

## SECTION 01 17 01

### Brown University Department of Facilities Management

#### LEAN CONSTRUCTION PROCESSES FOR DESIGN-BUILD PROJECTS

##### 1.1 GENERAL PRINCIPLES

Except to the extent otherwise directed in writing by Brown University, the Design-Builder and Design Professionals shall include the following tasks, services, and practices in their project operations. Brown University shall cause this Division 1 section to be incorporated into its Project agreements with Design-Builder, and Design Builder shall incorporate this section into their respective subcontracts and consulting agreements. To the extent the provisions of this section conflict with the Design-Build agreement or any other Contract Document, this section shall govern, except over conflicting provisions in written amendments made after the date this section became effective.

##### 1.2 DEFINITIONS

- A. "A-3 Report" is a Lean Construction tool. Unless otherwise directed by the Core Group, the A-3 Report template contains seven main elements that follow one another in a natural and logical sequence: background; current situation and problems; goals and targets; root cause analysis; action items and proposed implementation plan; verification measures; and follow-up. The Project Team will develop a custom A-3 Report template to be used for the Project. An A-3 Report should always address both the current condition and a target condition. All information should flow and be relatively simple.
- B. "Actual Cost" means the sum of the compensation paid to Design-Builder (for themselves and for their subcontractors, suppliers, and consultants) for their services on the Project.
- C. Design-Builder is the person or entity identified in Design-Builder's Phase 1 and Phase 2 agreements. References to General Contractor or Contractor in the Contract Documents are to be read as Design-Builder.
- D. Design-Build Contract Documents are the drawings and specifications, as defined in the Contract General Conditions.
- E. "Expected Cost" is the Project Team's best estimate of the final Actual Cost of the Project at the time of the Validation Study, based upon current best practices and similar projects, as adjusted according to this Section.
- F. "Final Completion" shall have the meaning defined in the Contract General Conditions.
- G. "GMP Budget" means the maximum Actual Cost established by Brown University to meet its objectives in Brown University's Program.
- H. "Brown University's Program" is an initial description of the Project and Brown University's objectives, including the GMP Budget, space requirements and relationships, time requirements, flexibility and expandability requirements, special equipment and systems, and Worksite requirements.

- I. "Target Cost" is the Project Team's specific and documented goal for the final Actual Cost, which reflects reduction to the Expected Cost as required to not exceed the GMP Budget.
- J. "Target Value Design" or "TVD" is a design methodology that requires Project values, cost, quality, schedule, and constructability to be basic components of the design criteria, and uses cost targets to drive innovation in designing a project that provides optimum value to Brown University.
- K. A "TVD Cluster" is a cross-functional team of designated representatives of the Project Team collaborating on the design or implementation of major Project components, systems, or processes to develop certain Project Team deliverables.
- L. "Validation Study" is the written report prepared by the Project Team during the Validation Phase addressing whether the Project can be designed and constructed within the GMP Budget and other parameters set forth in Brown University's Program.
- M. "Worksite" means the location identified in Design-Builder's agreement where the Work is to be performed.

### **1.3 PROJECT FUNDAMENTALS**

- A. **LEAN PROJECT DELIVERY:** Brown University expects that the Project will benefit by implementing "Lean Project Delivery," which includes: (a) collaboration throughout the Project between all members of the design and construction team (together with Brown University and Brown University's separate consultants, the "Project Team"); (b) planning and managing the Project as a network of commitments; (c) optimizing the Project as a whole, rather than any particular piece; and (d) tightly coupling learning with action (promoting continuous improvement throughout the life of the Project). Brown University intends to utilize Lean Project Delivery to facilitate construction of the Project. The Project Team members, including Design-Builder, its subcontractors, and Design Professional and its consultants, will be expected to reasonably share information and cooperatively collaborate for the benefit of the Project. Specific actions in support of these objectives are set forth elsewhere in the Contract Documents.
- B. **COOPERATION:** Design-Builder and Design Professional each promise to furnish its skill and judgment and to collaborate and cooperate with the Project Team to further the interests of the project. Each Project Team member shall furnish its services and work in an expeditious and economical manner. Brown University shall endeavor to promote harmony, collaboration, and cooperation among the Project Team. Project Team members are encouraged to share ideas freely and collaborate in an atmosphere of mutual respect and tolerance.
- C. **RELIABLE COMMITMENTS:** Project Team Members will make and secure reliable commitments as the basis for planning and executing the Project. In order for a promise to be reliable, the following elements must be present:
  1. The conditions necessary for the satisfaction of the commitment are clear to relevant Project Team members;
  2. The performer/promisor is competent and able to perform the task or has retained individuals or entities with the competence or ability to perform the task;
  3. The performer/promisor has estimated the time to perform the task, has allocated adequate resources to perform the task, and has properly scheduled time to perform the task;

