date for approving the Design Development Drawings for the entire project if it is not the same date as the BOR approval.

 **THECB Review Phase:** The projected/actual dates for the the Institution and the A/E to submit the project the the Texas Education Coordinating Board for project review. (These

dates must coincide with regularly scheduled submission and meeting dates for the THECB.)

- The THECB meets quarterly in the third week of January, April, July and October. THECB applications are due thirty (30) days prior to the meetings.



**Guaranteed Maximum Price:** The projected/actual dates to receive the initial GMP and approve the final GMP by the EVCBA.



**Construction Document Phase:** The projected/actual dates to prepare, review, submit and approve Construction Documents for the entire project.

- The “blanks” may be used to identify %CDs or Bid Package Numbers.



**Request for Competitive Sealed Proposals Phase:** The projected/actual dates to advertise, meet and receive proposals from contractors.

- Allow two (2) weeks for OFPC, the institution and the A/E to confer, and the president of the institution to make a written request to the appropriate Executive Vice Chancellor for award of the contract.
- Typically allow eight (8) weeks between lines 8e and 10a for award of the construction contract to the start of contract time. (This includes time for the Notice to Proceed to take effect, which is normally 10 days from the date of contract award to the start of contract time.)



**Construction Phase:** The projected/actual dates to issue the Notice to Proceed, hold a Pre-construction/Partnering meeting, mobilize, complete the foundation, structure, building dry-in, start commissioning, pre-final inspections, achieve Substantial and Final Completion, start furniture move-in and Operational Occupancy.

# 11


## Implementation Approach

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The implementation approach should address every key element relative to *how* the project will be executed, as well as the procedures, methods, and resources that will be required to accomplish this execution. The implementation approach will vary depending upon the needs of the institution and the project, and should be a written section in the program that represents the consensus of the project team. It will form the basis for a more detailed project implementation approach developed later.

A formal implementation approach, often called execution plan or project execution strategy, is required to ensure that all tasks are identified and carried out in a timely manner, even early in project development. The approach to implementation of this Facility Program “sets the stage” for further work on the project. It provides overall direction for the project team, which must make numerous decisions throughout the course of a project. The implementation approach serves as organizer for that decision making process. It should be as detailed as possible, and should include specific roles and responsibilities.

The level of detail contained in the implementation approach should be consistent with the accuracy of the estimate, size and complexity of the project and firmness of the project scope. The implementation approach must be flexible, because plans, assumptions and design concepts developed during the pre-project activities will undergo review and possible change during subsequent phases.

-  The program should address each of the following subjects normally found in a typical implementation approach.

### **Comprehensive Project Schedule**

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In addition to the Project Schedule developed in Chapter 10, this section should address how the institutions plans to manage:


- ☐ Selection, procurement and installation of Owner furnished equipment (especially for long lead time items)
- ☐ Design of interior spaces, including furniture, furnishing and accessory selection, procurement and installation
- ☐ Multiple stages of the project, for example furniture procurement may be handled differently from general construction

### **Design Plan**

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This section defines the resources and methods to be used to provide cost effective design for the project. It also includes plans for utilizing both internal and external resources. It should include:

- ☐ Recommendation for the qualifications of the project architect-engineer and its consultants
- ☐ Suggestions for special consultants as may be required due to the nature of the project
- ☐ Need for comprehensive site investigations

-  Unusual design documentation required, emphasizing any special requirements including computer aided design and drafting (CADD), 3-Dimensional computerized modeling of MEP systems, physical models, etc.

### **Contracting Plan**

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-  State law dictates that construction contracts for higher education projects be publicly bid and awarded to the lowest responsible bidder. If the institution intends, and is able to complete any part of the project using an alternative contracting approach, this should be clarified in this section.
-  Identify any major stages of the project to pre-purchase equipment (such as boiler, chillers, cooling tower, etc.) or to separately advertise, bid and award multiple construction contracts within the overall project (such as site preparation, demolition, infrastructure contracts, etc.)


### **Permitting and Regulatory Compliance**

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This section includes a work plan to prepare, submit and track any unique approval or permit requirements identified in Chapter 8. Definition of responsibilities and coordination with OFPC, Institution EHS, and outside agencies should be discussed.

### **Safety Process**

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-  The State of Texas Uniform General Conditions and The U.T. System Supplementary General Conditions of the Construction Contract make safety during construction the responsibility of the General Contractor. If there are other safety procedures and review processes to be followed by the project for which the Owner is responsible this section should address them, including:

- Hazardous material handling
- Safety information for specialized processes and hazards
- Potential impacts to Institution security or safety during construction and operation

### **Cost and Schedule Controls**

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This section contains the overall project cost and schedule **philosophy** including:

- How project schedules and cost will be controlled
- Frequency, form, and level of detail of reporting requirements

### **Institution's Staffing and Team Building Plan**

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Update organization structure for the project during design and construction.

- Roles and responsibilities within the institution's organizational structure, including designation of a single institutional representative for the remainder of the project.

### **Project Insurance Approach**

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Construction insurance requirements for the project should be defined at the programming stage and these costs reflected in the preliminary project cost budget.

Once the program scope of the project is defined, a meeting should be held between the programming team and institutional and UT System representatives responsible for risk management and insurance issues. The purpose of the meeting is to consider including the project in the Owner's Rolling Owner Controlled Insurance Program (ROCIP) and to evaluate levels of coverage vs. risk for the anticipated scope and delivery method of the

project. These insurance costs should then be included in the appropriate line items within the preliminary project budget.

# 12

## Information Specific to the Institution

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Use this chapter to include any pertinent information that applies specifically to this institution, such as campus design or technical standards, permitting requirements, operating protocols, certifications, local preferences or other special information.

This chapter is also an appropriate place to include any supporting information used to generate the space requirements, such as activity projections or academic programming.



# 13

## Selecting a Project Delivery Method

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Texas Higher Education Codes 51 allows public institutions of higher learning, including OFPC, to use alternative delivery methods for construction of capital projects. It does not preclude use of the traditional, design-bid-build approach. Under this legislation, the new approach may result in the award of a construction contract either based solely on the lowest responsive bid, or based on the benefit of consideration of value provided, relative to established criteria, other than strict adherence to the lowest bid. The three alternate delivery methods are as follows:

### **Competitive Sealed Proposals (CSP)**

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This is the default project delivery method for the capital Improvement Program (CIP) and OFPC, and is to be used whenever the design-bid-build approach is determined for a project. The design and construction contracts are held separately and construction documents are completed prior to award of a contractor. CSP further offers benefit of some limited degree of constructability and value negotiation including some input to the determination of subcontractors, neither of which is likely when selection is based entirely on lowest price.

### **Construction Manager at Risk (CM-R)**

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This project delivery method combines the traditional design team relationship with expedited involvement by the construction team prior to the completion of contract documents. Both the design team and the CM-R are contracted separately to the Owner and each is selected through the RFQ and RFP process (2-part). Under this contractual relationship, which is similar to CSP, the Owner remains responsible to the CM-R for errors and omissions on the part of the design team. The CM-R's services are divided into Preconstruction – Preconstruction Services and Construction Services and the Owner derives benefit from “in-house” construction expertise throughout final development of the project documents and materials selections as well as budget and schedule development and tracking. Subcontractors are selected through competitively sealed proposals for trade packages. The CM-R is encouraged to utilize the CSP process to allow for consideration of values other than price.

### **Design–Build (DB)**

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This project delivery method creates a unique singular contract agreement between the Owner and a singular entity (most often a limited joint venture of construction and design firms) for both the design and construction of a project. The DB's services are divided into Preconstruction Services and Construction Services. While the Owner gives up direct control of the design process, those A/E services typically amounting to full professional services, including administering the construction phase, are included in the DB contract requirements. The Owner derives benefit from having construction expertise involved at the very beginning of design so constructability, budget, and schedule control are maximized throughout the project development.

### **Delivery Selection Matrix**

The following guideline matrix is intended to assist the project team to select the most appropriate alternate project delivery method for Capital Improvement Project. The team should identify 3-4 goals in the matrix, critical to project success. Then circle the value(s) in the corresponding columns. When all criteria have been selected and the values have been circled, total all values in each column. The column with the highest total should be considered the most appropriate project delivery method.

	<b>CSP</b>	<b>CM</b>	<b>DB</b>
Constructability is necessary for project design, budget and schedule		2	2
Construction Cost Limitation (CCL) is less than \$10,000,000	2		1
Facility Program requires further refinement during the design process	2	2	
OFPC's Project Manager is currently managing two or more CM/DB projects	3		
Owner desires some degree of participation in the subcontractor selection process		3	3
Owner requires a high level of control over the Project's design and quality	3	2	
Owner requires construction costs to be "guaranteed" during the design phase		2	2
Owner requires the ability to select the "best" design and construction firms	3	3	
Owner will allow a completed facility based on the approved Facility Program			3
Project is "complex", large, innovated or non-standard	2	2	
Project is "simple" in design and construction	3		
Project requires multiple construction stages		2	2
Project schedule is CRITICAL (eliminate CSP from consideration)		3	1
Project schedule is not critical	3	2	1
<b>TOTALS</b>			

## Delivery Method Summary Matrix

	COMPETITIVE SEALED PROPOSALS	CONSTRUCTION MANAGEMENT-AT-RISK	DESIGN-BUILD
TYPICAL PROJECT PROFILES	<p>Small to large, new or renovations projects of low to high complexity where the Owner desires control of the design and quality of materials and systems.</p> <p>-----</p> <p>The speed of project delivery is secondary to design and quality control. Cost estimates and constructability are provided by consultants typically not responsible for their accuracy.</p>	<p>Moderate to large, new or renovations projects of moderate to high complexity with phasing or detailed scheduling requirements where accurate, early cost estimates and constructability is required.</p> <p>-----</p> <p>The construction budget is established early and the speed of project delivery is primary.</p>	<p>Moderate to large, new projects, of moderate complexity where scope, budget and schedule are well defined in the Facility Program prior to selection of a Design-Build firm.</p> <p>-----</p> <p>The construction budget is established early and the speed of project delivery is secondary.</p>
SUMMARY	<p>The Owner selects two separate entities:</p> <p>-----</p> <p>An Architect/Engineer is selected to design the project to meet the Program and budget, to prepare construction documents and administer the construction contract.</p> <p>-----</p> <p>A General Contractor is selected via Competitive Sealed Proposals to provide construction services.</p> <p>-----</p> <p>This method is most similar to traditional design-bid-build.</p>	<p>The Owner selects two separate entities:</p> <p>-----</p> <p>An Architect/Engineer is selected to design the project to meet the Program and budget, to prepare construction documents and administer the construction contract.</p> <p>-----</p> <p>A Construction Manager is selected to provide pre-construction and construction services.</p>	<p>The Owner selects a single entity:</p> <p>-----</p> <p>The Design-Build firm consists of an Architect/Engineer to provide design and develop Construction Documents, and a Construction Manager to serve as the general contractor during construction.</p>

	<b>COMPETITIVE SEALED PROPOSALS</b>	<b>CONSTRUCTION MANAGEMENT-AT-RISK</b>	<b>DESIGN-BUILD</b>
<b>DESIGN</b>	<p>The Owner makes a qualifications-based selection of an A/E through a RFQ process to design the project to meet the program and budget, to provide complete contract documents, and to administer the construction contract.</p> <p>-----</p> <p>The A/E may develop the Facility Program, or the Owner may hire a separate Programming firm.</p> <p>The Owner is responsible for the performance of the A/E.</p>	<p>The Owner makes a qualifications-based selection of an A/E through a RFQ process to design the project to meet the program and budget, to provide complete contract documents, and to administer the construction contract.</p> <p>-----</p> <p>The A/E may develop the Facility Program, or the Owner may hire a separate Programming firm.</p> <p>The Owner is responsible for the performance of the A/E.</p>	<p>The Owner makes a selection based on a two-step qualifications and proposals RFQ/P process to design the project to meet the program and budget, to provide complete contract documents, and to administer the construction contract.</p> <p>-----</p> <p>The Owner hires a separate firm to develop the Facility Program.</p> <p>The Owner is responsible for the performance of the DB.</p>
<b>CONSTRUCTION</b>	<p>The Owner solicits General Contractors for competitive sealed proposals based on complete construction documents.</p> <p>-----</p> <p>Selection of the "best value" Contractor is based on a combination of price and other criteria that the Owner determines prior to solicitation.</p>	<p>The Owner makes a selection based on a two-step qualifications and proposals RFQ/P process.</p> <p>-----</p> <p>The CM typically develops a GMP based on incomplete design documents and the Owner tracks the GMP throughout the construction phase.</p>	<p>The CM typically develops a GMP based on incomplete design documents and the Owner tracks the GMP throughout the construction phase.</p>

	<b>COMPETITIVE SEALED PROPOSALS</b>	<b>CONSTRUCTION MANAGEMENT-AT-RISK</b>	<b>DESIGN-BUILD</b>
<b>SUBCONTRACTS</b>	<p>Neither state law nor the contract requires competitive bidding of subcontractors. However, both require Good Faith Efforts at obtaining, tracking and reporting HUB participation.</p> <p>-----</p> <p>-</p> <p>General Contractor procures and manages subcontracts based on complete construction documents.</p>	<p>The CM is required to follow the Contract (as required by Texas Education and Texas Government Codes) for soliciting competitive bids for Cost of Work and for providing a Good Faith Effort on HUB participation.</p> <p>-----</p> <p>The CM typically procures and manages subcontracts on bid packages based on 100% signed and sealed construction documents.</p>	<p>The DB is required to follow the Contract (as required by Texas Education and Texas Government Codes) for soliciting competitive bids for Cost of Work and for providing a Good Faith Effort on HUB participation.</p> <p>-----</p> <p>The DB typically procures and manages subcontracts on bid packages based on 100% signed and sealed construction documents.</p>



# Acknowledgments

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For assistance using these guidelines, or to make suggestions for future edits, please contact the appropriate OFPC Senior Project Manager, or the Project Improvements Coord. at 512-499-4600.

# B

## Notes About Complying with the THECB Space Model

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The Texas Higher Education Coordinating Board (THECB) was created by the Texas Legislature in 1965 as “the highest authority of the state in matters of public higher education.” The Coordinating Board recommends formulas for allocation of state funds to public institutions, works to eliminate duplication of academic programs, unnecessary construction projects and real estate acquisitions.

The *Space Projection Model for Higher Education Institutions in Texas* guides The Coordinating Board in its review of new construction and renovation projects at academic and health-related institutions. The Model uses an academic five-factor model and a health-related four-factor model to compare actual with predicted assignable square footage at each publicly supported institution of higher education in Texas.



<u>Academic</u>	<u>Health-Related</u>
Teaching	Teaching
Library	Research
Research	Office
Office	Support (includes Library)
Support	

The Coordinating Board continually updates the Model to track the use of assignable square footage at each institution. Any institution may request a copy of the current Model for its campus at any time.

The Coordinating Board evaluates proposed new construction and renovation projects based on a number of different criteria. **The assignable square footage for any proposed project may not cause the institution's actual assignable square footage to exceed the Model's predicted assignable square footage for the campus total.** In some cases, however, it may be justifiable to exceed the Model's predicted assignable square footage for a single factor as long as the campus total is not exceeded.

It is the Coordinating Board's policy to only approve projects where the assignable square footage divided by the gross square footage is sixty percent (60%) or more.



Refer to the Appendix C for the *Definition of Terms Relating to Square Footage* for Compliance with The Texas Higher Education Coordinating Board.

The U.T. System Board of Regents approves its *Capital Improvement Plan* (CIP) every two years, in which they identify and approve capital projects for further development at each institution. The facility programmer and institution should verify that the assignable square footage for the proposed project is coordinated with other projects in the CIP. The total assignable square footage for the institution's construction program in the CIP cannot exceed the Model as previously discussed.

The *Rules and Regulations* of the Board of Regents require that each institution maintain an Institutional Building Advisory Committee, whose responsibility is to advise the president regarding the overall need and long-term use of space at the institution. If the facility program should deviate in the quantity or use of space from that previously approved for the project, the proposed change should be reviewed with the Committee.

In 1970 the Coordinating Board issued Study Paper 12, *Space Factors and Space Utilization Values for Use in Meeting the Facility Needs of Texas Colleges and Universities*, which established the first facility standards in Texas. This study employed many space factors that are still valid today. If interested, a copy may be obtained from the Coordinating Board's Campus Planning Office.

# C

## Definition of Terms Relating to Square Footage

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The definitions described below must be used to illustrate project compliance with the Texas Higher Education Coordinating Board. A summary of important definitions for square footage is given below. Contact the Office of Facilities Planning and Construction for further explanations. See *Figure C.1* for a graphic illustrating the relationships of the definitions for the various square footages.

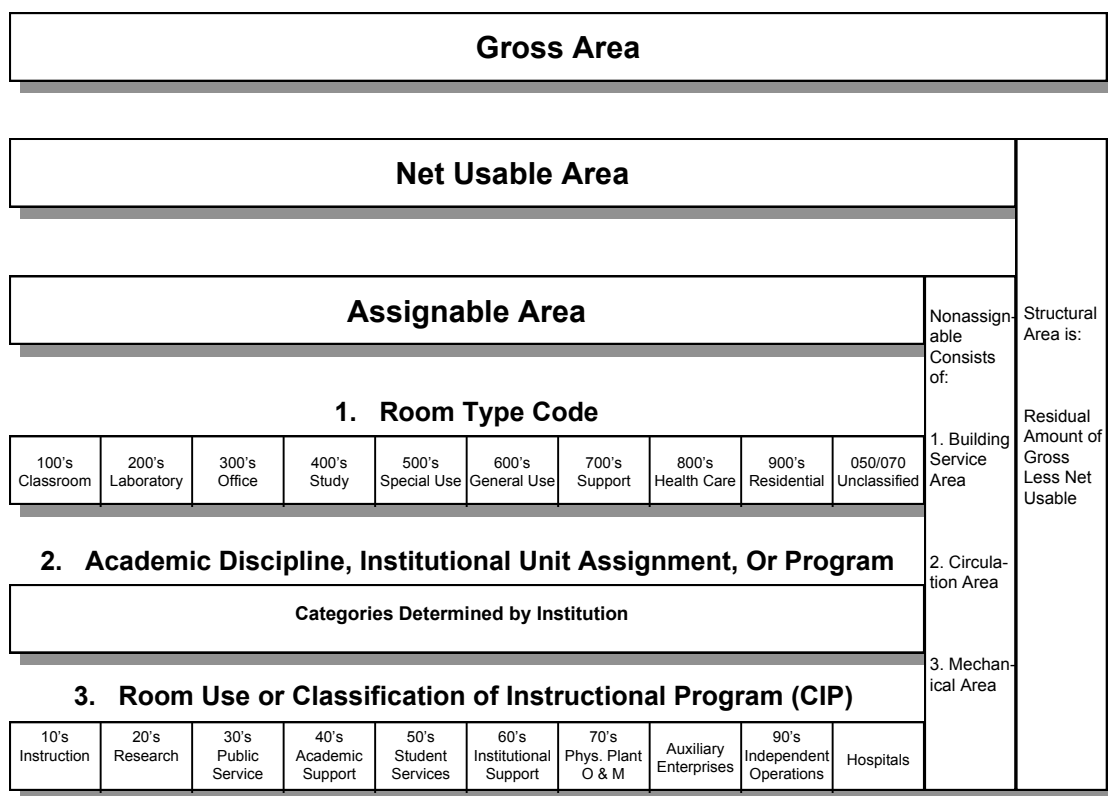
**Gross Square Feet (GSF):** The sum of the square footage of all areas on all floors of a building included within the inside faces of its exterior walls, including floor penetration areas, however insignificant, such as circulation and shaft areas that connect one floor to another.

*Basis for Measurement:* Gross area is measured from the OUTSIDE face of exterior walls, disregarding cornices, pilasters, buttresses, etc., which extend beyond the wall faces. Exclude areas having less than a 6'-6" ceiling height.

*Description:* In addition to all the internal floored spaces obviously covered above, gross area should include the following, provided they have greater than 6'-6" clear ceiling height and potential usability: Excavated basement areas; mezzanines, penthouses and attics; garages; enclosed porches, inner or outer balconies whether walled or not, if they are utilized for operational functions; and corridors whether walled or not, provided

they are within the outside face lines of the building, to the extent of the roof drip line. The footprints of stairways, elevator shafts and ducts (examples of building infrastructure) are to be counted as gross area on each floor through which they pass.

