Construction Manager as Constructor (CMc) Manual

Manual Courtesy of Purdue University

Presented By

Purdue University  Indiana University
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The project delivery method is one of the most important factors for Purdue to consider when embarking on a new construction project. Several fundamental project considerations are directly impacted by the delivery method selected. These considerations include the need to adhere to a realistic budget, a schedule that accurately represents the performance period, a responsive and efficient design process that leads to a quality set of documents, a thorough risk assessment followed by the proper allocation of risk by Purdue, and a recognition of the level of expertise within Purdue's organization or available to it.

On March 25, 2014, Governor Mike Pence signed into law House Bill 1196 permitting public agencies to utilize the Construction Manager as constructor (CMc) method of project delivery to build public buildings. CMc is also commonly referred to as Construction Manager at-Risk. Under this legislation, Purdue University is eligible to use the CMc method as of July 1, 2014.

Construction Manager as constructor is a project delivery method in which the Construction Manager acts as a consultant to the owner in the project development and design phases, and assumes the risk for construction performance as the equivalent of a general contractor holding all trade subcontracts during the construction phase.

Every construction project or program is unique, and for each, there is an optimum project delivery method. This manual describes the means, methods and best practices to procure and utilize a Construction Manager as Constructor and should be used as a guide when the CMc delivery method is selected.
Second Regular Session 118th General Assembly (2014)

PRINTING CODE. Amendments: Whenever an existing statute (or a section of the Indiana Constitution) is being amended, the text of the existing provision will appear in this style type, additions will appear in this style type, and deletions will appear in this style type. Additions: Whenever a new statutory provision is being enacted (or a new constitutional provision adopted), the text of the new provision will appear in this style type. Also, the word NEW will appear in that style type in the introductory clause of each SECTION that adds a new provision to the Indiana Code or the Indiana Constitution.

Conflict reconciliation: Text in a statute in this style type or this style type reconciles conflicts between statutes enacted by the 2013 Regular Session and 2013 First Regular Technical Session of the General Assembly.

HOUSE ENROLLED ACT No. 1196

AN ACT to amend the Indiana Code concerning state and local administration.

Be it enacted by the General Assembly of the State of Indiana:

SECTION 1. IC 5-32 IS ADDED TO THE INDIANA CODE AS A NEW ARTICLE TO READ AS FOLLOWS [EFFECTIVE JULY 1, 2014]:

ARTICLE 32. EMPLOYMENT OF CONSTRUCTION MANAGERS AS CONSTRUCTORS FOR PROJECTS

Chapter 1. General Provisions

Sec. 1. This article applies only to the following:

(1) A public works project of a state educational institution that begins after June 30, 2014.

(2) A public works project of a public agency, other than a state educational institution, that begins after June 30, 2017.

Sec. 2. Except as provided in this article, the applicable public works statute applies to the construction projects of the particular public agency performed under this article.

Sec. 3. This article expires July 1, 2020.

Chapter 2. Definitions

Sec. 1. The definitions in this chapter apply throughout this article.

Sec. 2. "Applicable public works statute" refers to whichever of the following statutes is applicable to public works projects of the public agency:

HEA 1196 — CC 1
(1) IC 4-13.6.
(2) IC 5-16.
(3) IC 36-1-12.
(4) Any other statute applicable to the public works projects of the public agency.

Sec. 3. "Applicable contract award standard" refers to the following:

(1) If the applicable public works statute is IC 4-13.6 or IC 36-1-12, the applicable contract award standard is "lowest responsive and responsible".
(2) If the applicable public works statute is IC 5-16, the applicable contract award standard is "lowest and best".
(3) If the applicable public works statute is a statute other than the statutes referred to in subdivision (1) or (2), the applicable contract award standard is the standard prescribed by the other public works statute that is the equivalent to "lowest responsive and responsible" or "lowest and best".

Sec. 4. "Architect" refers to a person registered under IC 25-4-1.

Sec. 5. "CMc" or "construction manager as constructor" means a person that provides CMc services.

Sec. 6. "CMc contract" refers to a contract for CMc services. Sec. 7. "CMc services" includes the following:

(1) Preconstruction phase services, including advice during the preconstruction phase of the project as described in the RFP.
(2) Consultation, collaboration, project construction management, and other services as described in the RFP, regarding the construction during and after the design and construction phases. However, the CMc may not procure the project professional architectural and engineering design services. The public agency must directly contract for the services of the architect and engineer of record.
(3) Development of a construction schedule, estimated cost of construction, and analysis of qualifications of first tier subcontractors.
(4) Subject to the CMc contract, a guarantee of:
   (A) the cost of the project; and
   (B) the project schedule.

Sec. 8. "Engineer" refers to a person registered under IC 25-31-1.
Sec. 9. "Evaluation committee" refers to a group of individuals who are responsible for evaluating the responses of offerors to the RFP.

Sec. 10. "First tier subcontractor" refers to a subcontractor who contracts directly with the CMc.

Sec. 11. "GMP" refers to the guaranteed maximum price for the work as may be established in the CMc contract.

Sec. 12. "Offeror" refers to a person who submits a response to an RFP.

Sec. 13. "Person" refers to a natural person, a partnership, a limited liability company, or a corporation.

Sec. 14. (a) "Project" means the construction, remodeling, rehabilitation, or repair of buildings or other facilities owned by a public agency as described in the RFP.

(b) The term does not include the construction, remodeling, rehabilitation, or repair of roads, highways, bridges, or potable water or wastewater infrastructure.

Sec. 15. "Public agency" has the meaning set forth in IC 5-30-1-11.

Sec. 16. "Request for proposals" or "RFP" refers to the process by which a public agency solicits persons to provide CMc services under this article.

Chapter 3. Request for Proposals

Sec. 1. If a public agency chooses to use the procedures set forth in this article when performing a public works project, the public agency shall select a CMc as provided in this chapter.

Sec. 2. (a) The public agency shall issue a request for proposals.

(b) Notice of a request for proposals shall be given as other notices are required to be given under the applicable public works statute.

Sec. 3. (a) A request for proposals must include at least the following:

(1) A statement of the criteria, process, and procedures, which must include consideration of qualifications and fees, by which:

(A) an offeror will be evaluated;
(B) a CMc will be selected; and
(C) a CMc contract will be awarded.

(2) Information about how the GMP may be established as part of the contract.

(3) A description of the insurance requirements for the CMc.

(b) The statement of the criteria for evaluation of offerors under
subsection (a) must include a statement that each offeror’s:

(1) history of contracting with or hiring minority, women, and veteran business enterprises; and
(2) good faith efforts to fulfill the state’s goals for contracting with or hiring minority, women, and veteran business enterprises;

will be considered in the evaluation of the offeror’s proposal.

Sec. 4. Each offeror selected to meet with the evaluation committee, based on the evaluation committee’s review of the RFP responses, must be given an equal opportunity to meet and communicate with the evaluation committee.

Sec. 5. A summary of the evaluation committee’s evaluation of each offeror is subject to disclosure under IC 5-14-3, but only after the CMc contract has been awarded.

Sec. 6. If the public agency determines to proceed with the project, the public agency shall enter into negotiations with the offeror whose proposal has been selected by the evaluation committee considering:

(1) the responses to the RFP;
(2) any interviews with selected offerors; and
(3) evaluation of fees.

Sec. 7. A CMc may perform a part of the work only if:

(1) the public agency approves of the CMc’s performance of the work;
(2) the CMc would be awarded a contract for the work under the applicable contract award standard; and
(3) the CMc performs only such work that equals not more than twenty percent (20%) of the total value of the project.

Chapter 4. CMc Contract

Sec. 1. After the public agency has selected an offeror to be the CMc, the public agency and that offeror may negotiate the final terms and conditions of the contract for CMc services for the project.

Sec. 2. (a) Subject to this article, the CMc contract must require the CMc to provide payment and performance bonds in an amount not less than the estimated construction costs of the project or the GMP, as provided by the RFP.

(b) Construction may not be performed until the CMc has provided the bonds for that construction as required in the RFP and IC 5-32-6.

Sec. 3. A CMc contract must describe the details of any adjustment of compensation or other incentives negotiated between the public agency and the CMc.
Sec. 4. A CMc contract may describe whether the CMc and the public agency agree to any cost overrun or delay damages or early completion incentives.

Sec. 5. Changes in the contract for CMc services may be made as provided in the CMc contract.

Sec. 6. A public agency or CMc may terminate the CMc contract before the GMP has been determined, if the RFP provides for a GMP.

Sec. 7. (a) If any of the following occur, the public agency may proceed as described in subsection (b):

(1) The CMc contract is terminated under section 6 of this chapter.
(2) The public agency and the selected offeror are unable to reach agreement on a CMc contract.
(3) The selected offeror does not provide the required bonds as provided in the RFP or this article.

(b) If any of the events described in subsection (a)(1), (a)(2), or (a)(3) occur, the public agency may do any of the following:

(1) Negotiate a contract with another offeror.
(2) Award contracts and complete the project under any other applicable public works statute.
(3) Terminate the project.

Sec. 8. A CMc contract may describe if and when the GMP will be determined. If a GMP is established, the contract must describe all clarifications and assumptions on which the GMP is based.

Chapter 5. CMc Award of First Tier Subcontracts

Sec. 1. The CMc shall comply with all notice, bidding, construction, and contract administration requirements relating to public works contracts that the public agency must comply with under the applicable public works statutes.

Sec. 2. (a) A first tier subcontract shall be awarded to the bidder for that contract that would be awarded the contract under the applicable contract award standard.