4. The performer/promisor has no current basis for believing that the commitment will not be fulfilled; and
  5. The performer/promisor is prepared to be accountable if the commitment cannot be performed as promised and shall promptly advise the relevant Project Team members if it believes that the task may not be performed as committed.
- D. NO JOINT VENTURE, FIDUCIARY DUTY, OR PARTNERSHIP: Design-Builder, and Brown University are each independent contractors for all purposes, and nothing contained in the Contract Documents shall be construed to create an association, joint venture, trust or partnership, or impose a fiduciary duty, trust, or partnership obligation or liability on or with regard to either party. Design-Builder, and Brown University shall each be individually responsible for its own obligations and liabilities under the Contract Documents. Except where otherwise expressly approved by another party in writing, Design-Builder, and Brown University shall act only on an individual basis and shall not be authorized to act as agent or representative of any other party nor have the power or authority to bind any other party for any purpose.

#### **1.4 PROJECT TEAM LEADERSHIP**

- A. BROWN UNIVERSITY DESIGNATED REPRESENTATIVE: Brown University shall appoint a Project Manager ("Brown University's Project Manager") to manage the Project on Brown University's behalf. Brown University's Project Manager shall be responsible for coordinating action among the Project participants, including any additional Brown University personnel who must participate in decision making on the Project.
- B. DESIGN PROFESSIONAL'S REPRESENTATIVE: Design Professional shall appoint a representative ("Design Professional's Representative") approved by Brown University whose duties include, without limitation, directing and coordinating the work of Design Professional and its design consultants and participating in the Core Group. Design Professional shall not replace Design Professional's Representative unless the replacement has substantially equivalent or better qualifications than Design Professional's Representative whom he or she replaces. Design Professional's Representative shall represent Design Professional, and all communications given to Design Professional's Representative shall be deemed to have been delivered to Design Professional.
- C. DESIGN-BUILDER'S REPRESENTATIVE: Design-Builder shall appoint a representative ("Design-Builder's Representative") approved by Brown University whose duties include, without limitation, directing and coordinating the work of Design-Builder and its subcontractors and suppliers, and participating in the Core Group. Design-Builder shall not replace Design-Builder's Representative unless the replacement has substantially equivalent or better qualifications than Design-Builder's Representative whom he or she replaces. Design-Builder's Representative shall represent Design-Builder, and all communications given to Design-Builder's Representative shall be deemed to have been delivered to Design-Builder.
- D. CORE GROUP
1. CORE GROUP: The Core Group shall manage and serve as the decision-making body for delivery of the Project employing collaborative methods for achieving the highest value and most efficient and economical delivery of the Project. The Core Group shall be comprised, at a minimum, of an authorized representative of each of Brown University, Design Professional, and Design-Builder. The Core Group may unanimously invite other critical Project Team members to appoint members of the Core Group, either for a specific duration or until Project completion, for

purposes of advancing the overall collaborative approach and the best interests of the Project. Any representative of a Project Team member added as an additional Core Group member shall be entitled to participate in all Core Group functions and decision-making on an equal basis. Brown University, Design Professional, and Design-Builder members of the Core Group may unanimously remove any other Core Group member from the Core Group.