### Conceptual Framework for Analyzing Buildings



**Figure C.1** Diagram outlining relationships of the definitions for square footage according to the Texas Higher Education Coordinating Board.

**Assignable Square Feet (ASF):** The sum of the square footage of all areas on all floors of a building assigned to, or available for assignment to, an occupant or other specific program use. Exclude non-assignable area and structural area (see below).

*Basis for Measurement:* Assignable area is measured from the inside faces of surfaces that form the boundaries of the designated area. Exclude areas having less than a 6'-6" ceiling height.

*Description:* Included should be space subdivisions of the ten major room use categories for assignable space that are used to accomplish the institution's mission: classrooms, labs, offices, study facilities, special use, general use, support, health care, residential and unclassified.

Assignable Area = Gross Area minus Non-assignable Area (Building Service Area, Circulation Area, and Mechanical Area) minus Structural Area

**Non-assignable Area (Includes Building Service Area, Circulation Area, and Mechanical Area):** The sum of all areas on all floors of a building not available for assignment to an occupant for specific program use, but necessary for the general operation of a building.

*Basis for Measurement:* Non-assignable Area is measured from the outside faces of surfaces that form the boundaries of the designated areas. Excludes areas having less than 6'-6" clear ceiling height.

*Description:* Included should be space subdivisions of the three non-assignable room use categories that are used to support the building's general operation, and structural area: building service, circulation and mechanical.

**Building Service Area:** The sum of all areas on all floors of a building used for custodial supplies, sink rooms, janitorial closets and for public rest rooms. Building service areas do not include assignable areas.

*Basis for Measurement:* Building service area is computed by measuring from the outside faces of surfaces that form boundaries of the designated

areas. Exclude areas having less than 6'-6" clear ceiling height.

*Description:* Included should be janitor closets or similarly small cleanup spaces, maintenance material storage areas, trash rooms exclusively devoted to the storage of non-hazardous waste created by the building occupants as a whole, and public toilets.

**Circulation Area:** The sum of all areas on all floors of a building required for physical access to some subdivision of space, whether physically bounded by partitions or not.

*Basis for Measurement:* Circulation area is computed by measuring from the outside faces of surfaces that form the boundaries of the designated areas. Exclude areas having less than 6'-6" clear ceiling height.

*Description:* Included should be, but is not limited to, public corridors, fire towers, elevator lobbies, tunnels, bridges and each floor's footprint of elevator shafts, escalators and stairways. Receiving areas, such as loading docks, should be treated as circulation space. Any part of a loading dock that is not covered is to be excluded from both circulation area and the gross building area. A loading dock, which is also used for central storage should be regarded as assignable area. Also included are corridors, whether walled or not, provided they are within the outside face lines of the buildings to the extent of the roof drop line.

**Mechanical Area:** The sum of all areas on all floors of a building designed to house mechanical equipment, utility services and shaft areas.

*Basis for Measurement:* Mechanical area is measured from the outside faces of surfaces that form the boundaries of the designated areas. Exclude areas having less than 6'-6" clear ceiling height.

*Description:* Included should be mechanical areas such as central utility plants, boiler rooms, mechanical and electrical equipment rooms, fuel rooms, meter and communications closets and each

floor's footprint of air ducts, pipe shafts, mechanical service shafts, service chutes and stacks.

**Structural Area:** The sum of all areas on all floors of a building that cannot be occupied or put to use because of structural building features.

*Basis for Measurement:* Structural area should be construed to mean that portion of the gross area, which cannot be occupied or put to use because of the presence of structural features of the building.

*Description:* Examples of building features normally classified as structural areas include exterior walls, fire walls, permanent partitions, unusable areas in attics or basements or comparable portions of a building with ceiling height restrictions, as well as non-excavated basement areas.

# *D*

## Examples of OFPC Forms Described in these Guidelines

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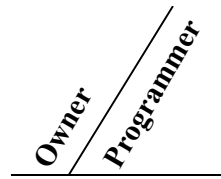
The following pages contain:

- List of Programming Tasks from chapter iv that may be used as an attachment to a contract for services.
- Category 1A Land Title Survey Exhibit from Chapter 6



### **List of Programming Tasks**

The following list is intended to be an attachment to an Agreement for Programming Services. It identifies the tasks to be completed by the Programmer and the tasks that are the responsibility of the Owner (including the Institution, OFPC, and other parties.) The chapter listed after each item refers to chapters in the *OFPC Facilities Programming Guidelines*.



#### **Programming Schedule (chapter iii)**

- ☐ ☐ A schedule of tasks to be done during the programming phase

#### **Project Goals (chapter 3)**

- ☐ ☐ A statement of agreement with the institution's mission and objectives
- ☐ ☐ A statement of agreement with the institution's strategic plan
- ☐ ☐ A statement that the project follows the institution's master plan
- ☐ ☐ A description of the programs and curricula to be housed in this project
- ☐ ☐ A summary of the need for the project
- ☐ ☐ A brief description of the intent of the project
- ☐ ☐ A discussion of alternative solutions that have been considered
- ☐ ☐ The objectives for the outcome of the project
- ☐ ☐ A statement that this project follows or deviates from the Coordinating Board's space model for this institution

### **Space and Adjacency Requirements** *(chapter 4)*

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- ☐ ☐ A summary space list of all areas in the project
- ☐ ☐ At least one overall adjacency diagram
- ☐ ☐ At least one stacking diagram (when appropriate)
- ☐ ☐ A discussion of future growth and phased development
- ☐ ☐ Detailed requirements for each room:
  - Space detail sheet
  - Functional relationship diagram
  - Room data sheet
  - List of furnishings and equipment
  - Description of finishes
  - Description of special access issues

### **Supporting Requirements** *(chapter 5)*

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- ☐ ☐ The requirements for site development
- ☐ ☐ A list of any additional requirements applicable to the project
- ☐ ☐ A description of the security needs of the project

### **Existing Site Studies** *(chapter 6)*

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*(May not apply to interior renovation projects)*

- ☐ ☐ An analysis of the site or sites under consideration
- ☐ ☐ An analysis of the site- or institution-specific environmental or safety considerations

### **Existing Facilities Studies** *(chapter 7)*

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*(May not apply to new projects on new sites)*

- ☐ ☐ Make copies of all available drawings for the current building

- ☐ ☐ Define the extent of the renovation
- ☐ ☐ A list of items that need to be reused after the renovation
- ☐ ☐ A list of areas in the building that are known not to comply with current building codes
- ☐ ☐ A list of any known hazardous materials in the building
- ☐ ☐ Discussion of any temporary or interim facilities that are required

#### **Design Parameters** *(chapter 8)*

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- ☐ ☐ A list of all of the applicable codes and standards
- ☐ ☐ A list of governmental agencies that have jurisdiction over the project
- ☐ ☐ A list of the U.T. System's technical and design standards that apply to this project
- ☐ ☐ A list of the institution's technical and design standards that apply to this project

#### **Preliminary Project Cost** *(chapter 9)*

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- ☐ ☐ A preliminary project cost estimate using the OFPC format

#### **Project Schedule** *(chapter 10)*

---

- ☐ ☐ A preliminary schedule for the project using the OFPC format

#### **Implementation Approach** *(chapter 11)*

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- ☐ ☐ A written plan that outlines how the project will be organized and delivered

#### **Information Specific to this Institution** *(chapter 12)*

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- ☐ ☐ Any institution requirements that will have an impact on the project

**Executive Summary** (*chapter 2*)

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- ☐ ☐ A synopsis of all areas in the program

**Sign-Offs** (*chapter 1*)

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- ☐ ☐ A sign off page with appropriate approval signature

***EXHIBIT - Category 1A Land Title Survey***

***Survey Requirements.*** A current Category 1A land title survey of the Land (the "Survey") sufficient to permit modification of the standard survey exception on the Owner Policy of Title Insurance and prepared by a registered surveyor. The Survey shall include the following:

- 1) a written description of the Land containing information to properly locate the Land on the ground and containing language confirming the contiguity of the Land with adjoining land owned by the Board of Regents, if applicable; if the Land's dimensions, boundary and area are in close agreement with the existing subdivision plat, if any, then use of lot, block, and subdivision, with all appropriate recording data, filing dates, and map numbers, may be used; otherwise a metes and bounds description must be provided;
- 2) a plat showing the actual dimensions of, and area within, the Land;
- 3) the location of any easements, existing and proposed roadways, encroachments or overlaps;
- 4) the physical access to the Land from a publicly dedicated street or road;
- 5) the outside boundary lines of the Land and all improvements;
- 6) all easements and other matters that are of record and would appear on a title commitment;

- 7) all easements or rights-of-way that are apparent from an on-the-ground survey;
- 8) the identification by name and deed recording reference of adjoining property owners;
- 9) the surveyor's signature, certification in the form shown below, registered number, seal, and the date of the Survey; and
- 10) identification of any area within the Land that has been designated as a Special Flood Hazard Area on the most recent U.S. Department of Housing and Urban Development and Federal Insurance Administration Flood Hazard Boundary Map.

**FORM OF SURVEYOR'S  
CERTIFICATION**

The undersigned Registered Professional Land Surveyor ("Surveyor") hereby certifies to the Board of Regents of The University of Texas System and           [title company]           that (a) this plat of survey and the property description set forth hereon were prepared from an actual on-the-ground survey of the real property ("Property"); (b) such survey was conducted by the Surveyor, or under his direction; (c) all monuments shown hereon actually existed on the date of survey, and the location, size and type of material thereof are correctly shown; (d) except as shown hereon: (i) there are no observable encroachments onto the Property or observable protrusions therefrom, (ii) there are no observable improvements on the Property, (iii) there are no observable easements or rights-of-way either burdening or benefiting the Property, and (iv) there are no observable discrepancies, conflicts,

shortages in area or boundary line conflicts; (e) the size, location and type of improvements, if any, are as shown hereon; (f) the Property has access to and from a public roadway; (g) recorded easements and rights-of-way referenced in Title Commitment GF No. \_\_\_\_\_ (issued \_\_\_\_\_, 20\_\_\_\_) prepared by \_\_\_\_\_ have been labeled and plotted hereon, unless otherwise noted; (h) the boundaries, dimensions and other details shown hereon are true and correct and conform to the appropriate accuracy standards of the Manual of Practice for Land Surveying in Texas (\_\_\_\_) for a Category 1A Condition \_\_\_\_ (\_\_\_\_ Land Title Survey); (i) the Property is located in Zone \_\_\_\_ as delineated on the \_\_\_\_\_, Texas, Flood Insurance Rate Map Panels Numbered \_\_\_\_\_, dated \_\_\_\_\_, 20\_\_\_\_, as published by the Federal Emergency Management Agency, which zone is defined as “\_\_\_\_\_”; and (j) the basis of bearing \_\_\_\_\_ for this survey is

\_\_\_\_\_  
\_\_\_\_\_.

\_\_\_\_\_

Name: \_\_\_\_\_

Registered Professional Land Surveyor,

Texas, No. \_\_\_\_\_

Date \_\_\_\_\_

## **EXHIBIT H**

### **ANTICIPATED PRE-DESIGN PHASE DELIVERABLES**



## **ANTICIPATED PRE-DESIGN PHASE DELIVERABLES**

The Project A/E shall be responsible for coordinating and compiling all of the Pre-Design Phase materials in the form of a manual (with exhibits as required); in the chapter sequence established in the Facilities Programming Guidelines. As between Owner and Project A/E, the party with primary/secondary responsible for generating the materials will be as follows:

<u>Work Area from Guidelines</u>	<u>Primary/Secondary Responsibility</u>
Programming Schedule	Project A/E
Ch. 1: Sign-Off Sheet	Owner (form provided by Project A/E)
Ch. 2: Executive Summary	Project A/E
Ch. 3: Project Goals	
Institution's Mission Statement and Objectives	Owner
Compliance with Institution's Strategic Plan	Owner
Compliance with Institution's Campus Master Plan	Owner
Functional Programs Curricula Descriptions and Projections	Owner
Project Need	Owner
Project Objectives	Project A/E/Owner
Compliance with Coordinating Board Space Model	Project A/E/Owner
Ch. 4: Space & Adjacency Requirements	Project A/E
Ch. 5: Supporting Requirements	Project A/E
Ch. 6: Existing Site Studies	Project A/E (except as follows)
Topographic Survey	Owner
Geotechnical Survey	Owner
Ch. 7: Existing Facilities Studies	Project A/E
Ch. 8: Design Parameters	Project A/E
Ch. 9: Preliminary Project Cost	Project A/E
Ch. 10: Project Schedule	Project A/E
Ch. 11: Implementation Approach	Owner
Ch. 12: Information Specific to This Institution	Owner
Ch. 13: Selection a Delivery Method	Owner/ Project A/E

## **EXHIBIT I**

### **OWNER'S DESIGN GUIDELINES**

## EXHIBIT I – OWNER’S DESIGN GUIDELINES “TIP SHEET”

NOTE: Design Guideline Elements are available from MD Anderson’s external website. Please find URL below to the website:

<https://www.mdanderson.org/>

Scroll to bottom of site to: **“Vendors and Suppliers”**

Select under heading “Vendors and Suppliers”: **Owner’s Design Guidelines**

Next Select: **Design Guideline Elements**

Note: The Design Guideline Elements are best viewed with **Google Chrome**.

# MD ANDERSON CANCER CENTER DESIGN GUIDELINES

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**Preface** ..... ODG030513

20 Proposal, Bidding, Contracting

2010 **Instructions for the Preparation of Project Manuals** ..... ODG  
20200129

## Construction Systems and Assemblies

### Element A - Substructure

#### A10 Foundations

A1010 **Standard Foundations** ..... ODG030119

A1030 **Slab on Grade** ..... ODG030119

### Element B - Shell

#### B10 Superstructure

B1010 **Floor Construction** ..... ODG030119

B1020 **Roof Construction** ..... ODG030119

#### B20 Exterior Enclosure

B2010 **Exterior Walls** ..... ODG030119

B2020 **Exterior Doors** ..... ODG030119

### Element C - Interiors

#### C10 Interior Construction

C1010 **Partitions** ..... ODG030119

C1020 **Interior Doors** ..... ODG030119

C1030 **Fittings and Interior Specialties** ..... ODG030119

C1031 **Fabricated Toilet Partitions** ..... ODG030119

#### C20 Stairs

C2010 **Stair Construction** ..... ODG030119

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### C30 Interior Finishes

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C3020	Floor Finishes	-----	ODG030119
C3025	Base Finishes	-----	ODG030119
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### Element D – Services

#### D10 Conveying

D1010	Elevators and Lifts	-----	ODG020311
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#### D20 Plumbing

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D200002	Parking Garage Plumbing Design Guidelines	-----	ODG030119
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D201001	Emergency Shower and Eyewash Equipment	-----	ODG030119
D201002	Plumbing Fixtures for Open Parking Garages	-----	ODG030119
D2020	Domestic Water Distribution	-----	ODG030119
D202001	Domestic Water Distribution for Open Parking Garages	-----	ODG030119
D2030	Sanitary Waste and Vent	-----	ODG030119
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D2060	Medical Vacuum and Gas Systems	-----	ODG030119
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#### D30 Heating, Ventilating, and Air Conditioning (Includes BAS)

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<b>D4000</b>	<b>General Design Guidelines</b>	-----	ODG030119
<b>D400001</b>	<b>General Design Guidelines for Open Parking Garages</b>	-----	ODG030119
<b>D4010</b>	<b>Wet Standpipe and Sprinkler Systems</b>	-----	ODG110119
<b>D50</b>	<b>Electrical (Includes Communications and Security Systems)</b>		
<b>D5000</b>	<b>Load Calculation Criteria</b>	-----	ODG030119
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<b>G2040</b>	<a href="#">Site Development</a>	-----	ODG030119
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<b>Z20 Owner Standards and Other Requirements</b>			
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<b>Z2011</b>	<a href="#">Equipment Naming Convention and Acronyms</a>	-----	ODG080113
<b>Z2015</b>	<a href="#">Structural Criteria</a>	-----	ODG103008
<b>Z2020</b>	<a href="#">Furniture and Accessories Planning</a>	-----	ODG111512
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## **EXHIBIT J**

### **OWNER'S BUILDING INFORMATION MODELING REQUIREMENTS**

**BUILDING INFORMATION MODELING REQUIREMENTS  
FOR ARCHITECTS / ENGINEERS / CONSULTANTS / CONTRACTORS**

**PART 1 – GENERAL**

**1.1. RELATED DOCUMENTS**

- 1.1.1. Attention is specifically directed, but not limited to, the Uniform General Conditions for University of Texas System Building Construction Contracts (UTUGCs) for other requirements related to the completion and submittal of Record Documents.
- 1.1.2. Attention is specifically directed to Owner's Design Guidelines Elements (ODGs) issued for the Project for other requirements related to the development, maintenance and exchange of design information, the formatting of design documents, and the completion and submittal of Record Documents. Particular attention should be directed to Owner's Design Guidelines Elements; Z10, Z2010 and its subsections and Z2035. Additionally, ODG Supplemental Resources; AutoCAD Standards; Equipment Matrix and Record Document Edit Log.
- 1.1.3. Attention is specifically directed to Owner's Master Construction Specifications for other requirements related to the development, maintenance and exchange of construction project information, and the completion and submittal of Record Documents. Particular attention should be directed to Division 01, General Requirements, specification sections 01 77 00, Project Closeout Procedures, and 01 78 39, Project Record Documents.

**1.2. SUMMARY**

- 1.2.1. This document establishes general and administrative requirements pertaining to Building Information Modeling (BIM) to meet Facilities Information Management (FIM) expectations for projects of various sizes and delivered under various contracting methodologies.
- 1.2.2. BIM practices require collaboration and involvement of all parties throughout the project delivery process, regardless of the delivery method being used for a given project. For BIM practices to be successful, collaboration must begin at the onset of the project development and continue throughout the Project until Owner accepts all final record document requirements.
  - 1.2.2.1. To accomplish this required collaboration and successfully deliver the Project to Owner, it is mandatory that a BIM Execution Plan be generated with involvement of all Project stakeholders. Owner recognizes that the industry standard for a BEP has been developed by the building SMART alliance™ (bSa) Project "BIM Project Execution Planning" and is incorporated by the National Institute of BUILDING SCIENCES as part of its National BIM Standard – United States Version 3. Owner recommends this as a template when generating the BIM Execution Plan for the Project.
- 1.2.3. BIM practices encompass and coordinate traditionally separate functions of design (Architect/Engineer) and construction (Contractor) in order to assemble all related building information into the Equipment Matrix for building operation assets or the Project Information Matrix for all other required information. These documents will provide the information required to efficiently operate and maintain the facility once Substantial Completion has been achieved and the Project has been turned over to Owner.
- 1.2.4. It is of primary concern that all building modeling and facility information developed during the design and construction of the Project be timely and efficiently developed, maintained and exchanged from initiation of the Project through Final Completion in accordance with all Contract Documents and with Owner's operational and maintenance needs. A/E shall develop a BIM Execution Plan (BEP) that details how, throughout the Project lifecycle, A/E, in collaboration with Contractor expects to systematically demonstrate to Owner that all building and system information is current to the extent that it can be at the time during the design and construction process. For a Design/Build delivery method, the BEP shall be developed jointly between A/E and the Design/Build Contractor, coordinating with Owner.
- 1.2.5. It shall be the responsibility of A/E, and each of its consultants, and Contractor and each of its

Subcontractors, to have or obtain, at their cost, the trained personnel, hardware, and software necessary to successfully fulfill their respective obligations as set forth in the mutually developed BIM Execution Plan.

### 1.3. DEFINITIONS

Capitalized terms used in this document shall have the meanings as set forth in the applicable contract(s), the UTUGCs, or any combination thereof, unless otherwise defined or modified below. For projects implemented with the construction manager-at-risk delivery method, the term Contractor shall mean Construction Manager. For projects implemented with the design-build delivery method, the term Contractor shall mean Design/Build Contractor. To be consistent with the UTUGCs, A/E is used in lieu of, and as a synonym for, the terms Project Architect, Project Architect/Engineer, and Project A/E that may appear in some standard UT System construction manager-at-risk, design-build, and some design services agreements.

