MEMORANDUM

Date: 09 March 2022

Re: OFM Request for CPARB Member Input
Construction Cost Assessment Preliminary Report and Related Topics

To: Jen Masterson, Senior Budget Assistant to the Governor - Capital Budget, Office of Financial Management

From: Van Collins, President & CEO, ACEC Washington
Larry Swartz, PE, Vice-President & Principal Notkin a P2S Company, ACEC Washington Chair
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George Shaw, FAIA, Partner, LMN Architects, AIA Washington Council
Walter Schacht, FAIA, Partner, Mithun, AIA Washington Council, Architects' Representative to CPARB

Thank you for asking members of the Capital Projects Advisory Review Board (CPARB) to review and provide input on the Construction Cost Assessment Preliminary Report and related topics. To provide a broad, balanced industry perspective, we reached out to industry colleagues with experience in planning, design, construction and project management of state funded projects. Our collective experience includes writing capital requests (project request reports) and predesigns, and all forms of project delivery from design-bid-build to GC/CM and design-build.

We agree with the broad findings of the preliminary report. We appreciate the fresh look at the opportunities and challenges to establish and maintain capital budgets that deliver their intended scope and value for the benefit of public owners and the citizens of our state. We would like to share some detailed perspectives on the issues that we believe will further your goals for the study. We have also provided our thoughts on A/E fees, project management fees as requested in your email.

The report does not address the underlying differences between design-bid-build, general contractor construction manager (GC/CM) and design-build in establishing and managing project costs. Alternative project delivery methods are preferred by many public owners because they leverage the experience and knowledge of engineers, architects and contractors during the design process, allow lean principles such as target value budgeting to be applied, provide for a comprehensive risk assessment and embed value engineering and constructability into the process. The report should address the differences between methods including contingencies and risk allocation.

We hope this is the beginning of a process of engagement between state government and private industry that enables all of us to contribute to the procurement of public facilities that serve our communities and the environment, maximizing the use of state resources. It is a dialogue that we have been seeking and we are glad to be asked to participate.

Walter Schacht, FAIA
Architects' Representative to CPARB
Former chair, CPARB

Bill Dobyns
General Contractors' Representative to CPARB
Vice-chair, CPARB

Construction Cost Assessment Preliminary Report:
Executive Summary

CONSTRUCTION COST ASSESSMENT	COMMENT
GOALS OF THE STUDY	
Page 5 *The budget estimates must meet these objectives even though estimates are typically generated 2 – 3 years before construction starts (often as early as five years before a project is completed)…*	Predesign budgets completed more than a year prior to commencement of design should be re-evaluated for inevitable changes in programs, technology, codes, escalation and market conditions.
CURRENT STATE PRACTICES	
Page 6 *…the capital planning process works effectively, and capital projects are successfully delivered across all agencies….*	Capital projects are typically subject to substantial changes to program scope, facility standards and sustainable design goals to align with the project budget. Examples include recent community college and university projects.
Page 7 *Life cycle costing is required for all capital project submissions using three specific excel tools…*	LCCM does not benefit a project where the outcome between lease space, renovation and new construction is predetermined, which is usually the case. It should focus on site development and building system alternatives that impact scope/budget alignment and determine value. There is confusion amongst public owners, design professionals and contractors about LCCT and ELCCA, which should be consolidated into a single process. CPARB's LCCA Guidelines, prepared in response to a budget proviso and coordinated with the Department of Commerce's development of the LCCT tool, should be followed. A summary of the Guidelines is attached.
GAP ASSESSMENT	
Page 7 *This can lead to a mismatch between available funds and the program's need… Typically, this is minor…*	See comment above about higher education projects where program scope is frequently reduced by 20-30%, in some instances by over 40%. As a result, the investment does not realize project goals or provide intended value to the institution or the state.
Page 7 *When a mismatch results in overfunding, there is a risk that a project gets enhanced in a way not intended within the original funding...*	Uncommon except in unique situations, such as community colleges burying escalation in construction cost figures in 2007 project request reports to offset OFM's low rate of escalation. When an economic downturn followed, the project budgets were inflated and the colleges did add unintended scope.
DATA MANAGEMENT	
Page 7 *…the C-100 database could become an extremely valuable data repository…*	The information should be sorted in relation to project specific issues that reflect the circumstances that drive costs. Site development is a major issue. The data must represent the actual scope and cost of the completed project that is often different than the original forecast.

ESCALATION AND LOCATION/MARKET ADJUSTMENT	
Page 8 *Projects become underfunded when inflation and market adjustments are inadequate.*	OFM escalation rates have not typically aligned with projections or actual costs as reported by the industry. Attached charts from Mortenson and RLB/Lewis indicate a historical range of 4.2% – 4.5%. Industry should be consulted on an annual basis before OFM establishes the C-100 rate.
CONTINGENCY AND RISK MANAGEMENT	
Page 8 *Value-engineering analysis and constructability review… are often undertaken late in the design phase.*	Value engineering (prefer the term value analysis) should be embedded in a continuous construction cost estimating process that occurs from predesign through construction documents. Current VE practices are not value-oriented and tend to be a laundry list of cost savings recommendations that may not align with project goals, code requirements, sustainability requirements, etc. Constructability should also be a continuous process.
BEST PRACTICES FOR OFM'S CONSIDERATION	
1. Additional Estimate Submission Requirements	Agree with overall recommendations.
Clear Scope of Work <u>revise to include:</u> – *Site conditions, constraints* – *Operational considerations (occupied site, congestion, accelerated schedule, logistics challenges)* – *Anticipated architectural expression/materials/appearance*	The three bulleted items included in the report under "Capital Cost Estimate" should be part of the definition for "Clear Scope of Work." A clear scope of work includes **functional requirements** (uses and space program), **performance requirements** (such as building codes, facilities standards, sustainability, operations and maintenance) and **development requirements** (such as land use codes, access, parking, stormwater, site utilities). See attached Venn diagram illustrating this paradigm. Predesigns should include an OPR (owner's project requirements) and consultation with authorities having jurisdiction over the project. Many predesigns focus on the functional program and do not define the scope or account for the cost of performance and development requirements that have an equal or greater impact on the budget. Agency stakeholders who are aware of these constraints are better partners in the planning and design process
Life Cycle Costing *Streamline the life cycle costing tools to a common platform and include an assessment of total cost of ownership as opposed to just comparison of alternative concepts.*	Agree with value of streamlining tools, see previous comments about LCCM. Owner's Project Requirements (OPR) are required to perform life cycle cost analysis and should be initiated in predesign. See CPARB's LCCA Guidelines, attached, for the recommended approach to the process. Total cost of ownership (TCO) is a valuable tool but requires specialized expertise that project sponsors, design professionals and contractors do not typically possess. Costs for this service are in addition to what is contained in most project budgets.