2. **DECISION-MAKING:** Consistent with lean principles of collaboration and to the greatest extent possible, the Core Group shall diligently seek to make unanimous actions and decisions. The Core Group shall act in the best interest of the Project as a whole consistent with applicable laws. Dispute resolution shall conform to the terms of the Contract Documents. The Core Group shall meet regularly to review Project performance, coordinate efforts, make key decisions, and stimulate excellence among Project Team members.
3. **SUPERVISION:** All Parties, consultants, Subcontractors, and suppliers providing labor, services, materials, or equipment to the Project are independent contractors. Each Project Team member is alone responsible for supervising its employees. However, the Core Group is responsible for developing and implementing a program for: (a) evaluating the Project Team's performance and their utilization of Lean Project Delivery; and (b) stimulating continuous improvement in the Project Team's performance. The performance improvement program will include at least the following elements: (a) an established set of no more than fifteen performance metrics; (b) a regular schedule for periodic evaluations; (c) a focus on behaviors of team members; (d) clear standards and protocols for evaluating performance against the established metrics; and (e) a feedback mechanism on recommendations to improve team member behavior.
4. **OBJECTION TO PERSONNEL:** Design-Builder, Design Professional and other Project Team members shall each remove from the Project any employee, person, or entity retained by it for the Project to which Brown University or the Core Group has a reasonable objection.

## **1.5 GENERAL TEAM RESPONSIBILITIES**

### **A. PROJECT PLANNING & SCHEDULE**

1. **PULL PLANNING:** The Project Team shall employ a pull scheduling approach to planning and scheduling which provides that preceding activities are not started sooner than is needed to assure the continuous performance of subsequent activities. Where the work of one Project Team member is dependent upon the prior performance of another Project Team member, the Project Team member whose work is dependent shall request of, and receive from, the prior performer a commitment as to when the precedent work will be finished. Applicable Project Team members shall agree upon criteria for the hand-off of items of work.
2. **CONSTRUCTION SCHEDULE:** When Project requirements have been sufficiently identified, Design-Builder shall prepare a preliminary construction schedule consistent with the contract time and project schedule for the review and approval of the Core Group. The construction schedule shall coordinate and integrate the services and activities of Brown University, Design-Builder, Design Professional, Subcontractors and the requirements of governmental entities. At intervals determined by the Core Group and in conformance with the Contract Documents, Design-Builder shall update the construction schedule for the Core Group's approval to indicate: (a) proposed activity sequences and durations; (b) proposed milestone dates for

such activities as receipt and approval of pertinent information; (c) issuance of the construction documents; (d) the preparation and processing of shop drawings and samples; (e) delivery of materials or equipment requiring long-lead-time procurement; (f) Brown University's occupancy requirements; and (g) estimated date of Substantial Completion of the Project.

- a. If construction schedule updates indicate that milestone dates contained in prior construction schedules will not be met, Design-Builder shall notify and make recommendations to the Core Group. If the Project is to be completed in phases, Design Professional and Design-Builder shall make recommendations to the Core Group regarding the phased issuance of the construction documents. Design-Builder shall monitor the performance of Subcontractors as it relates to the construction schedule; update the construction schedule; and if required, recommend corrective alternatives or adjustments to the Core Group.