- 1.3.1. Final Model –The model(s) from the Contract Documents that has (have) been professionally electronically generated by A/E reflecting the as-constructed conditions of the Work based upon the information provided by Contractor as reflected in the Record Documents and Contractor's construction model.
- 1.3.2. BIM Execution Plan (BEP) – A document developed by A/E's BIM Team, in collaboration with Owner, concurrent with the start of the Project, that prescribes in detail how Building Information Modeling will be implemented for the Project and how requisite information will be transferred into the Equipment Matrix and the Project Information Matrix prior to Substantial Completion of the Project. For a design-build project, Contractor will be involved in the creation of the initial BEP with A/E. Reference section 1.2.2.1 for recommendations on the BEP development.
- 1.3.3. BIM Level – The extent to which model and information development will be required on a specific project. The BIM Level initially will be determined by Owner but may be adjusted, with Owner's express approval, by the BIM Team over the course of the Project. The BIM Level will depend upon several factors, including the scope of project, project schedule; project cost; availability of existing BIM models; and availability of existing BIM data, etc. Reference sections 1.3.16 through 1.3.18 for Owner's definition of project levels.
  - 1.3.3.1. A/E team must provide to Contractor a level of Model that is dimensionally accurate, detailed and contains all required data to be sufficient for Contractor to accurately create and maintain its construction model throughout the construction and project close out processes. Owner is not dictating the means and methods of coordination between A/E and Contractor. However, A/E shall be required to coordinate with Contractor to provide clarifications and additional modeling elements should the initial Design model prove to be insufficient. This shall be detailed, as well as Owner's interactions in the process, in the BEP created at the beginning of the Project and modified as needed throughout.
- 1.3.4. Building Automation System (BAS) – The distributed control system used by Owner to monitor and control infrastructure systems within its facilities.
- 1.3.5. Building Information Modeling (BIM) – The process of generating and managing building data and geometry using three-dimensional (3-D), real-time, dynamic building modeling software resulting in a Building Model and corresponding information.
- 1.3.6. Building Information Modeling Team (BIM Team): Working group made up of representative(s) from A/E, A/E's consultants, Contractor, Subcontractors and Owner. A/E will provide ad hoc representation of A/E's consultants on the BIM Team as required for the implementation of the BIM Execution Plan. Contractor will provide ad hoc representation of Subcontractors on the BIM Team as required for implementation of the BIM Execution Plan.
- 1.3.7. Building Model – A 3-D digital representation of physical and functional characteristics of a facility, or the components or systems thereof that encompass building geometry, spatial relationships and quantities and properties of building components and systems.
- 1.3.8. Computerized Maintenance Management System (CMMS) – The computer software package that Owner uses to manage a digital database of information related to its facilities equipment and systems for the purpose of optimizing its maintenance operations.

- 1.3.9. CMMS Integration Process (CIP) – The prescribed process by which the information generated during Building Information Modeling will be fully integrated into Owner's CMMS. The CIP is to be developed by the BIM Team and is to be included in the BIM Execution Plan.
- 1.3.10. Construction Documents – Defined in the UTUGC unless otherwise defined herein. The Construction Documents shall also include the Building Models, the Equipment Matrix and the Project Information Matrix as well as all other documents required within the Specifications, Owners Design Guidelines and the BIM Requirements.
- 1.3.11. Construction Model – A 3-D digital representation of physical and functional characteristics of a facility, or the components or systems thereof, that encompasses building geometry, spatial relationships and quantities and properties of building components and systems and that is developed by Contractor and the Subcontractors before or during the Construction Phase of the Project. Unless Owner specifically agrees otherwise, the Construction Model shall represent a spatially accurate, as-built condition. Components of the building shall be modeled, and their corresponding data shall be built into the model as detailed in the project BIM Execution Plan. This includes Tier 1 & Tier 2 items as described in sections 1.3.12 and 2.2. Reference section 2.5.1.1.6.
  - 1.3.11.1 Coordination model(s) – Typically a derivation of the Construction Model in either a Navisworks or BIM 360 Glue format used by Contractor and Subcontractors to coordinate the objects and systems to be installed during the course of construction.
- 1.3.12. Depth of Detail – A measure of the amount of information to be provided for each element within the Building Model. The Building Model and Contract Documents shall be developed so as provide information that aligns with the following tiers:
  - 1.3.12.1.1. Tier 1 Data – Information that Owner maintains about its facilities, or any components thereof, that shall reside within Owner's CMMS and is to be maintained throughout the Project in the Equipment Matrix
  - 1.3.12.1.2. Tier 2 Data – Information Owner maintains about its facilities, or any component(s) thereof, that does not reside in Owner's CMMS. This data may or may not physically reside within a model, a table, schedule, list, external spreadsheet/database, submittal, RFI, ASI, drawings or specifications etc. that pertain to final completion of the Project. This includes but is not limited to the following:
    - 1.3.12.2.1 Fixed equipment data gathered during the course of design and construction (e.g. manufacturer's information, including maintenance, related to sinks, faucets, emergency showers, light fixtures, life safety items, etc.).
    - 1.3.12.2.2 Fixed architectural and finish features (e.g. manufacturers maintenance information related to doors, hardware, finishes, glazing, etc.).
  - 1.3.12.3. Tier 1 and Tier 2 Data elements within the Equipment Matrix and PIM must reference to a specific individual, physical space utilizing the appropriate room numbering designation. Reference section 2.2 of this document.
- 1.3.13. Design Model – A 3-D digital representation of physical and functional characteristics of a facility, or the components or systems thereof, that encompasses building geometry, spatial relationships and quantities and properties of building components and systems and that are developed during the design phase of the Project as detailed in the project BEP. Reference sections 1.3.3.1 and 2.5.1.1.5.
- 1.3.14. Facilities Information Management (FIM) – The process of gathering, maintaining and distributing data associated with Owner's facilities for the purposes of operating, maintaining and renovating those facilities.
- 1.3.15. Level of Development – The degree to which information included within the Building Model can be relied upon to be current and accurate
- 1.3.16. Major Capital Project – Any project that involves the construction of a new facility and that has a total project cost of \$10 million or more (Major Capital – New Construction), or any project that involves the renovation (repair and rehabilitation) of an existing facility and that has a total project cost of \$10 million or more (Major Capital – Renovation). Major Capital Projects may involve the rehabilitation or

upgrading of mechanical, electrical, plumbing, infrastructure technology components or systems or any combination thereof.

- 1.3.17. Minor Capital Project – Any project that involves the construction of a new facility and that has a total project cost of \$100,000 or more but less than \$10 million (Minor Capital – New Construction), or any project that involves the renovation (repair and rehabilitation) of an existing facility and that has a total project cost of \$100,000 or more but less than \$10 million (Minor Capital – Renovation). Minor Capital Projects may involve the rehabilitation or upgrading of mechanical, electrical, plumbing, infrastructure technology components or systems or any combination thereof.
- 1.3.18. Operations Project – Any project that involves new construction work or the renovation (repair and rehabilitation) of an existing facility and that has a total project cost that is less than \$100,000. Operations Projects may involve the rehabilitation or upgrading of mechanical, electrical, plumbing, infrastructure technology components or systems or any combination thereof.
- 1.3.19. Project Information Matrix (PIM) – The electronic file for a spreadsheet or database that identifies the information required from the Building Model, Drawings, and any other data source(s) developed for the Project and the parameters and properties of the content. Generally, Owner initially will provide the PIM at the beginning of the Project. During the design phase, A/E will expand and populate the PIM as information becomes available. Throughout the construction phase, Contractor and A/E will update the PIM and will issue scheduled renditions during construction in addition to the final PIM to Owner at Substantial Completion of the Project. Special attention should be given to section 1.3.12.1.2 of this document for specific requirements concerning the information to be collected in the PIM.
- 1.3.20. Project Information Core Team (PICT) – A working group comprised of Owner personnel from various departments within the Division of Operations and Facilities Management who are facilities system Subject Matter Experts (SME's). The PICT will monitor information delivery requirements for project information governance and the application of BIM requirements on projects for design, construction, construction support, professional and non-professional services. A representative of the PICT will be part of the project team and will report to the PICT on the status of the project information throughout the lifecycle of the Project.
- 1.3.21. Record Documents – Defined in the UTUGCs and Owner's Master Construction Specification Section 01 78 39, Project Record Documents, unless otherwise defined herein. Record Documents shall also include all BIM deliverables as detailed in this document; reference section 2.5 for additional detail.
- 1.3.22. System – A group or collection of items or equipment that work together or in tandem to function as a whole. Examples of systems include but are not limited to: HVAC systems, bulk gas systems (any gases or vacuum not supplied by a point-of-service device), plumbing, fire-rated assemblies such as doors/frames, glazing, etc. or any items that are commonly known as systems by the design and construction industries. If uncertainty exists, A/E and Contractor are to coordinate with Owner for clarification.
- 1.3.23. Test, Adjust, and Balance (TAB) Firm: Owner may engage a Test, Adjust, and Balance Firm for the Project under a Separate Contract. When engaged for the Project, the TAB Firm shall be a part of the BIM Team and shall provide services as set forth in the Specifications and its Separate Contract.

#### 1.4. COORDINATION

##### 1.4.1. BIM Team

###### 1.4.1.1. Owner's Members

1.4.1.1.1. Representatives assigned by Owner's Designated Representative, including but not limited to, the Owner's Project Manager, BIM Manager, PICT member and other SMEs, as required.

1.4.1.1.2. TAB Firm, when engaged for the Project.

1.4.1.1.3. Commissioning Agent, when engaged for the Project.

###### 1.4.1.2. Architect / Engineer Members

1.4.1.2.1. A/E, including A/E and its subconsultant BIM manager(s), except for projects implemented with design-build methodology. Team members for design-build projects shall include Contractor's BIM Team members, as well, with each party's responsibilities detailed in the joint BEP.

1.4.1.3. Contractor's Members

1.4.1.3.1. Individuals, each having authority to act on behalf of the entity it represents, explicitly organized to implement all BIM activities through coordinated actions.

1.4.1.3.2. Representatives of Contractor, including but not limited to

- Contractor's project manager,
- Contractor's BIM Manager/Coordinator
- A/E, including A/E subconsultant BIM manager(s), (for projects implemented with design-build methodology)
- Subcontractors, as needed for Contractor to fulfill its BIM obligations, and
- Equipment suppliers, as needed for Contractor to fulfill its BIM obligations.

1.4.2. Scheduling

1.4.2.1. Design (Preconstruction) Phase

1.4.2.1.1. For projects implemented using the traditional or the construction manager-at-risk contracting methodology, A/E shall integrate all BIM activities into its BEP, Project Work Plan and the design schedule.

1.4.2.1.2. For projects implemented using the design-build methodology or the design assist methodology, A/E and Contractor together shall integrate all BIM activities into the BEP, Baseline Schedule and the Work Progress Schedule and shall ensure that BIM requirements are clearly set forth in all solicitation documents used to select subcontractors or suppliers for the Project. All parties will address scheduling problems and make necessary notifications in a timely manner to expedite all BIM activities.

1.4.2.2. Construction Phase

1.4.2.2.1. At time of contractor selection, A/E shall provide to Contractor A/E's up-to-date BEP for utilization in creating the comprehensive Project BEP unless the delivery method is design-build, in which case the Project BEP is developed jointly with A/E and Contractor.

1.4.2.2.2. Contractor shall integrate all BIM activities into the BEP, Baseline Schedule and the Work Progress Schedule. A/E, Contractor and all other stakeholders will address scheduling problems and make necessary notifications in a timely manner to expedite all BIM activities.

1.4.2.2.3. Contractor shall provide its initial BEP and schedule of primary BIM activities at the project kick-off meeting. For design-build delivery, prior to the start of Schematic Design, Contractor shall have incorporated and integrated the BEP and all BIM activities into the Baseline Schedule and Work Progress Schedule with appropriately linked predecessors and successors.

1.4.2.2.4. A/E shall receive periodic as-built information from Contractor as detailed in the BEP and make all changes necessary to maintain an up-to-date, accurate as-built model throughout the construction phase of the Project to ensure that a complete as-built model and set of Construction Documents are available to Owner at time of Substantial Completion.

1.5. ROLES AND RESPONSIBILITIES

1.5.1. Roles and responsibilities of BIM Team members are set forth below to help to clarify Owner's expectations with respect to the BIM and FIM processes.

1.5.2. Owner's Role and Responsibilities:

- 1.5.2.1. Provide specifications related to the format and content for the Project Information Matrix. These specifications are to include the identification of Tier 2 Data required for the Project where available.
- 1.5.2.2. Provide specifications related to the format and content for the Equipment Matrix.
- 1.5.2.3. Provide initial direction as to the extent the BIM is to be used on the Project, including the BIM Level to be used on the Project.
- 1.5.2.4. Approve the BIM Execution Plan and A/E's and Contractor's schedules for completing all BIM activities.
- 1.5.2.5. Participate in BIM Team meetings.
- 1.5.2.6. Review and validate adequacy of Building Model development and project data collection and delivery.

1.5.3. A/E's Role and Responsibilities:

- 1.5.3.1. Initiate the BIM collaboration proceedings with Owner at time of project award. Contact Owner's Project Manager to establish the BIM Coordination Kick-Off meeting with all stakeholders, including the Owner's BIM and PICT representative(s).
- 1.5.3.2. Attend BIM Team meetings.
- 1.5.3.3. Incorporate all BIM activities into the BEP, design Work Plan and the design phase schedule.
- 1.5.3.4. Produce for Owner's approval, the initial BEP, prior to or concurrently with the start of the project design, the initial Project Information Matrix and Equipment Matrix of all devices, systems and equipment supplied. It is intended that the initial BEP be coordinated with and contain Owners BIM requirements including the BIM Deliverables. Reference section 2.5 – BIM Deliverables.
  - 1.5.3.4.1. A/E BEP shall also include anticipated interactions with Contractor, Subcontractors and other stakeholders throughout the project lifecycle.
  - 1.5.3.4.2. If the delivery method is design-build, A/E shall work with Contractor to produce a single project BEP incorporating the entire Project from project inception to Final Completion.
- 1.5.3.5. Collaborate with Contractor and approve edits to the BEP, and the PIM.

1.5.4. Contractor's Role and Responsibilities:

- 1.5.4.1. Receive from A/E and assume lead responsibility for the BEP, Building Model, PIM and Equipment Matrix. If the project delivery method is design-build, Contractor shall work with A/E to produce a single project BEP incorporating the entire project from project inception to Final Completion.
- 1.5.4.2. Administer updates to the BEP, the Building Model, the PIM and the Equipment Matrix with the intent that all BIM-FIM Team members will have up-to-date information as the Project progresses, this includes A/E..
- 1.5.4.3. It is intended that Contractor will revise and refine the BEP with their responsibilities and requirements prior to the start of construction and coordinate the revised BEP with Owner and A/E by requesting a BIM Kick-Off meeting. If no BEP was supplied by A/E, it is intended that Contractor will create a Project BEP that incorporates Owners BIM requirements including the BIM Deliverables. Reference section 2.5 – BIM Deliverables.
- 1.5.4.4. Provide an individual, experienced in Building Information Modeling to document changes to the Building Model and complete the implementation of the BEP. Contractor shall assign this individual to act as the BIM Coordinator, who may have additional duties such as MEP Coordinator, but shall not be Contractor's project manager or superintendent. Contractor shall submit qualifications demonstrating the BIM Coordinator's technical expertise and

experience to Owner for approval. In the event that Contractor chooses to subcontract its BIM obligations, Contractor must submit the name and qualifications of the proposed subcontractor for Owner's approval.

- 1.5.4.5. Ensure that Building Modeling activities are incorporated into the BEP, Baseline Schedule and the Work Progress Schedule.
- 1.5.4.6. Schedule and conduct periodic meetings with Subcontractors and equipment suppliers related to BIM to ensure the Construction Model, Equipment Matrix and the Project Information Matrix are being routinely and accurately updated.
- 1.5.4.7. Transmit to A/E all as-built project information as it becomes available and as defined in the BEP throughout construction.

## **PART 2- EXECUTION**

### **2.1 BIM EXECUTION PLAN**

- 2.1.1 Throughout its development, efforts shall be made to align the responsibilities set forth in the BEP with the skills customarily contributed by each party associated with the Project. The BEP shall be considered as a "living document" that is to be updated and refined throughout the life of the Project and shall be available for review and verification by Owner at any time.
- 2.1.2 To the extent practical, the BEP shall minimize redundant efforts in favor of a single, organized approach to all activities required to successfully complete the BIM - FIM process.
- 2.1.3 The BEP shall include all pertinent Project Information. Reference section 1.2.2.1 for recommendations on the BEP development and organization. It shall also identify and specify;
  - 2.1.3.1. the extent to which Building Model(s) are to be used on the Project.
  - 2.1.3.2. the expected timeline for when information will become available for the Equipment Matrix and Project Information Matrix.
  - 2.1.3.3. the information workflow process, which is to include identifying from where the information to be included in the Equipment Matrix and PIM will originate, the requirements for transferring information from and to each model and into the Equipment Matrix and PIM, the Depth of Detail and the party responsible for authoring and supplying the information at the appropriate time.
  - 2.1.3.4. A project BIM Responsibility Matrix detailing what parties are responsible for the numerous aspects of the BIM process and their products. Reference Owners sample BIM Responsibility Matrix, Attachment "A", for baseline.
  - 2.1.3.5. the version of the Autodesk Building Design Ultimate software suite into to which the project documents will be transferred.
  - 2.1.3.6. the file structure for the Building Model.
  - 2.1.3.7. all model types, names, content and relationships.
  - 2.1.3.8. the Level of Development for each element to be included within the Building Model at each stage of the Building Model development.
  - 2.1.3.9. the Depth of Detail for each element to be included within the Building Model.
  - 2.1.3.10. the drawings to be generated from the Building Model(s) and the process(es) to be used for generating two-dimensional drawings from the Building Model(s) to ensure that all generated drawings adhere to Owner's CAD Standards, drawing structure, content, data elements and delivery as defined in the ODGs.
  - 2.1.3.11. the CMMS Integration Process to be used on the Project, including the requisite process for receiving Owner's CMMS Asset Numbers and for incorporating those numbers into the design documents and the PIM.



- 2.1.3.12. the data transfer protocol.
- 2.1.3.13. conventions to be used for naming files.
- 2.1.3.14. measures to be taken to ensure that there is no significant loss of drawing entities or data during drawing generation and data extraction.
- 2.1.3.15. areas in which laser scanning is to be conducted.
- 2.1.3.16. locations and folder/file structures where all working files will be located during the lifecycle of the Project that will be accessible by all members of the BIM Team, including Owner. Coordination between A/E, Contractor and Owner of the location, folders and files to be detailed prior to project design to ensure a seamless transfer of data and models throughout the Project life cycle and for BIM Deliverables. This must include a method for transfer to Owners control at the end of Project that does not require file re-pathing or the breaking of any links within the models and documents.
- 2.1.3.17. Agreed upon version of all software that will be utilized to create the models, drawings, etc. This may include, but not be limited to the following: AutoDESK REVIT, AutoDESK AutoCAD MEP, Navisworks and BIM 360.
- 2.1.4 Development of the BEP shall be included as an agenda item for all Project Team meetings throughout the Preconstruction (Design) Phase of the Project. When and as appropriate, and as agreed upon by Owner, the discussion items shall include, as a minimum;
  - 2.1.4.1. the status of the development of the BEP,
  - 2.1.4.2. the identification of any issues related to the timing for exchanging information between the various Building Models and the timing and the means and methods for entering information into the Project Information Matrix,
  - 2.1.4.3. the Level of Development of each of the Building Models,
  - 2.1.4.4. the Depth of Detail for information within the Building Models and to be entered into the Project Information Matrix.
- 2.1.5 Refinement and implementation of the BEP shall be included as an agenda item for all Project Team meetings throughout the Construction Phase of the Project. When and as appropriate, the discussion items shall include, as a minimum;
  - 2.1.5.1. the status of the refinement of, and any updates to, the BEP,
  - 2.1.5.2. the identification of any issues related to the timing for exchanging information between the various Building Models and the timing and the means and methods for entering information into the Project Information Matrix and the Equipment Matrix, and the impact on the delivery schedule of information as defined in the BEP.
  - 2.1.5.3. the Level of Development of each of the Building Models,
  - 2.1.5.4. the Depth of Detail for information contained within the Building Models and for information to be entered into the Project Information Matrix and the Equipment Matrix.
  - 2.1.5.5. the status of the development and implementation of the CMMS Integration Process.