2. Escalation Market Analysis	Agree with overall recommendation.
Establish a requirement for a high-level market evaluation to be provided by the project sponsors… and [be] incorporated into the C-100	Project sponsors do not typically have expertise to provide an evaluation of market escalation and require the input of design professionals and contractors. What is the process for coordinating the proposed rate with OFM's fixed rate of escalation in the C-100?
3. Risk Assessment	Agree with overall recommendation.
Establish a requirement for a concept-level risk assessment to be completed by the project sponsor…	Project sponsors do not typically have expertise to conduct a risk assessment and require the input of design professionals and contractors.
4. Cost and Program Capture	Agree with overall recommendation.
Establish procedures to capture the actual cost and program at the award stage and construction completion stage…	Consult with industry on best practices and reporting formats for capturing cost and program data. Maintaining the database so the information is current is a challenge in terms of time and cost. Users of USACE's database indicate it often lags behind market conditions. Capture all design, construction and other project costs. Require Uniformat Level 2 breakdown at a minimum. Provide details for categories like "Owner Change Orders." Capture detailed parametric cost data such as program matrix, net-to-gross ratio, site development, building systems such as exterior closure area and type, roof area and type, mechanical system, electrical service, special features, etc. Make sure reported data is for the completed project, not an earlier projection of scope and/or cost.
5. C-100 Database	Agree with overall recommendation.
Create a database of C-100 submittals and MSPRs…	Consult with industry on best practices for defining project scope for each project so that the cost information is valuable. Maintaining the database so the information is current is a challenge in terms of time and cost. Require agencies to submit a final C-100 that reconciles budget in terms of expenditures; compare to initial C-100.

Construction Cost Assessment Preliminary Report:
Current Industry Best Practices for Cost Estimating

CLEAR SCOPE OF WORK

FUNCTIONAL, PERFORMANCE AND DEVELOPMENT REQUIREMENTS

- The report defines the “scope of work” as “the project's functional needs, interior and exterior functional requirements.” We believe the definition should be expanded to include development and performance requirements that have an equal or larger impact on the budget. In our paradigm:
  - **functional needs and requirements** address space use inside and outside the building,
  - **performance requirements** address the owner’s project requirements (OPR) such as operations, maintenance, facility standards, sustainability and building codes, and
  - **development requirements** address land use codes, access, parking, stormwater and utilities.
- The attached Venn diagram illustrates the integrated relationship of these elements which reflects an understanding of “what you have to do in relation to what you want to do.” Typically, the owner has the least discretion about use of funds in relation to development requirements, somewhat more discretion about use of funds in relation to performance requirements and the most discretion in relation to functional needs and requirements. Binding all of these elements together under the definition of “scope of work” makes it clear that they are an equation whose sum is the construction cost estimate/project budget.
- Best practices in facilitating interaction with agency stakeholders, especially in the predesign phase, is to make them aware that program is only one part of the equation. It leads to an honest, transparent dialogue that fosters effective decision-making. Otherwise, functional programming and design occurs in a vacuum.

PREDESIGN

- Comprehensive predesigns are essential to reliable cost forecasting. In our collective experience they are frequently incomplete, especially in the definition of performance and development requirements. The OFM predesign checklist infers that the report should include pre-application meetings with authorities having jurisdiction, geotechnical reports, site surveys, environmental assessments, hazardous materials surveys and the like. However, they are not explicitly required and often missing from the final predesign report. As a result, significant scopes of work are often missing from the project description and cost estimate. For projects targeted to achieve high performance goals such as net zero energy (NZE), energy modelling and utility infrastructure capacity analysis are required to determine feasibility and cost.
- Commissioning is required for all projects targeted for LEED Silver. The agent should be engaged in predesign and lead preparation of the OPR to maximize the value of their participation and ensure coordination with CPARB’s Life Cycle Cost Analysis Guidelines, attached.
- Furnishings and equipment budgets represent a significant project cost and should be estimated based on a preliminary quantity survey, not a lump sum allowance.
- The "Current State Practices" section of the report indicates that predesigns may not be required for projects under $10 million and that project budgets can be established based on historical data. We recommend predesigns be completed for all projects to determine their feasibility. Smaller projects often have the same level of complexity in terms of performance and development requirements and less ability to mitigate an inaccurate budget assessment.

PARAMETRIC ESTIMATING

- The report indicates the use of USACEs PACE software that must be continually updated to be relevant. In our recent experience, USACE has not maintained the database in a timely fashion, which impacts the reliability of cost estimates. If a database is developed, OFM should plan for adequate resources to keep it up to date.
- The report indicates that parametric data for building costs in different states may be comparable, which does not take into account substantial performance requirements, such as energy codes and zero net energy targets that substantially impact costs.
- Capture of design and construction costs should be based on costs and data for the completed project and include net and gross square feet, applicable codes and the LEED rating system. Building and site costs should be stated separately since site costs are typically more variable.

BENCHMARK ESTIMATING

- Establishing standardized cost benchmarking information across state-funded projects would be of value to public owners, design professionals and contractors. It requires dedicated resources to establish and maintain.

ENGINEERING BUILD-UP ESTIMATE

- Engineering build-up estimates should be required at the predesign phase, where project specific circumstances frequently dictate costs. These typically include site development costs. Too often, predesign estimates provide building costs based on preliminary quantity surveys and site costs based on allowances. Complex renovations may also require engineering build-up estimates that are developed in alignment with the required scope of work to bring the existing building up to code.

HYBRID ESTIMATING

- A combination of estimating types is typically required to identify project costs.

ALLOWANCES AND CONTINGENCIES

- The allowances and contingencies section of the report indicates that design contingency can be reduced to zero once the design is complete. That is appropriate only if the project is bid immediately following. If there is a time lapse, some contingency should remain to account for market conditions and/or other forces that would increase costs.
- The report should identify the specific requirements of GC/CM and design-build project delivery that are different from design-bid-build.

C-100

- C-100 revisions would benefit from industry input. On many projects the design professionals develop and maintain the C-100 on behalf of the public agency. We recommend making a draft of the proposed revisions to the C-100 available for review before publishing the final report.
- The C-100 is designed for design-bid-build project delivery. It should be updated to align with alternative project delivery methods. It is flawed for GC/CM and does not recognize the shift of most of the consultant services to the contract for construction in design-build.
- The “MACC” that is the basis of A/E basic services in the form means different things in different methods. In design-bid-build and GC/CM, I C-100 does not account for the difference, which results in basic services fees on GC/CM projects calculating at a lower amount than a DBB with the same construction cost. Basic services on GC/CM projects should be calculated on the Total Cost of Construction that includes the

GC/CM's MACC, fees, negotiated support services and risk contingency that are all included in a Design-Bid-Build MACC.

OTHER

- Elapsed time between project funding, design and construction increases the potential impacts of code changes and market conditions. It also impacts functional requirements as agency leadership and staff changes and technology evolves. Reducing the time between funding and project completion reduces these risks.
- Figure 1 in the report indicates that market uncertainty is constant. In reality, market uncertainty is variable depending on global and national (i.e., climate change, pandemics and wars) and local (i.e, strikes) trends.

