SKANSKA

DGS Public Works, Bureau of Capital Projects - Design

RFQ for DGS C-0411-0068 Phase 1

Millersville University - Brooks Hall Business School

Technical Response to Request for Quote - Contract No.: DGS 2020-SWCE
June 20, 2022

Kautter & Kelley Architects

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SKANSKA

A. Understanding the Project Scope

A. Understanding the Project Scope

Detailed Work Statement

Understanding of the Project

We understand that as part of Millersville University's new strategic plan (Tradition and Transformation), Brooks Hall will be completely renovated to become the home of the Lombardo College of Business. Brooks Hall was built in 1938 and has served as an athletics venue until it's closure in the Spring of 2017. Brooks Hall was constructed with a gymnasium, pool, classrooms, offices and locker room spaces. It is 3 stories with a lower-level mechanical floor and an approximately 38,000 square foot interior area. It has stone foundation walls, concrete footers and steel columns. Its exterior walls are limestone and brick. The roof is a rubber membrane and only about 5 years old.

This project will be carried out segregated in into 3 phases:

Phase 1: Envelope upgrades, site prep/utilities, elevator, structural upgrades, core MEP equipment/systems (including sprinkler and fire alarm)

Phase 2: Phase 1 existing building finishes and remaining MEP work, Lobby addition (including fitout and MEP), East Terrace in front of the Lobby, and other miscellaneous work, such as the food service area fitout, stock market ticker, and water bottle filling stations

Phase 3: Annex addition (including fitout and MEP), remaining sitework and parking with stormwater management

The design stage of this project will encompass most of the existing building renovation (Phase 1), as well as the remaining renovation work and the new additions (Phases 2 and 3). It is understood that the construction stage will only cover scope obtainable within the base construction amount of $8,700,000 (Phase 1). Phase 1 construction is anticipated to exclude the new additions and some renovations.

Target Value Design will be used during this Lean project to reconcile the Phase 1 scope with the funding allocated for this project. After Phase 1 construction is complete, the existing building will be in a state of completion adequate to accommodate either full or partial occupancy.

All design stages will be completed for the entire project scope covered by Phases 1, 2 and 3. Phase 1 will focus on existing building renovations, upgrading the shell and fit out of the above ground areas. Fit out of the basement and construction of the addition components are anticipated to occur in the subsequent Phases 2 and 3 that will be designed as part of this project but not constructed by DGS.

Because of the need to develop accurate and durable cost estimates during the Design Stage of this project, DGS is looking for an experienced construction and cost estimating firm that will prepare estimates as though they were bidding on a Department of General Services construction contract. Because Skanska is a builder, a program/project manager, and a cost estimating consultant, we have all of the attributes and resources required for success on this assignment.

Work Statement Summary

Our collaborative approach to cost estimating will include leadership during the Target Value Design process. Within the TVD process we will develop detailed and definitive estimates during the design stages that will be prepared as though we were bidding on a DGS construction contract. We will then support cost control and cost management efforts throughout both bidding and construction.

In-House Estimating Resources

Skanska has a staff of in-house estimators that includes architectural, civil, mechanical and electrical estimators. Software that our estimators employ includes BIM Revit Modeling, Assemble Systems, On Screen Takeoff (OST), SAGE Estimating, and Metriks™ (our national construction cost estimating database). These tools provide a powerful tool for establishing cost.

Our estimating team sets Skanska apart from our competitors. Their sole function is to develop estimates for our projects, work with teams to identify cost saving opportunities and validate the project budget as part of each estimate deliverable. In addition, our preconstruction team's day-to-day interaction with the construction market ensures that the unit pricing is accurate and based on real-time market information. Most of Skanska's estimators started their careers in the subcontractor market and understand the factors that influence bid pricing. This ensures that our deliverables are accurate.

Our in-house estimating team prices projects as though they were bidding on the work and as if they were developing a Guaranteed Maximum Prices (GMP) for a project where our fee was at risk.

This distinguishes us from pure cost estimating firms that do not build. Their initial budget figures are based on "estimates" from prior assignments, not on the final cost of those projects and not on real-time market intelligence.

As a result, we are capable of producing accurate and durable estimates during the design stage of this project. The benefit for DGS and Millersville University is that you will not have to request additional funding as this project moves forward into design and construction.

AACE Class	ANSI Classification	Typical Use	Project Definition	Expected Range of Accuracy: Low Expected Actual Cost	Expected Range of Accuracy: High Expected Actual Cost	Other Terms
Class 5	Order-of-Magnitude	Strategic Planning; Concept Screening	0% to 2%	-50% to -20%	+30% to +100%	ROM; Ballpark; Blue Sky; Ratio
Class 4		Feasibility Study	1% to 15%	-30% to -15%	+20% to +50%	Feasibility; Top-down; Screening; Pre-design
Class 3	Budgetary	Budgeting	10% to 40%	-20% to -10%	+10% to +30%	Budget; Basic Engineering Phase; Semi-detailed
Class 2	Definitive	Bidding; Project Controls; Change Management	30% to 75%	-15% to -5%	+5% to +20%	Engineering; Bid; Detailed Control; Forced Detail
Class 1		Bidding; Project Controls; Change Management	65% to 100%	-10% to -3%	+3% to +15%	Bottoms Up; Full Detail; Firm Price

Data from Similar Projects: Skanska Metriks™

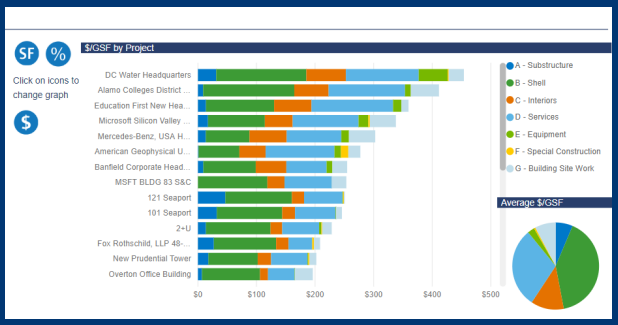
As stated in your RFQ, estimates in the early stages of this project are expected to utilize data and experience from similar projects. We are well aligned with this expectation because of our experience both developing scope options for and carrying out renovations of higher educational facilities and because of our national construction cost database, known as Skanska Metriks. We use Skanska Metriks to harvest close to 400 specific, quantified attributes from every project in order to help customers and design firms optimize results.