## B. PROJECT TEAM COMMUNICATIONS

1. PROJECT COMMUNICATIONS PROTOCOL: After its formation, the Core Group shall promptly agree on communications protocol. The communications protocol shall: (a) identify critical Project personnel and their contact information; (b) provide a detailed Project meeting matrix with meeting frequency and attendance requirements; (c) allow for direct communication between and among Project Team members, as necessary, and identify when contemporaneous notification of the content of such communication should be made to the other Project Team members; (d) establish the exchange of documents and data in electronic form; (e) determine the necessary equipment, software, and services; (f) determine acceptable formats, transmission methods, and verification procedures; (g) establish methods for maintaining version control; (h) set forth privacy and security requirements; and (i) set forth stage and retrieval requirements. Except as otherwise agreed to by the Parties in writing, the Parties shall each bear their own costs as identified in the communications protocol. Absent a written protocol, use of documents and data in electronic form shall be at the sole risk of the recipient.
2. The Core Group will notify a Project Team member in writing with any difficulty resulting from the member's failure to comply with the communications protocol. Failure of a Project Team member to timely cure a breach of the communications protocol may be cause for replacement of the Team Member.
3. RECORDKEEPING: Unless the Core Group directs otherwise, Design-Builder shall maintain a log of all transmittals, change proposals, change order requests and other pertinent Project transactions and records and shall provide an updated copy of the log to the Core Group at intervals as directed by the Core Group. Design-Builder shall promptly provide to Brown University copies of such Project-related documents as Brown University may request. If Design-Builder intends to use an electronic system to monitor Project documentation, it shall be acceptable to the Core Group, prior to being placed into use.

## 1.6 SERVICES PRIOR TO CONSTRUCTION

### A. JOINT WORKSITE INVESTIGATION

1. The Core Group shall review whether additional information or joint investigations are needed concerning the Worksite to validate Brown University's Program. The Core Group shall identify in writing any apparent deficiencies or discrepancies in the information Brown University provides. Brown University shall provide required information in timely manner and in reasonable detail describing the physical

and legal characteristics of the Worksite, including surveys; Worksite evaluations; legal descriptions; available data or drawings depicting existing conditions, subsurface conditions, utilities, benchmarks, and adjacent property; and available environmental studies, reports, and investigations. Project Team members shall suggest options for investigation of existing conditions for Core Group consideration, including the cost and potential benefit of the differing levels of investigation prior to construction. Based on the Core Group's review of the available information and the level of investigation recommended by the Core Group and approved by Brown University, Design-Builder shall conduct joint investigations at or concerning the Worksite during the period prior to construction. The Core Group will prepare a report of the Project Team's findings and recommendations from this Worksite Investigation. Brown University may execute a service agreement amendment to facilitate this Worksite Investigation.

B. EVALUATION OF BROWN UNIVERSITY PROGRAM

1. The Core Group shall meet to review Brown University's Program for sufficiency. If Brown University's Program has not been sufficiently developed, the Core Group shall assist Brown University in the further development of Brown University's Program. Brown University shall provide any other available information or services that the Core Group deems necessary to fully develop Brown University's Program.
2. Design-Builder and Design Professional shall each review Brown University's Program to ascertain the requirements of the Project, and together with any other Project Team members then retained, shall meet to confer on and verify such requirements. The Project Team shall provide to Brown University for its written approval a joint preliminary evaluation of Brown University's Program and the Project requirements. This evaluation shall address issues bearing upon Project success including the need for additional study or for testing the Worksite with regard to access, traffic, drainage, parking, building placement, utilities, subsurface conditions, environmental factors, and other considerations affecting the building, the environment, energy use, as well as information regarding applicable laws. The joint preliminary evaluation of Brown University's Program shall also propose alternative architectural, civil, mechanical design approaches based on the most desirable approaches on the basis of cost, technology, quality, building operations and lifecycle, and speed of delivery. The Project Team shall review existing test reports, but shall not undertake any independent testing, unless the Contract Documents expressly provide otherwise. The joint preliminary evaluation shall identify any recommended deviations from Brown University's Program.

C. VALIDATION STUDY

1. VALIDATION STUDY AND EXPECTED COST: When Brown University's Program is sufficiently defined, Design Professional and Design-Builder shall undertake to confirm and validate whether Brown University's Program can be completed for the GMP Budget. Design-Builder shall present a Validation Study, which shall develop and approve the proposed Expected Cost and a proposed Project schedule including major milestone dates. After receiving and reviewing the Validation Study, Brown University shall provide written notice to the Core Group indicating whether or not it accepts the Validation Study's Expected Cost and Schedule.
2. If, at any time during validation of Brown University's Program, it appears that the Expected Cost will exceed the GMP Budget:

- a. Brown University may give written approval to increase the GMP Budget;
- b. The Core Group may direct the Project Team to collaborate on revising the scope of, or criteria in, Brown University's Program to bring it within the GMP Budget, and Design Professional in concert with the Core Group and with Trustee approval, shall revise the drawings and specifications to allow the Expected Cost to be reduced to be equal to or less than the GMP Budget; or
- c. Brown University may elect to terminate the agreements of Design-Builder for convenience pursuant to the terms of their respective agreement.