LIFE CYCLE COSTING

- Life cycle cost analysis is a valuable tool that helps public agencies make cost-effective decisions about scope and budget. CPARB developed Life Cycle Cost Analysis Guidelines, attached. However, the guidelines are infrequently applied. Key to the process is the commissioning agent, who should be engaged in the predesign phase and lead development of the Owner's Project Requirements (OPR). However, this occurs infrequently. We recommend that the commissioning agent and the OPR be a required element of the predesign.
- There is confusion about the roles and relationship between OFM's LCCM, the LCCT tool and DES's ELCCA. We agree with the recommendation that the processes should be integrated.

Construction Cost Assessment Preliminary Report:
Current Best Practices for Escalation Forecasting

- C-100 escalation rates are typically lower than actual rates of escalation. Rider Levett Bucknall/Lease Crutcher Lewis estimate that escalation in Western Washington has averaged 4.5% over the past fifty years. Mortenson estimates 4.2% escalation since 2009.
- Date of construction start identified in project request reports and/or predesigns may be delayed, which exacerbates the impact of escalation rates that do not align with market conditions.

Construction Cost Assessment Preliminary Report:
Current Best Practices for Risk Management

- A general risk assessment process which starts with the capital request (project request report) and continues from predesign through construction informs project delivery type selection, budgeting and organization of agency resources.
- See Washington State Department of Transportation's Determination of Professional Liability Spreadsheet, attached, as an example of a risk assessment tool that addresses impacts on project costs.
- The report indicates the project sponsor could conduct the initial assessment. The most sophisticated project sponsors often rely on design or the design/contractor team. Few project sponsors have the ability to do it independently.
- A risk assessment can be performed at any point in the process. However, it is important for public agencies to know that the sensitivity is directly related to the available information. Risks should be assigned to all unknowns. Early in the project that may include site survey, geotechnical report, hazardous materials report, land use and building code requirements, etc. Reducing the unknowns early in the process, and definitely during predesign, increases the level of confidence.

- The report suggests a simplified risk identification during concept planning. A more detailed risk assessment may influence the predesign alternatives analysis, and the selection and detailed analysis of the preferred alternative, leading to a result that is not optimal.
- The risk assessment should consider the impact of code changes that occur prior to permitting that include mandates for reduced carbon emissions and zero net energy facilities.
- The report suggests agencies should "Cushion the risk through contingency." The current C-100 calculates a 5% contingency for design services and construction costs. It does not provide risk contingencies. Previously, the C-100 included a 5% contingency for "Agency Management' that allowed agencies to mitigate risk for changes in program, site development, jurisdictional requirements, etc. Returning this item to the C-100 would implement the report's recommendation.

Other Issues:

Architectural and Engineering Fee Schedule

- OFM's Guidelines for Determining Architect/Engineer Fees for Public Works Building Projects and A/E Fee Schedule have been in effect since July 1, 2015. They do not align with the scope of design services required to meet their requirements or account for escalation in the cost of design services. It is time to review and revise the documents to better serve public owners and increase fairness to design professionals. Industry and public owners should be included in the process.

A/E FEE SCHEDULE

- The A/E Fee Schedule calculates basic service fees based on a percentage of construction costs. The percentage has an inverse logarithmic relationship to the construction value based on an assumption of economy of scale. This is reasonable given the algorithm yields a fee percentage in alignment with market conditions at the time it is established. However, it needs to be updated regularly to maintain that alignment.
  - As an example, if a project was designed and constructed ten years ago at a cost of $20 million it would cost about 50% more, or $30 million today. Although the current total fee would be higher it would not fully reflect the increased cost of compensation to design professionals because the inverse algorithm reduces the fee percentage for the higher construction value, negating some of the value of escalation in the cost of design services.

PROJECT TYPES AND FEE DISTRIBUTION

- Project types (A, B and C) should coordinate with specialized consulting needs. Most STEM teaching facilities for science, advanced manufacturing and allied health are designated Schedule B, which is appropriate if the required laboratory consulting services are provided as an extra service. However, the A/E Fee Guidelines do not list them as "specialty consultants." If they are not an extra service, then Type A should be applied.
- The guidelines should provide guidance for projects with mixed project types, such as a classroom building with a performance hall.
- The guidelines were updated to recognize front loading of design effort in the process, as shown in the chart on page 22, when schematic design was increased from 15% to 18% of design services. Further development indicates the percentage should be increased to 20% to reflect the use of lean principles, alternative project delivery, sustainable design and building information modelling (BIM).
- Remodel design allows for a 3% to be added to the fee schedule percentage for basic services. Redevelopment of existing sites with existing infrastructure involves technical and jurisdictional complexities that warrant a similar additional cost.

HOURLY RATES

- OFM's Guidelines stipulates that hourly rates for Additional Services be negotiated with a limit of $200/hour for principals and $150/hour for employees of the firm. The limits apply to both the prime and their subconsultants. These rates have not been updated since they went into effect in July 2015 and are not aligned with market conditions. Private sector rates for similar levels of responsibility and experience are considerably higher.
  - Design firms are struggling to recruit and maintain capable staff. The pool of capable employees is limited. Firms compete with contractors, public agencies, developers and tech companies, all of whom offer higher wages and benefits. Talented design professionals are in demand in other corporate entities due to their project management, strategic thinking and communications skills.
  - Architect compensation has increased an average of 6.2% annually as reported in the 2019 American Institute of Architects (AIA) Compensation Report (https://www.aia.org/press-releases/6197486-demand-for-design-services-has-bolstered-c).
  - Many firms are located in urban centers with high cost of living. Compensation in Seattle, for example has increased 3%-4% annually as reported by the US Bureau of Labor Statistics (https://www.bls.gov/regions/west/news-release/employmentcostindex_seattle.htm).
  - Specialized design and engineering disciplines (geotechnical, medical equipment planning, etc.) typically have hourly labor rates well above the limit.
- We recommend increasing the limits to $250/hour for principals and $200/hour for employees of the firm. Hourly rates should be updated biannually to reflect market conditions and increases in cost of living.

CONSTRUCTION PHASE SERVICES

- The fee schedule allocates 27% of basic services to the construction phase, which is not typically adequate to administer the construction contract.
- Many factors unique to specific projects impact the ability to successfully provide the effort needed for a successful outcome within the identified basic fee percentage, including:
  - Duration of construction phase.
  - Complexity and size of the project having more impact than addressed by fee category.
  - Level of experience and sophistication of the contractor, especially in design-bid-build.
  - Capability of the agency to monitor and respond to construction demands.
  - Distance of the project from A/E's office.
- These requirements will increase the need for more frequent site visits to ensure installations are satisfying the intent of the design documents and perform as intended.
- The guidelines require the A/E to provide project administration, discipline coordination, permit consulting, administration of submittals, preparation of construction documentation (responding to requests for information, supplemental instructions, changes in the work, schedule monitoring and reporting, cost accounting, and project meetings and field observation documented by minutes and field reports. The A/E is required to visit the site at intervals appropriate to the stage of construction and to conduct on-site project progress meetings once per week.
- Typically, the basic services fee divided by the construction phase duration provides compensation for less than .5 FTE for all design team disciplines. The result is either the A/E providing services at a loss or inadequate administration of the contract for construction, or both. The disconnect between requirements for construction phase services and fee means the project may not receive the attention required to meet the state's goals for cost, schedule and quality.