(b) Before award of a first tier subcontract, the CMc may prequalify potential bidders based on written criteria established and published by the public agency. Otherwise, the applicable public works statute applies.

Sec. 3. Each bidder must submit under oath as a part of the bid a statement of the following information:

(1) The bidder’s professional experience.
(2) The bidder’s proposed plan for performing the work.
(3) The equipment and personnel available for the performance of the work.

(4) The bidder's current financial status.

(5) The bidder's best estimate of the cost of each item of work to be performed, including a breakdown of all labor and materials required to complete the work.

Sec. 4. Once a bidder is selected, the CMc's contract with that bidder must include terms and conditions that are designed to accomplish the work at the lowest possible cost to the public agency.

Sec. 5. (a) Except as provided in subsection (b), a bid is a public record subject to public inspection under IC 5-14-3.

(b) A bid is not subject to inspection and copying under IC 5-14-3 until a contract has been awarded or the solicitation of bids has been canceled.

Chapter 6. Bonds

Sec. 1. The CMc shall execute a payment bond to the public agency, approved by the public agency, in an amount equal to the GMP, if established, or the proposed construction cost. The payment bond must be conditioned for payment by the CMc, the CMc's successors and assigns, and by the first tier subcontractors, their successors and assigns, of all indebtedness that may accrue to any person for any labor or service performed, materials furnished, or service rendered in the project. The bond by its terms must be conditioned to directly inure to the benefit of subcontractors, laborers, suppliers of materials, and those performing service who have furnished or supplied labor, material, or service for the project.

Sec. 2. (a) The CMc shall furnish proof of its ability to obtain a valid performance bond that is acceptable to the public agency in an amount equal to the GMP, if established, or the proposed construction cost.

(b) The CMc shall furnish the bond at the time of an early release construction package or when the GMP is determined and provided to the public agency.

(c) If the bond is acceptable to the public agency, the performance bond may provide for incremental bonding in the form of multiple or chronological bonds that, when taken as a whole, equal the GMP, if established, or the proposed construction cost. The surety on the bond shall not be released for a period of one (1) year after final settlement with the CMc. A change, modification, omission, or addition in and to the terms or
conditions of the contract, plans, specifications, drawings, or profile or any irregularity or defect in the contract or in the proceedings preliminary to the letting and awarding of the CMc contract does not in any way affect or operate to release or discharge the surety.
2.2 Analysis of House Bill 1196 and Requirements

Construction Manager as Constructor: A New Option to Deliver Public Construction Projects in Indiana

On March 25, 2014, Governor Mike Pence signed into law House Bill 1196 permitting public agencies to utilize the Construction Manager as Constructor (CMc) method (also commonly referred to as a Construction Manager at Risk) of project delivery to build public facilities with the exception of road, highway, bridge, potable water or wastewater projects. Under the new law state educational institutions may start using CMc on June 30, 2014, while other public agencies may use this method starting on June 30, 2017.

What is a CMc?

A CMc is responsible for constructing the project and serving as a trusted advisor to the owner. Under CMc the constructor is involved much earlier in the process by providing pre-construction services to the owner. From the outset the CMc provides input to the architect / engineer retained separately by the owner on the design and cost of the project. After each phase of the design the CMc may provide construction cost estimates and schedules which help the owner assess whether the scope meets the budget and time requirements. Generally the CMc contracts to build the project for the cost of the work plus a fee consisting of a percentage of the cost of the work or a lump sum. Often a guaranteed maximum price (GMP) is set at some point during the process, an amount the CMc guarantees the cost of construction work will not exceed.

The relationship between the owner and CMc is much closer than that of the owner and constructor in other delivery methods. The American Institute of Architects (AIA) recognizes this closer relationship by providing in its standard AIA CMc contracts that the CMc accepts a relationship of trust and confidence with the owner and agrees to exercise its skill and judgment in furthering the interests of the owner. Further, transparency is increased because the CMc is obligated to disclose certain costs and fees.

What procedures must be used to select a CMc?

Under the new statute, to utilize a CMc the owner must first publish a notice of Request for Proposals (RFP) that includes a statement of criteria, process and procedures by which the CMc will be evaluated, selected, and awarded a contract, information on how the GMP may be established and a description of insurance requirements. Potential CMc’s proposals must include a statement detailing their history of contracting with or hiring minority, women, and veteran business enterprises. The owner must form an evaluation committee to analyze the proposals and the evaluation committee must give each responder it selects to meet with equal opportunities to communicate with them. The public agency may enter into contract negotiations with the CMc whose proposal has been selected by the evaluation committee based on the responses to the RFPs, the interviews and an evaluation of the fees. It is important to note that unlike a general contractor in a Design-Bid-Build project, the CMc that is selected does not have to be the low bidder. If a GMP is to be set, then the contract must describe all clarifications and assumptions on which the GMP is based.

If the RFP called for a GMP, the public agency or the CMc may terminate the contract before the GMP has been determined. If the public agency and CMc recommended by the evaluation committee are unable to agree to a contract or the contract is terminated before the GMP is set, then the public agency can negotiate a contract with a different CMc who submitted a proposal or bid and award contracts and complete the project under the applicable public works statute.

State educational construction projects will serve as the pilot program for CMc in Indiana. It is likely the legislature will make changes to the statute based on the experiences of the state educational institutions using CMc before other public agencies are permitted to use CMc in mid-2017. (Dankert, Jones, Uhl, 2014)
3.1 When and Why to Use Construction Manager as Constructor (CMc)

Project delivery methods carry different levels of risk for Purdue. Generally, the level of control retained by Purdue correlates with the level of risk, and those levels typically have an inverse relationship to the risk and control levels of the contractor.

**Construction Manager At-Risk (CMc)** – A project delivery method in which the construction manager acts as a consultant to the Owner in the development and design phases, but assumes the risk for construction performance as the equivalent of a general contractor holding all trade subcontracts during the construction phase. This delivery method is also known as Construction Manager At-Risk.

**Design-Bid-Build (DBB)** – The traditional Purdue delivery method, which customarily involves three sequential project phases: design, procurement and construction. An architect/engineer will provide the design and then contracts are bid and awarded to a single or multiple contractors.

**Design-Bid-Build (DBB) + Agency Construction Manager (CMA)** - On occasion, the DBB contracts bid and awarded as multiple prime contracts are managed by an Agency Construction Manager (CMA). A CMA is paid a fee to manage the contractors in an advisory role but does not hold the contracts or the associated risks.

**Design-Build (DB)** – A project delivery method that combines architectural/engineering design services with construction under one contract.

No delivery method is right for every project. There are relative advantages and disadvantages associated with the owners risk and control with each delivery method. Purdue needs to carefully assess the specific project requirements, goals, and potential challenges and determine the delivery method that offers the best opportunity for success.

The table below summarizes the relative levels of the owners risk and control for the respective delivery methods.

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<thead>
<tr>
<th>Design-Build</th>
<th>CM at Risk Contracts</th>
<th>Design-Bid-Build</th>
<th>Multiple Prime Contracts</th>
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</table>
3.1 When and Why to Use Construction Manager as Constructor (CMc)

**CONSTRUCTION PROJECT DELIVERY METHOD ANALYSIS**

**Design-Bid-Build**
- **OWNER**
- **A/E**
- **GENERAL CONTRACTOR**
- **SUBCONTRACTORS**

**Characteristics**
- Owner and Architect/Engineer develop program and complete plans and specifications
- Architect/Engineer is responsible for budget estimates, constructability review, and design
- After the project documents are completed, bids are solicited
- Traditionally, the low bidder is awarded the contract to construct the project
- Communication is directed through the Architect/Engineer to the Owner

**Advantages**
- Traditional, familiar delivery method
- Defined roles/responsibilities of the team

**Disadvantages**
- Does not facilitate a “fast-tracking” process
- Budget estimates may or may not be accurate
- Architects/Engineers are not always current on market conditions for construction costs
- Low bidder may not understand project goals, objectives, and criteria
- Owner has limited control or input on sub-contractor selection
- Process puts Owner as issue resolution agent if contract documents and constructability conflict
- Higher potential for change orders and conflicts
- Owner has limited control or input on contractor and subcontractor staff
- No shared cost savings
- Owner’s risk is higher
- Project cost determined late

**Design-Build**
- **OWNER**
- **DESIGN-BUILDER**
- **A/E**
- **SUBCONTRACTORS**

**Characteristics**
- Owner selects Design-Build team based on quantitative and qualitative proposals
- The Design-Build team is fully responsible to the Owner for the delivery of a project
- A GMP is established early
- Communication for the project flows through the Design-Build team to the Owner

**Advantages**
- Owner has a single contract for design and construction (single source of accountability)
- GMP is established early and Owner risk is low
- Except for Owner initiated changes, there are no change orders
- Owner involvement is discretionary
- Construction budget control is maximized
- Owner is not issue resolution agent between Architect/Engineer and Contractor

**Disadvantages**
- Limited opportunities for schedule to be accelerated or “fast-tracked”
- Design is complete at GMP
- Quality control is responsibility of Design-Build team
- Selection of a Design-Build team is somewhat cumbersome and based partially on price
- Owner has limited control or input in selecting consultants/sub-consultants

**CMc**
- **OWNER**
- **CONSTRUCTION MANAGER**
- **A/E**
- **SUBCONTRACTORS**

**Characteristics**
- Owner selection of CMc based on qualifications
- Architect/Engineer is responsible for design
- CMc is responsible for budget estimates and constructability review
- Architect/Engineer and CMc work together to deliver the project the Owner requires
- A GMP is established early
- Competitive bids for all subcontracts and other project cost elements

**Advantages**
- CM and Architect selection based upon qualifications
- Project finances are open book
- Early CM involvement to control budget and schedule
- Owner may be involved in sub-contractor selections
- GMP is established early
- All work is competitively bid
- Projects can be delivered utilizing a “fast-tracked” schedule
- Opportunity for shared cost shaving
- Owner’s risk is lower
- Alignment of CMc and Owner goals
- Subcontractors are prequalified

**Disadvantages**
- Perception that price competition is limited
- Can create adversarial relationship between Architect/Engineer and CMc after design phase is complete
3.1 When and Why to Use Construction Manager as Constructor (CMc)

Conditions for Use of CMc

Conditions to be considered when determining which projects are candidates for Construction Manager At-Risk are:

- The project is large and/or complex; or,
- Early and accurate cost information is required; or,
- The overall project schedule is very aggressive; or,
- The project is an alteration of an occupied facility which requires working around or relocating occupants while keeping the facility fully operational; or,
- The project is a repair or renovation where conditions requiring correction cannot be determined and specified without extensive contractor involvement in the removal and examination process during the design phase.