Because it contains data from similar projects, Skanska Metriks will enable an understanding of the costs and cost drivers in the implementation of your project.

We will use our cost benchmarking capabilities during the design phase to convey the relationship of program to cost and of cost to value to project stakeholders. We will also use this data to provide continuous, and collaborative input throughout the design process.

Benchmarking with Skanska Metriks™

We collect close to 400 specific, quantified attributes from every project we build to help our customers and design team members achieve optimization. Skanska Metriks™ provides greater confidence in budget, schedule and overall project efficiency.



Target Value Design Principles

Target Value Design (TVD) is included in the Cost Estimating Criteria for this project. The TVD process will be employed to ensure that your project remains within the established budget, while providing the best value for DGS and the Millersville University. Skanska is one of the few, if not the only, construction management firms that has successfully conducted TVD in a Multiple-Prime environment. TVD principles must be modified in order to comply with Pennsylvania procurement laws.

Our estimators have extensive experience utilizing Target Value Design principals to provide accurate cost estimates for public projects that are under Pennsylvania's Separations Act, Multiple-Prime Delivery System.

The objectives of conducting TVD on a Multiple-Prime project include the following:

1. Open communication
2. Scope/Cost Control
3. Scope refinement/build-ability/contingency reduction
4. Proactive value engineering
5. Design for what is constructible vs. evaluate the constructability of a design after it is designed
6. Strive to reduce the waste and rework in the Redesign/Estimate/Redesign Cycle.

We will look beyond business-as-usual to explore ideas that balance performance, quality and life-cycle cost to deliver the best value for your investment.

Even during the design stage of this project, a TVD process can be effective in solidifying DGS's and Millersville University's project values, priorities and constraints, which would be organized within a Value Assessment Matrix that would be used in the development of the cost model.

The benefit for DGS and the University of applying TVD principles to the design stage is that it leads to enhanced collaboration, transparency and, most importantly, avoiding surprises downstream.

While TVD focuses on discovering and employing best value solutions, we also understand that the design process needs to be flexible. We are experienced using TVD on collaborative projects, and our approach will not stifle creativity during the design phase.

Target Value Design

Skanska has in-depth experience managing the Target Value Design process for all project types including Multiple-Prime delivery and we will ensure that your project remains within the established budget, while providing the best value for the University.

Cost is typically the value with the greatest influence over the client, but time, location and other project goals must be met in order to achieve all TVD objectives.

The basic objectives of conducting TVD on a Multiple-Prime project:

- **Open Communication**
- **Proactive Value Engineering/ Constructability**
- **Reduce the Redesign/ Estimate/Redesign Cycle**
- **Scope/Cost Control**

Key Variables

As part of preparing Cost Estimates, we use our builder's expertise and project management experience to consider the effect of the expected construction schedule on construction costs. We use our estimating experience to take into account such variables as escalation, union and non-union construction, bidding requirements, anticipated number of prime contracts, the nature of construction, and the influence of government regulations on construction costs.

Skanska understands that establishing an accurate budget isn't restricted to construction materials and labor. Other key factors need to be taken into account, including known project risks, owner cost and constraints, logistics/ phasing, escalation, market conditions, and schedule.

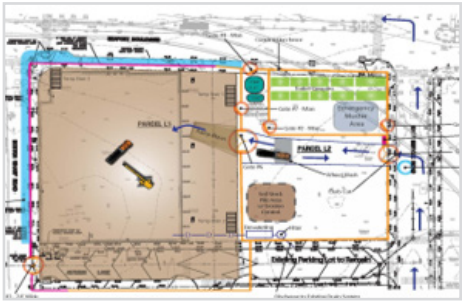
SKANSKA COST INDEX

Year	January	February	March	April	May	June	July	August	September	October	November	December	Annual Escalation	5 Year Average	10 Year Average
2022	1.00%	1.38%	1.48%										3.87% *year to date*	15.11% *last 12 months*	
2021	0.27%	0.56%	0.84%	1.07%	2.19%	1.85%	1.93%	2.82%	0.21%	0.47%	0.19%	0.50%	12.91%		
2020	0.28%	0.10%	0.06%	0.29%	0.12%	0.17%	0.22%	0.20%	0.55%	0.73%	0.80%	0.88%	4.40%		
2019	0.08%	0.05%	0.07%	0.04%	0.07%	0.15%	0.26%	0.29%	0.05%	0.40%	0.20%	0.36%	2.03%		
2018	0.35%	0.04%	0.21%	0.24%	0.73%	0.20%	0.68%	0.33%	0.39%	0.23%	0.05%	0.24%	3.69%		
2017	0.05%	0.03%	0.23%	1.23%	0.28%	0.04%	0.53%	0.35%	0.22%	-0.06%	0.64%	0.24%	3.79%	5.37%	
2016	0.01%	0.51%	0.36%	0.53%	0.12%	0.03%	0.45%	0.22%	-0.17%	0.47%	0.20%	0.61%	3.33%	3.45%	
2015	0.50%	-0.12%	0.03%	0.29%	0.27%	-0.07%	0.10%	0.12%	0.52%	0.09%	0.39%	0.04%	2.17%	3.00%	
2014	0.01%	0.04%	0.26%	0.44%	0.28%	0.14%	0.19%	0.18%	0.38%	0.66%	0.52%	0.12%	3.21%	3.24%	
2013	0.46%	0.43%	0.10%	0.19%	0.32%	0.31%	-0.05%	-0.03%	0.19%	0.48%	0.20%	0.21%	2.82%	3.06%	
2012	0.15%	0.07%	0.49%	0.15%	0.37%	0.10%	0.04%	0.70%	-0.13%	0.22%	0.04%	0.04%	2.23%	2.75%	4.06%
2011	-0.06%	0.82%	0.09%	0.30%	0.29%	0.52%	0.34%	0.37%	0.04%	0.31%	0.22%	0.06%	3.29%	2.75%	3.10%
2010	0.15%	0.28%	0.03%	0.16%	0.91%	0.66%	0.48%	-0.06%	0.16%	0.78%	0.48%	0.16%	4.17%	3.15%	3.07%
2009	-0.28%	-0.30%	0.07%	-0.08%	0.30%	-0.02%	-0.15%	0.18%	-0.04%	-0.01%	-0.05%	0.84%	0.47%	2.60%	2.92%
2008	0.06%	0.02%	0.04%	0.50%	0.53%	0.93%	1.83%	0.27%	2.02%	0.87%	-0.37%	-1.00%	5.70%	3.17%	3.12%
2007	-0.14%	0.04%	-0.44%	0.14%	1.38%	-0.03%	0.54%	0.47%	0.49%	0.08%	0.55%	0.01%	3.09%	3.34%	3.05%
2006	0.18%	0.10%	-0.12%	0.16%	-0.07%	0.25%	0.42%	0.13%	0.38%	1.34%	0.74%	-0.45%	3.06%	3.30%	3.02%
2005	-0.23%	0.14%	0.39%	1.12%	0.63%	0.27%	0.17%	0.43%	0.33%	1.23%	1.22%	0.52%	6.23%	3.71%	3.43%
2004	0.39%	1.05%	1.62%	1.39%	1.35%	1.14%	0.55%	0.47%	1.99%	0.78%	0.10%	0.00%	10.85%	5.79%	4.19%
2003	0.26%	0.23%	-0.12%	0.12%	0.26%	0.51%	0.20%	0.83%	0.18%	0.79%	0.58%	-0.17%	3.67%	5.38%	4.28%
2002	0.15%	0.04%	0.49%	-0.35%	0.85%	0.37%	0.81%	-0.07%	0.23%	-0.07%	0.12%	-0.34%	2.26%	5.21%	4.28%
2001	-0.04%	-0.21%	0.18%	0.04%	0.21%	0.75%	1.53%	-0.51%	-0.18%	0.18%	-0.12%	-0.49%	1.33%	4.87%	4.08%
2000	0.21%	0.61%	0.41%	-0.01%	0.72%	-0.10%	-0.18%	0.07%	-0.16%	0.27%	-0.13%	0.24%	1.95%	4.01%	3.86%