D. COST MODELING

1. During the Phase 1, Design-Builder shall provide cost modeling and analysis on a continuous basis. Design-Builder shall generate cost model reports at appropriate milestones as designated by the Core Group and the Contract Documents. Throughout the Project, Design-Builder and engaged subcontractors shall provide cost information and estimates of portions of the Work, systems under consideration, and such other cost information as required by the Core Group. The cost models may contain contingencies and allowances as agreed upon by the Core Group and approved by Brown University.
2. The Core Group shall establish milestones for updating and reconciling the cost model to assure that the overall cost meets or is trending toward Brown University's GMP Budget., The Core Group with Trustee approval shall give direction on what actions shall be taken by the Project Team.

E. INTEGRATED DESIGN PROCESS AND TARGET VALUE DESIGN

1. GOAL: The Target Value Design ("TVD") services are aimed to: (a) design the Project so it may complete Brown University's Program for less than the approved Expected Cost;  
(b) maximize all Project Team members' understanding of the design requirements, including the design intent and all technical requirements of the Project, prior to field construction; and (c) virtually eliminate requests for information or clarifications ("RFIs") after construction is commenced.
2. INTEGRATED DESIGN PRINCIPLES: The Parties acknowledge that value, cost, schedule, and constructability (including work structuring) are basic components of the design process and will proceed in a collaborative manner, informed by a free-flow of accurate information concerning program, quality, cost, and schedule. While retaining overall responsibility for the Project design, Design-Builder must work collaboratively with and draw upon the respective expertise of the other members of the Project Team, in order to achieve the Project objectives. Design Professional shall be responsible for coordinating and integrating the information provided by other Project Team members to develop a complete, coordinated, and integrated set of Design Documents.
3. PULL-BASED DESIGN PRODUCTION: Design-Builder and their subcontractors and consultants shall use "pull-based" planning in pursuing TVD and producing the Design Documents. The Core Group shall oversee development of the Design Documents for Project. The Core Group shall specify the documentation standards with which all Design Documents shall comply.
4. BUILDING INFORMATION MODELING APPROACH: To the extent directed by the Core Group, the Project Team shall use building information modeling ("BIM") to design and construct the Project in order to provide continuous, immediate, and reliable information regarding design, scope, schedule, and cost for integration and coordination by the Project Team. The Design-Builder shall establish, as applicable, the BIM parameters, standards, and technological requirements by executing and

attaching a BIM standards addendum to the agreements of Design Professional and applicable subcontracts and consultant agreements.