When to Engage a CMc

Typically, the construction manager is selected before or during the schematic design phase of the project and made an integral part of the design and pre-construction process.

Design and Pre-construction Phase of CMc

Contracts for construction management services consist of two phases. The first phase of the contract is pre-construction services, wherein the construction manager is paid a fixed fee for services performed and is an integral part of the design process. Pre-construction services provided by a CMc may include value engineering, scheduling, constructability analyses, and the development of a Guaranteed Maximum Price (“GMP”). “GMP” refers to the Guaranteed Maximum Price for the work as established in the CMc contract.

Construction Phase of CMc

The second phase of the contract is the construction phase. The construction phase of the contract is initiated upon acceptance of the GMP. During the construction phase, the construction manager becomes the single point of responsibility for performance of the construction contract for the project and functions in the role of an independent contractor, publicly bidding trade contracts.

Funding Considerations for CMc

When utilizing the CMc method, adequate funding for pre-construction services during the design and pre-construction phase must be available during the pre-construction phase (before acceptance of the GMP) and must be considered when planning funds are requested for appropriation.
3.1 When and Why to Use Construction Manager as Constructor (CMc)

Benefits of Construction Management At-Risk

- Purdue, Architect / Engineer and Construction Manager are a team with common goals and priorities
- Purdue gains full time, on-site representation
- Complete and accurate project costs are established early.
- Incremental pricing occurs through the design development allowing control of the budget
- Minority contractor participation opportunities can be greatly increased
- Sub-contractors are prequalified before bidding for better control of quality, schedule and cost
- Project records are open book
- Purdue involvement in day-to-day management of the project can be reduced
- Constructability reviews during the design process eliminate timely and costly re-design
- Value engineering effort by the Construction Manager can lower the cost of construction
- Purdue can gain lower maintenance and operating costs due to life cycle analysis by Construction Manager
- Purdue can select CMc on factors other than price
- Purdue’s risk is reduced
This document has been created to provide assistance, guidance and best practice recommendations to Purdue when selecting a design team. Following are the chronological steps that should be taken in the selection of an Architect:

**Requirement**

Indiana Code (IC) 36-1-12-7 requires that any public works project in excess of $100,000 may only be undertaken with plans and specifications approved by an architect or engineer licensed under IC 25-4 or IC 25-31.

**Indiana Code Selection Requirements for Professional Services**

IC 5-16-11.1 defines the requirements for retention of Architects, Engineers and Land Surveyors for public projects. The law allows for Purdue to contract for professional services on the basis of competence and qualifications and negotiate compensations that Purdue determines to be reasonable. Furthermore, Purdue has discretion of whether to give notice regarding the employment opportunity. If Purdue chooses to publicly provide notice, the notice must include:

- Location of the project
- General description of the project
- Criteria to be used to select design professional
- Where additional information regarding the project can be attained
- Business hours of the public agency
- Last date for accepting statement of qualifications

**Who to hire first Architect or CMc**

Typically, it is recommended to hire the Architect / Engineer first followed by the CMc. The Architect / Engineer will need to generate a program for the new building and gain an understanding of the project. Once the program is established, the CMc will be able to provide valuable pre-construction information such as which structural type will be the most economical for the building (steel, concrete, load bearing studs, etc.). It is in Purdue’s best interest to solicit feedback from the selected Architect to start the selection process of a CMc. Having a CMc and Architect that work well together can be a factor in the success of a project.

**Selection Process:**

The selection process begins after a project is approved. The selection process commences with a Request for Qualifications (RFQ) notification letter that is sent to interested design firms.
The basic framework for a RFQ should include the following:

- A description of the scope of the project and project delivery systems to be utilized (CMc)
- A summary of the anticipated design services and disciplines required to complete the work
- Identification of Purdue’s designated point-of-contact for any questions, clarifications and final submission of qualifications (contact name, phone, email address, etc.)
- Clearly defined format for the submittal
- Anticipated timeline of events for the selection process
- The position and titles of members on the selection committee (if available)
- Information requested to be submitted as part of the RFQ should include:
  - General information from the participating firm (firm name, contact name, address, phone, years in business, specialties, etc.)
  - Information on the participating firm’s culture, management style and service philosophy
  - Client and contractor references for the participating firm
  - Project team and designated personnel proposed by the participating firm
  - Office location
  - Schedule review and confirmation statement – This will inform the Architect/Engineer early of Purdue’s schedule intent.
  - ‘Innovative Delivery Statement’ – A summary of how the firm has successfully implemented projects via an innovative delivery model such as Design-Build, Construction Manager as Agent, Construction Manager as Constructor and Developer, etc. It shall include items like: Architect/Engineer philosophy on working with the contractor, managing project costs and maintaining quality.
  - Project experience for relevant projects. With each project include the following details:
    - Staff and their role
    - Design consultants/sub-consultants
    - Construction estimate and total costs
    - Overview of project schedule
    - Square footage and comparable features
    - Contractor(s)
Once the RFQ is released, it is highly recommended that a log be maintained listing all firms requesting submittal information. Then, as notices of change and addenda are issued for the RFQ, they can be sent to all participating firms.

It is important that sufficient time be allowed for participating firms to prepare responses. (Up to three (3) weeks) A pre-proposal meeting should be considered approximately two weeks prior to the submittal deadline to answer any questions and address clarifications as needed. All questions and answers, either from the pre-proposal meeting or submitted separately in writing, should be published in an addendum and sent to each of the participating firms.

Submitted RFQs are organized into three categories:

- In-state team (most desirable)
- In-state/out-of-state team
- Out-of-state team (least desirable)

The RFQs are then evaluated by a combination of the following people:

- Physical Facilities staff
- User group representatives

**RFQ Evaluation:**

In qualifying and selecting an architectural firm, Purdue must be clear internally on the qualifications it is seeking and the methods it will follow to establish the qualifications. Purdue must have a clear understanding about how it will evaluate qualifications submitted. One of the best ways to accomplish this objective is to establish a point scoring system. The items requested in the RFQ should be given point values and weighted. Each member of the selection committee should set together in a room and evaluate the proposals as a team discussing the pros/cons of each submission.

Upon completion of the meeting, the 3 to 5 firms achieving the highest average score should be shortlisted and invited for an interview. A shortlist letter sample is included in the ‘Document Templates and Samples’ Section of this manual.

The shortlist letter should be utilized to notify the successful firms of the requirements of the interview. As a best practice, it is ideal to share as much information as possible with each firm to describe the specifics of the project. Sharing this information will allow the architectural firms to tailor their individual interview presentations to be specific to this project. More details allow the firms to show their innovation and commitment to the project as well as keeping the interviews interesting.
4.0 Designer Selection
Best Practices for CMc

Interview Process:
The interview committee is formed from Physical Facilities staff along with the User Group representative(s).

The intent of the interview process is to:
- Follow up on the responses to the questions sent in the shortlist letter
- Develop an understanding of the proposed Design Team’s vision, style and past experience on similar types of projects
- Allow the User Group to evaluate the assembled Design Team and determine if the fit will successfully meet the goals and objectives of the project

Specific project criteria used for the evaluation may include:
- Fee
- Design Team’s specific project experience
- Design Team’s Project Manager
- Project specific understanding of the program
- Team’s design ability based on examples of past work shared in its response to the RFQ
- Project consultant’s value to the Design Team
- Design Team’s working relationship with their consultants
- Rapport between the Design Team and the User Group
- MBE/WBE/VBE significant and meaningful participation

Evaluation of the Interview:
The University Engineer and University Architect will make an award recommendation to the Vice President of Physical Facilities.
Construction Manager as Constructor Selection Best Practices

This document has been created to provide assistance, guidance and best practices recommendations to Purdue when selecting a Construction Manager as Constructor (CMc). Following are the chronological steps that should be taken in the selection of a CMc:

Indiana Code Selection Requirements for Construction Managers as Constructors

IC 5-32 (House Bill 1196) allows public works projects of state educational institutions to employee Construction Managers as Constructors for projects. The article expires July 1, 2020. IC 5-32 has specific requirement that must be addressed, each of these items are addressed in the sections below.

Definitions

“Request for Proposals” or “RFP” - The process by which a public agency solicits persons to provide CMc services under this article.