## 2.2 EXTRACTED DATA

- 2.2.1 Unless Owner specifically agrees otherwise, all data input into the model(s) or Contract Documents, shall be extracted from its various sources and delivered in either the Equipment Matrix or the Project Information Matrix. All Equipment, systems, finishes, etc. installed within the course of the Project that were not identified in the initial Owner-provided Equipment Matrix or PIM are required to be included. Data elements within the Equipment Matrix and PIM, must reference to a specific, individual, physical space utilizing the appropriate room numbering designation.

2.2.1.1 Reference section 1.3.12 – Depth of Detail, for explanation of Data types and requirements.

## 2.3 DOCUMENT INDEX

- 2.3.1 An index shall be included with each document delivery. The document index shall be in the form of a Microsoft Excel spreadsheet and shall identify every file included in the delivery. Identification information shall include;
  - 2.3.1.1 Owner's project number.
  - 2.3.1.2 Owner's project name.
  - 2.3.1.3 File name.
  - 2.3.1.4 File description.
  - 2.3.1.5 Identity of the file authoring entity (i.e. who generated the file A/E, consultant, Contractor, Subcontractor).
  - 2.3.1.6 Cross references to any required support files.

## 2.4 LASER SCANS

- 2.4.1 Unless Owner specifically directs or agrees otherwise, Contractor shall provide laser scans for the following types of spaces:
  - 2.4.1.1 Operating rooms.
  - 2.4.1.2 Intensive care units.
  - 2.4.1.3 Imaging suites.
  - 2.4.1.4 Mechanical equipment rooms.
  - 2.4.1.5 Plenum, above ceiling spaces and walls through which significant mechanical, electrical, plumbing and/or information technology distribution systems are routed. When in doubt about whether a space or area requires scanning, contact the Owner's project manager and Owner's BIM manager for direction.
  - 2.4.1.6 Spaces and areas located above hard finished ceilings.
  - 2.4.1.7 Laser scans generated by any project team member including, but not limited to, A/E, its consultants, Contractor or its Subcontractors, throughout the life span of the Project not specifically detailed above.
- 2.4.2 Laser scans shall be completed for all identified areas, including ceilings, walls and plenums before final cover-up begins.
- 2.4.3 Laser scan deliverables shall be in the form of three-dimensional models or two-dimensional drawings as set forth below in the BIM-FIM Deliverables section of this document and the final point cloud file generated by the laser scan used to create the models or drawings.
  - 2.4.3.1 Documentation of what scanning hardware and software was used shall be part of the Laser Scan deliverables.

## 2.5 BIM-FIM DELIVERABLES

- 2.5.1 The BIM-FIM deliverables shall be set forth in the BIM Execution Plan and are based upon the Project requirements. All files delivered in portable document file (pdf) format shall be searchable (i.e. "smart" or "vector" pdf's). Unless Owner expressly agrees otherwise, the deliverables for each project type shall be as follows:
  - 2.5.1.1 Project Deliverables
    - 2.5.1.1.1 BIM Execution Plan
    - 2.5.1.1.2 Project Information Matrix
    - 2.5.1.1.3 Equipment Matrix
    - 2.5.1.1.4 Final Model(s) – in the version of Autodesk REVIT agreed upon in the BEP. The Final Model may be either the Design Model, the Construction Model or a

combination of elements and information from both depending on the contract language and method of project delivery. Federated REVIT Models shall be pathed and configured in such a manner that they are usable without significant re-pathing. Reference section 1.3.1.

- 2.5.1.1.4.a All BIM Team members (A/E, consultant(s), Contractor and Subcontractor(s)) shall utilize REVIT to generate all as-constructed final models.
- 2.5.1.1.4.b The "Final Model" shall be generated by A/E and shall be continuously updated throughout construction of the Project with all significant changes. A change shall be considered significant if the 3-D geometry related to structure, partitions walls, doors, windows, or ceilings change.
- 2.5.1.1.4.c Tier I and Tier II construction and data elements shall be incorporated within the model structure to the extent specified in the BEP, section 2.1.4.4 – Depth of Detail, from which Contractor shall extract the data and place it into either the Equipment Matrix or Project Information Matrix.
- 2.5.1.1.4.d A/E and Contractor shall maximize the use of REVIT Spaces and Zones within the models. Each item that is placed within the model will be linked to a room number, space and/or zone.
- 2.5.1.1.4.e All mechanical, electrical, plumbing, security, telecommunications and all other items or equipment that are part of a System will be linked to both the space it is located within and the zone (groups of spaces and/or zones) that are served by said items or equipment.
- 2.5.1.1.3.d.1 Systems and their related zones and spaces shall be scheduled within their respective models.
- 2.5.1.1.4.f To the extent identified in the BEP, physical items that are documented in a table, schedule, list, external spreadsheet/database, submittal, RFI, ASI, etc. that pertain to final completion of the Project will be represented within the model as a 3-D object with inherent parameters or as part of a property set, etc.
- 2.5.1.1.5 Design Model(s) – in the version of Autodesk REVIT agreed upon in the BEP. Reference section 1.3.13. Federated REVIT Models shall be pathed and configured in such a manner that they are usable without significant re-pathing. If the final design model is federated, ensure all models properly supplied and linked to the central model utilizing a generic path.
- 2.5.1.1.6 Construction Model(s) – in the version of Autodesk REVIT agreed upon in the BEP. Reference section 1.3.11. Federated REVIT Models shall be pathed and configured in such a manner that they are usable without significant re-pathing. If the final construction model is federated, ensure all models are properly supplied and linked to the central model utilizing a generic path.
- 2.5.1.1.7 Coordination Model(s) - in the version of Autodesk Navisworks or GLUE as agreed upon in the BEP. Reference section 1.3.11.1. Final Coordination Models will have all Tier 1 data (CMMS equipment) submittals, operational data, etc., hyperlinked within the model to the appropriate information in a manner that will not result in non-functioning hyperlinks when the model is turned over Owner.
- 2.5.1.1.8 Extracted Data - Equipment Matrix containing Tier 1 data and the Project Information Matrix containing Tier 2 data as defined in sections 1.3.12 and 2.2
- 2.5.1.1.9 Laser Scans - Laser Scans shall be delivered in 3-D REVIT models as well as the final Point Cloud file from which the model(s) were generated. Searchable PDF floor plans with scan locations identified and hyperlinked to each scan. PDF's shall be created in a manner hyperlinked that will not result in non-functioning hyperlinks

when the model is turned over to Owner. Reference section 2.4 for additional requirements.

- 2.5.1.1.10 Final Documents as specified in Owner's Master Construction Specification 01 78 39.
- 2.5.1.1.11 Media Type and format - All models, drawings, submittals, RFI's, Spreadsheets, databases, and any other deliverable shall be provided to Owner through Owner's Project Management Information System (Owner's PMIS), unless otherwise agreed upon by Owner prior to the start of design or construction.
  - 2.5.1.1.11.a If any project model file(s) exceed the allowable size limit for upload into the Owner's PMIS, all model file(s) shall be delivered on a Windows 7 compatible USB 2.0 "Plug and Play" device, unless otherwise agreed upon by Owner prior to the start of design or construction.
  - 2.5.1.1.11.b All appropriate relationships, links, hyperlinks and all other required connections between models, data and documentation must be maintained or updated so that the information on the USB device or agreed upon alternative is complete, accessible and usable by Owner upon delivery.

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**R** RESPONSIBLE  
**C** CONSULTED

**A** ACCOUNTABLE  
**I** INFORMED

# **BIM RESPONSIBILITY MATRIX**

	REQUIRED	MDA	BIM Team	Arch	Struct	Civil	Eng. (MEP)	GC	MEPFP	CxA
<b>BIM Execution Plan (BEP)</b>	YES									
BIM Manager	YES	C	R	A	I	I	I	A	I	C
Owner	YES	C	R	C	I	I	I	C	I	C
Commissioning Agent (CxA)	YES	C	R	C	I	I	I	C	C	A
Architect	YES	C	R	A	I	I	I	I	I	I
Structural	YES	C	I	A	R	C	C	I	I	I
Civil	YES	C	I	A	C	R	C	I	I	I
Mechanical	YES	C	I	A	C	C	R	I	I	I
Electrical	YES	C	I	A	C	C	R	I	I	I
General Contractor	YES	C	R	I	I	I	I	A	C	I
MEPFP Trades	UNKNOWN	I	I	I	I	I	I	A	R	I
<b>Design Authoring</b>	YES									
Schematic Design	YES	I	I	A,R	R	R	R	C	C	I
Design Development	YES	I	I	A,R	R	R	R	C	C	I
Construction Documents	YES	I	I	A,R	R	R	R	C	C	I
Architectural	YES	I	I	A,R	C	C	C	C	C	I
Structural	YES	I	I	A	R	C	C	C	C	I
MEP	YES	I	I	A	C	C	R	C	C	I
Civil	YES	I	I	A	C	R	C	C	C	I
<b>Existing Conditions</b>	YES	C	C	A	C	C	C	R	R	I
<b>3D Site Modeling</b>	YES	I	I	A	C	C	C	R	C	I
<b>3D Coordination</b>	YES	I	I	A	C	C	C	R	C	I
<b>4D Scheduling</b>	UNKNOWN	I	C	C	I	I	I	A	R	I
<b>5D Quantity Verification</b>	UNKNOWN	I	R	C	C	C	C	A	R	I
<b>Facility Maintenance Modeling</b>	YES	C	A	R	C	C	C	R	C	I
<b>Model Analysis</b>	UNKNOWN	C	C	A	C	C	C	C	C	C
Energy Analysis	YES	C	C	A	I	I	R	C	C	C
Lighting Analysis	UNKNOWN	C	C	A	I	I	R	C	C	I
Mechanical Analysis	UNKNOWN	C	C	A	I	I	C	C	C	C
Structural Analysis	UNKNOWN	C	C	A	R	I	I	I	I	I
Code Verification Analysis	UNKNOWN	C	C	A	C	C	C	C	C	C
<b>3D Pre-Fabrication Mockups</b>	UNKNOWN	I	C	C	C	I	C	A	R	I
<b>5D Cost Estimating</b>	UNKNOWN	I	R	C	C	C	C	A	R	I

MD Anderson Project Name: South Campus Garage 2  
MD Anderson Project No.: FPDC-190120  
July 23, 2020

**ATTACHMENT “A”** (2 of 3 pages)

**R** RESPONSIBLE  
**C** CONSULTED

**A** ACCOUNTABLE  
**I** INFORMED

	REQUIRED	MDA	BIM Team	Arch	Struct	Civil	Eng. (MEP)	GC	MEPFP	CxA
<b>Revit Modeling Protocols</b>		I	C	A	R	R	R	R	C	I
Civil	YES	I	C	A	I	R	I	R	C	I
Rooms	YES	I	C	A	I	I	I	R	C	I
Walls	YES	I	C	A	I	I	I	R	C	I
Doors	YES	I	C	A	I	I	I	R	C	I
Closure and Adjacency	YES	I	C	A	I	I	I	C	C	I
MEPFP Models	YES	I	C	A	I	I	C	R	C	I
Duplication Verification	YES	I	C	A	C	C	C	R	C	I
Parametric Verification	YES	I	C	A	C	C	C	R	C	I
MDA nomenclature Verification	YES	I	C	A	I	I	I	R	I	I
Object definition Verification	YES	I	C	A	R	R	R	R	C	I
<b>Revit Warnings</b>	YES	I	R	A	C	C	C	R	C	I
<b>Model Origin</b>	YES	I	C	A	I	C	I	C	I	I
<b>Z-Dimension Accuracy</b>	YES	I	C	A	I	C	I	C	I	I
<b>Model Definition and Progression Specification (MDPS)</b>										
Uniformat Classifications	YES	I	C	A	C	C	C	R	C	I
LOD Definitions	YES	I	C	A	I	I	I	C	I	I
<b>Completeness of Models</b>	YES	C	A	R	C	C	C	R	C	C
<b>Model Property and Parameter Data</b>	YES	C	R	A	C	C	C	R	C	C
<b>Revit Model Matrix</b>	YES	C	A	R	C	C	C	R	C	C
<b>Tracking Model Revisions from CD Forward</b>	YES	I	A	R	C	C	C	R	C	I
<b>2D Supplemental Drawings during CA</b>	YES	C	R	A	C	C	C	C	I	I
<b>Model QA/QC</b>	YES	I	A	R	C	C	C	R	C	I
<b>BIM Coordination</b>										
Early Design Stage	YES	I	R	A	C	C	C	I	I	I
Design Coordination	YES	I	R	A	C	C	C	C	I	I
Spatial Analysis	YES	I	R	A	I	I	I	I	I	I
Clash Resolution	YES	I	R	A	R	R	R	C	C	I
Design Coordination Collaboration	YES	I	R	A	C	C	C	C	C	I
General Contractor Design Model Acceptance	YES	I	R	R	C	C	C	A	R	I
Construction Coordination	YES	I	R	R	C	C	C	A	R	I
Coordination-enabled Pre-Fabrication	YES	I	R	C	I	I	I	A	R	I
<b>CMMS Management</b>										
Administration	YES	R	A	C	I	I	I	C	I	C
Validation	YES	C	A	R	I	I	I	R	I	I

MD Anderson Project Name: South Campus Garage 2  
MD Anderson Project No.: FPDC-190120  
July 23, 2020

**ATTACHMENT “A”** (3 of 3 pages)

**R** RESPONSIBLE  
**C** CONSULTED

**A** ACCOUNTABLE  
**I** INFORMED

	REQUIRED	MDA	BIM Team	Arch	Struct	Civil	Eng. (MEP)	GC	MEPFP	CxA
<b>BIM Information Managers (IM)</b>										
BIM Manager/Owner IM	YES	C	A	C	I	I	I	C	I	C
Architect IM	YES	I	C	A	I	I	I	I	I	I
Structural IM	YES	I	C	A	R	I	I	I	I	I
Civil IM	YES	I	C	A	I	R	I	I	I	I
Mechanical IM	YES	I	C	A	I	I	R	I	I	I
Electrical IM	YES	I	C	A	I	I	R	I	I	I
General Contractor	YES	I	C	I	I	I	I	A	I	I
MEPFP Trades IM	UNKNOWN	I	C	I	I	I	I	A	R	I
CxA IM	YES	C	C	C	I	I	I	C	I	A
<b>BIM Facility Maintenance Models and Data</b>										
Updating Design Models	YES	I	C	A,R	R	R	R	C	C	I
Equipment Matrix	YES	C	C	C	C	C	C	A	C	C
Project Information Matrix	YES	C	C	A,R	C	C	C	R	C	C
BIM Team Record Models	YES									
Final Model	YES	I	C	A,R	R	R	R	C	I	I
Architectural Models	YES	I	C	A,R	I	I	I	C	I	I
Engineering Models	YES	I	C	A	I	I	R	C	I	I
Structural Models	YES	I	C	A	R	I	I	C	C	I
MEPFP Record Models	YES	I	C	A	I	I	C	A	R	I
Federated Record Model	YES	I	C	C	C	C	C	A	C	I
Record Model Utilization Instructions	YES	I	C	A	C	C	C	C	C	I

**R** RESPONSIBLE

*Those who do the work to achieve the task.*

**A** ACCOUNTABLE

*Ultimately answerable for the correct & thorough completion of the deliverable/task, delegates the work to those responsible.*

**C** CONSULTED

*Those whose opinions are sought, typically subject matter experts; and with whom there is two-way communication.*

**I** INFORMED

*Those kept up-to-date on progress, often on completion of the task/deliverable; typically just one-way communication.*

**EXHIBIT K**

**CONSTRUCTABILITY IMPLEMENTATION PROGRAM**



# **CONSTRUCTABILITY IMPLEMENTATION PROGRAM**

## **GENERAL SCOPE OF WORK**

### **1.0 PROGRAM OBJECTIVES**

- Implement a rigorous constructability program.
- Identify and document project cost and schedule savings (targeted costs are 5% of construction costs).
- Clarification of project goals, objectives.

### **2.0 PROGRAM IMPLEMENTATION**

#### **2.1 Project Team Meeting with Constructability Consultant**

- Identification of all project team personnel and all project stakeholders.
- Team briefing of objectives, methods and concepts of constructability.
- Familiarization with implementation program.
- Preliminary identification of constructability priorities, special challenges, concerns and progress to date.

#### **2.2 Constructability Implementation**

- Review constructability program, implementation and documentation requirements.
- Establish constructability organization following.
- Identify preliminary constructability priorities and special challenges or concerns.

#### **2.3 Schematic Design Phase**

(On-going tasks during Schematic Design Phase and for final review of Schematic Design Documents)

##### **2.3.1 Constructability Consultant**

- Attend project team meetings, review documents, and develop constructability recommendations and documentation.
- Provide construction cost estimates to coincide with Project A/E's submissions. Project A/E and Constructability Consultant shall consult and resolve any differences in their respective construction cost estimates.

##### **2.3.2 Project Team and Constructability Consultant**

- Review detailed issues of front-end, high-priority concepts and identify concerns, identify information needs, start to brainstorm alternative approaches, conduct preliminary evaluation of approaches, identify needs for further analysis, chart path forward.
- Review constructability recommendations, documentation and construction cost estimates for acceptance.

#### **2.4 Design Development Phase**

(On-going tasks during Design Development Phase and for final review of Design Development Documents)

#### 2.4.1 Constructability Consultant

- Attend project team meetings, review documents, and develop constructability recommendations and documentation.
- Provide Cost Quantity Surveys to coincide with Project A/E's submissions. Project A/E and Constructability Consultant shall consult and resolve any differences in their respective Cost Quantity Surveys.
- Provide follow-up discussions on front-end, high priority concepts.

#### 2.4.2 Project Team and Constructability Consultant

- Review constructability recommendations, documentation and Cost Quantity Surveys for acceptance.

### 2.5 Construction Documents Phase

(On-going tasks during Construction Documents Phase and for final review of Construction Documents)

#### 2.5.1 Constructability Consultant

- Attend project team meetings, review documents, and develop constructability recommendations and documentation.
- Review plans and specifications developed to date, identifying sub-optimal or potentially problematic design elements.
- Recommend alternative design suggestions for consideration and document potential savings.
- Conduct value engineering investigations into selected high-cost design elements.
- Provide Cost Quantity Surveys to coincide with Project A/E's submissions. Project A/E and Constructability Consultant shall consult and resolve any differences in their respective Cost Quantity Surveys.

#### 2.5.2 Project Team and Constructability Consultant

- Review constructability recommendations, documentation and Cost Quantity Surveys for acceptance.

### 3.0 Close-out Documentation

#### 3.1 Constructability Consultant

- Complete all documentation to summarize the accomplishments or the constructability effort.

#### 3.2 Project Team and Constructability Consultant

- Review documentation for acceptance.

## **EXHIBIT L**

### **OWNER'S COMMISSIONING REQUIREMENTS**

# Element Z General Design Requirements

Owner Standards and Other  
Requirements

## Z2035 Project Commissioning

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### PART 1 - GENERAL

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#### 1.01 OVERVIEW

- A. MD Anderson is committed to commissioning our facilities to ensure that all systems are complete and functioning properly upon occupancy and that the facility staff has adequate system documentation and training. Commissioning refers to a systematic process confirming that building systems have been installed, properly started, and consistently operated according to criteria set forth in the Contract Documents, that all systems are complete and functioning in accordance with the A/E's Design Intent Document at Substantial Completion, and that the Contractor has provided MD Anderson's facility staff with adequate system documentation and training.
- B. MD Anderson may contract directly with a Commissioning Authority as an extension of Owner's staff, to perform technical reviews of project design documents, observe completion of construction, verify equipment and system startup by Contractor or Subcontractor, observe prefunctional tests and functional performance tests of systems and integrated systems against requirements of the project Contract Documents, track deficiencies, and recommend solutions. The Commissioning Authority has authority only as delegated by the Owner, but has no authority to alter design or installation procedures.
- C. To clarify the A/E's role in the design and construction process, this Design Guideline Element describes the intended scope of services that both the Commissioning Authority and A/E will be responsible for.