- The construction phase requires the A/E to respond to project needs as they arise to maintain efficiency in the field and reduce the risk of delays. The architect team typically requires 1 – 1.5 FTE to meet the demand, enabling the contractor to stay on schedule and ensuring minor issues do not create major cost and schedule impacts issues.
- The current solution is to negotiate additional services for the construction phase that is often termed "Extended" or "Enhanced" CA phase services. DES' research indicates that they typically agree to these additional services, but it often requires a protracted negotiation and is not applied equally by all public owners to all projects.
- Two alternate solutions should be considered:
  - increase the fee percentage for the project and rebalance percentage of fees assigned to the bidding, construction and closeout phases, or
  - designate a portion of the services such as field visits and project meetings as required additional services comparable to the way civil engineering is divided between basic and additional services.

Other Issues

Consultant Extra Services

COST ESTIMATING

- Cost estimating should be an additional service. Architects and engineers do not typically have the expertise, industry contacts or database of past project and current market conditions required to estimate construction costs. Means and methods, which effect costs, are not part of their contractual responsibility. The estimating methods identified in the report indicate that specialized cost estimating consulting services should be provided as an extra service.

PERMITTING

- Permitting should be an additional service due to the time and effort required to manage the process. Municipalities struggle to provide consistent code interpretations and definitions of requirements from pre-application meeting through submittals, often changing their mind. Permit schedules are frequently extended due to municipal staff shortages requiring design professionals to divide submittal packages and/or engage authorities having jurisdiction throughout the review process.

CIVIL ENGINEERING

The range of interpretation by public agencies of the scope of civil engineering are Extra Services ranges from 50% to 100% of the total cost of civil engineering. We recommend that all civil engineering services be designated as Extra Services to provide consistency and dedicate A/E basic services to architecture, structural, mechanical and electrical engineering.

- Civil engineering services have a different relationship to design and construction phases than other disciplines. Their work is front loaded to comply with land use permits, SEPA applications and early bid package. Providing civil engineering fees as an extra service allows the consultant to be compensated in alignment with project process and schedule.

OTHER

- Traffic engineering and building envelope consultants should be added to the list of Specialty Consultants.
- Some projects involve materials that are purchased by the owner. The work is not included in the MACC and therefore not accounted for by the A/E Fee Schedule. The services should be designated as additional to basic services.

Other Issues:

Project Management Fees

- Currently, there are no guidelines for project management fees, which deserves further study. Community and technical colleges have increased the use of consultants to support their capital projects. A survey of the scope of services and fees would inform the development of guidelines.
- The costs depend on the division of responsibility between the public agency, the Department of Enterprise Services (where involved), the design (or design and GC/CM or design-build) team and the project management firm. More resources can benefit the public agency. They can also add cost and confusion in communications and decision-making.
- Definition of responsibilities is the first step to identifying whether an outside project manager is required.
  - During the design phases, the prime consultant may be able to provide a portion of the project management services. GC/CM and design-build project delivery increase the capability of the team to provide project management services in support of the state agency. Nonetheless, agencies need their own resources to review budgets and design documents, schedule stakeholder meetings and keep executive leadership informed. Some agencies have capacity to provide this internally, others need outside support.
  - During the construction phase, the agency is responsible for coordinating its use of the site in relationship to the contractor's scope of work (such as construction deliveries, and water, power and data shutdowns); reviewing pay applications and change orders and resolving disputes between design professionals and contractors. Again, some agencies have capacity to provide this internally while others need outside support.

Other Topics:

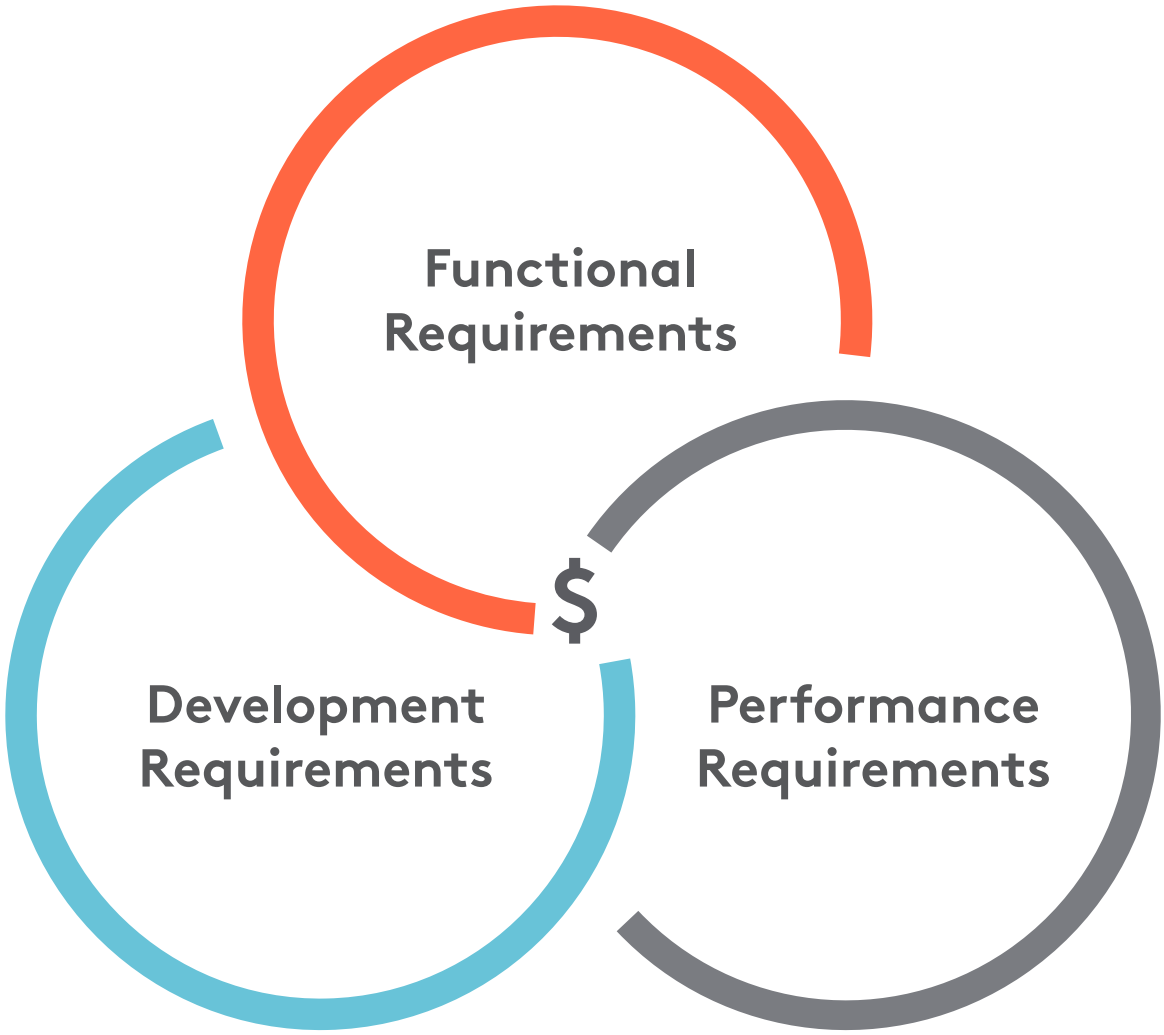
Adequate Funding of Capital Projects

- We are hopeful that the report will help the state and its agencies identify more realistic project budgets for capital projects. Current projects for higher education are not adequately funded to meet their targeted functional programs. Many are realizing only 70- 80% of their intended space program due to the fact that the state's guidelines for "reasonableness of cost" are based on studies that are no longer relevant in terms of the construction market and specifically excluded project specific costs such as development.
- We encourage OFM to implement the report's recommendations as quickly as possible. Projects that will be considered for the 2023 state capital budget were underfunded at the time of the submittal of their project request report. Combined with the current rates of escalation they are even less likely to meet their functional goals.

Attachments

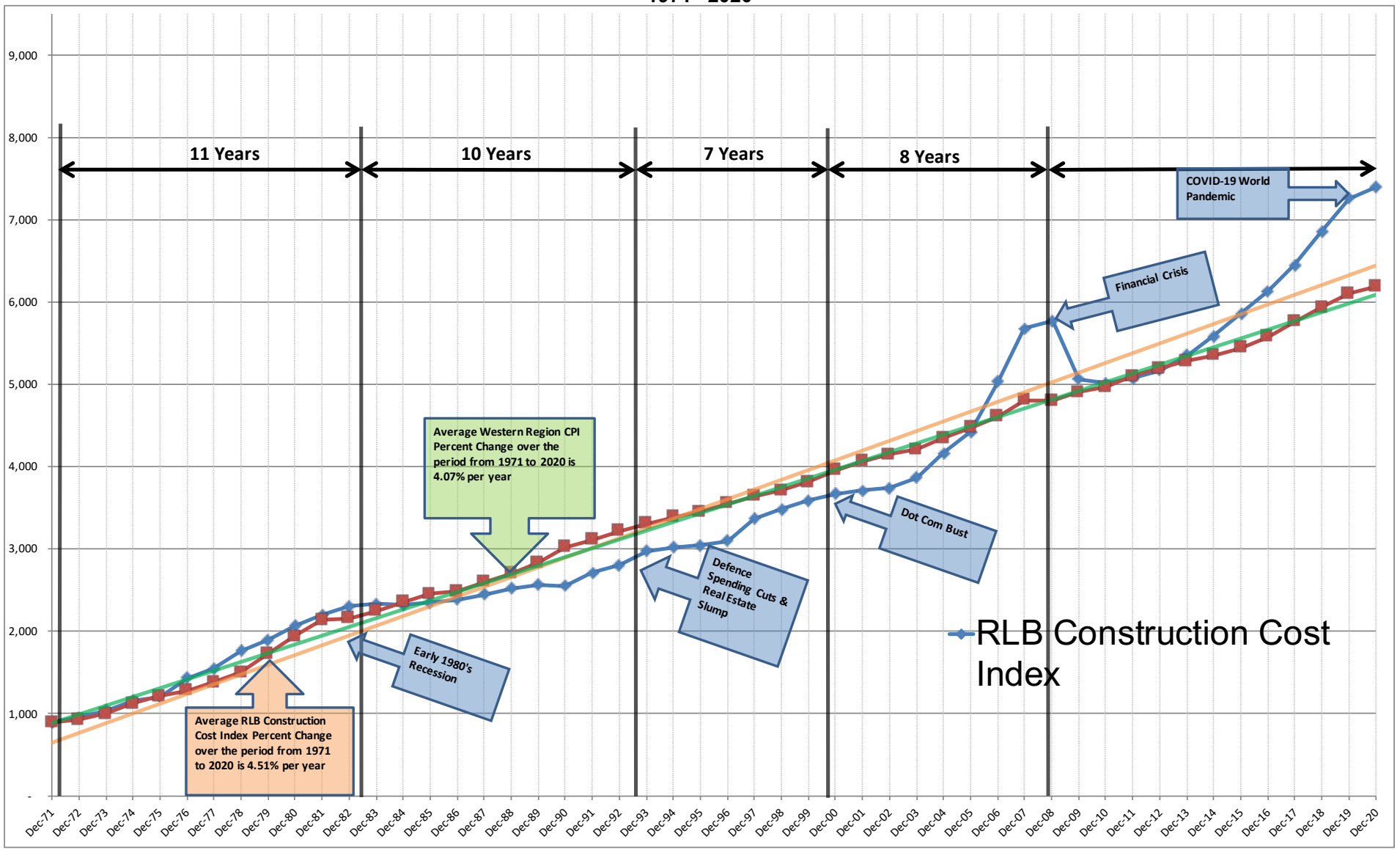
- Venn Diagram: Clear Scope of Work
- Construction Cost Index Since 1971, Rider Levett Bucknall / Lease Crutcher Lewis
- Construction Cost Index since 2009, Mortenson
- CPARB Life Cycle Cost Analysis (LCCA) Guidelines Summary
- Determination of Professional Liability, Washington State Department of Transporation