RFP-A - The initial qualifications based review. From these responses, firms will be shortlisted to proceed to the next stage (RFP-B)

RFP-B – The second stage of the selection process which is a more in depth review of the qualifications. From these responses, firms will be shortlisted to proceed to the next stage (RFP-C)

RFP-C – The third stage of the selection process, the Interview. From the interviews a firm will be selected.

Who to Hire First Architect or CMc

As a general rule, it is best to hire the Architect first followed by the CMc. The architect will need to generate a program for the new building and gain an understanding of the project. Once the program is established, the CMc will be able to provide valuable information such as which structural type will be the most economical for the building (steel, concrete, load bearing studs, etc.). It is in Purdue’s best interest to solicit feedback for the selected architect in selection of a CMc. Having a CMc and Architect that can work well together will be crucial for project success.

Selection Process:

The selection process commences with a Request for Proposal (RFP) notification. Public Notification of the RFP shall be given pursuant to IC 5-3-1 and all contractors are eligible to respond to the RFP.

A sample Public Notification for Request for CMc Services can be found in the ‘Document Templates and Samples’ Section of this manual.

The RFP is comprised of three components, RFP-A, RFP-B and RFP-C. The purpose of breaking up the RFP into three components is to expedite the review process, and keep unqualified contractors from doing unnecessary work responding to detailed RFP questions. Indiana Statute allows for anyone to respond to the RFP, so multiple responses can be expected. RFP-A is the initial qualifications based review that is designed to quickly eliminate unqualified proposers. RFP-A and RFP-B are issued in the same RFP document, but responses to RFP-A are due in advance of RFP-B.
5.1 CMc Selection Best Practices

Once the public notice for the RFP is released, it is highly recommended that a log be maintained listing all firms requesting submittal information. Then, as notices of change and addenda are issued for the RFP, they can be sent to all participating firms.

It is important that sufficient time be allowed for participating firms to prepare responses to RFP-A (3 weeks) and RFP-B (3 weeks after RFP-A shortlist is determined). A pre-proposal meeting should be considered approximately two weeks prior to the submittal deadline to answer any questions and address clarifications as needed. All questions and answers, either from the pre-proposal meeting or submitted separately in writing, should be published in an addendum and sent to each of the participating firms.

RFP A and RFP B Responses are evaluated the same way.

Submitted RFP Responses are organized into three categories:

- In-State team (most desirable)
- In-State/Out of State team
- Out of State team (least desirable)

The RFP Responses are then evaluated by Physical Facilities Staff.

RFP Response Evaluation:

In qualifying and selecting a CMc, Purdue must be clear internally on the qualifications it is seeking and the methods it will follow to determine qualifications. Purdue must have a clear understanding about how it will evaluate qualifications submitted. After the selection committee has independently reviewed the qualifications submitted, the committee should set meet to collectively review and evaluate the proposals as a team, discussing the pros and cons of each submission.

Upon completion the review meeting, the 3 to 5 firms determined to be best qualified should be shortlisted and invited for an interview. The shortlist letter should be utilized to notify the successful firms of the requirements of the interview. As a best practice, it is ideal to share as much information as possible with each firm to describe the specifics of the project. Sharing this information will allow the construction firms to tailor their individual interview presentations to be specific to this project. More details allow the firms to show their innovation and commitment to the project as well as keeping the interviews interesting.
Interview Process:
The interview committee is formed from Physical Facilities Staff.

The Intent of the Interview Process is to:
- Follow up on the responses to the questions sent in the shortlist letter
- Develop an understanding of the construction team’s vision, style, and past experience on similar types of projects
- Allow the User Group to evaluate the assembled construction team and determine if the fit will successfully meet the goals and objectives of the project

Specific Project Criteria Used for the Evaluation may Include:
- Fee
- Construction Team’s specific project experience
- Construction Team’s Project Manager
- Project specific understanding of the program
- Preconstruction Organizational Staff Chart
- Construction Organizational Staff Chart
- Team’s ability based on examples of past work shared in its response to the RFQ
- Construction Team’s working relationship with the Architect
- Rapport between the Construction Team and the User Group
- M/WBE significant and meaningful participation

Evaluation of the Interview:
The University Engineer will make an award recommendation to the Vice President of Physical Facilities.
5.2 Best Practices Related to Allowing CMc to Self-Perform Work

Indiana Code Requirements for Self Performance

IC 5-32 Chapter 3 Section 7 states that a CMc may self-perform a part of the work only if: 1) Purdue approves of the CMc self-performing the work; 2) the CMc would be awarded a contract for the work under the applicable contract award standard; and 3) the CMc performs only such work that equals not more than twenty percent (20%) of the total value of the project.

There are two distinct opinions when it comes to the CMc self-performing work:

The first opinion is that self-performing a portion of the work allows the CMc to better control cost, quality and schedule. Since the CMc would be utilizing its own forces, it can directly control the manpower on the project and set the pace of the job. Since the CMc is a risk for the work, it is in the CMc’s best interest to produce high quality work and set the example for other subcontractors. If the CMc is self-performing the work, the opportunity for subcontractor delay claims is reduced (since there are less subcontractors). The CMc is ultimately responsible to deliver a quality project within the GMP schedule and budget; therefore, the choice of who to perform the work should ultimately be that of the CMc.

The second opinion is that it is bad practice for a CMc to furnish construction labor or do any portion of the construction work. CMc self-performance leads to a perceived (or real) conflict of interest. CMc’s should take bids for all construction work to ensure competitive pricing, then the CMc should see to it that each subcontractor delivers what is specified. A CMc cannot perform that role on work done by the CM’s own employees without being exposed to criticism for conflict of interest. If a CMc bids against other subcontractors, the subcontractors may feel that the CMc has an advantage. If the CMc is awarded a separate lump sum contract for the self-performed work, the Owner will have to monitor billings to ensure the CMc is not billing for ‘self-performance supervision’ as part of its CMc General Conditions, etc.

As stated above, the two opinions for whether a CMc should self-perform are on opposite ends of the spectrum. Purdue’s acceptance of self-performance should be decided on a project by project basis with consideration of the CMc’s reputation. For example, if the CMc is well respected in the industry for exceptional concrete work, and is known to drive the project schedule, then consideration for self-performance should be heavily considered.
The Construction Manager shall include with the Guaranteed Maximum Price proposal a statement of the estimated Cost of the Work organized by trade categories or systems, allowances, contingency, and the Construction Manager’s Fee also known as a cost model.

The amount of detail in the estimate should directly correlate to the amount of detail in the design documents that the GMP is based on.

The cost model should be broken down in sufficient detail to allow Purdue and the Architect to understand the component pricing that the GMP is based on. Once the cost model has been developed, the Architect should review the detailed cost estimate to confirm that the unit prices utilized in the estimate are in line with the design intent. For example, the architect/engineer should review the unit price utilized for brick, metal wall panels, carpet, ceramic tile, curtainwall, or lighting fixtures to list a few. The architect/engineer should also review quantities utilized in the cost estimate for items that may be inferred but are not fully detailed in the GMP Drawings.

Purdue should review the cost model at a very high level and determine that the overall unit costs, $/SF, $/Bed, etc. are in line with Purdue’s historical averages. If it is found that the costs are well above or below the historical averages, then the CMc should explain why the project does not fit within the historical range. (i.e. increased utility cost, upgraded finishes, deep foundations)

It is also recommended that a peer review of the GMP is conducted with Purdue’s staff. It is critical to understand the details of the GMP and what items are included and excluded, as well as fully comprehending the qualifications and assumptions associated with the GMP.
5.4 Best Practices on Defining the GMP Submittal Package

What is a GMP (Guaranteed Maximum Price)

“GMP” refers to the guaranteed maximum price for the work as established in the CMc contract. Effectively the GMP is the sum of the cost of the work plus the CMc’s fee.

What Should be Included in the GMP Submittal Package

The GMP Submittal package must contain all clarifications and assumptions on which the GMP is based. As a best practice, the GMP submittal package should also contain a Drawing and Specifications Log listing the documents on which the GMP is based, a matrix defining items that are to be furnished and / or installed by Purdue, construction schedule, site logistics plan showing any required road closures, cost model (detailed estimate including a detail of general conditions cost), list of allowances included in the GMP, and a list of alternates (additive and deductive).

- For projects that do not require phasing or fast track packaging, it is recommended that the GMP be provided by the CMc when the construction documents are 100% complete.
  - **Pros:** The use of contingency allowances can be minimized and their usage can be more clearly defined. The need for subcontractors to qualify their bids or proposals is minimized.
  - **Cons:** Work does not begin until the GMP is accepted by the Purdue.

- For projects that require phasing or fast track packaging, the percentage of completion of the construction documents used for the GMP(s) will vary by project, depending upon how the project is structured. Whenever possible, it is recommended that the phasing or packaging be established by construction sequence, such as using a site package or a foundation package, rather than just stating that the GMP will be provided at 50% or 75% completion of the construction documents. It is also recommended that the total project budget and individual package budgets be established from the outset so overall budget control can be maintained as individual packages are released.
  - **Pros:** Allows for an earlier start of construction, thus relieving potential schedule pressure.
  - **Cons:** Typically results in the use of larger and possibly less clearly defined contingency allowances. Subcontractors may include more qualifications and/or exclusions in their bids or proposals.