Recognizing the vital importance of understanding each key variable, our estimates will be accomplished by a narrative that outlines the facts, assumptions, construction logistics, and other insights that form the basis of our order of magnitude estimates, budget estimates, and control estimate.

Logistics Planning:

Logistic greatly impacts the cost of construction. Correctly defining logistics and phasing requirements upfront significantly improves budget certainly by clearly defining requirements to contractors.



Contingencies

In support of the collaborative cost estimating process, we will also work with you to develop contingencies to hedge against unforeseen cost events. In past projects, we have devoted one team wide meeting to establish common definitions for each contingency type: Design Contingency, Project Contingency, and Construction Contingency. Given the range of uses and types of contingencies, establishing common definitions up-front creates dialog among all project team members as to key project issues, cost drivers and budgetary constraints.

Lean Case Study

1. Define what the client values and project constraints.

2. Design and Cost Refinement

1.	2.	3.
Value: ✓ Safe ✓ Weather tight ✓ Aesthetically pleasing ✓ High quality ✗ Integrated into campus plan **Constraints:** ✓ Phased approach ✗ Within budget ✓ Minimum distribution to its occupants ✗ Easily constructed	**Value:** ✓ Safe ✓ Weather tight ✗ Aesthetically pleasing ✓ High quality ✓ Integrated into campus plan **Constraints:** ✓ Phased approach ✓ Within budget ✓ Minimum distribution to its occupants ✓ Easily constructed	**Value:** ✓ Safe ✓ Weather tight ✓ Aesthetically pleasing ✓ High quality ✓ Integrated into campus plan **Constraints:** ✓ Phased approach ✓ Within budget ✓ Minimum distribution to its occupants ✓ Easily constructed

3. Bid and Award

Prime Contractor Bids were under budget and Skanska's estimate was within 4%.

4. Construction Phase

- Prefabricated panels
- Just-in-time delivery
- Weekly pull planning
- Morning Huddles

5. Construction Complete

- Under budget
- Zero defects
- 25% of contingency remaining

Pre-bid validation of the final project scope

We will assist the project team in a pre-bid validation of the final project scope as represented by the bid documents. The goal is to ensure that bid packages are complete and comprehensive in terms of scope and in terms of all performance expectations relative to safety, security, cost, schedule, quality, site logistics, close out documentation, submittals, engineering, manufacturing installation quality, coordination, and delivery.

Ensuring that all project scope is identified and purchased in the bid process is the single most cost saving activity throughout the process.

Bid Reviews

Once bids are received, we will work with the design team and DGS to evaluate the bids. Although the bid process is regimented, our team's experience and understanding of the process will ensure that prime contractor bids are complete and compliant. Our estimates will be utilized to compare and evaluate contractor bids and assist in negotiations with the awarded bidders. We can also utilize our expertise to confirm the alignment of proposed project schedules and work force requirements with contractor labor hours.

Cost control during design and construction

We will work closely with the Prime contractors to promote cost control and use Earned Value Analysis during both design and construction to aid in tracking both project schedule and budget, to compare early assumptions with completed work, and to compare forecasted expenditures established during the design phase with actual expenditures. We will update this document on a regular basis in order to gauge each prime contractor's progress on the project.

We will also carefully analyze all aspects of proposed change orders. When a proposed change is presented, every effort is made to provide full disclosure of the facts and costs of the change. Skanska employs all means necessary to accurately record and report all potential change order items during construction that will affect your project's final cost.

Conclusion

We will provide accurate, durable estimates to DGS that will enable complete and comprehensive comparisons between scope options for the renovation of Brooks Hall. Our approach will be to:

- Provide you with cost certainty and an exceptional level of accuracy
- Draw upon the experience of Skanska's estimators in developing construction costs for renovation projects in higher educational settings
- Utilize Skanska's national database of construction costs
- Utilize Skanska's relationships with vendors and subcontractors to validate pricing
- Factor in escalation
- Establish contingencies commensurate with risks and "unknowns"
- Anticipate the needs of Millersville University as an evolving organization
- Integrate cost, technical, and qualitative observations into the comparative evaluation process

The result will be a control estimate that will serve as the baseline for assessing and controlling project costs throughout the design and construction of this project.