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### PART 2 - COMMISSIONING AUTHORITY'S RESPONSIBILITIES

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#### 2.01 GENERAL

- A. In general, the Commissioning Authority, if retained by MD Anderson, will provide the following services during the Project's Design and Construction Phases.

#### 2.02 DESIGN PHASE

- A. Review and comment on project Drawings and Specifications for clarity, completeness, and compliance with the Owner's Design Guidelines.
- B. Recommend alternative design approaches or value engineering items based on project Design Phase reviews.
- C. Work with the A/E to make modifications and/or additions to the Master Construction Specifications for coordination with Commissioning requirements specific to the project scope.

#### 2.03 CONSTRUCTION PHASE

- A. Provide input to the Contractor on the first draft Commissioning Plan. The Commissioning Plan is a document prepared by the Contractor and approved by MD Anderson that provides

# Element Z General Design Requirements

Owner Standards and Other  
Requirements

## Z2035 Project Commissioning

- the structure, schedule, and coordination planning for the Commissioning process from the construction phase through the warranty period. Review the Commissioning Plan for completeness.
- B. Participate in Contractor's Pre-Installation meetings and Pre-Commissioning meetings with subcontractors.
  - C. Review Contractor submittals applicable to systems being commissioned for compliance with commissioning needs, concurrent with A/E and MD Anderson reviews.
  - D. Review Test, Adjust, and Balance (TAB) execution plan and review completed TAB reports.
  - E. Before startup, gather and review current control sequences and interlocks and work with Contractor and A/E until sufficient clarity has been obtained, in writing, to be able to prepare detailed testing procedures.
  - F. Verify start-up and prefunctional testing of all systems as defined in the Commissioning Plan. Monitor execution of functional performance testing, Owner demonstration of tests, integrated systems testing, and document results, follow-up, and signoffs.
  - G. Provide solution recommendations on deficiencies noted during the Commissioning process.
  - H. Perform site visits, as necessary, to observe component and system installations. Attend selected project meetings to obtain information on construction progress. Review project construction meeting minutes for revisions/substitutions relating to the commissioning process. Assist in resolving any discrepancies.

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### PART 3 - ARCHITECT/ENGINEER'S RESPONSIBILITIES

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#### 3.01 GENERAL

- A. The following describe the A/E's activities to support the commissioning process from the design phase through construction.

#### 3.02 DESIGN PHASE

- A. Document the development of design intent and operating parameters by all A/E team members within a document titled "Design Intent Document". The Design Intent Document describes the complete architectural and engineering design intent for the project including design guiding principles, assumptions, issues, recommendations, and narrative assessment of the architectural and infrastructure systems that comprise the building.
- B. Update the Design Intent Document at each phase of design to incorporate current design documentation. Refer to Design Guideline Element Z2010 Design Submittal Requirements for additional information on the Design Intent Document format.
- C. Adapt Owner's Master Construction Specifications to apply to project-specific applications.
- D. Specify control sequences of operation within the Contract Documents.

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- E. Clarify the operation and control of equipment and systems to be commissioned where the Contract Documents are not sufficient for writing the Commissioning Plan and detailed test procedures.
- F. Participate in project meetings related to commissioning activities.

### 3.03 CONSTRUCTION PHASE

- A. Review prefunctional checklist, functional performance test, and integrated system test procedures and results.
- B. Review functional performance test trend log data.
- C. Review training plan.
- D. Review test, adjust, and balance execution plan.
- E. Coordinate resolution of design and operational deficiencies identified during commissioning, according to the Contract Documents.
- F. Review operating and maintenance manuals.
- G. Coordinate resolution of design non-conformance and design deficiencies identified during warranty-period commissioning.
- H. Participate in project meetings related to commissioning activities.

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## PART 4 - PRODUCTS

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### 4.01 GENERAL

- A. Refer to Master Construction Specifications for fire suppression, plumbing, mechanical and electrical commissioning requirements, including examples of prefunctional checklists and functional performance tests to be used during the commissioning process.

# Element Z General Design Requirements

Owner Standards and Other  
Requirements

## Z2035 Project Commissioning

### PART 5 - DOCUMENT REVISION HISTORY

Issue	Date	Revision Description	Reviser
	01-01-07	Initial Adoption of Element	
Rev. 1	12-17-13	Changed the term "Commissioning Consultant" to "Commissioning Authority" throughout document. Added fire suppression and plumbing to 4.01 A.	DOS
Rev. 2			
Rev. 3			
Rev. 4			
Rev. 5			

END OF ELEMENT Z2035

## **SECTION 01 91 00 – GENERAL COMMISSIONING REQUIREMENTS**

### **PART 1 – GENERAL**

#### **1.1. RELATED DOCUMENTS**

- 1.1.1. The Contractor's attention is specifically directed, but not limited to, the Uniform General Conditions for University of Texas System Building Construction Contracts (UTUGCs) for other requirements.
- 1.1.2. Specifications throughout all Divisions of the Project Manual, which pertain to operable equipment and/or building systems, are directly applicable to this Section, and this Section is directly applicable to them.

#### **1.2. SUMMARY**

- 1.2.1. This Section establishes general and administrative requirements pertaining to commissioning of equipment, devices, and building systems installed on renovation and new construction projects delivered under various contracting methodologies. Technical requirements for commissioning of particular systems and components are established in the Contract Documents.
- 1.2.2. It is of primary concern that all operable systems installed in the Project perform in accordance with the Contract Documents and the specified Owner's operational needs. During Commissioning, the Contractor systematically demonstrates to the Owner that the operable systems are properly performing in strict accordance with the Contract Documents.
- 1.2.3. Commissioning requires cooperation and involvement of all parties throughout the construction process. The Contractor shall deliver a successful Commissioning process. Successful Commissioning requires that installation of all building systems complies with Contract Document requirements and that full operational check-out and necessary adjustments are performed prior to Substantial Completion, except for deferred tests approved in advance by Owner.
- 1.2.4. Commissioning will encompass and coordinate traditionally separate functions of system documentation, Inspection, Prefunctional Checklists and start-up, control system calibration and point-to-point checkout, testing, adjusting, and balancing, validated trend data, Functional Performance Tests, Integrated System Tests, Contractor demonstration to the Owner, and training of Owner's personnel. This requires assembling all related documentation into one Commissioning Manual. Commissioning is intended to achieve the following specific objectives of the Contract Documents.
  - 1.2.4.1. Verify and document proper installation and design parameters of equipment, systems, and integrated systems.
  - 1.2.4.2. Ensure that operating and maintenance and Commissioning documentation requirements are complete.
  - 1.2.4.3. Provide Owner with functional buildings and systems that meet the Contract Document requirements at Substantial Completion.

#### **1.3. DEFINITIONS**

Capitalized terms used in this Section shall have the meanings as set forth in the Contract, the UTUGCs, or both, unless otherwise defined or modified below.



- 1.3.1. Commissioning: A systematic process confirming that building systems have been installed, properly started, and consistently operated in strict accordance with the Contract Documents, that all systems are complete and functioning in accordance with the Contract Documents at Substantial Completion, and that Contractor has provided Owner adequate system documentation and training. Commissioning includes Deferred Tests, as approved by Owner.
- 1.3.2. Commissioning Authority: Party employed on the Project, by Owner under a Separate Contract, to provide certain commissioning services as defined herein under Commissioning Authority's Role and Responsibilities. Commissioning Authority does not have authority to alter design or installation procedures without the written approval of Owner and the A/E.
- 1.3.3. Commissioning Plan: A document that provides the structure, schedule, and coordination plan for Commissioning during the construction phase and through the warranty period. The Commissioning Plan will describe the project and systems to be commissioned, Commissioning activities, procedures to follow throughout Commissioning, roles and responsibilities for each participant, and general description of testing and verification methods. The Commissioning Plan must satisfy all Test Requirements set forth in the Contract Documents.
  - 1.3.3.1 Download an electronic version of the Commissioning Plan Template for submittal purposes at the following website:  
  
<https://www.mdanderson.org/content/dam/mdanderson/documents/about-md-anderson/about-us/doing-business/owner's-design-guidelines/supplemental-resources/Commissioning%20Plan%20Template.zip>
- 1.3.4. Commissioning Team: Working group made up of representative(s) from the A/E, Contractor, Test, Adjust, and Balance Firm, Building Automation System vendor, specialty manufacturers and suppliers, Owner, and Commissioning Authority. Contractor will provide ad-hoc representation of Subcontractors on the Commissioning Team as required for implementation of the Commissioning Plan.
- 1.3.5. Deferred Tests: Functional Performance or Integrated System Tests performed after Substantial Completion, with Owner's approval, due to seasonal requirements, site conditions, or both, that prohibit the test from being performed prior to Substantial Completion.
- 1.3.6. Deficiency: Condition of a component, piece of equipment, or system that is not in compliance with the Contract Documents.
- 1.3.7. Factory Testing: Testing of equipment at the factory, by factory personnel with an Owner's representative present, if deemed necessary by Owner.
- 1.3.8. Functional Performance Test: Test of dynamic function and operation of equipment and systems executed by Contractor. Systems are tested shall be various modes, such as during low cooling or heating loads, high loads, component failures, unoccupied, varying outside air temperatures, life safety conditions, power failure, etc. Systems are run through all specified sequences of operation. Components are verified to be responding in accordance with Contract Documents. Functional Performance Tests are executed after start-ups and Prefunctional Checklists are complete.
- 1.3.9. Functional Performance Test Procedures: Commissioning protocols and detailed test procedures and instructions in tabular and script-type format that fully describe system configuration and steps required to determine if the system is performing and functioning properly.
- 1.3.10. Integrated System Test: Test of dynamic function and operation of multiple systems. Integrated System Tests are conducted under various modes, such as fire alarm and emergency situations, life safety conditions, power failure, etc. Systems are integrally operated through all

specified sequences of operation. Components are verified to be responding in accordance with Contract Documents. Integrated System Tests are executed after Functional Performance Tests are complete and prior to Substantial Completion. Integrated System Tests provide verification that the integrated systems will properly function according to the Contract Documents.

- 1.3.11. Integrated System Test Procedures: Commissioning protocols and detailed test procedures and instructions in tabular and script-type format that fully describe system configurations and steps required to determine if the interacting systems are performing and functioning properly.
- 1.3.12. Manual Test: Use of hand-held instruments, immediate control system readouts or direct observation to verify performance (contrasted to analyzing trend data to make the "observation").
- 1.3.13. Non-Compliance Report (NCR): A tool used to document an item or condition that does not meet the Contract Documents.
- 1.3.14. Prefunctional Checklist: A list of static inspections and material or component tests that verify proper installation of equipment (e.g., belt tension, oil levels, labels affixed, gages in place, sensors calibrated, etc.). The word Prefunctional refers to before Functional tests. Prefunctional Checklists must include the manufacturer's start-up checklist(s).
- 1.3.15. Start-up: The activities where equipment is initially energized tested and operated. Start-up is completed prior to Functional Performance Tests.
- 1.3.16. Test, Adjust, and Balance (TAB) Firm: The Owner may engage a Test, Adjust, and Balance Firm for the Project under a Separate Contract. When engaged for the Project, the TAB Firm shall be a part of the Commissioning Team and shall provide services as set forth in the Specifications.
- 1.3.17. Test Requirements: Requirements specifying what systems, modes and functions, etc. must be tested. Test Requirements are not detailed test procedures. Test Requirements and acceptance criteria are specified in the Contract Documents.
- 1.3.18. Training Plan: A detailed plan prepared by the Contractor, and reviewed by the Owner, that outlines the training activities, instructors, time durations, and system requirements in accordance with the Contract Documents and Commissioning Plan.
- 1.3.19. Trending: Data collection of monitoring points using the Building Automation System or dataloggers. Trend definitions are initiated a minimum of 14 days prior to beginning related functional performance tests.

#### 1.4. COORDINATION

##### 1.4.1. Commissioning Team:

###### 1.4.1.1. Owner's Members

- 1.4.1.1.1. Representatives assigned by Owner's Designated Representative
- 1.4.1.1.2. Commissioning Authority, when engaged for the Project.
- 1.4.1.1.3. A/E.
- 1.4.1.1.4. TAB Firm, when engaged for the Project.

1.4.1.2. Contractor's Members:

- 1.4.1.2.1. Individuals, each having authority to act on behalf of the entity they represent, explicitly organized to implement all Commissioning activities through coordinated actions.
- 1.4.1.2.2. Representatives of Contractor, including but not limited to, project manager and commissioning coordinator, Subcontractors, installers, and equipment suppliers. Owner must approve Contractor's commissioning coordinator.

1.4.2. Scheduling:

- 1.4.2.1. Contractor shall integrate all Commissioning activities into the Baseline Schedule and the Work Progress Schedule. All parties will address scheduling problems and make necessary notifications in a timely manner to expedite all Commissioning activities.
- 1.4.2.2. Contractor shall provide the initial schedule of primary Commissioning activities at the pre-commissioning meeting. Prior to the first Start-up or Prefunctional Checklist test occurring, Contractor shall have incorporated and integrated all Commissioning activities into the Baseline Schedule and Work Progress Schedule with appropriately linked predecessors and successors.

1.5. ROLES AND RESPONSIBILITIES

- 1.5.1. Roles and responsibilities of Commissioning Team members are provided in this Section to clarify the commissioning process.

1.5.2. Owner's Role and Responsibilities:

- 1.5.2.1. Review Specifications containing Commissioning requirements.
- 1.5.2.2. Provide Owner's Test Requirements to Commissioning Team.
- 1.5.2.3. Approve the Commissioning Plan, Training Program and Contractor's schedule for completing all Commissioning activities.
- 1.5.2.4. Participate in Commissioning activities, including the following:
  - 1.5.2.4.1. Commissioning Team meetings.
  - 1.5.2.4.2. Review and approve Commissioning Plan, Training Plan, Prefunctional Checklists, Functional Performance Test Procedures, Functional Performance Tests, Integrated System Test Procedures, Integrated System Tests, Deferred Tests, Trending, Training Plan and other Commissioning documents.
  - 1.5.2.4.3. Attendance at Contractor's training sessions in operation and maintenance of systems and equipment.
  - 1.5.2.4.4. Observation of Contractor's demonstration of systems and equipment operation.

- 1.5.3. Commissioning Authority's Role and Responsibilities, when engaged for the project.

- 1.5.3.1. Prepare and submit the Commissioning Plan for Owner's approval.

- 1.5.3.2. Review, comment and approve on Contractor's schedule for Commissioning activities.
- 1.5.3.3. Participate in Contractor-led Pre-Commissioning Meeting.
- 1.5.3.4. Conduct and document Commissioning Team meetings.
- 1.5.3.5. Perform site visits as necessary or in conjunction with Commissioning Team meetings to observe component and system installations. Attend selected Project progress meetings to obtain information on construction progress.
- 1.5.3.6. Review and comment on Submittals and coordination drawings applicable to systems being commissioned.
- 1.5.3.7. Review and comment on Contractor-prepared Prefunctional Checklist and other Contractor-prepared documents, including Operating and Maintenance Manuals and Training Plan.
- 1.5.3.8. Prior to equipment Start-ups, review the control sequences and coordinate with the Contractor and A/E in order to prepare the Functional Performance Test and Integrated System Test procedures.
- 1.5.3.9. Witness equipment Start-ups as executed by Contractor.
- 1.5.3.10. Write Functional Performance Test Procedures and Integrated System Test Procedures for Contractor's execution of tests.
- 1.5.3.11. Review trend logs, confirm that all control loops are tuned complying within the maximum allowable variance (specified by Owner) prior to performing functional performance testing, and report any deficiencies for correction
- 1.5.3.12. Witness, verify, and document results of Functional Performance Tests and Integrated System Tests.
- 1.5.3.13. Coordinate resolution of Deficiencies identified during Commissioning, Deferred Tests, and during the warranty period.
- 1.5.3.14. Review Contractor's Training Plan.
- 1.5.3.15. Compile Commissioning documentation for Contractor-prepared Commissioning and Closeout Manual including test documentation, Deficiency reports and solution results; non-compliance issue tracking; and recommendations on continuous commissioning, best practices, and preventive maintenance.
- 1.5.4. Architect/Engineer's Role and Responsibilities:
  - 1.5.4.1. Attend Commissioning Team meetings.
  - 1.5.4.2. Review and Approve Commissioning Plan, Training Plan, Prefunctional Checklist, Functional Performance Test Procedures, Functional Performance Tests, Integrated System Test Procedures, Integrated System Tests, Deferred Tests, and other Commissioning documents.
  - 1.5.4.3. Review and Approve Contractor's Training Plan.
  - 1.5.4.4. Review and Approve Test, Adjust, and Balance plan as defined in Specification 23 05 90 and 23 05 93.

- 1.5.4.5. Approve technical requirements for correction of Deficiencies identified during Commissioning, Deferred Tests, and during the warranty period.
- 1.5.4.6. Review Operating and Maintenance Manuals.
- 1.5.5. Contractor's Role and Responsibilities:
  - 1.5.5.1 Produce for Owner, Commissioning Authority and A/E's approval, the Commissioning Plan, Prefunctional Checklist, Functional Performance Test Procedures, Integrated System Test Procedures, Equipment Matrix of all devices, systems and equipment supplied, and other Commissioning documents.
    - 1.5.5.1.1 Commissioning Authority will produce the Commissioning Plan, project-specific Functional Performance Test Procedures, and project-specific Integrated System Test Procedures.
    - 1.5.5.1.2 Contractor shall review and provide comments on documents produced by the Commissioning Authority, and shall accept the Commissioning Plan, Functional Performance Test Procedures, and Integrated System Test Procedures as approved by Owner.
  - 1.5.5.2 As the Project progresses, add specific checklists, test procedures, schedules, recorded results, action lists, signoff sheets and other documents for the Commissioning and Close-out Manual. Administer updates to the Commissioning and Close-out Manual with the intent that all Commissioning Team members will have up-to-date documentation as the Commissioning progresses.
  - 1.5.5.3 Provide an individual, subject to Owner's approval, experienced in construction and Commissioning of building systems to organize, schedule, conduct, and document the Commissioning Plan and the Commissioning process. The Contractor shall assign this individual to act as the Contractor's Commissioning Coordinator. The Contractor's Commissioning Coordinator may have additional duties such as MEP Coordinator, but not as Project Manager or Superintendent. Submit qualifications demonstrating the Commissioning Coordinator's technical expertise and experience to the Owner for approval. In the event that Contractor chooses to subcontract its Commissioning obligations, then Contractor must submit the subcontractor's qualifications and personnel to Owner for Owner's approval.
  - 1.5.5.4 Furnish and install systems that meet all requirements of the Contract Documents. Perform construction inspections, Start-ups, Prefunctional Checklists, Functional Performance Tests, and Integrated System Tests in accordance with the Contract Documents and Commissioning Plan. Correct any Deficiencies identified during these processes.
  - 1.5.5.5 Ensure that Commissioning activities are incorporated into the Baseline Schedule and the Work Progress Schedule.
  - 1.5.5.6 Submit inspection and Start-up documentation to Owner in accordance with this Section – 01 91 00 General Commissioning Requirements, Section 01 45 00 – Project Quality Control, Section 01 77 00 – Project Close-out Procedures, Specifications, and the Commissioning Plan.
  - 1.5.5.7 Furnish copies of all Submittals, manufacturers' literature, maintenance information, and any other information required for the Commissioning process. Contractor must submit to Owner installation and checkout materials actually shipped inside equipment and actual field checkout sheet forms used by factory or field technicians. Cross-reference Section 01 31 00 – Project Administration and Section 01 77 00 – Project Close-out

Procedures (Operating and Maintenance Manuals) for additional required documentation.