5. DOCUMENT REVIEW: Throughout all phases of the Project, and Design-Builder and Design Professional and their respective contractors and consultants shall use reasonable care to examine and compare the Design Documents with each other, with the report of the Joint Worksite Investigation, if any, and with any information furnished by Brown University as provided elsewhere in the Contract Documents and shall immediately report to the Core Group, in writing, any errors, inconsistencies, or omissions discovered. With reasonable promptness and without cost, Project Team members shall have access to the information described in this paragraph. Design Professional and Design-Builder and their respective contractors and consultants shall advise the Core Group in writing of any issues that would prompt them to include additional contingency in their estimates or require the responsible designer to make a design assumption that might prove wasteful if additional investigation was performed. Design-Builder, Design Professional and their respective contractors and consultants shall also suggest options for additional preconstruction investigation of existing conditions for Core Group consideration, including the cost and potential benefit of the differing levels of preconstruction investigation.
6. VALUE ANALYSIS STRATEGY: The Core Group shall develop strategies for value analysis and for avoiding the waste of re-drawing as part of its TVD efforts, including early involvement of certain of Design-Builder subcontractors who possess information essential to the TVD process, carrying multiple design options forward, and deferring decisions until the last responsible moment.
7. TARGET VALUE PRICING
  - a. Using the TVD process, Design-Builder, with Project Team support, shall diligently strive to design the Project so that it can be constructed for the GMP Budget, and with a further goal of delivering the Project for the Target Cost through innovation and collaboration. Unless already established in an approved Validation Study or a Contract Document, the Core Group shall establish the Expected Cost and the Target Cost early in the TVD effort by written notice to the parties. The Core Group shall jointly manage the budget to further the Project objectives. A decision that would cause the Target Cost to be exceeded may only be made with the express approval of Brown University.
  - b. Target value pricing is a continuing refinement of the cost models supporting the Expected Cost and the Target Cost. Depending on the stage of document development, the scope and nature of this ongoing effort may change. Cost analysis shall not be deferred until documents reach a certain stage of development, but rather shall be the by-product of the continuous TVD process. Design-Builder and its applicable subcontractors shall provide ongoing cost information and estimates of portions of the Work, systems, and details as they are developed or considered. Project Team members shall participate in all cost exercises that the Core Group deems advisable. The estimates, Expected Cost, and Target Cost shall each address escalation in labor and material prices only as provided by the Core Group in an escalation management plan. Unless Design-Builder's agreement with Brown University specifically provides otherwise: (a) the estimates, Expected Cost and Target Cost shall each include an allowance amount for certain labor and material price escalation as provided in the approved escalation management plan; and (b) escalation in certain labor and material prices on a unit cost basis beyond the unit costs shown in the Contract Documents or escalation management plan will be initially charged to the escalation



allowance.

- c. The Core Group shall develop written protocols for TVD, including items such as the following:
  - 1) Method to establish initial target costs for major components and systems;
  - 2) Method for determining targets for other cost elements;
  - 3) Schedule for selection of any design-assist or design-build subcontractors of Design-Builder;
  - 4) Method for forming and meeting structure for TVD Clusters for major Project components, processes, systems, or Project Team deliverables;
  - 5) Method of assure continuous cost analysis and reporting procedures within the TVD Clusters for monitoring estimated costs against components of the Expected Cost and Target Cost;
  - 6) Protocols for set-based design;
  - 7) Creation of a target value team comprised of the leaders of applicable TVD Clusters to meet regularly and frequently, with responsibility for evaluating TVD tradeoffs and opportunities (including function/ cost trade-offs) and authority to direct value analysis and adjustments of the component/system costs up or down to maintain or improve on the Target Cost
- d. If, in performing its obligations, Design-Builder or any of its consultants and design-assist or design-build subcontractors discover an error, omission, or inconsistency in the Design Documents, the applicable team member shall promptly notify the Core Group for action by the applicable team member and Design Professional.

## 8. VALUE AND CONSTRUCTABILITY ANALYSES

- a. Throughout the design of the Project and especially during early design, the Project Team shall identify options for reducing capital or life cycle costs, improving constructability and functionality, and enhancing operational flexibility consistent with Brown University's objectives. Consistent with the best interests of the Project, the Project Team shall bring forward value analysis proposals ("VAPs") within TVD Clusters, including alternative systems, means, methods, configurations, Worksite locations, finishes, equipment, and the like that satisfy the general design criteria of the Project. The VAPs shall: (a) create savings of time or money in designing, constructing, or operating and maintaining the Project; or (b) increase quality, constructability, or other measures of values that are cost effective.
- b. The Project Team shall use the TVD Clusters to break the work into smaller components for maximizing the benefits of the TVD process. VAPs shall be a primary focus of the TVD Clusters and should be a basis for set-based design. Each VAP shall: (a) examine the proposed alternative; (b) identify aspects of the Project