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B. Contractor Prior Experience

Montgomery County, One Montgomery Plaza Reskin

Norristown, PA

Project Description

Skanska provided construction management services for the $25 million replacement of the façade of One Montgomery Plaza, a ten-story county office building that houses multiple court-related and public service departments. The façade was replaced over six phases including the replacement of MEP Systems located in shafts at the perimeter of the structure while the building remains fully occupied and operational. In order to protect the building and its occupants, temporary weather walls were be constructed inside the building prior to the façade being removed. The rehabilitation of the ground level plaza consisted of replacing the concrete walkways, perimeter railings and site lighting. Lean construction principles were a central driver in all aspects of project delivery.

Description of CE Work Engaged In

Skanska provided recommendations on constructability, schedule, availability of materials and labor, construction sequencing, lead times for materials procurement, durations for installation and construction, and factors related to construction cost including, but not limited to, costs of alternative designs or materials, preliminary budgets, life-cycle data, and possible cost reductions. Skanska provided cost management and claims mitigation for the construction of the Reskin Project. Our due diligence performing these functions has resulted in ~33% reduction in approved change requests verse submitted change requests. All claims to date have been resolved with little additional cost or schedule extensions.

Project Information

Start date:
03/06/2018

End date:
05/07/2021

Cost

Gross construction cost:
$25,000,0000

Amount responsible for:
$25,000,0000

Firm's fees:
Total Fee:
$2,600,0000

Preconstruction & Cost Estimating Fee:
$200,000

Reference

Montgomery County, Pennsylvania
One Montgomery Plaza, Suite 600
Norristown, PA 19404

Tom Bonner, Director of Assets and Infrastructure
Phone: 610.278.3029
tbonner@montcopa.org

Lean Project Experience

Lean methods and tools utilized on this project included:

- Development of Project Charter
- A3 decision making
- Target Value Design (TVD)
- Lean Last Planner (Design and Construction)
- Prefabrication
- Just-in-time delivery
- Morning Huddles
- Visual Mockups

Department of General Services (DGS) - Collaborative Cost Estimating Services - DGS 2020-SWCE-3 - Various locations

Project Description

1. California University of Pennsylvania, PASSHE Science Building Construction
The new California University of Pennsylvania Science Building will be a facility supporting evolving science education and research in the coming years. This building will include state-of-the-art technologies for active learning classrooms, flexible laboratories, offices, and social spaces to foster engagement aimed at scientific training, inquiry, and discovery.

The new facility ideally will be a new two to three-story building that is in the range of 70,000 – 90,000 square feet. The program will include classrooms, offices, meeting rooms, as well as research spaces along with contemporary, flexible laboratories for general, biology, chemistry, environmental, and physics sciences. Additional support spaces include chemical, specimen, animal care, greenhouses, instrumentation, walk-in cooler, and cleaning will be required.

2. Phase 1 Norristown New Building Construction - Forensic Psychiatric Hospital
Norristown State Hospital is a 255-bed forensic psychiatric facility that currently houses patients in two buildings: Building 10 (constructed in 1965) and Building 51 (constructed in 1947). Both buildings are in need of substantial upgrades in order to provide a recovery-oriented environment for patients, but they cannot be renovated while occupied. As a result, it has been determined that the best and

Project Information

Start date:
01/29/2021

End date:
Contract end date: 05/31/2025

Cost

California University - Science Building Construction
Gross construction cost:
$42,143,730

Amount responsible for:
$52,264

Firm's fees:
Total Fee:
$52,264

Preconstruction & Cost Estimating Fee:
$52,264

Norristown State Hospital - New Forensic Building
Gross construction cost:
$283,246,003

Amount responsible for:
$126,824

Firm's fees:
Total Fee:
$126,824

Preconstruction & Cost Estimating Fee:
$126,824

PA State Police Greensburg-DNA Laboratory Facility New Building
Gross construction cost:
$28,704,049

Amount responsible for:
$44,923.52

most cost-effective solution is to construct a new 420-bed, Forensic Psychiatric Hospital. Because construction activity (including infrastructure upgrades) will take place on an active healthcare campus, it must be carried out in a manner that poses minimal disruption to existing patient care functions.

3. P1 State Police Greensburg-DNA Laboratory Facility New Building
Construct two new buildings: 1) The original design was a three-story approximately 59,800 s.f. laboratory and office building, (the third floor is a mechanical penthouse), and, 2) an 1850 s.f. one-story maintenance building to house landscaping and snow removal equipment.

4. Phase 1, Ebensburg Center – HVAC, Sprinkler, Electrical & Misc. Improvements
Located on a 70-acre campus in Cambria Township, the Center currently features seven licensed patient buildings that were built starting in the 1950s and that have been modified over the years. The general scope of the proposed construction program includes upgrades to and/or replacements of existing HVAC, plumbing, and electrical systems and the addition of a wet pipe fire protection system in one or more of the seven residential buildings.

Description of CE Work Engaged In

- Participated in on-site Gemba walks with the Project team
- Developed preliminary order of magnitude estimates/ cost models
- Participated in Program Development Study (PDS) workshops
- Participated in project risk analysis/constructability reviews
- Provided budget estimates for alternative design concepts
- Participated in the development of the PDS reports
- Provided final PDS cost model and BCE organized by Uniformat (Level II or III)

Firm's fees:
Total Fee:
$44,923.52

Preconstruction & Cost Estimating Fee:
$44,923.52

Ebensburg Center – HVAC, Sprinkler, Electrical & Misc. Improvements
Gross construction cost:
$15,238,776 (Buildings 1, 2, and 5)

Amount responsible for:
$52,264

Firm's fees:
Total Fee:
$52,264

Preconstruction & Cost Estimating Fee:
$52,264

Reference

Pennsylvania Department of General Services
Arsenal Building
18th & Herr Street
Harrisburg, PA 17125

Linda Van Sickle, PE, Designer
Project Manager - Public Service Division
(717) 480-8227
lvansickle@pa.gov

Lean Project Experience

Lean methods and tools utilized on this project included:

- Target Value Design
- Continuous Cost Estimating
- Cluster Groups
- Conditions of Satisfaction
- Plus Delta
- Alternate design concepts
- Collaboration

