



Council of American Mechanical &
Electrical Engineers

BEST PRACTICE

1

Planning:

A project planning tool for MEP/FP engineering firms

**Tool No. 1-1: Project Planning Guideline for
Mechanical, Electrical, Plumbing & Fire
Protection**

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I. Purpose

This MEP/FP Project Planning Worksheet has been developed for engineering consulting firms that are engaged in the design of building systems (mechanical, electrical, plumbing, fire protection, telecom, etc.) The purpose of the Planning Worksheet is to serve as a platform to help engineering consulting firms develop internal processes that will strengthen the business-related aspects of their organizations.

II. Project Overview

A. Project Description

B. Project Selection/Acceptance Review

Selection/Acceptance Criteria Table	
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Go/No Go Talking Points

- Verify that the following entries are satisfied prior to accepting a project
- Project is in alignment with business plan
- Qualified technical staff available during projected schedule
- Qualified project manager available during projected schedule
- Previous experience with project type/technical requirements
- Consider the following criteria when determining whether or not to pursue/accept a project
- Previous experience with client
- Previous experience with owner
- Reward potential is worth the risk potential

III. Project Definition

A. Project Understanding

Project Type:

Location:

Approximate construction cost:

Approximate area or size:

Unique project objectives or constraints:

B. Scope of Work

Consulting Engineer Scope Table

Mechanical Systems

	Consult. Engineer	Specialty Consultant	Not Required
HVAC (Heating, Ventilating, and Air Conditioning)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Central cooling plant	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Central heating plant	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Laboratory exhaust	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Kitchen exhaust	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Vehicle exhaust	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Smoke control or removal	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Dust collection	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Humidification/Dehumidification	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Process cooling	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Fuel storage and distribution	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Bulk fluid storage and distribution	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Building automation systems	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Site steam/hot water distribution	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Site chilled water distribution	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Site natural gas distribution	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Site fuel distribution	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Other: _____	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Other: _____	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

Plumbing systems

	Consult. Engineer	Specialty Consultant	Not Required
Domestic water	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Storm	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Sanitary	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
De-ionized water	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Medical gases	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Process air and vacuum	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Ultra – pure water systems	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Other: _____	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Other: _____	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

Fire Suppression Systems

	Consult. Engineer	Specialty Consultant	Not Required
Water-based fire suppression	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Clean agent suppression systems	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Fire pump	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Fire suppression water storage	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Fire protection site distribution	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Other: _____	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Other: _____	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

Electrical systems

	Consult. Engineer	Specialty Consultant	Not Required
Electrical service entrance	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Interior power distribution (<600V)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Standby power systems	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Basic interior lighting	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Site medium voltage power distribution (>600V)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

Site lighting	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Specialty lighting	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Other: _____	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Other: _____	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

Communications Systems

	Consult. Engineer	Specialty Consultant	Not Required
Voice/data structured cabling	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Voice/data equipment	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Audio-video	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Paging	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Public address	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Sound masking	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Intercom	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Patient monitoring and telemetry	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Nurse call	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Central clock	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Graphical / data systems	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Other: _____	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Other: _____	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

Safety and Security

	Consult. Engineer	Specialty Consultant	Not Required
Access control	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Intrusion detection	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Video surveillance	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Detention monitoring and control	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Fire detection and alarm	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Other: _____	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Other: _____	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

C. Division of Responsibilities with Other Consultants

Specialty Consultant Coordination Table

Specialty Consultant	Form of Design Input			
	Design Criteria	Design Review Comments	Advisory Drawings	Construction Documents
• Code consultant	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
• Landscape architect	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
• Food service consultant	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
• Laboratory consultant	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
• Lighting consultant	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
• Theatrical consultant	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
• Audio-visual consultant	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
• Acoustical consultant	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
• Security consultant	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
• LEED consultant	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
• Commissioning agent	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