Clear Scope of Work



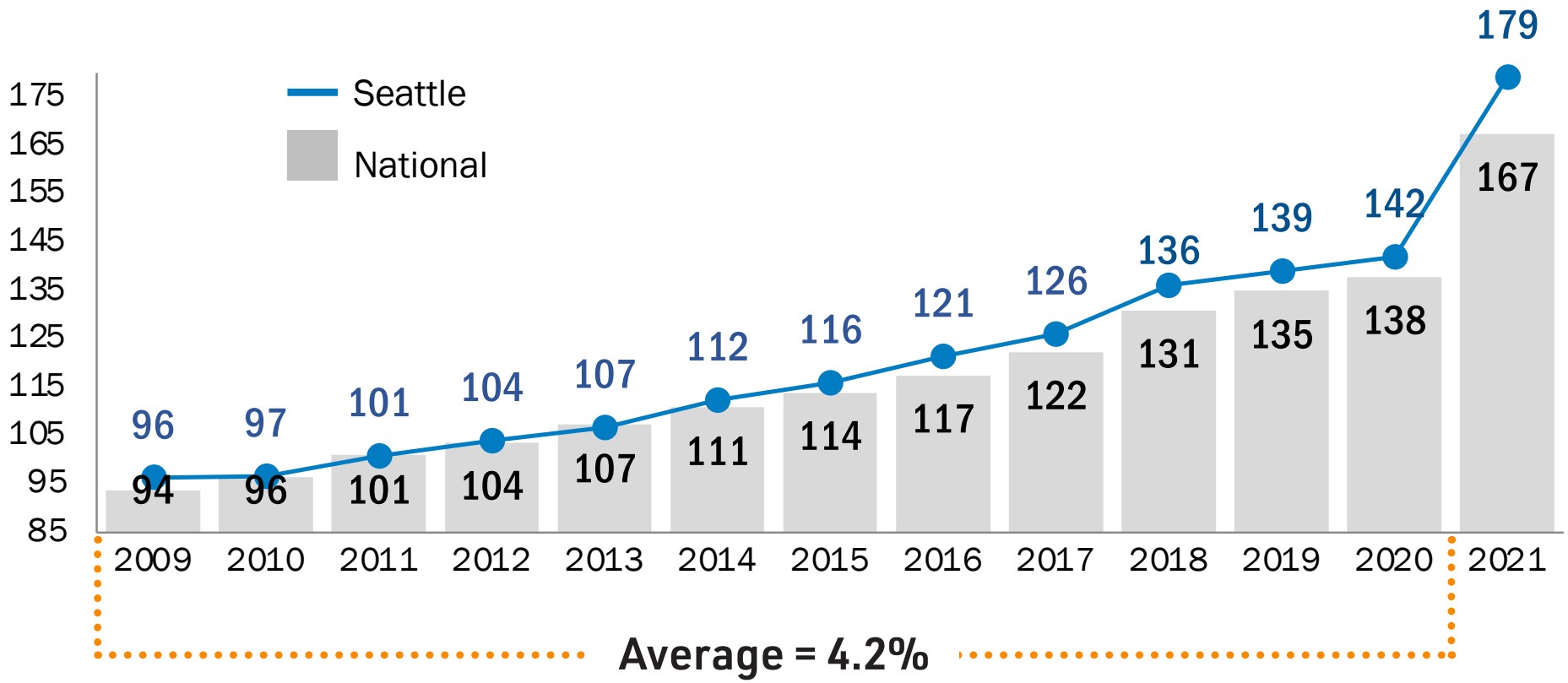
RIDER LEVETT BUCKNALL
LEASE CRUTCHER LEWIS

ESCALATION
1971 - 2020



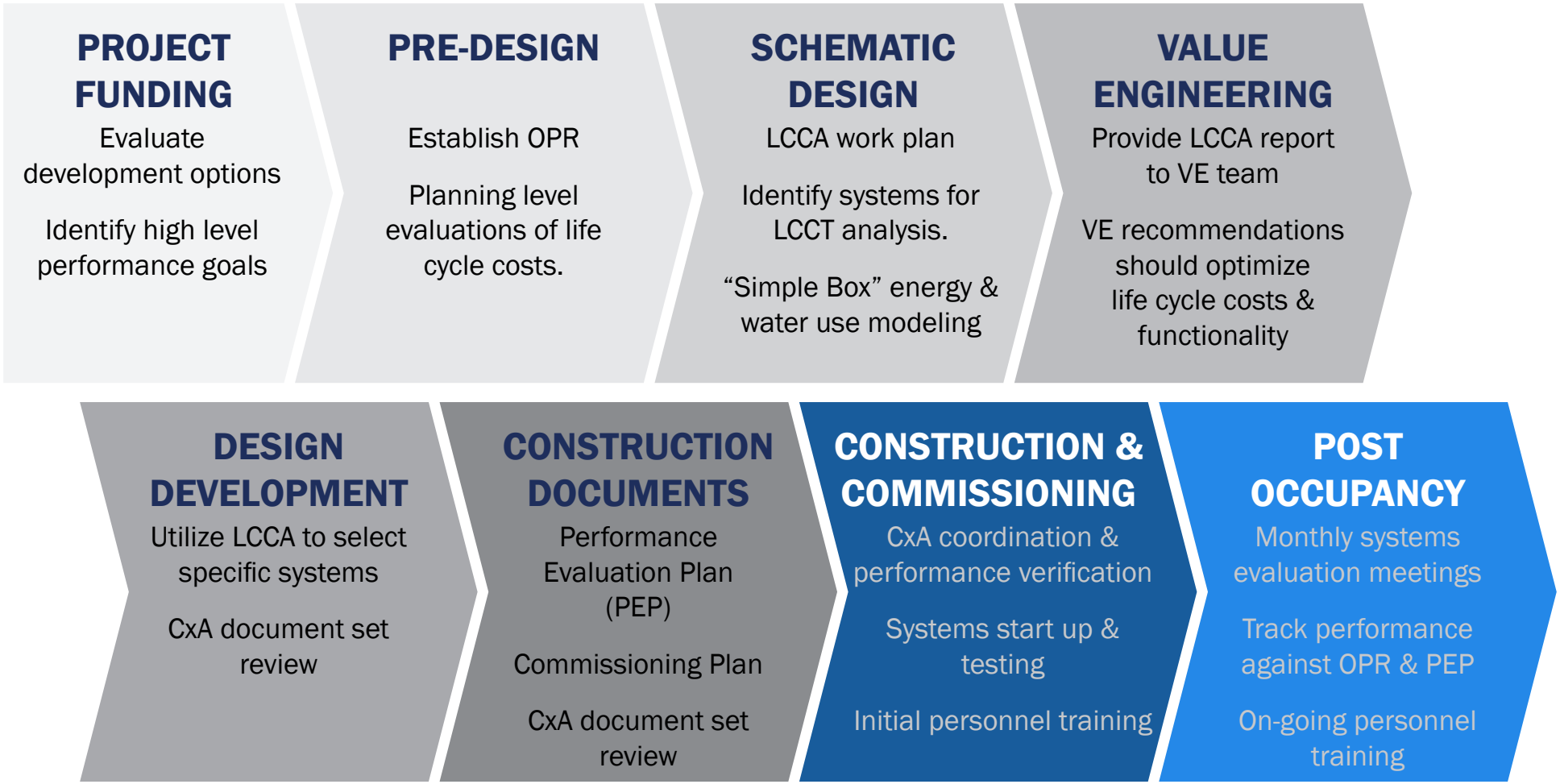
Mortenson

Construction Cost Index Seattle, Q4 2021



Guidelines for Life Cycle Cost Analysis

Capital Projects Advisory Review Board
Committee on Life Cycle Cost Analysis & Energy Efficiency


PROJECT FUNDING
Evaluate development options
Identify high level performance goals
PRE-DESIGN
Establish OPR
Planning level evaluations of life cycle costs.
SCHEMATIC DESIGN
LCCA work plan
Identify systems for LCCT analysis.
“Simple Box” energy & water use modeling
VALUE ENGINEERING
Provide LCCA report to VE team
VE recommendations should optimize life cycle costs & functionality
DESIGN DEVELOPMENT
Utilize LCCA to select specific systems
CxA document set review
CONSTRUCTION DOCUMENTS
Performance Evaluation Plan (PEP)
Commissioning Plan
CxA document set review
CONSTRUCTION & COMMISSIONING
CxA coordination & performance verification
Systems start up & testing
Initial personnel training
POST OCCUPANCY
Monthly systems evaluation meetings
Track performance against OPR & PEP
On-going personnel training

