



## 01010

### Scope of Work

*This document provides design standards only, and is not intended for use, in whole or in part, as a specification. Do not copy this information verbatim in specifications or in notes on drawings. Refer questions and comments regarding the content and use of this document to the Yale University Project Manager.*

## CONTENTS

### [A. Summary](#)

## A. Summary

This section contains general scope of work requirements owner-consultant architectural and engineering services agreements. The scope of work may vary according to the project requirements. See [Section 01330: Designer Submittals](#), for detailed engineer submittals to Yale University.

### 1. Design/Enhanced Schematic Design

The engineering consultant must work with Yale University to define the best applicable systems based on performance, operation and ease of repairs, quality, first cost, operating cost, maintenance cost, and aesthetics. At the end of this phase, submit drawings, one-line diagrams, and a report to Yale University that address the following requirements. Include photographs and illustrations in the report, as necessary.

#### a. General

1. Survey and assess existing building systems.
2. Review applicable building codes, and identify requirements for the given building type and occupancy.
3. Identify energy sources and other utilities available or feasible at the site, and determine the most desirable sources that meet the needs of the project.



4. Identify or recommend the required degree of mechanical system flexibility to accommodate building expansion and changes in space usage or occupancy.
5. Identify special needs and/or Yale University requirements pertaining to mechanical systems, such as:
  - Special aesthetic treatment
  - Special safety or security requirements
  - Special acoustical requirements
  - Special temperature or humidity requirements, or control strategies
  - Indoor air quality levels
  - Special scheduling or sequencing of construction work
  - Special equipment
6. Propose recommended systems or equipment.
7. Provide information for the preparation of a detailed estimate of construction cost based on a preliminary system concept. Include a preliminary life-cycle cost analysis.
8. Determine the applicability of utility company or other energy conservation incentive programs.
9. Identify site conditions affecting construction.
10. Identify long lead-time items.
11. Provide the information necessary to develop a construction schedule.
12. Attend meetings, as requested, with Yale University, building committees, governmental agencies, and other groups.
13. Work with Yale University to determine energy management system requirements for all building systems.
14. Provide outline specifications in a system-type format.



### *b. Mechanical*

1. Provide preliminary load calculations.
2. Select generic heating or cooling equipment.
3. Review or propose alternate types of systems and analyze them for first cost and life-cycle cost comparisons.
4. Review space requirements and service accessibility for all systems and equipment.
5. Provide flow diagrams for major systems.
6. Provide a one-line diagram showing major equipment and the proposed piping and ductwork layout.
7. Provide a systems description and sequence of operation.

### *c. Electrical*

1. Provide one-line system diagrams.
2. Review or propose alternate types of systems and analyze them for first cost and life-cycle cost comparisons.
3. For renovation projects, submit copies of documentation generated during field investigations, including field notes, sketches, and photographs of all pertinent portions of the existing installation.
4. Provide preliminary load calculations based on loads shown in panelboard and switchboard schedules. Provide breakdowns of power consumption per square foot for lighting, air conditioning, and other major categories of utilization, together with total consumption.
5. Review space requirements, and service accessibility for all systems and equipment. Plan space requirements to meet the most demanding operations and maintenance required.
6. Provide a design intent document based on load requirements and design parameters.
7. Provide lighting calculations for each type of space in accordance with IES standards. Calculations must clearly indicate assumptions of reflectances, maintenance factors, and ballast factors. Present results in footcandles and in watts per square foot.



## 2. Design Development

Provide drawings and a report that addresses the following requirements:

### *a. General*

1. Provide an updated estimate of construction cost indicating scope changes and including cost implications and updated life-cycle costing.
2. Provide lead-times for ordering equipment.
3. Attend agency reviews as requested by Yale University (for example, owner representatives, building inspector).
4. Identify demolition requirements.
5. Attend utility company reviews.
6. Identify bidding alternatives.
7. Provide an updated code analysis as a result of the design process.
8. Provide outline specifications in CSI format.

### *b. Mechanical*

1. Provide preliminary detailed drawings showing equipment, piping and ductwork locations.
2. Determine space requirements for equipment, ductwork, and piping, including chases and mechanical rooms. Coordinate with structural members and other trades.
3. Define seismic requirements for mechanical systems.
4. Identify site utility locations.
5. Define equipment control strategies.
6. Update flow diagrams.



### *c. Electrical*

1. Provide updated one-line diagrams.
2. Provide updated electrical load calculations.
3. Provide harmonics calculations in accordance with standard IEEE 519.
4. Provide short-circuit calculations showing contributions from each source, the characteristics of each circuit element, and the short-circuit energy available at each bus. Calculations must indicate the selection criteria for conductors, in addition to overcurrent devices.
5. Submit coordination analyses or all types of overcurrent devices in series.