Construction Manager’s Fee

The Construction Manager’s fee represents the CMc’s overhead and profit and is further defined in the AIA A133 Contract Document to include costs not to be reimbursed. These costs include salaries and other compensation of the CMc’s personnel stationed at the CMc’s principal or other offices other than the project site office. Exceptions include supervisory and administrative personnel when stationed at the project site such as a project manager that spends a portion of his time at both locations. These exceptions need to be addressed in the CMc’s proposal and general conditions, if they are part of the proposal. Other costs, which are considered part of the fee, include the CMc’s principal office or offices other than the project site, general and administrative costs, and CMc’s capital expense. A broad definition of fee would be any cost that is not directly required to complete the specific contractual scope of work. It is important to note that the law does not require that the fee and general conditions be included in the RFP. These can be negotiated with the selected CMc, but it is ideal to request these in the RFP to get a more competitive fee range.
1. **Bonds** - The CMc must provide payment and performance bonds in an amount not less than the estimated construction costs of the project or the GMP. Bonds are components of the cost of the work and their requirements should be detailed as part of the Request for Proposals.

2. **Insurance** - Insurance policy types, requirements, minimum coverage, and deductible amounts should all be stipulated in the Request for Proposals. Minimum requirements should include Workers’ Compensation, Builder’s Risk, Auto Liability and Commercial General Liability. Additional coverages to be considered are Owner and Contractor’s Protective Liability Coverage, Extended Coverage Insurance, Special Hazards Insurance, Pollution Liability and Errors and Omissions Professional Liability. Consideration should also be given to who is responsible for the deductible should a claim be required. Insurance requirements should be addressed in the CMc’s contract, but during the GMP submission it is also important to confirm that all of the required insurances have been accounted for. The GMP clarifications and assumptions may also address who is responsible for any deductibles.

3. **Fees to Governing Authorities** - Permits and fees paid to Governing Authorities and Agencies are also considered cost of the work. Defining who will pay what fee is imperative in developing a GMP (Guaranteed Maximum Price). Some items to be considered are:
   - Building Permits
   - Inspection fees (Materials Testing, Geotech, Welding Inspection, Etc.)
   - Health Department fees
   - Utility fees, tap fees, permanent connection fee
   - Meter charges and fees
   - Elevator license and inspection fees
   - Platting and zoning change fees

Fees to governing authorities can be included in the cost of the work, whereas the CMc is responsible for paying these fees or they can be paid directly by Purdue to the governing entity. Defining which party is responsible for which fees during the Request for Proposal process promotes a clear understanding of the responsibilities for fees and prevents delays and surprises later in the construction process.
4. **General Conditions** - The GMP should include a detailed estimate of the General Conditions Cost. Purdue may elect to make the General Conditions ‘Lump Sum’ or ‘Reimbursable’.

**Lump Sum General Conditions:**

- **Pros:** Lump Sum General Conditions are typically billed on a straight line basis with no backup, this decreases the amount of administrative cost for both the CMc and Purdue. The Cost is fixed, so Construction Contingency cannot be utilized to offset overruns in the General Conditions Cost.

- **Cons:** When negotiating Change Orders, the CMc will likely be more aggressive in pursuing additional General Conditions compensation from Purdue. Purdue will not have audit rights for the General Conditions and will therefore not know how much profit/loss the General Conditions represent to the CMc. The CMc will likely try to push more items into the ‘direct work’ categories and out of the General Conditions cost to increase their potential profit. Examples include buck hoist rental, crane rental, safety manager, safety labor, etc. When defining Lump Sum General Conditions, it is imperative to have a clear understanding of what is and isn’t included in the General Conditions cost. The CMc may also understaff the project in an attempt to increase profit, quality and safety could suffer as a result.

**Reimbursable General Conditions:**

- **Pros:** The CMc will not have any hesitation to properly staff the project. Purdue will only have to pay the actual cost of the General Conditions, eliminating the ability for the CMc to ‘make money’ on the General Conditions. Change Order negotiations will be much more transparent because General Conditions cost can only be billed as incurred. Purdue can monitor the General Conditions expenses monthly during the Pay Application Review. During Pay Application review, Purdue can challenge expenses and recommend adjustments as necessary (i.e. increase staff, decrease staff, eliminate unnecessary equipment rental, etc.).

- **Cons:** More upfront due diligence is required to negotiate with the CMc what costs are allowable for reimbursement. More administrative cost will be incurred to manage the General Conditions backup required for billing. Each CMc will bill General Conditions cost differently, so each project will be slightly different. Because the General Conditions are left to negotiations, Purdue may feel that they are not getting a competitive number for the cost of the General Conditions.

General Conditions cost typically include:

<table>
<thead>
<tr>
<th>Accounting</th>
<th>Bid Advertising</th>
<th>Clean-up - General</th>
</tr>
</thead>
<tbody>
<tr>
<td>Clean-up - Final</td>
<td>Clean-up - Site/ Paving and Walks</td>
<td>Close-out Manuals</td>
</tr>
<tr>
<td>Construction Fence</td>
<td>Copier and Supplies</td>
<td>Dumpsters</td>
</tr>
<tr>
<td>Field Office</td>
<td>Field Office Furnishings</td>
<td>First Aid</td>
</tr>
<tr>
<td>Hoisting Equipment &amp; Materials</td>
<td>Hoisting Personnel</td>
<td>ID Badges</td>
</tr>
<tr>
<td>Jobsite Office</td>
<td>Jobsite Office Furnishings</td>
<td>Layout Equipment/ Material</td>
</tr>
<tr>
<td>Lodging</td>
<td>Mobilization/Demobilization</td>
<td>Monthly Fuel and Oil</td>
</tr>
<tr>
<td>Monthly Ice and Cups</td>
<td>Monthly Power</td>
<td>Monthly Telephone</td>
</tr>
<tr>
<td>Monthly Toilets</td>
<td>Monthly Water</td>
<td>Office Supplies</td>
</tr>
<tr>
<td>OSHA Requirements</td>
<td>Permits</td>
<td>Printing of Plans</td>
</tr>
<tr>
<td>Printing of Shop Drawings</td>
<td>Professional Surveyor (layout)</td>
<td>Progress Photos</td>
</tr>
</tbody>
</table>
5.4 Best Practices on Defining the GMP Submittal Package

*General Conditions cost typically include (continued):*

<table>
<thead>
<tr>
<th>Project Signs</th>
<th>Project Staff</th>
<th>Postage and Delivery</th>
</tr>
</thead>
<tbody>
<tr>
<td>Radios</td>
<td>Record Drawings</td>
<td>Scaffolding</td>
</tr>
<tr>
<td>Security</td>
<td>Snow Removal</td>
<td>Small Equipment Purchase</td>
</tr>
<tr>
<td>Small Equipment Rental</td>
<td>Storage</td>
<td>Temporary Barricades</td>
</tr>
<tr>
<td>Temporary Electrical Service</td>
<td>Temporary Lighting</td>
<td>Temporary Protection (Fire)</td>
</tr>
<tr>
<td>Temporary Protection (Weather)</td>
<td>Temporary Telephone Service</td>
<td>Temporary Water Service</td>
</tr>
<tr>
<td>Travel Expenses</td>
<td>Various Consultants</td>
<td></td>
</tr>
</tbody>
</table>

The General Conditions items listed prior are typically straightforward. The following items will usually require some level of negotiation on whether or not they will be reimbursable. These items should be reviewed and negotiated prior to approval of the GMP.

- **Staff Cost** should be billed as an actual cost with multiplier. The multiplier includes benefits, bonuses, holiday pay, sick pay, etc.
- **Technology Fees.** CMc’s will typically try to recover their technology overhead cost on individual projects. A common example is charging a monthly fee for technology related to each individual on a project. These costs can include email, laptops, software, etc.
- **Cell Phones**
- **IT Professional**
- **Employee Bonuses** (typically not reimbursable)

5. **Contingencies** - Contingencies typically are used for the following reasons:

- **Design Contingency** – used during preconstruction phase estimates and initial GMP estimates when construction documents are not 100%. These contingencies allow for further development of the drawings, and specifications. The amount varies depending on the completeness of the drawings and specifications and the ability of the team to define and manage scope. Contingencies of this sort typically range from 1% to 5%. Upon completion of the construction documents and final pricing, the design contingency is normally eliminated.

- **Construction Contingency -** In competitive bidding, the General Contractor sometimes includes a contractor contingency, which the Owner and Architect do not see broken out because the bid is submitted as a lump sum bid amount. If this construction contingency amount within the stipulated sum is not utilized by the General Contractor, it remains with the General Contractor and is not returned to Purdue. However, in the CMc delivery method, any unused amounts remaining in the construction contingency are included as part of the overall savings of the project. (The Associated General Contractors of America Houston, Texas Chapter, The Council of Educational Facility Planners International Southern Region/Gulf Coast Chapter, 2002)

6. **Supplier Diversity** - Minority/Women Business Enterprises (MBE/WBE) utilization goals/requirements should be considered by Purdue in the negotiation and approval of the GMP.
Changes in the scope of work on a project can be an inevitable part of the construction process. Proper management of project changes is critical to the success of the job. The most common risk area within the change management process is when change work is performed before a formal change order is issued from Purdue to the CMc. Without an agreement in writing and terms and scope of work documented, the CMc and Purdue will be at risk until the change is approved.

Change management begins with a thorough understanding of the executed contract between the CMc and Purdue. While reviewing the contract for information on the change management process looks for the following:

- What is the Approval Process: What is the appropriate change documentation?
- Who must be involved in the change process? This may be defined in the contract or the process should be established at the first Owner/Architect/Contractor meeting. On a project where a number of people are involved in the approval process a flowchart may be a useful tool to understand the process.
- Who is authorized to sign and how many different signatures are required? Is there a limit on the dollar value that a specific person can sign for?
- The contract may state what back-up is required to be attached to the change document. Since a GMP is an open book contract, Purdue is entitled to review all back-up prepared by subcontractors.
- A formal change order should be prepared as soon as possible once a change is agreed upon, because this is the authorizing document for billing purposes.