University of Delaware, Worrilow Hall Renovation

Newark, Delaware

Project Description

Renovation of the primary academic and research laboratory facility for the College of Agriculture and Natural Resources at the University of Delaware. The 66,000-SF renovation includes a total interior re-programming and renovation of the facility including:

- Demolition of all interior architectural elements and associated HVAC, plumbing and plumbing gas services
- New fume hoods and lab casework and equipment and all new MEP/FP services to lab casework
- New HVAC (piping and sheet metal) and plumbing systems throughout, including new AHUs
- New power, lighting and back-up power systems (new MV switchgear and emergency generators included)
- New architecture for interior spaces, addition of new curtain wall and metal panel systems at main entrance and a full roof replacement with new windows on all levels
- New elevators
- New security, technology and networking systems
- New building-wide sprinkler and fire pump installation
- Set-up of temporary trailers as swing space during the lab renovation
- New fire alarm system

Description of CE Work Engaged In

Skanska worked closely with the designer and owner during preconstruction. Our work included milestone cost estimates during the progress of the design including estimates at Design Development and 50% Construction Documents. We engaged in Value Management during the design of the project. We identified long lead MEP equipment and leveraged our Strategic Supply Chain group to bring those partners on board early to assist with procurement and specification writing. We also developed a detailed construction schedule which needed to identify campus activities, graduations, move in days, so not to bottleneck the college with our activities.

Project Information

Start date:
7/8/2019

End date:
12/21/2020

Cost

Gross construction cost:
$32,000,000

Amount responsible for:
$32,000,000

Firm's fees:
Total Fee:
$650,441

Preconstruction & Cost Estimating Fee:
$30,000

Reference

University of Delaware
222 S. Chapel Street
Newark, DE, 19716

Robert Liburdi, Project Manager
Phone: 302.831.2792
rliburdi@udel.edu

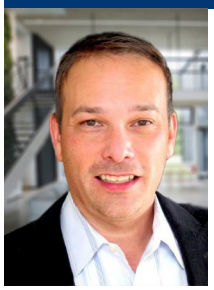
Lean Project Experience

Lean tools utilized on this project included:

- Last Planner System
- Just In Time Delivery Strategies
- Pareto Analysis
- Visual Management and Visual Mockups

SKANSKA

C. Contractor Personnel and Qualifications



Christopher Anderson, CEA, LEED AP | Project Executive

28 years in industry
19 years with Skanska

Villanova University
Certificate, Project Management

University of Maryland
B.S., Electrical Engineering

Community College of the Air Force
A.S., Electronic Systems Technology

CEA

LEED AP

OSHA 10

Member, Association of Energy Engineers, Certified Energy Auditor

Member, Building Commissioning Association (BCA)

Member, Delaware Valley Green Building Council

Pennsylvania Department of General Services (DGS) - Collaborative Cost Estimating Services

California University of Pennsylvania, PASSHE Science Building Construction

The new California University of Pennsylvania Science Building will be a facility supporting evolving science education and research in the coming years. This building will include state-of-the-art technologies for active learning classrooms, flexible laboratories, offices, and social spaces to foster engagement aimed at scientific training, inquiry, and discovery.

The new facility ideally will be a new two to three-story building that is in the range of 70,000 – 90,000 square feet. The program will include classrooms, offices, meeting rooms, as well as research spaces along with contemporary, flexible laboratories for general, biology, chemistry, environmental, and physics sciences. Additional support spaces include chemical, specimen, animal care, greenhouses, instrumentation, walk-in cooler, and cleaning will be required.

Phase 1, Ebensburg Center – HVAC, Sprinkler, Electrical & Misc. Improvements

Located on a 70-acre campus in Cambria Township, the Center currently features seven licensed patient buildings that were built starting in the 1950s and that have been modified over the years. The general scope of the proposed construction program includes upgrades to and/or replacements of existing HVAC, plumbing, and electrical systems and the addition of a wet pipe fire protection system in one or more of the seven residential buildings.

Phase 1 Norristown New Building Construction - Forensic Psychiatric Hospital

Norristown State Hospital is a 255-bed forensic psychiatric facility that currently houses patients in two buildings: Building 10 (constructed in 1965) and Building 51 (constructed in 1947). Both buildings are in need of substantial upgrades in order to provide a recovery-oriented environment for patients, but they cannot be renovated while occupied. As a result, it has been determined that the best and most cost-effective solution is to construct a new 420-bed, Forensic Psychiatric Hospital. Because construction activity (including infrastructure upgrades) will take place on an active healthcare campus, it must be carried out in a manner that poses minimal disruption to existing patient care functions.

P1 State Police Greensburg-DNA Laboratory Facility New Building

Construct two new buildings: 1) The original design was a three-story approximately 59,800 s.f. laboratory and office building, (the third floor is a mechanical penthouse), and, 2) an 1850 s.f. one-story maintenance building to house landscaping and snow removal equipment.

Montgomery County, One Montgomery Plaza Reskin Project, Norristown, PA

Skanska provided construction management agency services in support of the $25 million, 220,000-SF replacement of the façade of One Montgomery Plaza, a ten-story structure in Norristown, PA, serving as the county office building for Montgomery County, Pennsylvania. In addition to the Montgomery County reskin project, we also provided the following services: Montgomery Plaza - Mechanical and Electrical Systems Feasibility Analysis.

Gary Warren | Sr. Project Manager

14 years in industry
12 years with Skanska

The Pennsylvania State University
B.S., Structural Engineering

OSHA 30-1926 Construction Safety

OSHA Hazmat 40

Choose to Save a Life (Fall Protection) Training

CPR and First Aid Training

Pennsylvania Department of General Services (DGS) - Collaborative Cost Estimating Services

California University of Pennsylvania, PASSHE Science Building Construction

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James Lane, ASPE | Sr. Site/Civil Architectural Estimator/Lead Estimator

34 years in industry
5 years with Skanska

University of Pittsburgh
B.S., Civil Engineering

Certified Professional Estimator (ASPE)

OSHA 30

Pennsylvania Department of General Services (DGS) - Collaborative Cost Estimating Services

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Montgomery County Justice Center and Hancock Square Expansion, Norristown, PA

$350 million, 455,000-SF project. Skanska is providing construction management agency services to the Montgomery County Board of Commissioners for a project that involves the construction of a new justice center, the renovation of a historic county courthouse and the redevelopment of the existing courthouse plaza known as Hancock Square. The project also involves the demolition of a parking garage, the installation of between 200 and 400 parking spaces and the re-opening of a public thoroughfare that traverses the site.