I. INTRODUCTION

A. OPPORTUNITIES

1. Life cycle cost analysis (LCCA) is a tool that can contribute to the process of designing facilities that meet the needs of their owners.
    a. Evaluating capital and operating costs enables the client agency, the architect/engineer and the contractor to make decisions that can reduce the total cost of ownership.
    b. Identifying the Owner's Project Requirements (OPR) early in the planning process ensures that design decisions are made in relation to the owner's goals for the project.
    c. Modeling energy and operational performance of the design can lead to projects that conserve resources.
    d. Commissioning, measurement and verification of the completed project can improve the performance, operations and maintenance of the facility.
2. The LCCA process should be organized to serve the specific needs and circumstances of each project.
    a. Identifying the project elements that would benefit from a life cycle cost analysis early in the process enables LCCA to be applied in an efficient, cost-effective manner.

B. RELATION TO EXISTING STATE GUIDELINES

1. The proposed LCCA guidelines are built on the foundation of the State's existing ELCCA guidelines and assumes that the Washington State Life Cycle Cost Tool (WA LCCT) developed by OFM will be utilized.
2. LCCA and ELCCA should be integrated into a single process to maximize outcomes, avoid redundancy and eliminate conflicts.
3. Under these guidelines, life cycle cost analysis starts earlier in the process to ensure that development and design alternatives are evaluated before decisions are made.
    a. Evaluate development options in capital request.
    b. Establish OPR and make initial evaluation of life cycle costs in predesign.
    c. Utilize LCCA early in the design process to inform critical decisions.
4. Under these guidelines, measurement and verification continues beyond completion of the construction phase to ensure a successful transition from the contractor to the client agency's facilities team.
    a. Provide ongoing participation of commissioning agent, architect/engineer and contractor in the Warranty and/or Energy Performance Contract Phases.

C. PROJECT DELIVERY MODEL

1. General principles of incorporating life cycle cost analysis into a project apply to Design Bid Build, General Contractor Construction Manager and Design Build, however the details and sequence of the process may vary and should be modified to specific circumstances.

D. TEAM

1. An effective LCCA process involves the client agency, the commissioning agent, the architect/engineer and the contractor or cost estimator.
    a. For projects managed by the Department of Enterprise Services (DES) representatives of Engineering and Architectural Services and Energy Services should be involved.
2. Commissioning Agent
    a. The commissioning agent (CxA) is a representative of the client agency.
    b. The CxA may work with the client agency to prepare the OPR and should review the design documents to ensure they convey its intent.
    c. The CxA coordinates, oversees and/or performs the commissioning testing.
    d. The CxA participates in the post-occupancy measurement and validation process.
3. LCCA Analyst
    a. The LCCA analyst is typically part of the architect/engineer design team and may be an architect, engineer or cost estimator.
    b. The LCCA analyst must have the skills and experience necessary to coordinate the consultants required to evaluate the initial and life cycle costs, and to utilize the coordinated information in an LCCA model.

II. CAPITAL REQUEST

IDENTIFY PROJECT NEED

A. ESTABLISH OVERALL GOALS

1. Identify high level performance goals for the project including LEED certification, and energy and water use targets.

B. DEVELOPMENT OPTIONS

1. Analyze alternative strategies for the development of the project.
2. Options may include doing nothing, leasing space, renovating and/or expanding an existing facility or new construction.
3. Consider financial impact on operations and programs in addition to facility costs.

III. PREDESIGN

ESTABLISH PROJECT GOALS

A. ROLES AND RESPONSIBILITIES

1. Document roles and responsibilities for the client agency, Department of Enterprise Services or other appropriate agency, commissioning agent, architect and/or engineer and general contractor or cost estimator.

B. OWNER'S PROJECT REQUIREMENTS (OPR)

1. Document project goals for performance, operations and maintenance.
    a. Owner and user requirements.
    b. Systems and equipment performance.
    c. Training, operations and maintenance requirements.
    d. Confirm LEED certification type and level, and energy and water use targets.
    e. Sustainability and environmental stewardship goals.
    f. Energy performance guarantees.
    g. Indoor air quality, occupant productivity, daylighting, ventilation, etc.

C. PLANNING LEVEL EVALUATION OF LIFE CYCLE COSTS

1. Develop predesign work plan identifying project elements to be analyzed for review and approval by OFM.
2. Evaluate proposed site and building systems per the WA LCCT.
3. Complete applicable portions of the ELCCA Environmental Design Considerations checklist.

IV. DESIGN

UTILIZE LIFE CYCLE COST ANALYSIS AS A DESIGN TOOL

A. SCHEMATIC DESIGN

1. Develop a design phase LCCA work plan.
    a. Design Bid Build and General Contractor Construction Manager: client agency, commissioning agent and architect/engineer develop work plan and identify project elements for review and approval by OFM, Department of Enterprise Services Energy Services and/or other appropriate agency.
    b. Design Build: identify minimum requirements for the LCCA work plan in the predesign and/or the Design Build Request for Proposals.
    c. For guidance on project elements to assess, reference the LEED v4 Integrative Process credit.
    d. Identify opportunities for utility incentives, grants and government loans.
2. Identify elements that are most likely to reduce life cycle cost impacts and/or yield energy savings.
3. Provide "simple box" modeling of energy and operational performance to test alternative design strategies.
4. Conduct a water budget analysis to identify opportunities for reducing system water use.

B. VALUE ENGINEERING

1. Include LCCA report in submittal to value engineering team.
2. Value engineering recommendations should optimize life cycle costs and functionality.

C. DESIGN DEVELOPMENT

1. Provide final modeling of energy and operational performance of preferred options to establish criteria for the commissioning plan, energy and water use, operations and maintenance.
2. Utilize LCCA to make decisions about specific equipment alternatives.
3. Conduct a comprehensive document review by the CxA.

D. CONSTRUCTION DOCUMENTS

1. Prepare Performance Evaluation Plan.
    a. Establish Key Performance Indicators (KPI), which allow performance requirements to be measured and verified in the completed facility.
2. Design KPI data collection system.
    a. Incorporate measurement systems into the design.
3. Provide Commissioning Plan.
    a. Incorporate commissioning requirements into the Bid Documents.
    b. Identify systems and equipment to be commissioned.
4. Conduct a comprehensive document review by the CxA.

V. CONSTRUCTION

INSTALL AND TEST SYSTEMS & EQUIPMENT

A. CONSTRUCTION COORDINATION

1. CxA reviews shop drawings and submittals, evaluates change orders for impact on KPIs and OPR and updates both as necessary.
2. Identify testing requirements for the contractor including scheduling.