D. Consulting Engineer Basic Services and Deliverables

Consultant Basic Services and Deliverables by Project Phase Table	
<input type="checkbox"/>	Conceptual Design/Programming Develop the overall project scope with the Owner and/or User <input type="checkbox"/> Establish the design criteria <input type="checkbox"/> Identify any project budget limitations <input type="checkbox"/> Identify the implementation schedule <input type="checkbox"/>
<input type="checkbox"/>	Schematic Design Submit systems descriptions for mechanical, electrical, plumbing, and fire protection systems, including alternate solutions/systems where applicable <input type="checkbox"/> Develop program area requirements for MEP/FP systems <input type="checkbox"/> Submit a life cycle cost analysis of up to _____ alternate systems. <input type="checkbox"/> Perform a code review to identify applicable codes and code requirements <input type="checkbox"/> Review opinion of probable cost prepared by the Client's/Owner's cost estimating consultant <input type="checkbox"/> Submit a \$/sf opinion of probable cost and review compliance with project budget <input type="checkbox"/> Attend up to _____ design coordination meetings
<input type="checkbox"/>	Design Development Submit a Schematic Design comments disposition <input type="checkbox"/> Submit basic floor plan drawings, riser diagrams, equipment schedules and basic details of selected MEP/FP systems <input type="checkbox"/> Prepare detailed calculations based on detailed programming information provided by the Architect, such as room criteria or data sheets. <input type="checkbox"/> Submit calculations for review <input type="checkbox"/> Perform basic coordination of MEP/FP, site, architectural, and structural elements <input type="checkbox"/> Review opinion of probable cost prepared by the Client's/Owner's cost estimating consultant <input type="checkbox"/> Submit a unit cost opinion of probable cost and review compliance with project budget <input type="checkbox"/> Resolve all significant issues and incorporate all approved Owner/User comments <input type="checkbox"/> Provide updates for the project schedule <input type="checkbox"/> Attend up to _____ design coordination/submittal review meetings
<input type="checkbox"/>	Construction Documents Submit a Design Development comments disposition <input type="checkbox"/> Submit up to _____ interim MEP/FP drawings and specifications for review and coordination <input type="checkbox"/> Perform quality assurance procedures <input type="checkbox"/> Participate in final coordination with all consultants <input type="checkbox"/> Submit final calculations <input type="checkbox"/> Submit a final opinion of probable cost <input type="checkbox"/> Submit bid documents, including original drawings and technical specifications for reproduction and distribution <input type="checkbox"/> Prepare a permit set for submittal to the authority having jurisdiction <input type="checkbox"/> Attend up to _____ design coordination/submittal review meetings
<input type="checkbox"/>	Bidding/Negotiation Attend a pre-bid conference <input type="checkbox"/> Answer bidders questions and prepare addenda material as required <input type="checkbox"/> Review bid results and offer recommendations <input type="checkbox"/>
<input type="checkbox"/>	Construction Administration/Assistance Resolve any permit design related issues <input type="checkbox"/> Prepare an Issued for Construction document set incorporating all addenda and permit corrections <input type="checkbox"/> Perform periodic on-site field observation and prepare a written report for up

- to _____ person visits.
- Review shop drawings and submittals
- Respond to Contractor's requests for information
- Prepare change order requests if required, exclusive of Owner requested changes
- Review Contractor's pricing for change order requests
- Prepare a final punchlist
- Project Closeout**
- Review Contractor's Record Drawings and Operations and Maintenance Manuals
- Perform a post-occupancy evaluation

E. Client/Owner Information

Design Input Information to be furnished by Client/Owner Table		
Design Input	Client	Owner
Project budget	<input type="checkbox"/>	<input type="checkbox"/>
Project schedule	<input type="checkbox"/>	<input type="checkbox"/>
Owner/User design criteria or standards	<input type="checkbox"/>	<input type="checkbox"/>
Survey	<input type="checkbox"/>	<input type="checkbox"/>
Record drawings	<input type="checkbox"/>	<input type="checkbox"/>
Program, design memorandums, studies, or reports	<input type="checkbox"/>	<input type="checkbox"/>
Room data or criteria sheets	<input type="checkbox"/>	<input type="checkbox"/>
Drawing and CADD standards	<input type="checkbox"/>	<input type="checkbox"/>
Guide specifications or specification format	<input type="checkbox"/>	<input type="checkbox"/>
Product data sheets for Owner-furnished equipment	<input type="checkbox"/>	<input type="checkbox"/>

F. Additional Services

Consultant Additional Services	
Condition assessments of existing systems	<input type="checkbox"/>
Procurement or coordination of testing of existing systems	<input type="checkbox"/>
Examination and documentation of existing conditions	<input type="checkbox"/>
Documentation or compilation of rough-in requirements for Owner furnished equipment	<input type="checkbox"/>
Energy code compliance calculations for building envelope	<input type="checkbox"/>
Energy usage modeling for code compliance calculations for MEP systems	<input type="checkbox"/>
Redesign for value-engineering after design development	<input type="checkbox"/>
Redesign due to change in Owner's criteria or code of record	<input type="checkbox"/>
Preparation of additive design alternates	<input type="checkbox"/>
Development of phased construction documents	<input type="checkbox"/>
Perform scope review with bidders	<input type="checkbox"/>
Submittal of electronic files for use by Contractor	<input type="checkbox"/>
Evaluation of Contractor's product substitutions	<input type="checkbox"/>
Resident engineering	<input type="checkbox"/>
Equipment start-up and testing observation or reports	<input type="checkbox"/>
Preparation of record documents	<input type="checkbox"/>
Warranty period observation and corrections for warranted work	<input type="checkbox"/>
Permit coordination	<input type="checkbox"/>
Environmental / clean air permit	<input type="checkbox"/>
Commissioning	<input type="checkbox"/>

IV. Compensation Methods

A. Basic Services

Basis of Compensation – Basic Services

- Lump sum

- Hourly (Direct Wage Expense x Multiplier)
 - Firm multiplier
 - Audited multiplier – Federal
 - Audited multiplier – city or state
 - With not-to-exceed amount

- Hourly (Flat Billing Rate by Position)
 - With not-to-exceed amount

- Percent of construction cost estimate
 - Include CA?

- Percent of actual construction cost @ bid
 - Include CA?