Mary Judge, AVS | Site/Civil/Architectural Estimator

23 years in industry
10 years with Skanska

Community College of Philadelphia
A.S. Applied Science

SAVE International Associate Value Specialist (AVS)

CPR and First Aid Training

Pennsylvania Department of General Services (DGS) - Collaborative Cost Estimating Services

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The Pennsylvania State University, Water Treatment Plant Upgrades, University Park, PA

$60 million, 28,000-SF replacement and reconstruction of an on-campus water treatment facility, including an underground storage tank, pump station, 750,000-gallon wastewater tank and a $2 million amphitheater/performance space. The project also encompassed the rehabilitation of three existing elevated steel water tanks and 100,000-SF of hardscaping and landscaping, such as concrete paving; blue stone pavers; stairs; retaining walls; lighting: stormwater management/drainage systems; and over 500 native trees, shrubs and plants.

Colleen Demark, LEED AP, AVS | Sr. Electrical/ Technology Estimator

22 years in industry
19 years with Skanska

Pennsylvania State University
B.S., Mineral Engineering

SAVE International Associate Value Specialist (AVS)

LEED AP

CPR and First Aid Training

Pennsylvania Department of General Services (DGS) - Collaborative Cost Estimating Services

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University of Delaware, Worrilow Hall Renovation, Newark, DE

$32 million, 66,000-SF, renovation of the primary academic and research laboratory facility for the College of Agriculture and Natural Resources at the University of Delaware. The renovation includes a total interior re-programming and renovation of the facility.

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Phil Colonna | Sr. Mechanical Estimator

31 years in industry
21 years with Skanska

Villanova University
B.S., Mechanical Engineering

Pennsylvania Department of General Services (DGS) - Collaborative Cost Estimating Services

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Steven Gobac | Sr. Plumbing/Fire Protection Estimator

4 years in industry
4 years with Skanska

Drexel University
B.S., Civil Engineering

Pennsylvania Department of General Services (DGS) - Collaborative Cost Estimating Services

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Abigail Beyer | Construction Phase Project Manager

4 years in industry
3 years with Skanska

Elizabethtown College
B.S., Engineering, Mechanical Concentration

OSHA 30-Hour Safety Training

University of Delaware, Worrilow Hall Renovation, Newark, DE

$32 million, 66,000-SF, renovation of the primary academic and research laboratory facility for the College of Agriculture and Natural Resources at the University of Delaware. The renovation includes a total interior re-programming and renovation of the facility.

Children's Hospital Of Philadelphia, Middleman Family Pavilion, King of Prussia, PA

$220.4 million, 275,000-SF (new); 54,000-SF (renovation), the project consists of a new inpatient hospital located in King of Prussia, PA. The hospital is approximately 252,000-GSF over seven floors, as well as a 22,000-SF penthouse. The project also includes renovation of approximately 54,000-SF of the existing Specialty Care Center (SCC) which involved administrative office suite and full-service kitchen and cafeteria space. In addition to the new Inpatient Buildings and the SCC renovations, the project includes an expansion to the existing loading dock and a 192-vehicle precast parking garage. Among its features are a 16-bed pediatric intensive care unit, a 36-bed medical surgical unit, a broad range of pediatric specialties, including orthopaedics, plastic surgery and ear, nose and throat and a 20-bay emergency department, open 24/7, specializing in pediatric care. The new hospital also has four operating rooms, specializing in elective services requiring overnight stays; comprehensive radiology services; and transitional care for chronic complex patients with assisted breathing. The new hospital has the capacity to expand to 100 inpatient beds.

GlaxoSmithKline, UP02 Lab Support Addition/Renovation, Collegeville, PA

$30.1 million, 60,000-SF renovation of an existing vivarium to convert it to a bioanalytical hub for research and development. The project included the demolition of three existing floors; modifications to the existing façade; replacement/refurbishment of existing air handling units; and construction of new offices, laboratories and support spaces.

SKANSKA

D.
Project Work Plan

D. Project Work Plan

I. Include a high-level summary that shows all the tasks and deliverables to complete the project. Explain your approach to deliverables.

Design Phase Approach

General Target Value Design Approach

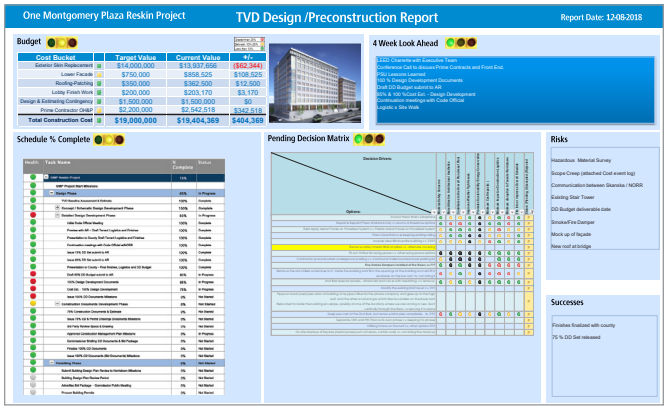
As a part of a collaborative team, Skanska will provide continuous cost estimating services for the duration of the Target Value Design (TVD) process that is aimed at maximizing customer value within a predetermined BCE budget. This will be accomplished in part by considering trade-offs and opportunities (including function/cost trade-offs) in order to maintain the construction budget.

Skanska's approach starts with us participating in the initial Design Kick-Off meeting. This is where we can get up to speed on understanding the CoS and established Target Values. We will work toward setting up meetings (who and when) for monthly Big-Room Integration meetings, monthly TVD cost meetings and the weekly meetings that will occur during the duration of the design process.

Early on, once Target Values are defined, Skanska will revisit these values throughout the design phase.

Skanska will work with the team to develop lines of communication so that our estimators are kept informed of all potential design changes.