It is a best practice to only allow extra work to proceed when it has been authorized in writing by Purdue. Early notification of potential change issues from the CMc to Purdue is critical to the success of the change management process. If the CMc foresees an item causing a major impact to the budget or schedule, the CMc should discuss such items with Purdue to insure that Purdue fully understands the impact prior to proceeding.

A common procedure for the CMc to notify Purdue of a potential change is through the use of a ROM-letter. A ROM-letter is used to transmit a preliminary estimate of the cost or the savings of a change. The preliminary estimate ideally should be broken down by trade, summed up and the overhead and profit applied. ROM-letters should be prepared immediately upon discovery of the potential change.

ROM-letters should be clear, concise and indicate the information upon which the estimate is based. It should also emphasize that the estimate is approximate and, therefore, subject to change upon the receipt of more definite information. ROM-letters must also include a statement as to whether or not the work is proceeding, and show any limitation.

The ROM-letter should include an estimate. This estimate should establish the magnitude of the change, Purdue should be aware that this is only an order of magnitude estimate. A ROM-letter should also define an estimate of schedule impact.

Once the ROM-letter is approved by Purdue, the CMc should obtain final pricing from subcontractors and vendors. After all pricing is received the CMc should issue Purdue an official change request. The change request should be detailed and include all subcontractor and vendor back-up. Upon approval from Purdue, and official change order should be issued to the CMc to incorporate the added scope into the contract.

As a best practice all changes should be closed no later than thirty (30) days from date of inception. This allows the CMc two weeks to price and Purdue two weeks for approval.
Quality Control Program Best Practices

Each CMc will have its own quality assurance / quality control program and policies. The commentary in this section is to be used as a general guide when addressing quality assurance / quality control.

1. Overview

Quality control programs start with the pre-construction and bidding stages of the project and continue throughout the construction and closeout process. During the pre-construction process the CMc should work closely with Purdue, the architect and its consultants to identify and avoid potential problems that may arise as a result of proposed design schemes or features.

The CMc should develop subcontractor bid documents that not only cover scope of work items, but address important submittal, mock-up, constructability and quality assurance and quality control issues and requirements.

This effort is followed by the thorough review of subcontractor submittals including shop drawings, certifications, samples, and product data by the CMc. This review assures that the trade subcontractor’s planning conforms to the contract documents. From this review, problem areas can be discussed with the subcontractors, architect / engineer, consultants, and Purdue. Procedures and methods for the proper fabrication and installation of the work can be established. After approval, the CMc should review each submittal item with the appropriate trade contractors so that there is a complete understanding of the installation techniques and quality control standards required by the specifications and product manufacturers.

In many cases, prior to the start of any new item of work, the CMc should have the subcontractor prepare initial sample installations for review of quality and performance standards, which are established and enforced until final completion and acceptance of the work. Any work falling below the standards of the approved sample area of work shall be rejected.

Where appropriate, materials and fabricated items should be reviewed at the shops or plants of the manufacturers and again on the site to assure that all material is satisfactory before installation.

The CMc’s Superintendent typically will oversee the observation of all field installation work.

The first operation of any new trade work shall be closely followed and checked so that the expected level of workmanship is established from the outset. A day to day check of new items of trade work shall be made by the appropriate CMc staff member. The CMc shall call upon the field representatives of material manufacturers, suppliers and product institutes to provide first hand technical information and instruct the subcontractor’s personnel on the installation of their products. In new applications or complex systems, the CMc shall supplement their staff with specialists, consultants, and in-house experts with the necessary experience and information to assist the project team.

Structural inspections involving both material and workmanship shall be conducted by independent testing agencies retained by Purdue. The testing and inspection program should be detailed in the specifications by the Structural Engineer of Record.
2. Preconstruction

2.1 Constructability Reviews

Constructability reviews shall be performed early in the project, for the purpose of reviewing the design drawings and specifications and evaluating the various building systems. Specifically the review shall include:

- Evaluation of specific building details for the practicality and efficiency of design.
- Technical review of details and building systems to clarify the sequence of construction and the impact of design tolerances.
- Evaluations of various building system mock-ups, in order to assume a smooth sequenced construction.

A constructability review, investigating the details of the various building systems, can help to prevent major delays, quality problems and cost increases. The objective of the review is to find problem areas in the documents, incorrect materials, incomplete scope, or design errors.

Purdue and the CMc should encourage the design team to select finishes as early as possible. The construction of various mock-ups, as required by the specifications, is intended to allow the CMc to review the construction sequence, identify tolerance problems, and establish the quality level for the completed work.

The CMc shall work closely with the design team to produce a functional building that maximizes the design within the constraints of the budget objectives.

2.2 Subcontractor Selection (Purchasing)

With a majority of the work being performed by vendors and subcontractors, hiring the right subcontractor for the project is a must. If the CMc hires subcontractors with a track record of poor quality work, the chances of achieving a quality final product are greatly reduced.

When developing the bid list for the project, it is imperative that subcontractors are prequalified and references are checked to confirm the subcontractor performs at a quality level acceptable to Purdue.

3. Construction Quality Assurance (QA) / Quality Control (QC)

Establish quality assurance / quality control procedures to make sure that the actual work meets the pre-established standards. These should be initiated before the start of the work, not just early in the job. By doing this, poor quality will not be compounded.

The following is a listing the tools the CMc should use to help maintain the level of quality established by the contract documents.

3.1 Meetings

**OAC (Purdue/Architect/CMc) Meeting** - The CMc shall conduct OAC meetings on a regularly scheduled basis. This meeting will have Quality Assurance / Quality Control as a topic of discussion for both the project in general and the specific trade items. By continuing to focus on quality, the project team can address any item of concern brought to the meeting by any party. This format is especially important for resolving issues the CMc has become aware of from its other meetings.
CMc Job Meetings - The CMc should hold job review meetings. This meeting provides a formal communication for the Engineering and Superintending staff to review status of purchasing, engineering, fabrication, deliveries, field installation, problem areas, quality issues, and closeout.

Subcontractor Engineering Meetings - The CMc shall hold, as required, meetings among the various subcontractors led by the Project Manager (or Area Engineer) and his (or her) staff to discuss coordination of the work and special problems that may arise in scheduling the performance of the work. The primary purpose of subcontractor coordination meetings shall be the early detection of problems, which may occur in the preparation of shop drawings or in materials and work in the field before such problems occur. As a result, such things as coordinated shop drawings that interface properly with existing and contiguous materials and systems, clarifications of conflicts in design drawings and specifications, and the pinpointing of long lead time items based upon fabrication and on market conditions can be uncovered.

Field Coordination Meetings - The CMc’s Superintendent (along with the various Area Superintendents) shall hold weekly meetings at the jobsite at which representatives of all major subcontractors will be present. The intent of these meetings is to review the progress of the work during the week prior to the meeting, and to set forth the goals of each subcontractor for the following week. Specific attention will be given to protection of any work in place.

Pre-Installation Meetings - The CMc shall conduct pre-installation meetings for major subcontracts. These meetings shall be held prior to start of physical work in the field. In attendance shall be the subcontractor, material suppliers, the CMc, and any testing agencies. Purdue and the Architect should also be invited to these meetings. The agenda should be based on the scope of work, contractual relationships, communications, a discussion of the appropriate plans, specifications, contract requirements, special site rules, testing and inspection, and other pertinent matters. The CMc should also review the status of submittals and shop drawings.

3.2 Submittal Reviews (Shop Drawings, Samples, Product Data, Etc.)

The CMc’s staff will review all shop drawings and submittals required by the contract documents prior to submitting them to the Architect / Engineer. This review will not only take into account contractual obligations but also contiguous work with which the item under review must be coordinated. Shop drawings or material submittals not substantially complying with contract requirements will be returned to the subcontractor for correction prior to formal submittal to the design team. The CMc’s staff should provide a shop drawing and submittal schedule that has been coordinated with the construction schedule as a tool to monitor and control the submittal process. Wherever possible shop drawings and submittals are to be completed well ahead of the time material is needed in the field.

3.3 Daily Supervision of the Work

The CMc’s field staff should review quality of the project on a daily basis. Field reports should be made daily of progress and focus on quality control issues, observations, deficiencies, corrections, and incomplete items to list a few. The following Quality Control related activities should be job requirements for the field supervision staff:

- Become familiar with the contract documents, submittals, samples, mock-ups, and shop drawings prior to start of work in the field.
- Check material conformance to the contract documents upon receipt.
- At the beginning of the installation review the first work of the installation.
- Coordinate and ensure that materials are properly stored and protected from the elements and weather.
- Monitor production quality daily, and promptly reject nonconforming work.
- Make sure finished work is protected from damage by other trades.
3.4 Involve the Subcontractors

Upon contract award, and prior to any submittals or work in the field, the CMc should involve the subcontractors in the quality requirements of the project. The CMc should impress on the subcontractors that the CMc and Purdue want quality assured from the start of the project and not just quality controlled at the end of the project by correcting a punch list.

The CMc should insist that each subcontractor provides a job specific quality control plan for their trade(s). The plan should cover work in their shop if applicable, as well as work in the field.