- 1.5.5.8 Schedule and conduct pre-installation meetings and pre-commissioning meetings with Subcontractors and equipment suppliers related to Commissioning. Contractor must invite A/E and Owner to attend the pre-installation meetings and pre-commissioning meetings.
- 1.5.5.9 Provide qualified personnel, including Subcontractors as required, to fully perform the testing and operational demonstrations required by the Contract Documents and the Commissioning Plan, including any Deferred Tests or re-testing related to warranty work.
- 1.5.5.10 Correct Deficiencies identified during any stage of commissioning prior to proceeding, unless approved by Owner.
- 1.5.5.11 Provide training to Owner. Coordinate Subcontractor and vendor participation in training sessions.
- 1.5.5.12 Perform Deferred Tests and make necessary amendments to Operating and Maintenance Manuals and Record Documents for applicable issues identified during the Deferred Tests.
- 1.5.5.13 Contractor shall be responsible for the following activities and may contract with a Building Automation System (BAS) vendor for these activities.
  - 1.5.5.13.1 Provide on-site technician skilled in software programming and hardware operation to exercise sequences of operation and to correct controls deficiencies identified during Commissioning. Contractor must provide Record Documents reflecting correction of controls deficiencies identified during Commissioning.
  - 1.5.5.13.2 Provide instrumentation, computer, software and communication resources necessary to demonstrate compliance with the Contract Documents and the Commissioning Plan during the Prefunctional Checklist activities, Functional Performance Tests and Integrated System Tests of Building Automation System equipment.
  - 1.5.5.13.3 Attend pre-commissioning meetings and Commissioning meetings including seasonal, post occupancy, or deferred Commissioning meetings and activities as deemed appropriate by Owner. Prepare BAS Training Plans with Commissioning Team and perform training as specified in Contract Documents and Commissioning Plan.
  - 1.5.5.13.4 Maintain comprehensive system calibration and checkout records. Submit records to Owner.
  - 1.5.5.13.5 Set up, capture, format analyze, and report trend logs as requested by the Commissioning Authority and/or Owner to substantiate proper systems operation.
- 1.5.6 Test, Adjust, and Balance Firm's Role and Responsibilities, when engaged for the project:
  - 1.5.6.1 Attend pre-commissioning meetings and Commissioning Team meetings including seasonal, post occupancy, or deferred Commissioning meetings and activities as deemed appropriate Owner.

- 1.5.6.2 Submit Test, Adjust, and Balance Plan and forms describing methodology for performance of Test, Adjust, and Balance procedures specific to this Project to Owner/Engineer of record for review.
- 1.5.6.3 Cooperate with Contractor and Contractor's Building Automation System vendor, if any, during Commissioning.
- 1.5.6.4 Re-balance as needed to correct any Deficiencies identified during Commissioning.
- 1.5.6.5 Review BAS graphics and performance tests for accuracy, note deficiencies.
- 1.5.6.6 Provide T A B data to Contractor and Commissioning Team before Contractor begins Functional Performance Tests.

## 1.6 EQUIPMENT DOCUMENTATION REQUIREMENTS

### 1.6.1 Equipment Matrix:

- 1.6.1.1 Contractor's first submittal of the Equipment Matrix shall contain a complete listing of all equipment, fire dampers, valves, devices, and systems, contained within the Contract Documents to be installed or removed, within twenty-one (21) days of issuance of the Notice to Proceed with Construction and at least seven (7) days prior to submission of the first Application for Payment. This submittal shall be titled as "Equipment Matrix-Contract Compliance". Download an electronic version of this spreadsheet in Microsoft Excel format to use as a template for submittal purposes at the following website:

<https://www.mdanderson.org/content/dam/mdanderson/documents/about-md-anderson/about-us/doing-business/owners-design-guidelines/supplemental-resources/Equipment%20Matrix%20Template.xlsx>

- 1.6.1.2 Contractor shall coordinate Contractor's response to this requirement with Contractor's preparation of the Baseline Schedule, Work Progress Schedule, Submittal Schedule, Schedule of Values, and list of all equipment. Refer to Section 01 32 00 – Project Planning and Scheduling and Section 01 31 00 – Project Administration.

- 1.6.1.2.1 To the extent practical, Contractor should minimize redundant efforts in favor of a single, organized approach to all documentation required for Project equipment, systems, and devices.

- 1.6.1.3 The Equipment Matrix shall be formatted as a spreadsheet per Owner's template, with capability for printing various selected data columns to meet documentation requirements at various stages of construction, and for different purposes as required by various Technical Sections. The Equipment Matrix shall be updated and submitted as the project progresses using the owners project management system as outlined below:

- 1.6.1.3.1 As outlined in Section 1.6.1.1, the first submission of the Equipment Matrix, titled "Equipment Matrix – Contract Compliance" is intended to identify and validate the prescribed equipment to be installed or removed per the Contract Documents. Project progresses and submitted periodically as requested by Owner.

- 1.6.1.3.2 Once Equipment Submittals have been submitted and approved, Contractor shall submit the second submission of the Equipment Matrix titled "Equipment Matrix- Asset Number Request".

- 1.6.1.3.2.1 The following fields are required to be populated at a minimum prior to the second submission of the Equipment Matrix-Asset Request:

Equipment Plan Designation (Equipment Name), Specification reference, Building ID, Location / Room Number, Asset Short Description, Asset Long Description, System Level Asset (What system it serves), Product submittal reference number(s), Product submittal approval date, Name of installing Subcontractor, Installing Subcontractor contact information, Equipment Manufacturer, Equipment model number, Emergency Power Requirements (as applicable).

- 1.6.1.3.3 The third submission of the Equipment Matrix is to be titled "Equipment Matrix- True-up". This submission is intended to capture changes to the contract documents that has occurred during the construction process. This submission may occur more than once throughout the construction process as changes occurs. New items shall comply with Section 1.6.1.3.2.1. Additional or removed equipment shall be identified by a contrasting color from the previously submitted Equipment Matrix.
- 1.6.1.3.4 The fourth submission of the Equipment Matrix is to be titled "Equipment Matrix-Final". This submission shall contain a complete populated listing of all equipment, fire dampers, valves, devices, and systems, represented within the Record Documents.
- 1.6.1.3.5 Provide Owner with an electronic version of the final approved Equipment Matrix at or before Project Substantial Completion.
- 1.6.1.4 Contractor may elect to combine the Submittal Schedule and Equipment Matrix into one spreadsheet (with multiple tabbed sheets) that Contractor updates as the Project progresses.
- 1.6.1.5 The Equipment Matrix shall identify all operable devices and equipment grouped by the Construction Specification Institute (CSI) Master Format under the system they are primarily categorized under. When sorted by the column for system identification, the resulting printout must identify all system components, regardless of whether they are mechanical, electrical, or otherwise.
- 1.6.1.6 Contractor shall continue to update the Equipment Matrix for each device or system. Owner will assist the Contractor in collecting information on Owner-furnished and Contractor-installed equipment. The Equipment Matrix shall include the following column headings, as a minimum, for each device per specification 20 05 53:
  - 1.6.1.6.1 Equipment Plan Designation: Equipment Naming Convention (equipment acronym and sequential number) from Contract Documents.
  - 1.6.1.6.2 Specification Section number.
  - 1.6.1.6.3 Building ID: Shall be obtained from Owner.
  - 1.6.1.6.4 Location / Room Number: Owner's Wayfinding Codes from Owner's Space Management database referring to room number or building location. Shall be obtained from Owner.
  - 1.6.1.6.5 Asset Short Description: The asset short description is to be a very short textual description. Type a brief, identifying description for the asset followed by a comma then the "Equipment Plan Designation". If multiple units, of same type, include equipment ID number from the Construction Documents. This field is limited to 80 characters. Example= Pump, Secondary Chilled Water, SCHWP-01-2B.
  - 1.6.1.6.6 Asset Long Description: A more complete description of the asset to make it clearer to the Owner's maintenance group. Include any distinguishing details relevant to identifying the asset from other identical units (color, physical location within a room, and so on. Example: Horizontal split case pump located in North end of room.



- 1.6.1.6.7 System Level Asset: Type of system that the equipment serves. Shall be obtained from Owner. Example: Domestic Hot Water
- 1.6.1.6.8 Product submittal reference number(s).
- 1.6.1.6.9 Product submittal approval date.
- 1.6.1.6.10 Name of installing Subcontractor.
- 1.6.1.6.11 Installing Subcontractor contact information.
- 1.6.1.6.12 Equipment Manufacturer.
- 1.6.1.6.13 Equipment model number.
- 1.6.1.6.14 Equipment serial number.
- 1.6.1.6.15 Emergency Power: Note whether equipment is served from emergency power system.
- 1.6.1.6.16 Equipment manufacturer's representative (Vendor).
- 1.6.1.6.17 Equipment manufacturer's representative (Vendor) contact information.
- 1.6.1.6.18 Manufacturer's purchase order number.
- 1.6.1.6.19 Asset Cost: Equipment purchase price excluding all auxiliary costs.
- 1.6.1.6.20 Start-up Date: Date of initial equipment or device start-up by the Contractor.
- 1.6.1.6.21 Prefunctional Checklist completion date.
- 1.6.1.6.22 Functional Performance Test completion date.
- 1.6.1.6.23 Integrated Systems Test completion date.
- 1.6.1.6.24 Substantial Completion date.
- 1.6.1.6.25 Manufacturer's warranty start date.
- 1.6.1.6.26 Warranty End Date: The date on which the asset warranty ends. (Default is one year after the Substantial Completion Date unless a longer warranty period is requested or provided.)
- 1.6.1.7 Owner will furnish the following additional information; allow column headings for this data:
  - 1.6.1.7.1 Asset Number
  - 1.6.1.7.2 Parent ID
  - 1.6.1.7.3 Asset Group Code
  - 1.6.1.7.4 Cost Center
  - 1.6.1.7.5 Critical Factor
  - 1.6.1.7.6 Estimated Asset Life

1.6.1.7.7 Asset Status

1.6.1.7.8 Work Group

1.6.1.7.9 Work Area

## **PART 2- EXECUTION**

### **2.1 COMMISSIONING PLAN**

- 2.1.1 When a CxA has not been engaged for the project, Contractor shall submit draft Commissioning Plan to Owner and A/E for review within twenty-one (21) days of issuance of the Notice to Proceed with Construction or within ninety (90) days prior to initial installation of materials or equipment that will undergo Start-up and Functional Performance Tests, as directed by Owner.
- 2.1.2 Contractor shall allow in the Work Progress Schedule a minimum of twenty-one (21) days after the receipt by the Owner of the draft Commissioning Plan Submittal for the Owner to submit review comments to Contractor.
- 2.1.3 Contractor shall incorporate Owner's review comments and resubmit the revised Commissioning Plan to Owner within fourteen (14) days of receipt of the review comments.
- 2.1.4 Contractor shall allow in the Work Progress Schedule an additional fourteen (14) days for Owner's approval of the resubmitted Commissioning Plan that incorporates Owner's review comments.
- 2.1.5 **PRE-COMMISSIONING MEETING**
- 2.1.6 Upon obtaining Owner's approval of the Commissioning Plan, Contractor shall schedule, plan, and conduct a Pre-Commissioning Meeting with all parties involved in Commissioning. This meeting should include the major Subcontractors, specialty manufacturers/suppliers, A/E, Test, Adjust, and Balance Firm, Commissioning Authority, and Owner's representatives as participants.
- 2.1.7 Contractor shall prepare for the Pre-Commissioning Meeting by creating drafts of the following documents with input from the Owner. Commissioning Authority, when engaged for the project, will prepare the Commissioning Plan, Functional Performance Test Procedures and Integrated System Test Procedures.
  - 2.1.7.1 Approved Commissioning Plan including the Equipment Matrix and the Close-out and Documentation Matrix as defined in Section 01 77 00 – Project Close-out Procedures.
  - 2.1.7.2 Baseline Schedule and Work Progress Schedule incorporating Commissioning activities.
  - 2.1.7.3 Prefunctional Checklists.
  - 2.1.7.4 Functional Performance Test Procedures.
  - 2.1.7.5 Integrated System Test Procedures.
- 2.1.8 Contractor or Commissioning Authority when engaged for the project shall conduct the Pre-Commissioning Meeting and review all aspects of the Commissioning Plan. All

documentation will be discussed and all test procedures and forms reviewed for approval with the Owner. Contractor shall prepare an outline noting responsibilities of the various parties involved in Commissioning for review at this meeting.

2.1.9 The Commissioning Plan shall be reviewed with all attendees and the scope of work discussed. Contractor should be prepared to distribute copies of the pertinent sections to the various Subcontractors involved in Commissioning.

2.1.10 Contractor shall present Commissioning target dates for the Project. These dates and durations shall be incorporated in the Baseline Schedule and the Work Progress Schedule in accordance with Section 01 32 00 – Project Planning and Scheduling.

## 2.2 REPORTING

2.2.1 Contractor shall provide status reports to Owner at frequencies directed by Owner.

2.2.2 Contractor shall communicate at least monthly with all members of the Commissioning Team, keeping them apprised of Commissioning progress and scheduling changes.

2.2.3 Contractor shall submit Non-Compliance and Deficiency reports to Owner within five (5) days of the date the Non-Compliance or Deficiency is first observed. This includes responses to items noted by the Commissioning Authority.

2.2.4 Contractor shall provide final Commissioning documentation to Owner in accordance with Section 01 77 00 – Project Close-out Procedures, which will become part of the Commissioning and Close-out Manual.

## 2.3 TEST EQUIPMENT

2.3.1 Contractor shall provide all specialized tools, test equipment and instruments required to execute start-up, checkout, and testing of equipment.

2.3.2 All specialized tools, test equipment and instruments required to execute start-up, checkout, and testing of equipment shall be of sufficient quality and accuracy to test and measure system performance within specified tolerances. A testing laboratory must have calibrated test equipment within the previous twelve (12) months. Calibration shall be NIST traceable. Contractor must calibrate test equipment and instruments according to manufacturer's recommended intervals and whenever the test equipment is dropped or damaged. Calibration tags must be affixed to the test equipment or certificates readily available.

## 2.4 PREFUNCTIONAL CHECKLIST

2.4.1 Contractor shall provide a Prefunctional Checklist for each system to Owner, Commissioning Authority and A/E for review.

2.4.1.1 Contractor shall provide a draft version of each individual Prefunctional Checklist at a pre-installation meeting for the system. Based on discussions at a pre-installation meeting and subsequent as-constructed conditions, Contractor shall amend and revise each Prefunctional Checklist as appropriate prior to requesting system inspection from the Owner.

2.4.1.2 Contractor shall submit the final approved Prefunctional Checklist and all supporting documentation prior to requesting Start-up and Functional Performance Tests.

2.4.2 Contractor shall review the installation and Contract Documents for each system and shall provide written confirmation of the following if not included in the Prefunctional Checklist.

- 2.4.2.1 All required test reports and certifications have been submitted and accepted by Owner. Contractor must provide certification of acceptance from manufacturer's representative.
- 2.4.2.2 Evidence that A/E has approved all Submittals for each component device.
- 2.4.2.3 All valve charts, wiring diagrams, control schematics, electrical panel directories, etc. have been submitted and approved, and that all devices have been installed in accordance with the Contract Documents.
- 2.4.2.4 All tabulated data has been submitted for each system and for each device.
- 2.4.2.5 Each component device has been installed in accordance with applicable codes, the Contract Documents, and manufacturer's written recommendations.

## 2.5 INITIAL START-UP

### 2.5.1 Start-up of Independent Devices:

- 2.5.1.1 Prior to Start-up, Contractor shall not energize or activate, or allow to be energized or activated, any operable device until Contractor has verified to Contractor's own satisfaction that all Contract Document requirements for the operable device have been met and have been documented in the Prefunctional Checklists.
- 2.5.1.2 Contractor may energize or start-up independent devices for operational check-out and testing only after Contractor and manufacturer's representative or engineering technician (if required by the Contract Documents) have inspected and accepted the installation. The installation must not vary from provisions of the applicable Specifications and the manufacturer's written recommendations for Start-up.
- 2.5.1.3 When Start-up of equipment or systems have the potential to impact Owner's daily operations or when the Contract Documents require the Owner to witness Start-up, Contractor must provide advance notice to Owner in accordance with the procedures outlined in the Contract Documents prior to Start-up. Contractor may not proceed with Start-up without the Owner's written approval.

### 2.5.2 Start-up of Building Systems:

- 2.5.2.1 Contractor shall not energize or activate any building system until the following conditions have been met:
  - 2.5.2.1.1 Contractor has verified that all wiring and support components for equipment are complete and have been tested in accordance with the technical specifications and the manufacturer's written recommendations.
  - 2.5.2.1.2 Contractor has verified that each component device has been checked for proper lubrication, vibration isolation, drive rotation, belt tension, control sequence, or other conditions that may cause damage.
  - 2.5.2.1.3 Contractor has verified that all tests, meter readings, and specified electrical characteristics agree with those required by the equipment or system manufacturer and are in compliance with applicable Contract Documents.
  - 2.5.2.1.4 Contractor has received approved building system final inspection reports. Refer to Section 01 45 00 – Project Quality Control.

- 2.5.2.1.5 Contractor has provided the Owner and A/E with a written fourteen (14) day notice of intent to start-up the system for operational check-out. The notification procedures outlined in the Contract Documents shall be utilized.
- 2.5.2.2 Contractor shall perform Start-up under supervision of the responsible manufacturer's representative in accordance with manufacturer's instructions and specification requirements.
- 2.5.2.3 Contractor shall coordinate and schedule system(s) Start-up in a timely manner so that each component or system can operate for a period of time that is sufficient to evaluate and adjust performance as necessary. All building systems shall be operational and must have been successfully inspected by Owner, through attendance and concurrence with results of the Prefunctional Checklists or as otherwise approved by Owner, prior to the Contractor proceeding with Functional Performance Tests.
- 2.5.2.4 Contractor shall clearly list outstanding items or initial Start-up and Prefunctional Checklists items not completed successfully. Contractor shall obtain from Subcontractor completed forms documenting any outstanding Deficiency within five (5) days of completion of tests.
- 2.5.2.5 Contractor shall review completed Deficiency forms to determine if outstanding items prevent execution of the Functional Performance Tests and shall issue any necessary responses to the Commissioning Team.

## 2.6 REQUEST FOR START-UP AND FUNCTIONAL PERFORMANCE TESTS

- 2.6.2 Contractor shall notify Owner to request: (1) initial energization or operation of equipment and systems; and (2) an inspection of any system or system component for readiness prior to Functional Performance Tests.
  - 2.6.2.1 Request for Start-up. Contractor must certify that: (1) electrical and mechanical connections have been installed and are safe for initial Start-up; (2) Contractor has complied with Owner's utilities outage notifications; and (3) Start-up will not harm Owner's daily routine operations.
  - 2.6.2.2 Contractor shall complete the applicable Prefunctional Checklist(s) signed by Contractor and CxA if engaged for the project, evidencing Contractor's own thorough inspection of the system and completion of Start-up activities required by the Contract Documents and the Commissioning Plan. Contractor shall submit required supporting documentation, including but not limited to, factory start-up forms, operational testing data, and certifications.
  - 2.6.2.3 Request for Functional Performance Test. Contractor must certify that the Contractor has verified that the installation, Start-up, Prefunctional Checklists, validated trend data and initial operation of the system or component are in accordance with the Contract Documents and the Commissioning Plan including manufacturer's instructions, manufacturer's requirements for maintenance of warranty, and verification that the system is ready for Functional Performance Tests. Contractor shall ensure the updated Equipment Matrix has been submitted and approved prior to the start of Functional Performance. Contractor must certify that the manufacturer's representative has verified that the installation, Start-up, and initial operation of the system or component are in accordance with the manufacturer's published recommendations.
- 2.6.2 Contractor must obtain Owner's approval prior to proceeding with the Start-up or Functional Performance Test. All construction inspections must be completed. Any and all Deficiencies and all items included in the Non-Compliance Report have been brought into compliance with the Contract Documents.

## 2.7 FUNCTIONAL PERFORMANCE TESTS

### 2.7.2 Objective and Scope:

2.7.2.1 The objective of a Functional Performance Test is to demonstrate that the entire individual system operates according to the Contract Documents.

2.7.2.2 Contractor shall operate each system through all modes of operation (occupied, unoccupied, warm-up, cool-down, etc.) for specified system responses. Contractor is required to demonstrate to Owner's satisfaction each operational sequence.

### 2.7.2 Development of Functional Performance Test Procedures:

2.7.2.1 The purpose of a Functional Performance Test is to verify and document compliance with the stated criteria of acceptance. Contractor or Commissioning Authority if engaged for the project shall develop specific script-type test procedures and associated test forms to verify and document proper operation of each piece of equipment and system.