directly or indirectly affected by the alternative; (c) specify the value to be achieved if the VAP is accepted; and (d) detail any anticipated effect on the Project's service life, economy of operation, ease of maintenance, appearance, design, sustainability, or safety standards. Each VAP shall be documented using an A-3 Report format that evaluates the VAP's specifics in relation to the value elements identified in the initial value identification report prepared as part of the TVD process. TVD Clusters and the Project Team shall initially review and consider whether to carry a VAP as a set during design. In case of disagreement concerning whether to carry a VAP, the Core Group shall determine which VAPs to pursue. For each VAP that is carried forward, Design Professional shall ascertain design concept, and compatibility and compliance with applicable laws and professional standards of care.

- c. In SBD (Set-Based Design), teams identify and simultaneously vet multiple possible options, committing to implementing a technical solution only after testing and validating assumptions. Set-based design is best suited for situations with a high degree of innovation or variability involved, and problems with immovable deadlines.

## F. RISK IDENTIFICATION AND MANAGEMENT

### 1. RISK IDENTIFICATION

- a. **RISK WORKSHOP:** Early in Phase 1, the Project Team shall identify material project risks through one or more workshop sessions involving relevant participants. The Core Group shall select a facilitator to lead the risk workshop. The Core Group may choose to employ an independent risk facilitator or utilize an employee of a Project Team member.
  - b. **RISK IDENTIFICATION PROCESS:** The workshop participants shall identify material project risks through a risk matrix/mapping process utilizing brainstorming, checklist, and other appropriate techniques. The risk facilitator shall record and elaborate on a risk matrix prepared in accordance with the standard Brown University Risk Analysis format, based upon the collective assessment of the risk workshop participants. The Core Group shall, at agreed-upon intervals, update the risk identification report based upon the collective assessment of the the Core Group in light of any added relevant information.
2. **RISK EVALUATION AND ASSESSMENT:** The Project Team shall assess and rank identified risks in such a way that attention may be focused on those risks assigned a high priority. The Project Team shall adopt an appropriate scoring system identifying the likelihood of occurrence and the impact, paying particular attention to potential cost and time impacts to the Project. Once Project risks have been ranked and scored, the Project Team shall prepare a risk matrix identifying the principal Project risks and the team member assigned to lead Project Team efforts at monitoring and managing each risk.
  3. **RISK MANAGEMENT PLAN** Once the Project Team has identified material Project risks, it shall develop a risk management plan for addressing the identified risks, subject to Core Group approval. The risk management plan shall (a) set forth contingency plans for addressing identified risk; (b) assign primary responsibility for the management of specific risks; and (c) address the role of others in managing risks.

## 1.7 CONSTRUCTION PHASE

### A. QUALITY ASSURANCE AND QUALITY PLANNING

1. QUALITY The Project Team members will work diligently throughout the Project to assure quality, avoid defects, and proactively and collaboratively mitigate the impact of any defects that do occur.
2. BUILT-IN QUALITY PLAN: Design-Builder, in collaboration with the other Project Team Members, shall develop a plan that addresses the following issues:
  - a. Confirming that the Contract Documents clearly communicate to Project participants the conditions necessary for the satisfaction of their commitments;
  - b. Training workers on the benefits of standardized work practices, the continuous improvement of work practices, and the negative impact upon the Project of failing to achieve commitments;
  - c. Using mockups, first run studies, early completion of standard work units, and similar efforts to complete designs, demonstrate and document agreed-upon levels of quality;
  - d. Providing task-based quality checklists for use by trade persons to self-evaluate quality performance, establish benchmarks, and promote continuous improvement
  - e. Developing methods for onsite managers and others providing quality assurance to review early work product and assure quality performance;
  - f. Integrating quality review and Project planning and scheduling;
  - g. Developing protocols for trade persons to discuss and assure quality when Work is being handed off to another;
  - h. Identifying procedures for immediately addressing quality failures by workers originally performing Work to assure minimum cost impact and continuous improvement;
  - i. Developing procedures for recognizing outstanding performance and quality by individual trade persons and the Project Team members; and
  - j. Creating standards by which to measure and track quality performance.
3. Design-Builder and Subcontractors shall submit to the Core Group for its approval a construction operations quality plan that addresses the following:
  - a. The removal of clutter and all unnecessary items from the work environment;
  - b. Placing items that will be used during construction so as to facilitate their efficient and responsible use;
  - c. Creating a culture of discipline and continuous improvement.