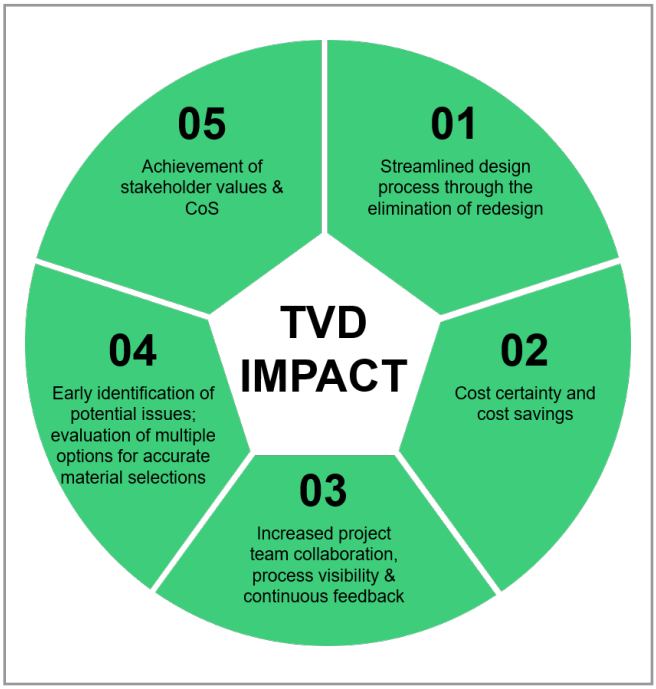
Our team will develop the TVD cost model that will be used as a tool during the design phase. The model will be broken down to align with major cost buckets and cluster groups to allow visibility to project costs. At each design phase interval, the TVD cost model will be reconciled to account for the current design and decisions made during the previous stage.



Example: Monthly TVD Report

At bi-weekly intervals, our team will meet with the design team to review updates, pending design changes and other developments that impact the TVD budget. As part of this process, each item will be evaluated and tracked within the TVD cost model. Our cost estimators will continuously and proactively evaluate and determine the cost implications of design decisions, which will be evaluated against the budget and the CoS and established Target Values. Due to the volatility of the current market, it is critical to evaluate certain materials and products cost and availability as lead times and price greatly impact the TVD budget. Our team's experience and real-time understanding of these risks will assist the design team finalizing product and material selections. In the event design decisions or developments result in cost impacts, the TVD cost model will track the impact and budget transfers within the model to offset and maintain the TVD budget. The TVD process creates a transparent and efficient process for all team members.

At each milestone, Skanska's project manager will provide an overview of the TVD cost model, summary of key decisions, open design decisions and other relevant status updates. This will ensure the entire team is informed and aligned with expectations as the design process moves ahead. Skanska will also conduct lessons learned meetings at each design phase that will promote continuous improvement throughout the life of the project.



General Estimate and Associated Report Approach

As part of preparing Cost Estimates, we use our Project Management experience to consider the effect of the expected construction schedule/sequencing on construction costs. We use our estimating experience to take into account such variables as escalation, union and non-union construction, bidding requirements, anticipated number of prime contracts, the nature of construction, and the influence of government regulations on construction costs.

Our estimating process is forward-thinking and predictive in nature. There are many factors that influence construction cost estimate reports, such as current labor rates, material prices, and site constraints. Additionally, there are external factors such as macroeconomic trends and the political landscape that can influence the construction cost estimate report. We also consider market volatility, commodity prices, appropriate contingencies and the availability of labor for a given project location.

Skanska will produce complete estimates in the appropriate format required by the DGS, based on current regional labor and material costs along with agreed-upon markups, including taxes, insurances, contingencies, and fees. The report will include a narrative describing assumptions, qualifications, exclusions, and allowances.

Continuous Cost Modeling

Skanska regularly collaborates with design partners on streamlining the model-to-estimate process in order to provide realtime cost feedback as the design team explores options. Our team understands the key cost drives for this type of project and will work to target measure that can provide significant impact.

Throughout the design phase, we will use our cost estimating skills for continuous budget validation and estimate reconciliation. Our team will work closely with DGS to identify, recommend, and price alternative design concepts, systems and material recommendations that provide benefits to this project. Skanska's estimating team is experienced working on similar projects that have been constructed and can offer unique perspectives that will significantly improve the quality of your project. We will provide order of magnitude pricing for each item which will be documented and tracked via our cost log. The cost log

will provide detailed breakdowns and assumptions for each item.

Conceptual Estimate (control estimate)

Our control estimates are developed to create a framework for the project moving forward.

Baseline quantification and pricing, preliminary logistic, phasing and constructability are being established even in these very initial stages. In addition, as determined by the team, we are able to incorporate and maintain a multitude of cost centers and/or breakout values to support decision making and reporting needs. Our estimate is truly built as a tool to facilitate the project on a real time basis throughout the design stage of the Brooks Hall University renovation project.

At each design submission milestone, Skanska will review all project documents (Concept, Detailed Design and Final Documentation). We will then update the cost model and track and report on our deliverable.

Below is an example of a high-level summary at each design submission.

Total Project Cost	$471,311,096	$481,184,542	$415,000,000	$414,996,406	$417,067,098	$414,999,999
Design Phase	Concept	Schematic Design	Schematic Design (VE and escalation)	Design Development 60%	Design Development 100%	Construction Documents 60%
Total Construction Cost:	$362,640,576	$398,999,172	$328,346,239	$328,342,642	$335,808,796	$331,567,521
Direct Construction Cost:	$275,708,236	$310,719,734	$244,439,391	$258,743,384	$262,581,450	$263,699,456
Construction Soft Cost:	$86,932,340	$88,279,438	$83,906,848	$71,599,258	$73,227,348	$67,868,065
Total Owner Cost:	$108,670,520	$82,185,370	$86,653,761	$86,653,764	$81,258,300	$83,432,478

Details

TOTAL AMOUNT:	$471,311,096	$481,184,542	$415,000,000	$414,996,406	$417,067,098	$414,999,999
+/- from TVD Budget	$56,311,096	$66,184,542	$0	($3,594)	$2,067,098	($1)
Total Sq. Ft.	613,125	619,922	603,922	606,353	623,000	621,254
Total Construction Cost Per Sq. Ft.	$591	$844	$544	$542	$539	$534
Owner Cost Total:	$108,670,520	$82,185,370	$86,653,761	$86,653,764	$81,258,300	$83,432,478
Design & Pricing Contingency Total:	$0	$0	$7,377,567	$1,364,337	$0	$0
Escalation Factor Total:	$0	$0	$6,400,187	$0	$0	$0

Example: TVD Tracking by Design Set

Approach to Constructability Risks

Our interdisciplinary approach to constructability reviews helps eliminate unworkable details within the design. The object is to find any issues early during design and before the start of construction, which helps prevent budget overruns long-term.