2.7.2.2 Contractor or Commissioning Authority if engaged for the project shall prepare Functional Performance Test Procedure forms as part of the Commissioning Plan. Once approved by Owner, Contractor shall utilize the forms for all testing activities.

2.7.2.3 Functional Performance Test Procedure forms must include the following:

2.7.2.3.1 System and equipment or component name(s).

2.7.2.3.2 Equipment location and identification number as identified in the Equipment Matrix.

2.7.2.3.3 Unique test identification number and reference to unique Prefunctional Checklist identification numbers for the equipment.

2.7.2.3.4 Date and time of test.

2.7.2.3.5 Project name.

2.7.2.3.6 Participating parties.

2.7.2.3.7 Specific sequence of operation or other specified parameters, including performance data being verified.

2.7.2.3.8 Instructions for setting up a Functional Performance Test.

2.7.2.3.9 Specific script-type, step-by-step procedures to perform a Functional Performance Test, in a clear, sequential and repeatable format that is customized for the system being tested.

2.7.2.3.10 A Pass / Fail checkbox (or data entry box as appropriate) for clearly indicating whether or not proper performance of each part of a Functional Performance Test was achieved and space for actual readings.

2.7.2.3.11 Section for comments.

2.7.2.3.12 Signatures and date block for participant and Owner approvals.

- 2.7.2 Contractor shall operate, or cause to be operated, each system, device, or equipment item, both intermittently and continuously, for a duration period as indicated in the Specification(s) for each item and/or in accordance with the manufacturer's written recommendations, the Contract Documents and the Commissioning Plan.
- 2.7.2 Contractor shall operate each component device and each building system to the full extent of its capability, from minimum to maximum, and under automatic control and manual control.
- 2.7.2 Contractor and manufacturer's representatives shall supervise and coordinate adjustments and balancing of all devices and systems for proper operation prior to requesting a Functional Performance Test(s).
  - 2.7.2.1 Where final balancing of a system is to be performed by Owner, such as final air balancing, Contractor shall provide all services indicated in the applicable Specifications and under this Section, including the following, prior to Owner's final balancing.
    - 2.7.2.1.1 Operational verification of all component devices and the total system, including automatic controls when applicable. Operational verification includes verification that all motors, fans, dampers, and other operable devices are performing in compliance with Specifications throughout their operable range and that all devices are controlled as described in the specified sequence of operation.
    - 2.7.2.1.2 All tabulated data, motor amperage readings, valve tag verifications, and other data required by the Specifications.
  - 2.7.2.2 Where final balancing of a system or particular components of a system are not specifically indicated to be performed by Owner, Contractor shall provide final balancing and adjustments for operation within specified tolerances prior to Functional Performance Test of such system.
  - 2.7.2.3 Coordination and Scheduling. Members of the Commissioning Team, including Owner, may observe Functional Performance Tests of equipment components and systems. Contractor shall provide written notice to Owner at least ten (10) days prior to Functional Performance Tests of equipment components and systems. Contractor shall notify Owner in advance of any changes to the Functional Performance Test schedule. Owner may require Contractor to reschedule Functional Performance Tests to ensure availability of Owner's representative(s).
  - 2.7.2.4 Contractor conducts Functional Performance Tests after system Start-up and Pre-functional Checklists are satisfactorily completed and have been approved by Owner. Air balancing and water balancing shall be completed before Functional Performance Tests.
  - 2.7.2.5 Contractor conducts Integrated System Tests after Functional Performance Tests are satisfactorily completed and have been approved by Owner.

## 2.8 INTEGRATED SYSTEM TESTS

### 2.8.1 Objective and Scope:

- 2.8.1.1 The objective of an Integrated System Test is to demonstrate that each system operates jointly with other systems according to the Contract Documents.
- 2.8.1.2 Contractor shall operate each system jointly with other systems, through selected modes of operation (fire alarm integration with HVAC, emergency power modes, equipment failures among related systems, etc.) for specified system responses. Contractor is required to demonstrate to Owner's satisfaction each operational sequence.

## 2.8.2 Development of Integrated System Test Procedures:

2.8.2.1 The purpose of an Integrated System Test is to verify and document compliance with the stated criteria of acceptance. Contractor or Commissioning Authority if engaged for the project shall develop specific script-type test procedures and associated test forms to verify and document proper operation of each piece of equipment and system, jointly and independently of other systems.

2.8.2.2 Contractor or Commissioning Authority if engaged for the project shall prepare Integrated System Test Procedure forms as part of the Commissioning Plan. Once approved by Commissioning Team., Contractor shall utilize the forms for all testing activities.

2.8.2.3 Integrated System Test Procedure forms must include the following.

2.8.2.3.1 System and equipment or component name(s).

2.8.2.3.2 System and equipment location and identification number as identified in the Equipment Matrix.

2.8.2.3.3 Unique test identification number and reference to unique Functional Performance Test identification numbers for the system and equipment.

2.8.2.3.4 Date and time of test.

2.8.2.3.5 Project name.

2.8.2.3.6 Participating parties.

2.8.2.3.7 Specific sequence of operation or other specified parameters, including performance data being verified.

2.8.2.3.8 Instructions for setting up an Integrated System Test.

2.8.2.3.9 Specific script-type, step-by-step procedures to perform an Integrated System Test, in a clear, sequential and repeatable format that is customized for the system being tested.

2.8.2.3.10 A Pass / Fail checkbox (or data entry box as appropriate) for clearly indicating whether or not proper performance of each part of an Integrated System Test was achieved and space for actual readings.

2.8.2.3.11 Section for comments.

2.8.2.3.12 Signatures and date block for participant and Owner approvals.

2.8.3 Contractor shall operate, or cause to be operated, each system, device, or equipment item, both intermittently and continuously, for a duration period as indicated in the Specifications for each item and in accordance with the manufacturer's written recommendations, the Contract Documents and the Commissioning Plan.

## 2.8.4 Coordination and Scheduling.

2.8.4.1 Members of the Commissioning Team, including Owner may observe Integrated System Tests of equipment components and systems. Contractor shall provide written notice to Owner at least fourteen (14) days prior to Integrated System Tests of equipment components and systems. Contractor shall notify Owner and A/E in advance of any



changes to the Integrated System Test schedule. Owner may require Contractor to reschedule Integrated System Tests to ensure availability of Owner's representative(s).

- 2.8.4.2 Contractor conducts Integrated System Tests after Functional Performance Tests are satisfactorily completed and have been approved by Owner.

## 2.9 DOCUMENTATION AND NON-CONFORMANCE

### 2.9.1 Documentation:

- 2.9.1.1 Contractor shall witness and document the results of all Functional Performance Tests and Integrated Systems Tests using specific procedural forms developed for that purpose or an approved electronic database program. Prior to testing, Contractor shall submit these forms to the Owner and A/E for review and approval. Contractor will include the completed, filled-out forms in the Commissioning and Close-out Manual.

### 2.9.2 Non-Conformance:

- 2.9.2.1 Contractor shall record results of Functional Performance Tests and Integrated System Tests. Contractor or Commissioning Authority if engaged for the project shall report all Deficiencies and non-conformance issues to Commissioning Team in accordance with the procedures outlined in the Commissioning Plan.

- 2.9.1.2 At the sole discretion of Owner, Owner may permit Contractor to make corrections of minor Deficiencies observed during a Functional Performance Test or during an Integrated System Test. However, the Contractor must document the Deficiency and resolution on the appropriate report form.

- 2.9.1.3 Contractor shall make every effort to expedite testing and minimize unnecessary delays, while not compromising the integrity of a Functional Performance Test or an Integrated Systems Test.

- 2.9.1.4 Contractor, A/E and Owner will attempt to resolve Deficiencies in the following manner.

- 2.9.1.4.1 When there is no dispute about a Deficiency and Contractor accepts responsibility for correction.

- 2.9.1.4.1.1 Commissioning Authority if engaged for the project or Contractor documents the Deficiency and the corrective actions, and then proceeds to another test or sequence. A Deficiency report is submitted to Owner. Contractor corrects the Deficiency, completes the statement of correction form certifying that the equipment or system is ready for retesting, and sends the certification to Owner.

- 2.9.1.4.1.2 Contractor reschedules test with Owner.

- 2.9.1.4.2 When there is a dispute about whether or not the test indicates a Deficiency or the Contractor's responsibility for correction of the apparent Deficiency.

- 2.9.1.4.2.1 Commissioning Authority if engaged for the project or Contractor documents the apparent Deficiency. A Deficiency report is submitted to Owner, including the apparent Deficiency.

- 2.9.1.4.2.2 Contractor facilitates resolution of the Deficiency and provides recommendations to the Owner. Contractor and Owner may bring other parties into the discussions as needed. Final technical

interpretive authority is with the A/E. Final acceptance authority is with the Owner.

2.9.1.4.2.3 Contractor documents the resolution process.

2.9.1.4.2.4 If Owner and the A/E agree with Contractor's interpretation and proposed resolution, Contractor forwards response to Owner. Contractor reschedules test with Owner. Contractor must repeat this process until satisfactory performance and Owner's approval is obtained.

## 2.10 DEMONSTRATION AND OWNER TRAINING

2.10.1 Contractor, in coordination with Owner shall develop the Training Plan with project specific requirements for Owner Training, after reviewing the different systems to be installed and commissioned. The purpose of the Training Plan is to specifically communicate the required content and training durations required by the Owner based upon the type of equipment and the Owner's past experience.

2.10.2 Refer to Section 01 79 00 - Demonstration and Training for specific requirements.

## 2.11 DEFERRED TESTS

2.11.1 Deferred Tests:

2.11.1.1 Deferred Tests shall be identified in writing and shall be approved by Owner.

2.11.1.1.1 Contractor shall complete Deferred Tests as part of this Contract during the Warranty Period. Contractor shall schedule this activity with Owner. Contractor shall perform tests and document and correct Deficiencies. Owner may observe the tests and review and approve test documentation and Deficiency corrections.

2.11.1.1.2 Contractor shall incorporate final updates to the Commissioning and Close-out Manual.

2.11.1.1.3 If any check or test cannot be completed prior to Substantial Completion due to the building structure, required occupancy condition, or other condition, performance of such test may be delayed to later in the Warranty Period, upon approval of the Owner.

2.11.1.1.4 Commissioning of systems which provide Life Safety (passive or active) to the building and its occupants shall not be deferred unless occupancy is deferred.

## 2.12 COMMISSIONING DOCUMENTATION

2.12.1 Contractor shall compile and organize all Commissioning documentation into a Commissioning and Close-out Manual and deliver to the Owner as specified in Section 01 77 00 – Project Close-out Procedures.

2.12.2 The Commissioning and Close-out Manual submitted to Owner shall contain all Commissioning documentation, including, but not limited to:

2.12.2.1 The Commissioning Plan.

2.12.2.2 Final Baseline Schedule filtered to show only the Commissioning activities.

- 2.12.2.3 Completed Equipment Matrix.
- 2.12.2.4 Completed Prefunctional Checklists with all required attachments,
- 2.12.2.5 Functional Performance Test Procedures and results.
- 2.12.2.6 Integrated System Test Procedures and results.
- 2.12.2.7 Training Plan and all supporting documentation. Refer to Section 01 79 00 – Demonstration and Training for specific requirements.
- 2.12.2.8 Deficiency reports and solution results.
- 2.12.2.9 Recommendations on continuous Commissioning, best practices, and preventive maintenance.
- 2.12.2.10 Refer to Section 01 77 00 – Project Close-out Procedures for additional Close-out documentation to be included in the Commissioning and Close-out Manual.

**END OF SECTION 01 91 00**



**EXHIBIT M**

**RIDER 104; POLICY ON UTILIZATION OF  
HISTORICALLY UNDERUTILIZED BUSINESSES**

**EXHIBIT N**

**PROJECT ARCHITECT/ENGINEER'S APPROVED HUB SUBCONTRACTING PLAN**

**EXHIBIT O**

**RIDER 105; CONTRACTOR'S AFFIRMATIONS AND WARRANTIES**

## RIDER 105

### CONTRACTOR'S AFFIRMATIONS AND WARRANTIES

Contractor affirms, certifies, and warrants that the information set forth in this Rider is current, complete, and accurate. Contractor agrees that in the event Contractor makes a false statement by affirming, certifying, or warranting the information set forth in this Rider, MD Anderson may, at its option, terminate the Agreement/Purchase Order to which this Rider is attached without further liability, and Contractor shall be removed from all MD Anderson bid lists.

Contractor agrees to notify MD Anderson in writing within thirty (30) days of any changes in the affirmations, certifications, and warranties made by Contractor under this Rider.

1. Contractor has neither given, offered to give, and has no intention to give at any time hereafter, any economic opportunity, future employment, gift, loan, gratuity, special discount, trip, favor or service to a public servant in connection with this Agreement/Purchase Order.
2. Neither Contractor nor the firm, corporation, partnership or institution represented by Contractor, or anyone acting for such firm, corporation, or institution, has violated the antitrust laws of the State of Texas, codified in Section 15.01, et. seq. *Texas Business and Commerce Code*, or the federal antitrust laws, nor communicated directly or indirectly Contractor's bid or proposal made to MD Anderson to any competitor or any other person engaged in such line of business. Contractor has not received compensation for participation in the preparation of the specifications for this Agreement or of the request for proposal-on which this Agreement is based.
3. Contractor is not excluded, debarred, or otherwise suspended from participating in the Federal Healthcare programs, as defined in 42 U.S.C. §1320a – 7b(f), or listed in the U.S. System for Award Management's ("SAM") List of Parties Excluded From Federal Procurement or Non-Procurement Programs, or the United States Office of Inspector General's List of Excluded Individuals/Entities ("LEIE"). Contractor further acknowledges that MD Anderson is prohibited by federal regulations and arrangements with third party payors from allowing any employee, subcontractor or agent of Contractor to provide services to MD Anderson if such employee, subcontractor, or agent is not eligible to participate in the Federal Healthcare programs. Therefore, Contractor shall not assign any employee, subcontractor or agent that is excluded from participating in any Federal Healthcare program, including but not limited to Medicare, Medicaid, or Tricare, to work on an MD Anderson engagement. Contractor shall perform an LEIE, SAM, and State Medicaid sanction check monthly on each of its employees, subcontractors and agents during the time such employees, subcontractors and agents are assigned to work on an MD Anderson engagement. Contractor acknowledges that MD Anderson will require immediate removal of any employee, subcontractor or agent of Contractor assigned to work on an MD Anderson engagement if such employee, subcontractor or agent is found to be excluded from participating in any Federal Healthcare program. Upon request, Contractor will provide MD Anderson a letter signed by an authorized officer of Contractor that certifies compliance with this Section.
4. Contractor certifies it qualifies status in one of the below as defined by the State of Texas:
  - A. Contractor **is a Small Business** (as defined by Chapter 2155 of the Texas Government Code), and claims the following status:
    - \_\_\_\_\_ (100) Small Business, Non-HUB
    - \_\_\_\_\_ (100N) Disabled Person, Small Business
    - \_\_\_\_\_ (141) Black American, Male, Small Business
    - \_\_\_\_\_ (142) Black American, Female, Small Business
    - \_\_\_\_\_ (151) Hispanic American, Male, Small Business
    - \_\_\_\_\_ (152) Hispanic American, Female, Small Business
    - \_\_\_\_\_ (160) Non-minority, Female, Small Business
    - \_\_\_\_\_ (171) Asian Pacific American, Male, Small Business
    - \_\_\_\_\_ (172) Asian Pacific American, Female, Small Business
    - \_\_\_\_\_ (181) Native American, Male, Small Business
    - \_\_\_\_\_ (182) Native American, Female, Small Business
  - B. Contractor **is not a Small Business** as defined above and claims the following status:

_____ (900N) Disabled Person	_____ (971) Asian Pacific American, Male
_____ (941) Black American, Male	_____ (972) Asian Pacific American, Female
_____ (942) Black American, Female	_____ (981) Native American, Male
_____ (951) Hispanic American, Male	_____ (982) Native American, Female
_____ (952) Hispanic American, Female	_____ (900) None of the above
_____ (960) Non-minority, Female	



**RIDER 105**  
**CONTRACTOR'S AFFIRMATIONS AND WARRANTIES**

- C. Contractor is to indicate below if it is not certified by the Texas Procurement and Support Services Division of the Texas Comptroller's Office as a Historically Underutilized Business.

\_\_\_\_\_ **YES**, Contractor is certified by the Texas Procurement and Support Services Division of the Texas Comptroller's Office.

\_\_\_\_\_ **NO**, Contractor is not certified by the Texas Procurement and Support Services Division of the Texas Comptroller's Office.

- D. Contractor is:

\_\_\_\_\_ A Non-Resident Contractor (e.g., does not maintain a permanently staffed full time office in Texas).

\_\_\_\_\_ A Resident Contractor (e.g., does maintain a permanently staffed full time office in Texas).

\_\_\_\_\_ Anticipating the use of Texas Non-Resident firms as sub-contractors and will provide information of such contracts, when requested.

\_\_\_\_\_ Not anticipating the use of Texas Non-Resident firms as sub-contractors.

**[Sourcing, item 5 should only be included if the Contractor is a franchise.]**

5. If Contractor is a franchise, then:

- A. Contractor affirms, certifies, and warrants that it shall maintain such franchise in full force and effect at all times during the existence of this Agreement/Purchase Order; and

- B. Contractor shall provide MD Anderson with all data that MD Anderson, in its sole discretion, deems necessary to identify Contractor's franchise, the date on which Contractor's franchise will expire, and to certify that Contractor's franchise remains in good standing at all times during the existence of the Agreement/Purchase Order.

6. (1) No relationship (whether by blood, marriage, business association, capital funding agreement or by any other kinship or connection) exists between Contractor and an employee of MD Anderson, and (2) Contractor has not been an employee of MD Anderson within the twelve (12) month period immediately prior to the date of this Agreement/Purchase Order, or (3) in the event such a relationship does exist, full written disclosure of the relationship has been made by Contractor to MD Anderson prior the execution of this Agreement, or acceptance of Purchase Order. Contractor understands that all such disclosures will be subject to administrative review, and approval by MD Anderson prior to MD Anderson's execution of this Agreement/Purchase Order. Subsection (2) of this item does not prohibit MD Anderson from entering into a contract with a corporation, firm, or other business entity that employs a former or retired employee of MD Anderson within 12 months of the employee's leaving MD Anderson, provided that the former or retired employee does not perform services on projects for the corporation, firm, or other business entity that the employee worked on while employed by MD Anderson.
7. (1) Contractor is not a party to any agreement with MD Anderson whereby it has licensed from MD Anderson any technology, invention, or other intellectual property that relates to or is used with any goods or services being acquired by MD Anderson hereunder; and (2) as a result of the sale to MD Anderson of the goods or services hereunder, Contractor will not owe, directly or indirectly, any royalties, fees, or other consideration of any kind to MD Anderson or any employee of MD Anderson under the terms of any license agreement with MD Anderson. Contractor will advise MD Anderson in writing of any change in status with respect to the foregoing items (1)-(2), by sending written notice within ten (10) days of such status change to: Legal Services, Unit 537, The University of Texas MD Anderson Cancer Center, P.O. Box 301439, Houston TX 77230-1439, ATTENTION: Chief Legal Officer.
8. **OSHA COMPLIANCE:** By signing the Agreement, or accepting the Purchase Order, Contractor affirms, certifies, and warrants that all goods and services furnished under this Agreement/Purchase Order will meet or exceed the safety standards established and promulgated under the Federal Occupational Safety and Health Law (Public Law 91-596) and its regulations in effect as of the date on which the goods or services are furnished.
9. **AFFIRMATIVE ACTION COMPLIANCE:** In addition to the Contractor's affirmation, certification, and warranty under section 8 of this Rider, if this Agreement exceeds \$50,000.00 in value, Contractor shall provide a copy of its written Civil Rights "Affirmative Action Compliance Program" which shall be incorporated into Exhibit A to this Rider. If Contractor is NOT required to have such a written Civil Rights "Affirmative Action Compliance Program", Contractor must state the reasons why it is not required to have such a written program in

**RIDER 105**  
**CONTRACTOR'S AFFIRMATIONS AND WARRANTIES**

Exhibit A to this Rider.