- ### B. LOGISTICS PLAN
- Design-Builder shall order the material and equipment in accordance with an agreed-upon material logistics plan, the current phase plan, and the look ahead plan in an effort to promote just-in-time deliveries to the site and minimize handling costs and provide the least obstruction of the premises and any adjoining property.

C. SUBMITTALS AND REQUESTS FOR INFORMATION

1. Design-Builder shall submit to Brown University and Design Professional, for review and approval, all shop drawings, samples, product data and similar submittals required. Design-Builder shall be responsible to Brown University and Design Professional for the accuracy and conformity of its submittals to the Contract Documents. Design-Builder shall prepare and deliver its submittals to Brown University and Design Professional in a manner consistent with the project schedule and in such time and sequence so as not to delay the performance of the Work or the work of Brown University and others. When Design- Builder delivers its submittals to Brown University and Design Professional, Design-Builder shall identify in writing for each submittal all changes, deviations, or substitutions from the requirements of the Contract Documents. The review and approval of any submittal shall not authorize changes, deviations, or substitutions from the requirements of the Contract Documents without express written approval from Brown University. Such approval shall be promptly memorialized in a Change Order and, if applicable, provide for an equitable adjustment in Design-Builder's GMP, or Contract Time as appropriate. Brown University shall not make any change, deviation, or substitution through the submittal process without specifically identifying and authorizing such deviation to Design- Builder. Design-Builder agrees to timely submit for the review and approval of Brown University and Design Professional any shop drawings, samples, product data, manufacturer's literature, or similar submittals reasonably required by Brown University.

D. PLANNING FOR COMPLETION AND CLOSE-OUT

1. PHASE 2 PLAN FOR COMPLETION: At a date established by the Core Group, and in accordance with the Quality Control Plan, the Project Team shall develop a plan that addresses completion, commissioning, and close-out. The plan shall include a process for assuring that the Project, at the date of Completion, will satisfy the conditions of satisfaction established in the Contract Documents, without relying on a traditional "punch list process." If according to that plan, Brown University will take beneficial occupancy of all or any portion of the Project prior to Final Completion, Design-Builder shall prepare and submit to the Core Group and the inspector of record, a comprehensive list of items to be completed or corrected after Substantial Completion and before final payment (the "Final Completion List"). Failure to include an item on the Final Completion List does not alter the responsibility of Design-Builder to complete all Work in accordance with the Contract Documents. When Design-Builder believes that the Work, or portion which Brown University agrees to accept separately, is complete, it shall notify the Core Group, in writing.
2. COMPLETION: Design-Builder shall notify the Core Group when it considers all or a designated portion of the work to have been completed. The Core Group shall promptly conduct an inspection to determine whether the Work or designated portion meets the requirements for Substantial Completion- generally defined as the point in the Work that the project can be utilized by the Owner for its intended purpose. If the Core Group determines that the Work or designated portion has not reached Substantial Completion, the Core Group shall promptly compile a list of items to be completed or corrected in order to achieve Substantial Completion. The Project Team members shall promptly complete all items on the list that are their respective responsibilities to the satisfaction of the Group.
3. CERTIFICATE: When Brown University has confirmed that Substantial Completion of the Work or a designated portion is achieved, Brown University shall request that the

Design Builder prepare a "Certificate of Substantial Completion" that shall establish the date of Substantial Completion, and the respective responsibilities of Brown University and Design-Builder for interim items such as warranties, security, maintenance, utilities, insurance, and damage to the Work. The Certificate of Substantial Completion shall be submitted by Design-Builder to Brown University

**END OF SECTION**