- Cost plus fixed fee
 - Firm multiplier
 - Audited multiplier – Federal
 - Audited multiplier – city or state

B. Expenses

Project Expense Table

Expense Type	Reimb	Direct	N/A
Vehicle mileage	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Vehicle rentals	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Out-of-town travel, lodging, and meals	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Instrument of service reproductions and delivery	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Permit fees	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Additional insurance coverage	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Renderings or photography	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

C. Additional Services

Basis of Compensation – Additional Services

- Lump sum

- Hourly (Direct Wage Expense x Multiplier)
 - Firm multiplier
 - Audited multiplier – Federal
 - Audited multiplier – city or state
 - With not-to-exceed amount

- Hourly (Flat Billing Rate by Position)
 - With not-to-exceed amount

- Cost plus fixed fee
 - Firm multiplier
 - Audited multiplier – Federal
 - Audited multiplier – city or state

V. Agreements

In the absence of a formal agreement, the following is an example of language to be included in proposals:

*“The terms and conditions of **AIA Document, Standard Form of Agreement between Architect and Consultant (latest edition)** shall apply to and be a part of this proposal. If this proposal is acceptable to you, please sign both copies. Keep one copy, and return one copy for our records, or issue an AIA C-141 Contract and attach this proposal as an appendix.”*

A. Form of Agreement

Form of Prime Agreement (Between Client and Owner)

- B141-1997, Standard Form of Agreement between Owner and Architect
- E-500, Standard Form of Agreement between Owner and Engineer for Professional Services
- E-520, Short Form of Agreement between Owner and Engineer for Professional Services
- E-505, Standard Form of Agreement between Owner and Engineer for Professional Services, Task Order Edition
- Owner furnished non-standard agreement
- Purchase order
- Letter agreement
- Other: _____

Form of Consultant Agreement (Between Consulting Engineer and Client)

- C141-1997, Standard Form of Agreement between Architect and Consultant
- C142-1997, Abbreviated Standard Form of Agreement between Architect and Consultant
- E-500, Standard Form of Agreement between Owner and Engineer for Professional Services
- E-520, Short Form of Agreement between Owner and Engineer for Professional Services
- E-505, Standard Form of Agreement between Owner and Engineer for Professional Services, Task Order Edition
- Client furnished non-standard agreement
- Letter agreement
- Other: _____

VI. Risk Management Assessment

Delivery Methods

Delivery method proposed	D/B/B	<input type="checkbox"/>	D/B	<input type="checkbox"/>
Construction manager	Yes	<input type="checkbox"/>	No	<input type="checkbox"/>
Fast track design & build	Yes	<input type="checkbox"/>	No	<input type="checkbox"/>

Client History

New Client	Yes	<input type="checkbox"/>	No	<input type="checkbox"/>
Existing Client	Yes	<input type="checkbox"/>	No	<input type="checkbox"/>
Returning Client	Yes	<input type="checkbox"/>	No	<input type="checkbox"/>
Prior relationship with Client	Positive	<input type="checkbox"/>	Negative	<input type="checkbox"/>

Possible Risks to Firm

Foreign travel	Yes	<input type="checkbox"/>	No	<input type="checkbox"/>
Injury/death claims potential	Yes	<input type="checkbox"/>	No	<input type="checkbox"/>
Insurance requirements	Yes	<input type="checkbox"/>	No	<input type="checkbox"/>
Impact to Firm project schedule	Yes	<input type="checkbox"/>	No	<input type="checkbox"/>
Loss of Client if not accepted	Yes	<input type="checkbox"/>	No	<input type="checkbox"/>
Other: _____	Yes	<input type="checkbox"/>	No	<input type="checkbox"/>

Decision Final Analysis

Accept risk	Yes	<input type="checkbox"/>	No	<input type="checkbox"/>	
Project insurance needed	Yes	<input type="checkbox"/>	No	<input type="checkbox"/>	
Project control located	_____				
Mitigate risk	Subcontract work with greatest risk	Yes	<input type="checkbox"/>	No	<input type="checkbox"/>
	List _____	Who	_____		
	List _____	Who	_____		
	Hold harmless provisions	_____			

Transfer of Risk

Owner contracts directly for:				
Architectural	Yes	<input type="checkbox"/>	No	<input type="checkbox"/>
Structural	Yes	<input type="checkbox"/>	No	<input type="checkbox"/>
Site/Civil	Yes	<input type="checkbox"/>	No	<input type="checkbox"/>
Mechanical	Yes	<input type="checkbox"/>	No	<input type="checkbox"/>
Plumbing	Yes	<input type="checkbox"/>	No	<input type="checkbox"/>
Electrical	Yes	<input type="checkbox"/>	No	<input type="checkbox"/>
Survey	Yes	<input type="checkbox"/>	No	<input type="checkbox"/>
Geotechnical	Yes	<input type="checkbox"/>	No	<input type="checkbox"/>
Acoustical	Yes	<input type="checkbox"/>	No	<input type="checkbox"/>
Asbestos	Yes	<input type="checkbox"/>	No	<input type="checkbox"/>
Other: _____	Yes	<input type="checkbox"/>	No	<input type="checkbox"/>