3.5 Mock-ups

The CMc should define in coordination with the Specifications the required mock-up schedule for the project with all mock-ups identified and dates for completion and acceptance. The CMc should incorporate mock-ups into the final work where practical. The mock-ups will establish the level of quality the remaining work will be judged against. Throughout the life of the project, the CMc should constantly review the constructability of the building. As the need arises, a mock-up should be done to help with constructability, fit, appearance, and quality of specific elements within the project. Each mock-up will be done prior to the work and reviewed by the project team for approval.

The following mock-ups are suggested:

- Typical repetitive interior rooms (student rooms, labs, etc.)
- Building exterior enclosure elements (masonry, curtainwall, window sills, etc.)
- Architectural Pre-cast concrete
- Exterior finishes, stone paving, decorative concrete
- Architectural paving (concrete, stone, simulated stone)
- Interior finishes

Water test mock-ups of exterior wall systems should be conducted as necessary to make sure the exterior wall assemblies are designed and built to withstand weather impacts. These mock-ups should be completed both offsite and in-place as needed to ensure that exterior wall assemblies that come together perform as a water tight system.

3.5 Testing and Inspections

The CMc and the appropriate subcontractors shall coordinate and implement the inspection requirements of Purdue and the Architect. The scope of the Testing and Inspection requirements shall be clearly defined in the typical specifications for Testing and Inspection Services.

3.6 Site Storage of Materials

The CMc should require that each subcontractor be responsible for assuring that proper handling, storage, shipping and preservation precautions are adhered to for those items requiring special care and protection. The ultimate responsibility for material handling, storage and preservation lies with the CMc.

3.7 Protection of Finished Work

One of the best ways to maintain the quality in the final product is to protect it from the construction environment after it is completed. The CMc shall monitor and manage the protection of finished work.
4. Post Construction and Closeout

4.1 Punchlist

The CMc should generate a punchlist in coordination with the Architect. The CMc shall coordinate with each subcontractor to confirm the punchlist is completed in a timely fashion.

4.2 Equipment and System Startup and Commissioning

The CMc shall confirm that all equipment is thoroughly inspected prior to startup. After the equipment has been inspected, startup should be conducted in accordance with the project specifications. The CMc shall then properly train the Owner on equipment operation and maintenance.
Each CMc will have its own project safety management program and policies. The commentary in this section is to be used as a general guide when addressing CMc Safety Management.

Prior to beginning work in the field, each CMc should present Purdue with a project specific safety management plan. The CMc’s safety management plan will typically include subcontractor prequalification, substance abuse policy, subcontractor safety program requirements, job safety communication, and employee conduct.

Prequalification

The CMc should review each subcontractor’s Experience Modification Rations (EMR) prior to issuing a subcontract. When the proposed subcontractor’s EMR is greater than one, meaning that the subcontractor is less safe than the industry average, the subcontractor should be deemed to be an “At Risk” Subcontractor. Prior to awarding a contract to an “At Risk” subcontractor, a specific Safety Risk Management Plan should be put in place. The Risk Management plan should address any areas in which the subcontractor has had high incidence rates (i.e. falls from a ladder, hand injuries, etc.). The subcontractor may also be required to perform additional training prior to working on the project, assure full time onsite supervision of a competent OSHA trained individual, ensure 100% glove policy, etc. Once the contract is awarded and the Safety Risk Management Plan is in place, the CMc will be responsible for monitoring the subcontractor and ensuring conformance with the plan.

Substance Abuse Policy

It is the standard of most CMc’s to ensure that every employee on a Purdue project must be free of the influence of drugs, alcohol and controlled substances. The unlawful use, possession, sale, conveyance, distribution, or manufacture of illegal drugs, intoxicants or controlled substances in any amount or in any manner is strictly prohibited. In addition, the abuse of alcohol, prescription drugs and controlled substances is strictly prohibited.

Substance Abuse Testing Policies should be implemented by the CMc and followed by all employees on a Purdue project. The policy typically includes the following drug testing requirements:

- Pre-Employment
- Random
- Post Accident
- For-Cause (Individual impairment or safety violation)

Preconstruction

The CMc should require that all subcontractors provide a training matrix that includes the individual names and the areas of completed training, identify competent persons and the areas of their competency and also provide their safety manuals and other safety related materials required by the state regulations.

Subcontractors should provide to the CMc:

- A designated site safety contact
- A copy of their site specific safety plan prior to beginning work, to include, if applicable:
  - Steel Erection Plan(s)
  - Hazard Communication Program and SDS Sheets
  - Emergency Action Plan(s)
  - Fall Protection Plan(s)
  - Critical Lift Plan(s)
Preconstruction (Continued)
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  - Hazard Communication Program and SDS Sheets
  - Emergency Action Plan(s)
  - Fall Protection Plan(s)
  - Critical Lift Plan(s)
  - Excavation Plan(s)
  - Any other applicable plans

Job Safety Communication
The CMc should require and provide a mandatory safety orientation training session for every employee working on a Purdue project. This training is to be completed prior to any work being performed. Visitors will be required to be escorted by an employee who has completed the orientation at all times.

The CMc should require all subcontractors working on a Purdue project to complete a Job Safety Analysis Form (JSA) daily. This form would be provided by the Construction Manager and completed by the foremen or crew member performing the work for each subcontractor. The CMc should manage and review the subcontractors JSAs.

The CMc should host a safety meeting at the beginning of each work week. All employees on the project will shall be required to attend this meeting. The CMc should also reserve the right to perform a mandatory “Stand Down” meeting or periodic safety meeting if it is deemed necessary by the CMc or Purdue.

Heavy Equipment Use and Inspection
The CMc should require pre-operational inspection checklists to be completed for any motorized equipment at the beginning of each shift by the equipment operator. Completed check sheets should be maintained in the job trailers. Any and all employees operating heavy equipment should be required to have documented training for the equipment being operated. Also all equipment should be used under the guidelines required by the equipment manufacturer’s operational manual.

Heavy Equipment subject to these guidelines includes, but not limited to:

- Aerial Work Platform
- Mobile and Tower Cranes
- Industrial Trucks
- Specialty Equipment
Subcontractor Prequalification

Prior to soliciting bids for any portion of the work the CMc shall secure Purdue's approval of its subcontracting plan and proposed bidding schedule. The criteria utilized by the CMc for the prequalification of prospective subcontractors shall include:

- The experience of a prospective subcontractor, the prospective subcontractor’s financial condition, conduct and performance on previous contracts, facilities, management skills, and the ability to execute the proposed subcontract properly;
- Furthering achievement of goals established by Purdue with regard to the utilization of MBE, WBE or DBE firms;
- Certification by a prospective subcontractor that it has not been found in violation of any affirmative action program during the five years preceding the date of the prequalification application;
- Subcontractor to submit proof of current licenses to perform the proposed work as required by Purdue and applicable law;
- Any additional criteria for particular subcontracts required by Purdue that are consistent with the scope and needs of the project.

The CMc shall complete the prequalification process for each subcontract no later than ten days before the CMc solicits bids for that subcontract unless Purdue agrees otherwise in writing. Upon receipt of prequalification submissions by prospective subcontractors the CMc shall:

- Evaluate the submission of each timely prospective subcontractor and promptly notify each of them in writing whether it is qualified and, if not, the basis for CMc’s determination. The CMc’s determination that a prospective subcontractor who timely submits its qualifications does not meet the qualification criteria shall be final;
- Submit to Purdue, for each bid package, the names and qualifications of as many qualified prospective subcontractors as directed by Purdue or, absent direction from Purdue, at least three prospective subcontractors. If the CMc identifies fewer than the required number of qualified prospective subcontractors it must demonstrate to Purdue’s reasonable satisfaction that fewer than three qualified prospective subcontractors are available to perform the work; and
- Meet with Purdue, upon request, to review its prequalification determinations. Purdue shall be entitled to rely on the CMc’s determination that the prospective subcontractors meet the prequalification criteria.

Upon receipt of the CMc’s list of qualified Subcontractors Purdue will complete its review with reasonable promptness. Purdue may eliminate any prospective Subcontractor that it determines is not qualified and notify the CMc of its determination and the basis for it. Purdue’s determination that the prospective Subcontractor does not meet the prequalification criteria shall be final.

If the CMc recommends a specific bidder that may be considered a “related party”, then the CMc shall promptly notify Purdue in writing of such relationship and notify Purdue of the specific nature of the contemplated transaction.
Preconstruction Services

Preconstruction services are typically defined as those services performed prior to the actual start of construction. A benefit of hiring a CMc early in the planning stages of a project is the ability to utilize their construction expertise in all aspects of the design and planning. With a CMc established early in the planning stages, the project team consists of Purdue, the Architect/Engineers and the CMc. Each team member has a role that should be defined at the beginning of the project. Although each project is unique, items have been listed in the following three sections to illustrate the typical tasks performed by the Owner, Architect/Engineers and CMc.

Performed by CMc

- Review Purdue’s Needs, Goals and Priorities
- Evaluate Purdue’s Budget and Program
- Evaluate Purdue’s Time Schedule
- Establish Set Team Meetings
- Schematic Design
  - Prepare a schematic design estimate/budget.
  - Monitor evolving design and make suggestions.
  - Consult with the Purdue and Architect on means and methods of construction.
  - Review schematic design documents and make suggestions.
  - Submit input to Purdue and Architect relative to time and cost control.
  - Identify certain areas of phased construction.
  - Prepare a preliminary project schedule, including the design phase. Identify critical milestones
- Design Development
  - Evaluate the design development documents.
  - Prepare a detailed estimate based on available design drawings in a CSI or subcontractor bid format to insure that project is within budget.
  - Analyze the project for potential alternative equipment, material and systems selections for cost savings.
  - Review any “trade-off” options relative to value engineering.
  - Review and update the project schedule.
  - Review project for constructability.
  - Discuss project with subcontractors and material suppliers to determine work loads, bonding capacity availability, worker/mechanic availability, etc., and to develop interest in the project, intent in bidding work, and fine tuning time schedule to provide best possible time to receive bids and construct project.
  - Prepare a site use study / site layout plan to be used for allocation of space for storage, parking and temporary facilities.
CMc Duties During Preconstruction

6.1

Performed by CMc (Continued)

- Construction Documents
  - Prepare and update estimates in the CSI format, and budgets and time schedules, at appropriate points in the working drawings stage.
  - Review the drawings and specifications and make comments and suggestions.
  - Develop a detailed CPM network schedule.