B. SYSTEMS AND EQUIPMENT START UP

1. Contractor start up, testing and balancing of systems and equipment.

C. PERFORMANCE VERIFICATION

1. CxA conducts final sign off on key performance indicators. CxA measures and verifies performance of as-built systems and equipment.
2. CxA provides summary Commissioning Report.

D. INITIAL TRAINING

1. Contractor trains client agency's personnel in operation of systems and equipment.

VI. POST-OCCUPANCY

VALIDATE PERFORMANCE OF COMPLETED PROJECT

A. WARRANTY AND/OR ENERGY PERFORMANCE CONTRACT PHASE MEETINGS

1. Monthly meetings of the client agency's facilities team, CxA, architect/engineer and contractor to evaluate systems and equipment performance.
    a. Hold meetings for a minimum of one year to monitor the performance of mechanical systems during at least one heating and cooling season.
2. Track facility performance in relation to OPR and other performance criteria.
3. Optimize systems performance based on KPI monitoring.
4. Identify opportunities to enhance operations and maintenance.
5. Provide ongoing tracking of systems performance to ensure energy efficiency and reduce operational risks.
6. Provide ongoing training of client agencies' facilities team.
7. Update commissioning report two months prior to expiration of warranty period to identify items to be corrected.

B. DATA COLLECTION

1. Report annually on systems and equipment performance, and energy use to OFM and DES Energy Services.

Washington State Department of Transportation

Determination of Professional Liability

Project Title:		**Date:**	
CN Cost Est:		**WIN:**	
		PIN	

SR		**Begin MP**		**End MP**		**Length:**	0 ***miles***
SR		**Begin MP**		**End MP**		**Length:**	0 ***miles***
SR		**Begin MP**		**End MP**		**Length:**	0 ***miles***

Brief Project Description:

<Insert Text>

Considerations

		Yes/No	Impact*	Score
1	*Is the Engineer's Estimate greater than or equal to $100 million?*		NA	**0**
2	**Project Location**			
2a	*Is the project in an urban area?*		NA	**0**
2b	*Is the project on an interstate corridor? If yes, skip 2c.*		NA	**0**
2c	*If 2b is no, is the project on a highway with high ADT (i.e. >25,000)?*		NA	**0**
2d	*Within Local agency jurisdiction and require a City Permit, Detour and/or Turnback Agreement?*			**0**
3	**Do the materials/components/tools/equipment pose any challenges?**			**0**
4	**Duration of project (i.e. number of construction seasons, etc)?**			
4a	*Less than or Equal to 1 construction Season*			**0**
4b	*Greater than 1 construction Season*			**0**

5 Constructing New Bridge(s) and/or Structure(s)

		Type of Structure (Yes/No)	Previously included in WSDOT project? (Yes/No)	Number of Structures (Number)		
5a	*Bridges Over a Roadway?*					**0**
5b	*Bridge Over Railroad Track?*					**0**
5c	*Pedestrian Bridge Over Roadway?*					**0**
5d	*Bridge Over Water?*					**0**
5e	*Burried Structure?*					**0**
5f	*Floating Bridge?*					**0**
5g	*Are there any structural issues not otherwise* addressed by another question?					**0**

6	**Bodies of water and/or buildings in close proximity**			
6a	*Does the project include in-water work?*			**0**
6b	*If 6a is yes, is there concern regarding the allocated in-water work window?*			**0**
6c	*Does the project include flow bypass work?*			**0**
6d	*Does the project include dewatering to facilitate in-water work (e.g. dewatering portion of stream)?*			**0**
6e	*Are their private structures (e.g. homes, building) in close proximity affect by dewatering elements (e.g. dewatering causes settlement)?*			**0**
7	**Any hazardous substance issues (Contaminated soils, underground storage tanks, etc.)?**			**0**

If yes, explain:

<Insert Text>

Washington State Department of Transportation

Determination of Professional Liability

8	**Traffic control Issues**				
8a	*Is the traffic control complex, and/or involves multiple statges?*				0
8b	*If so, is this on interstate freeway or multi-lane, high speed corridor?*				0
8c	*Does traffic control require temporary alignments outside of existing highway footprint?*				0
9	**Drainage Issues**				
9a	*Does the project include more than $250K of drainage work?*				0
9b	*Is the project's new draingage element(s) tieing into existing drainage system(s)?*				0
10	**Utilities Issues**				
10a	*Is there an elevated risk or concern assocaited with potential conflicts with utilities?*				0
10b	*Does the project utilize trenchless construction?*				0
11	**Railroads**				
11a	Does the project include coordination, design or construction with any railroads not included in 5b?				0
12	**Geotechnical**				
12a	*Does the project have compressible soils?*				0
12b	*Does the proejct incorporate one or more deep foundation?*				0
12c	*Is the project constructing any wall(s) that are not standard plan?*				0
12d	*Does the project have a high water table?*				0
12e	*Are there any other high risk geotechnical considerations (historic slides, etc.)?*				0
12f	*Are there any excavations requiring shoring or walls next to WSDOT or other facilities?*				0
13	Are there any known environmental issues not otherwise addressed by another question?				0
14	*Does the number of stakeholders exceed 5?*				0
15	Are there any other potential problems (What do YOU see as risks related to this project). If yes, explain: <Insert Text>				0

Total Score = **0**

Project Risk Level	
Score	Level
0 to 15	**Low**
16 to 30	**Medium**
31 to 60	**High**
61 or greater	**Very High**

Note: * - See "Impact" tab for more information.

Washington State Department of Transportation

Assessment of Impact

Project Title:	0
CN Cost Est:	$0

Date:	0
WIN:	0

Overview:

The assessment of "impact(s)" for any given question is intended to assess the magnitude of costs associated with a negative outcome relative to the project's total engineer's estimate (i.e. how much will it cost to correct the issue relative to the project's engineer's estimate). These potential costs include any collateral project impacts and associated cost's (e.g. schedule delay, office overhead, repairs to new and existing facilities including local agency and third party etc.). For any given risk, a negative outcome could result in a range of possible impacts (e.g. an impact could result in between $10,000 to $100,000 in additional costs). When assigned the how "impactful" any given question or risk is, identify the most likely approximate cost.

Assessment of Impact

Magnitude of Impact	Description	Cost relative to Total Eng. Est.	Project Specific Range		
Very Low	Very minor impacts with very limited or no collateral contract issues that may result in very minor cost to correct	$ ≤ 0.5%		$ ≤	$0
Low	Minor impacts with some collateral contract issues that results in minor costs to correct.	0.5% < $ ≤ 2%	$0	< $ ≤	$0
Medium	Moderate impacts with collateral contract issues that results in costs to correct.	2% < $ ≤ 5%	$0	< $ ≤	$0
High	Notable impacts with collateral contract issues that results in sizable costs to correct.	5% < $ ≤ 10%	$0	< $ ≤	$0
Very High	Significant impacts with extensive collateral contract issues that result in substantial costs to correct.	$ > 10%		$ >	$0