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**EXHIBIT A**

**Civil Rights "Affirmative Action Compliance Program"**

**EXHIBIT P**

**RIDER 106; PREMISES RULES**

## RIDER 106 PREMISES RULES

If this Agreement requires Contractor's presence on MD Anderson's premises, buildings, grounds, facilities, or campus, whether owned, leased or otherwise controlled by MD Anderson (collectively, "MD Anderson's campus"), Contractor represents and warrants that it will ensure that its representatives, agents, employees, and permitted subcontractors are aware of, fully informed about and in full compliance with Contractor's obligations under the following rules:

- A. Contractor (and its representatives, agents, employees and permitted subcontractors) will comply with all applicable MD Anderson rules and policies, including, without limitation, those related to environmental quality, safety, fire prevention, noise, information security, and architectural barriers issued by MD Anderson's Department of Environmental Health and Safety, (713) 792-2888, and those that restrict the use of alcohol on MD Anderson's campus.
- B. MD Anderson is a smoke-free institution. Smoking, or use of smokeless tobaccos, is prohibited throughout MD Anderson's campus.
- C. Contractor will have the right to access only those areas in MD Anderson's campus that are public areas or areas that it is necessary for Contractor to access in order to provide the products and perform the services under this Agreement. Cellular telephones and two-way radios are prohibited in some areas of MD Anderson's campus and Contractor affirms, certifies, and warrants that its representatives, agents, employees, and permitted subcontractors will abide by such prohibitions.
- D. It is the policy of MD Anderson to maintain a safe environment free from violence on MD Anderson's campus. Any direct or indirect threats or acts of violent behavior are prohibited. Violence includes, but is not limited to, intimidating, threatening, or hostile behavior; physical or verbal abuse; harassment, stalking, vandalism, arson, sabotage, use of weapons, possession of weapons on institutional property, the threat of any of the above, or any other act inconsistent with MD Anderson's campus violence policy. Intentionally bringing a prohibited weapon including a licensed, concealed handgun on MD Anderson's campus is a violation of MD Anderson's campus violence policy. Furthermore, any violation of a law prohibiting violence and violent behavior (including, but not limited to, the violation of Section 37.125 of the Texas Education Code or of Section 46.03 of the Texas Penal Code) also constitutes a violation of MD Anderson's campus violence policy. Violators of MD Anderson's campus violence policy or of any law prohibiting violence or violent behavior may be removed from or refused further access to MD Anderson's campus. Contractor represents and warrants that Contractor and all of its representatives, agents, employees, and permitted subcontractors will comply with MD Anderson's campus violence policy and all laws prohibiting violence and violent behavior. MD Anderson reserves the right to pursue criminal or civil actions against violators of MD Anderson's campus violence policy or of any law prohibiting violence and violent behavior. Contractor will remove from the performance of any work under this Agreement any Contractor representative, agent, employee, or permitted subcontractor that MD Anderson, in its sole discretion, finds has violated MD Anderson's campus violence policy or any law prohibiting violence and violent behavior.
- E. Contractor will ensure all personnel sent to work at MD Anderson's campus that have direct patient care/contact under this Agreement will be able to show proof of a tuberculosis screening having been completed within ninety (90) calendar days prior to starting work at MD Anderson's campus and every two years thereafter. Contractor will also be able to show proof that these same personnel do not have active tuberculosis. Contractor will ensure all personnel with direct patient care/contact will be able to show proof of current immunization to influenza and proof of immunization or immunity to varicella (chicken pox) prior to active duty at MD Anderson. Records of screenings, vaccinations, immunity and related reports will be made immediately available to M.D. Anderson upon request. This paragraph does not apply to contractors deemed by MD Anderson to not have direct patient care/contact.
- F. Contractor will be solely responsible for ensuring that all of its agents, employees, personnel, permitted subcontractors, or representatives abide by the provisions set forth in this Rider 106.
- G. The University of Texas Police Department ("UTPD") & Security Equipment:  
  
The UTPD is the law enforcement agency of record for all property and premises owned, leased, or otherwise under the control of MD Anderson. The UTPD will be notified in matters relating to the following:
  - 1. Reporting of criminal incidents, including those occurring to or involving Contractor property and personnel if the incident occurs on MD Anderson campus;
  - 2. The investigation of crimes, including those involving Contractor's property and personnel, if the incident occurs on MD Anderson campus; and
  - 3. Reporting of security problems.
- H. Contractor will not retain the services of outside guard or law enforcement services in connection with work on MD Anderson's campus without the specific prior written approval of the Chief of the UTPD.
- I. Contractor will not install or operate any system intended to electronically control access and/or detect and report intrusion, hold-up or duress on any MD Anderson property, any MD Anderson leased premises or any premises otherwise under the control of MD Anderson. Where such systems are required due to the nature of the Contractor's operation, the UTPD will be responsible for approval, design and installation. Once approved by UTPD, the system's cost will be Contractor's responsibility.

**RIDER 106  
PREMISES RULES**

these Premises Rules, MD Anderson will have the right to deny Contractor and its personnel access to MD Anderson's campus.

J. Installation by Contractor of any security system is subject to the review and approval of UTPD. If Contractor desires to install an electronic security system in accordance with the terms of this Agreement, Contractor will contact the UTPD - Crime Prevention Component of UTPD at (713) 792-2890 and request that UTPD establish design criteria for the application. Contractor will provide written evidence of the estimated cost of the electronic security system to the Technical Services Component of UTPD located at 7777 Knight Road and, if the electronic security system is approved by UTPD, the Technical Services Component of UTPD will coordinate the installation of the approved system. Upon written approval of the UTPD Chief, Contractor may use a commercial installation company to install the electronic security system under the coordination of the UTPD.

P. MD Anderson will not be obligated to pay for labor hours supplied by any individual(s) upon whom a background check and records check is not completed or who fails to meet the standards described in this Rider.

K. All security related systems must be monitored and controlled by the UTPD and UTPD must be the primary monitoring station. If Contractor utilizes the services of a commercial alarm company or a proprietary alarm monitoring station, the system may report to such location after first transmitting the alarm to the UTPD.

L. Contractor is responsible for the performance of the persons Contractor assigns to provide services for MD Anderson on MD Anderson's campus. Contractor will not knowingly assign individuals to provide services on MD Anderson's campus who have a history of violent, unacceptable, or grossly negligent behavior or who have a felony conviction. Prior to supplying labor services under this Agreement, MD Anderson may require Contractor to provide a list identifying the individuals that may be assigned to MD Anderson along with a letter signed by an appropriate officer of Contractor that affirms compliance with this Rider. Contractor will revise such letter each time there is a change in Contractor's personnel assigned to MD Anderson's campus, but in any case, annually on the anniversary date of this Agreement.

M. Contractor will ensure that all individuals assigned by Contractor to perform services on MD Anderson's campus will display in plain view a photo identification badge provided by MD Anderson while on MD Anderson's campus.

N. Contractor will retain resumes of all Contractor's employees assigned to this project. Contractor will ensure the proper maintenance of these documents for a minimum of one (1) year after contract completion. Contractor will maintain all documentation, including the results of any background checks, during the term of this Agreement.

O. MD Anderson will have the right to reject any individual(s) that Contractor offers to assign to MD Anderson's account for any reason. In addition, if Contractor and/or its personnel fail to abide by

**EXHIBIT Q**

**RIDER 107; TRAVEL POLICY**

## **RIDER 107 TRAVEL POLICY**

**All travel and expense costs will be calculated as follows:**

1. Contractor must use regular coach air transportation (state rate or corporate rate, whichever is lower) for travel in excess of two hundred (200) miles, unless otherwise agreed in advance by MD Anderson. In order to maximize discounted airfares, Contractor, with the cooperation of MD Anderson, will schedule on-site visits far enough in advance to take advantage of most advance-purchase offers. In the event meetings or on-site visits are cancelled by MD Anderson, Contractor may charge for any advance-purchase cancellation penalties imposed by the airline.
2. Corporate or state rate discounts (whichever is higher) will be used for hotel accommodations.
3. Maximum billable amount per person per day for meals will be \$36.00. Departing from MD Anderson prior to 12:01 p.m. negates any billing for meals for that day. Meal expenses are reimbursable for Contractor personnel who travel fifty (50) miles or more, and stay overnight.
4. Rental cars will be the least expensive, air-conditioned, automatic transmission, mid-size car available to Contractor under corporate rate programs. Full coverage collision insurance may be used for rental cars, but personal protection plans will not be reimbursed.
5. Ground transportation, parking costs and tolls may be invoiced at cost.
6. Personal automobile mileage charges will be computed based upon actual miles to and from the appropriate Contractor office to and from the applicable MD Anderson facility. Mileage charges will be invoiced at the standard mileage rate recognized by the State of Texas at the time of invoicing.
7. Miscellaneous expenses (i.e., tips, transfers, etc.) will be invoiced in an amount not to exceed \$5.00 per person per day, if deemed reasonable.

**All travel or miscellaneous expenses must receive prior written approval by the Project Coordinator. Contractor will not be reimbursed for expenses that do not receive this prior written approval.**

**All travel or miscellaneous expenses must be submitted with an original receipt. All approved expenses will be reimbursed at “actual cost” only. Contractor will not be reimbursed for expenses that are not accompanied by original receipts.**

**EXHIBIT R**

**RIDER 116; INVOICE PAYMENT REQUIREMENTS**



**RIDER 116**  
**INVOICE PAYMENT REQUIREMENTS**

**Section 1. CONTRACT VALUE**

Absent prior written authorization, invoices for amounts in excess of the Cap Amount will not be paid and will be returned unpaid.

**Section 2. INVOICE ROUTING; FORMAT; TIMELINESS**

**2.1. Invoice Submission Location:** MD Anderson cannot retrieve invoices through Contractor's website and can only accept invoices through the following format (listed in order of preference):

Submittal Format	Submittal Address
EDI	Qualifying Contractors contact: Accounts Payable 713.745.9439
E-mail (one invoice per e-mail in PDF form)	<a href="mailto:mdaccap@mdanderson.org">mdaccap@mdanderson.org</a>
United States Postal Service	Accounts Payable – Unit 1699 P.O. Box 301401 Houston, TX 77230-1401
Carrier (UPS, Fed Ex, etc.)	The University of Texas MD Anderson Cancer Center Accounts Payable 7007 Bertner Ave – Unit 1699 Houston, TX 77030

**2.2. Electronic Invoice:** An electronic invoice shall be provided in a secure, non-alterable electronic format (Adobe \*.pdf is acceptable) e-mailed directly to [mdaccap@mdanderson.org](mailto:mdaccap@mdanderson.org) with the Contractor name and invoice number in the e-mail Subject line. Do not send or copy the MD Anderson Accounts Payable representative. MD Anderson will accept only one invoice per e-mail and all invoices must include a valid MD Anderson Purchase Order Number. Invoices without a Purchase Order Number or an incorrect Purchase Order Number will be returned unpaid to the Contractor.

**2.3. Effective Invoice Period:** Contractor will submit invoices within sixty (60) calendar days after delivery of the goods or complete performance of the services invoiced. MD Anderson will not be obligated to pay invoices that are not received within sixty (60) calendar days after delivery of the goods or complete performance of the services, unless acceptable delays are identified and approved in writing by MD Anderson prior to the delay.

**2.4. Third Party Invoicing:** MD Anderson does not accept invoicing from third parties acting on behalf of the vendor.

**Section 3. ACCURATE BILLING**

**3.1. Invoice Requirements:** Each invoice must include:

- Billing related to only one valid MD Anderson Purchase Order.
- Invoice should be an original version and without manual or written changes.
- Valid MD Anderson Purchase Order Number clearly stated on the face of the invoice.
- Contractor's legal name and "remit to" address, telephone and fax numbers.
- A uniquely assigned invoice number.
- An invoice date.
- The MD Anderson "bill to" address listed in Section 2.1 for the United States Postal Service submittal format.
- A description of the goods or services purchased with the line item purchase price.
- The correct invoice amount (invoices that contain an incorrect amount or a disputed amount will need to be revised and resubmitted).
- For goods, the manufacturer's part number, item description, quantity shipped, and unit price.
- A line item for all freight, shipping and handling costs related to the invoice (not billed separately).

## **RIDER 116**

### **INVOICE PAYMENT REQUIREMENTS**

- Line items matching MD Anderson Purchase Order line items (invoice lines must exactly match, or be less than, MD Anderson Purchase Order line items).

Each invoice must be a standard typed original invoice on Contractor letterhead. MD Anderson will not make payments based on statements, quotations, service contracts, shipping/packing slips, calculator tapes, work orders, pro-forma statements, Letter of Intent, Memorandum of Understanding or other non-invoice documents.

**3.2. Deductions:** MD Anderson may reduce payment to Contractor for sales tax (for more information refer to Section 8.9 of the Agreement).

**3.3. Credit Memoranda:** Credit memoranda submitted to MD Anderson must include the Invoice Requirements set out in Section 3.1 of this Rider 116, as well as the following:

- The phrase “Credit Memo” in clear and apparent text.
- A uniquely assigned Credit Memo number.
- A description of the goods or services credited.
- A valid Purchase Order Number against which MD Anderson may credit the Credit Memo amount.

#### **Section 4. ACH PAYMENT DISBURSEMENT METHOD**

**4.1. Preferred Payment Method – Automated Clearing House (ACH):** MD Anderson’s preferred process for settling financial obligations is to utilize the National Automated Clearing House Association (NACHA) standard Cash Concentration and Disbursement (CCD) format. This industry standard process is utilized and recognized by most payees as the most efficient, safe and timely way to transfer funds. Our goal is that every payment made by MD Anderson is made via electronic funds transfers, unless legally prohibited. This service may be set up by contacting MD Anderson’s Treasury Services and Operations office at 713-745-9580 or by e-mail: [TreasuryServices@mdanderson.org](mailto:TreasuryServices@mdanderson.org).

Upon payment initiation, your company will receive the remittance information by e-mail with an attached Adobe Acrobat PDF file containing information detailing the payment date, invoice number, dollar amount, etc. Questions regarding this matter can be directed to MD Anderson’s Treasury Services and Operations office at 713.745.9580 or by e-mail: [TreasuryServices@mdanderson.org](mailto:TreasuryServices@mdanderson.org).

**4.2. Check Disbursement:** MD Anderson initiates payment disbursements on Tuesdays and Thursdays with typical funds availability the following business day.

**4.3. Accounts Payable Invoice Approval Process:**

**4.3.A Goods:** MD Anderson requires a 3-way match for payment on Purchase Orders for goods. The 3-way match includes a MD Anderson Purchase Order, a MD Anderson Materials Management Receipt, and a Contractor Invoice.

**4.3.B Services:** MD Anderson requires a 2-way match for payment on Purchase Orders for services. The 2-way match includes a MD Anderson Purchase Order and a Contractor Invoice. In addition, complete performance of services must be verified by an appropriate MD Anderson representative before an invoice for such services will be paid unless otherwise stated in the Agreement.

#### **Section 5. SUPPLIER INQUIRY OPTIONS**

**5.1. Payment Inquiry:** Contractor may research invoice status by contacting the MD Anderson Accounts Payable Department through the following methods (a MD Anderson Purchase Order Number and/ or Contractor Invoice Number is required):

- E-Mail (questions only): [mdaccAPIquiry@mdanderson.org](mailto:mdaccAPIquiry@mdanderson.org)
- Telephone: 713.745.9439
- Vendor Self Service (VSS) System: VSS is a secure, web-based system that allows Contractors to research detailed information regarding invoice status and MD Anderson payments online. To register for this service visit <http://mdanderson.org/suppliers> or call 713.745.7997.

**5.2. Reconciliation of Payment:** MD Anderson notifies Contractor that invoices have been paid by payment stub for standard check payments and e-mail for ACH payments.

**RIDER 116**  
**INVOICE PAYMENT REQUIREMENTS**

**Section 6. MATERIALS MANAGEMENT**

**6.1. Freight:** MD Anderson does not accept Collect On Demand (COD) shipping.

**6.2. Receiving/Logistics/Dock:** All deliveries must reference a valid MD Anderson Purchase Order Number or risk being turned away. Purchase Orders for goods not delivered to a MD Anderson receiving dock risk payment delays, unless otherwise stated in the Agreement.

MD Anderson Receiving Docks	
<b>MD Anderson Hospital</b> 1515 Holcombe Blvd. Houston TX 77030-4009	<b>Basic Sciences Research Building</b> 6767 Bertner Houston, TX 77030-2603
<b>Houston Main Bldg./ Ambulatory Clinical Bldg./ Mays Cancer Prevention Bldg.</b> 1155 Pressler Street Houston, TX 77030-3721	<b>Faculty Center Building</b> 1400 Holcombe Blvd. Houston, TX 77030-4008
<b>Smith Research Bldg.</b> 7777 Knight Road Houston, TX 77054-3005	<b>South Campus Research Bldg. II</b> 7435 Fannin Street. Houston, TX 77054-1901
<b>Proton Therapy Bldg.</b> 1840 Old Spanish Trail Houston, TX 77054-2002	

**Section 7. GOVERNING LAWS**

**7.1. W-9:** MD Anderson requires Contractor to have a valid W-9 on file with MD Anderson prior to all disbursements. Contractor may download the W-9 form from MD Anderson's website by accessing the Supply Chain Management Internet site at: <http://mdanderson.org/suppliers> then clicking on "Contract Information."

**7.2. Prompt Payment Act:** All funds held by MD Anderson are subject to the Texas Prompt Payment Act, Chapter 2251, *Texas Government Code*. Chapter 2251 of the *Texas Government Code* governs (i) when a payment by MD Anderson is overdue, and (ii) the rate of interest that accrues on such overdue payments.

**EXHIBIT S**

**RIDER 117; INSTITUTIONAL POLICIES**

THE UNIVERSITY OF TEXAS  
**MDAnderson**  
~~Cancer Center~~  
**RIDER 117**  
**Institutional Policies**

In accordance with the education requirements set forth in Section 6032 of the Deficit Reduction Act of 2005 (Act), MD Anderson has implemented, and Contractor agrees to abide by, the following policies, as may be subsequently amended, that are available at: <http://www.mdanderson.org/about-us/doing-business/vendors-and-suppliers/index.html>

1. Fraud, Waste, and Abuse Policy
2. Hospital Compliance Plan
3. Non-Retaliation Policy

**EXHIBIT T**

**SALES AND USE TAX EXEMPTION CERTIFICATION**

# Texas Sales and Use Tax Exemption Certification

This certificate does not require a number to be valid.

Name of purchaser, firm or agency <b>The University of Texas MD Anderson Cancer Center</b>	
Address (Street & number, P.O. Box or Route number) <b>1515 Holcombe Blvd., Unit 1695</b>	Phone (Area code and number) <b>(713) 792-2121</b>
City, State, ZIP code <b>Houston, Texas 77030</b>	

I, the purchaser named above, claim an exemption from payment of sales and use taxes (for the purchase of taxable items described below or on the attached order or invoice) from:

Seller: \_\_\_\_\_

Street address: \_\_\_\_\_ City, State, ZIP code: \_\_\_\_\_

Description of items to be purchased or on the attached order or invoice:

\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_


Purchaser claims this exemption for the following reason:

EXEMPT UNDER SUBCHAPTER H, SEC. 151.309 GOVERNMENTAL ENTITIES. PURCHASER IS AN AGENCY  
OF THE STATE OF TEXAS. FEDERAL I.D. 74-6001118; TEXAS TAXPAYER I.D. 35065065068

\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

I understand that I will be liable for payment of all state and local sales or use taxes which may become due for failure to comply with the provisions of the Tax Code and/or all applicable law.

*I understand that it is a criminal offense to give an exemption certificate to the seller for taxable items that I know, at the time of purchase, will be used in a manner other than that expressed in this certificate, and depending on the amount of tax evaded, the offense may range from a Class C misdemeanor to a felony of the second degree.*

<b>sign here</b> 	Purchaser	Title	Date
		Senior Vice President and CFO	07/13/2017

NOTE: This certificate cannot be issued for the purchase, lease, or rental of a motor vehicle.

**THIS CERTIFICATE DOES NOT REQUIRE A NUMBER TO BE VALID.**

Sales and Use Tax "Exemption Numbers" or "Tax Exempt" Numbers do not exist.

**This certificate should be furnished to the supplier.**  
**Do not send the completed certificate to the Comptroller of Public Accounts.**

**EXHIBIT U**

**EXECUTION OF OFFER**