## **3. Construction Documents**

### *a. General*

1. Provide final load calculations (mechanical and electrical).
2. Provide code compliance calculations.
3. Coordinate with other trades.
4. Provide a final estimate of construction cost.
5. Attend the final review and coordination meeting with Yale University representatives.
6. Formulate a submittals list along with a list of proprietary or non-University standard equipment.

### *b. Drawings*

See [Section 01330: Designer Submittals](#).



## 4. Bidding

### a. General

1. Prepare or assist in the preparation of bid documents.
2. Review bid documents.
3. Assist in the selection of bidders.
4. Review bidder qualifications.
5. Attend pre-bid meetings with contractors.
6. Provide Yale University with a written analysis or comparison of submitted bids.
7. Review proposed substitutions or alternates.
8. Attend the bid opening meeting.

## 5. Construction

### a. General

1. Assist with the preparation and filing of permits.
2. Attend the pre-construction meeting.
3. Review shop drawings.
4. Inspect installed work (roughing and finished work).
5. Attend job meetings as requested by Yale University.
6. Assist in the approval of payments to contractors.
7. Initiate requests for change orders, and/or review change orders.
8. Prepare punch lists.
9. Prepare record drawings (as-built).
10. Prepare or review system operation and maintenance manuals.
11. Assist with turnover and building commissioning.



### *b. Mechanical*

1. Review testing or balancing reports.
2. Review emissions compliance studies.
3. Witness on-site tests of all mechanical systems. Provide a written report to Yale University.

### *c. Electrical*

1. Review contractor submittals and shop drawings.
2. Witness on-site tests of all electrical systems. Provide a written report to Yale University.

## **6. Post Construction**

- Verify system performance. (mechanical & electrical)
- Review as-built drawings.
- Review operation and maintenance manuals.
- Provide record drawings on Mylar<sup>®</sup> and diskettes.

### *a. Preparation and Reproduction Costs*

Costs for preliminary, bidding, construction, and record documents and costs for bid, construction, and post-construction services include the following:

1. Presentation renderings and models.
2. Two or three sets of all other documents for Yale University. (The number of sets is determined for each project.)
3. Documents required for approval of the project by all outside agencies and/or organizations, including those involved with funding, codes, and ordinances.
4. Documents required for bidding and construction.

**NOTE: In addition to furnishing the required quantities of documents to each general contractor, the local practice for bidding is to have the consultant make copies of the documents available to subcontractors on a refundable deposit when pre-filed bids are invited. Otherwise, the consultant will make copies of the documents available at the cost of reproduction.**



5. Systems Designs.

Do not allow contractors' shop drawings to in any way determine the design of systems or assemblies. Shop drawings are expected to reflect and respond to designs originated by the consultant.

6. Systems Descriptions.

As described in [Section 01330: Designer Submittals](#), the architect—through his consulting engineers—must provide maintenance and repair personnel with a written description of the mechanical and electrical systems and their operation, together with such one-line diagrams (or a reference to specific portions of the detailed drawings and specifications) as might be required. These descriptions are important to Yale University. Prepare them carefully and thoroughly. Systems descriptions and diagrams should be coordinated with, and cross-referenced to, contractor-furnished maintenance manuals. See Yale Specification, [Section 01782: Operations and Maintenance Data](#). Yale University will retain a portion of the architect's fee until all documents are complete.

7. Archival Material.

At the close of construction, or at any earlier stage at which they are no longer needed for the prosecution of work, the architect must collect and deliver to Yale University those developmental sketches, drawings, models or other materials that illustrate the evolution of the design and all presentation renderings and models prepared for any purpose relating to the building for which services were performed.





### *b. Fees for Special Consultants*

1. In general, the nature of the project indicates, at project inception, whether any features will require professional competence or knowledge beyond that available to the architect's office.
2. Unless the project inception agreement indicates otherwise, Yale University expects the architect's fee to cover any costs incurred in providing technical competence in all areas of design, including:
  - Structure, including soils engineering, de-watering, and underpinning
  - Mechanical features
  - Electrical features, including lighting
  - Vibration isolation and/or damping
  - Kitchen facilities
  - Hospital facilities
  - Laboratory facilities
  - Acoustics, including special design for acoustically significant areas or assemblies, and normal design for sound absorption and travel
  - Interior decoration involving building surfaces

### *c. Costs and/or Fees for Time Spent in Coordination with Yale University*

1. If the nature of the project indicates the need for coordination with Yale University, the architect's normal non-reimbursable services must include consultation with other University consultants in the fields of source, provision, and use of all utilities; architectural master planning; architectural landscape planning; exterior lighting; and occupational and environmental health.
2. The degree of such consultation is fixed during design development in discussion between the architect and Yale University's project administrators. The degree of such consultation is usually not excessive and is what an architect would expect to provide for an owner with an existing "campus."