- Soliciting Subcontractor/Vendor Lump Sum/Competitive Sealed Proposals
  - Organize and distribute construction documents and other Contractor bid requirements for seeking lump sum or competitive sealed proposals.
  - CMc shall advertise publicly for sealed competitive or lump sum proposals.
  - Conduct, as necessary, pre-proposal meetings.
  - Respond to questions concerning schedule and sequencing, and forward questions from bidders to the Architect.

- Receiving Proposals
  - Receive all proposals.
  - Review proposals for compliance with contract documents and prepare proposal tabulations.
  - Review subcontractor/vendor qualifications, past experience and other key factors.
  - Make recommendations for subcontractor/vendor awards.
Construction Phase

The goal in this phase is to expedite and improve the efficiency of the construction process through professional planning and execution of project activities, all focused upon fulfilling Purdue's scope, cost, quality, and time requirements. Prior to construction, the CMc should develop a project specific Construction Management Plan that clearly identifies the roles, responsibilities and authority of the project team and the procedures to be followed during construction. Below is an outline of key construction phase activities.

1. **On-Site Construction Facilities** - The CMc should verify that office facilities, site work required for general access and utilities to all on-site organizations are provided.

2. **Coordination** - The CMc provides coordination and leadership of the individual professionals and contractor(s) in meeting the project requirements. To help accomplish this, all communications with professionals and contractor(s) are either through the CMc or with his prior knowledge.

3. **Meetings** - There are three (3) basic categories of meetings involved in the construction phases:
   - **Pre-construction** - The purpose of pre-construction meetings is to orient all on-site contractors to project procedures and site utilization requirements and to review near term and long term activity plans. The CMc will discuss a comprehensive list of contract communication, administrative and coordination requirements including the lines of communication, shop drawing procedures, and general written communication protocol.
   - **Progress** - Progress meetings are designed to monitor compliance with schedules and the requirements of the contract documents to coordinate the contractor(s) efforts and to allow short-and mid-term planning and problem solving. The CMc organizes, conducts, and records regularly scheduled progress meetings involving the CMc, contractor's principal personnel, the Architect, and Purdue, as required.
   - **Special Meetings** - Special meetings may be conducted weekly, bi-weekly or at least once a month. Special meetings are called, as necessary, to resolve issues of an immediate or short-term planning nature that cannot wait until the regularly scheduled progress meetings, or to discuss issues requiring detailed discussions not suitable for the progress meeting. Although the CMc has primary responsibility for determining the need for these meetings, Purdue, the Architect or subcontractors may call a special meeting through the CMc.

**Time Management** - The CMc establishes procedures for planning and monitoring compliance with the project time line, which relates to the construction schedule. This procedure involves Purdue and the Architect at appropriate time intervals. It is important that this process also involve the on-site subcontractors in the development and updating of project schedules. The CMc should generate cooperation and obtain commitment from each contractor to complete the project within Purdue's time requirements and as required by the contract documents. The CMc should also look for opportunities to recover schedule slippages as appropriate. The time management process also forms the basis for evaluating and resolving time related contract claims.
Construction Phase (Continued)

4. **Budget and Cost Monitoring** - For the benefit of Purdue, the CMc maintains responsibility for tracking, projecting, and monitoring costs through the construction phase. As contracts are awarded, the individual line item estimates are replaced with actual committed amounts, plus cost estimates for any unknowns or contingencies. The goal is to manage the incurred costs, estimated costs and cost to complete in order to stay within budget.

5. **Payment Requests** - The CMc should implement procedures for processing subcontractor’s payments in conformance with contract requirements. Monthly meetings should be scheduled to review and discuss the pay request.

6. **Change Orders** - The specific, documented procedures for initiating and approving contractor change orders are implemented by the project team and contract documents. The CMc should take the lead in administering this procedure.

7. **Claims Management** - The CMc establishes methods and procedures to minimize the impact of claims through prompt and equitable resolution with minimal disruption to the ongoing construction effort. Procedures should address receiving and disposition of claims submitted. Merit evaluation, entitlement evaluation, negotiation and settlement procedures, handling of disputes, and appeal procedures. All claim and potential claims should be discussed weekly at the progress meeting.

8. **Quality Management** - The CMc develops procedures for monitoring the quality of work being performed. The CMc’s responsibilities for quality control or quality assurance should be clearly spelled out in the CMc’s contract.

9. **Acceptance and Performance Testing** - If so required by the contract, the CMc will monitor the acceptance and performance testing (commissioning) to see that it is conducted in accordance with contract requirements. The contractor will need to provide opportunity for observation of these tests by the CMc as well as filing all appropriate test reports.

10. **Final Inspection and Punch Lists** - After receiving written requests from the contractor, the inspection staff will consider whether the contract work is substantially complete and will conduct a final inspection with the contractor, project staff and Purdue’s representatives. During the final inspection, the CMc develops the project punch list of remaining contract work. If the remaining items are not critical to occupancy or use, the contract will be declared substantially complete. The CMc must monitor the completion of the remaining punch list items which should be completed by the time frame specified in the contract documents. Upon completion of the punch list, the CMc will issue a final inspection report.

11. **Owner Occupancy (Partial Acceptance / Beneficial Occupancy)** - Upon declaring the contract substantially complete, the CMc will assist Purdue in taking beneficial occupancy of the project. This may include filing of the appropriate reports and approvals before governing boards or other owner representatives. In certain circumstances, partial acceptance can be taken for project elements that are substantially complete.
Construction Phase (Continued)

12. **Owner Purchased Materials and Equipment** - Prior to construction, the CMc should identify long lead materials and equipment for pre-purchasing, and other materials and equipment, which could be direct purchased to Purdue’s advantage. During construction, the CMc coordinates scheduling, onsite delivery and storage, and installation and start-up requirements for these materials and equipment.

13. **Record Drawings / As-Built Drawings** - Record drawings / As-Built drawings should be provided by the subcontractor(s) doing the work and, minimally, be in the form of a dedicated set of contract drawings and specifications marked up as the work is installed. The CMc should monitor the record drawing process monthly during construction in conjunction with review of contractor application for payment, and should receive these drawings at the completion of construction for transmittal to the owner, together with a set of specifications.

14. **Record Keeping** - A smooth, efficient and expeditious flow of paperwork is critical to project operations. The CMc should establish systems for flow of all project related paperwork.

15. **Management Reporting** - The CMc has a responsibility for establishing a management reporting system to keep the various team members informed on a project status. The CMc should determine the type, format, frequency, and distribution of information and reports required in accordance with the Construction Management Plan and the Project Procedures Manual.

16. **LEED Management - If Required** - The CMc shall establish a tracking system to monitor compliance with the established LEED goals for the project. Closely associated with acceptance and performance testing is retained. Otherwise, the CMc will be responsible for the commissioning process. While commissioning is underway, the CM must complete and submit all LEED documentation for certification of points obtainable during the construction process and in accordance with contract documents. It is strongly recommended that, for a LEED project, the CM have a LEED Accredited Professional on staff as an integral part of the project management team.
Post-Construction Phase
Expeditious and effective project close-out is a critical element of a successful project. The CMc’s responsibility in this phase typically consists of the following:

- Obtaining LEED certification – if required
- Completion of punch list items not required for substantial completion
- Facilitating owner occupancy
- Assembling record drawings for as-built documentation
- Assembling warranty, guaranty, and operation and maintenance manuals
- Pursuing resolution of warranty items
- Preparing contract files for transfer to owner
- Final payment and contract acceptance

Assembling Record Drawings for As-Built Documentation
Record drawings are maintained by the CMc and should be inspected monthly during the construction process to ensure the timely submittal of complete documentation to Purdue at project completion.

Warranty, Guaranty, and Operation and Maintenance Manuals
Prior to project close-out, the CMc must gather all warranty, guaranty and O&M manuals, ensure that all comply with contract requirements and submit these to Purdue. If specialized training is required, the CMc oversees training by the contractor, which usually must occur before formal acceptance of the project.

Warranty Administration
If requested by Purdue, the CMc should manage the resolution of all issues identified as warranty issues; including evaluating whether the issue is in fact a warranty issue, notification of the responsible subcontractor and appropriate sales and suppliers, and verification that warranty work is satisfactorily completed.

Preparing Contract Files for Transfer to Owner
The CMc must prepare the contract files in accordance with Purdue’s requirements to facilitate their transfer to Purdue for archiving.

Final Payment and Closing the Contract
The CMc assembles all documents relating to final payment, including retention, unresolved change orders and unpaid invoices, for approval by Purdue. Once approval is received for the final payment, which resolves all outstanding financial obligations with the contractor, the payment is processed and the contract closed. If there are any claims or adjustments requested by the contractor, the contract cannot be closed until these are completely resolved.

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