Four main issues that Skanska focusses on when evaluating Constructability risks are:

1. Interdisciplinary coordination. Interdisciplinary coordination seeks to identify clashes between design disciples, such as structural engineering and mechanical engineering.
2. Build-ability is addressed by reviewing the capability of the local workforce and dimensional issues. We will ask questions to determine if tolerances prescribed are workable or exceed normal conditions of the local workforce. We will also ask whether building components that are scheduled to be installed first create a work area too constrained for subsequent work.
3. Sequencing, phasing, and logistics. The impact of sequencing, phasing and logistics will also be evaluated. One of the key issues we will focus on is whether construction phasing will create unsafe conditions or have negative impacts on surrounding buildings and overall campus operations.
4. Materials and systems integrity. We will confirm that materials and systems selected for your project are the best choices for the long-term performance.

Bidding Stage Approach

Following the receipt of prime contractor bid proposals, our team will review the bids for completeness and compliance with project requirements. Bid leveling sheets will be created as our team analyzes each bid proposal. In conjunction with DGS and the design team, in person descope meetings will be scheduled with multiple vendors in each prime bid package.

Discussion topics will include but not limited to scope reviews, logistics overview and limitations, schedule milestones, contract terms and conditions, proposed project team and experience and relevant bid assumptions.

Following the descope meeting, bid leveling sheets will be updated and finalized based on any findings and discussions with the prime contractors. Finally, a formal recommendation letter will be issued summarizing our team's "Best Value" recommendation for each prime package.

Construction Stage Approach

- Engage with the Prime contractors in careful and collaborative cost control.
- Establish milestones within the construction schedule to review costs and update the budget template.
- Review and confirm change order requests including costs for material, labor, equipment, overhead, profit, taxes, bonds, and any sub-contracted work.
- Provide a document detailing the forecasted costs in Design and Construction along with the actual incurred costs during Design and Construction.

Cost Management During Construction

Cost management is a critical component during the construction phase of a project. This process begins once contracts are awarded, and contractors are onboarded. Our team will meet with contractors to review cost contract requirements such as allowable markups, required supporting documentation, and notification requirements for potential change order requests (COR) and establish periodic cost review meetings. Skanska will work closely with each prime contractor to ensure that the change order process is efficient and effective for all parties.

In the event a COR is submitted, our team will carefully analyze all aspects of the proposed change order. When a proposed change is presented, every effort is made to provide full disclosure of the facts and costs of the change. Skanska employs all means necessary to accurately record and report all potential change order items during construction that will affect each project's final cost.

Our evaluation will include confirming if the change is truly "out of scope", quantities of labor and materials, labor rates, equipment rates, sub-contracted work, allowance markups, schedule impacts and time requests, and whether the necessary supporting documents have been provided.

If any documentation or justification is required, our team will work with the prime contractor to revise their COR. Once pricing is finalized, Skanska will issue a recommendation to DGS justifying our professional opinion of the COR.

Cost Tracking During Construction

Our team will maintain detailed cost tracking logs. The cost tracker will be a detailed record of committed & pending cost, forecasted expenditures and contingency spend. We will meet with DGS monthly to review project cost control.

This meeting will serve to review open change order requests, forecasted cost events, contingency spend,

Example: Skanska Cost Tracking Dashboard

and other cost risks our team has identified. Our team's proactive cost management approach will ensure that the project cost is fully transparent to DGS.

II. Indicate all resources needed to complete the assignment, including staff assignments, consultants, and reimbursements.

Skanska is not utilizing consultants for this assignment. The only foreseeable reimbursement would be for printing of drawings. Staff assignments are indicated in our response to item IV.

III. Note inefficiencies or risks to successful implementation, and any planning efforts to mitigate issues such as travel distance, schedule conflicts and required coordination.

Skanska assumes that all in person meetings will held at the University and that we will conduct all design phase work from our home office.

IV. Indicate the anticipated number of hours required for each personnel assigned to the project based on task for completion of the work described in the Scope of Work (Attachment A).

Scope Item/Proposed Team	Sr. Project Manager	Project Manager	Sr. Site/ Civil/ Architectural Estimator/ Lead Estimator	Site/ Civil / Architectural Estimator	Sr. Electrical /Technology Estimator	Sr. Mechanical Estimator	Sr. Plumbing/Fire Protection Estimator
Phase 1, 2 and 3 Design Stage: Cost Modeling and Target Value Delivery							
Participate in the initial Design Kick-Off meeting.	2		2				
Using continuous cost estimating, provide order of magnitude values on the spot to assist the cluster groups and management group in evaluating small batch scope items or design sets. Assume 4 hours a month for 8 months			32	32	32	32	32
Participate in approximately 18 weekly Core Group meetings with the management team (1 hour in duration)			18				
Participate in 17 weekly Cluster Group meetings to provide cost input & feedback to aide in design development of each cluster group. Cluster Groups include Site/Civil; Structure/Envelope/ Shell; MEP/FP/Technology; and Interiors. Work to ensure that cluster groups stay attentive to TVD target values while making design decisions. (1 hour each in duration)			17	17	17	17	17
Participate in 9 Teaming Events, occurring each month for ½ day in duration throughout the anticipated design stage. There will be a Teaming Event each month during design and at the start of each stage of design: Concept Design, Detailed Design and Documentation. Provide a TVD update at the Teaming Event including a snapshot/overview of the current cost model and BCE status. Lead a discussion of the recent changes and all outstanding cost risks/opportunities associated with the project.	36		36				
Review all project documents at each Project milestone submission (Concept, Detailed Design and Final Documentation). This includes all drawings, specifications, surveys, and testing reports. Update the cost model and track deviations from the order of magnitude estimate for the Department. With the project team develop, maintain, and track the multiple Base Bid options adhering to the DGS base bid requirements.			80	80	80	80	80

Scope Item/Proposed Team	Sr. Project Manager	Project Manager	Sr. Site/ Civil/ Architectural Estimator/ Lead Estimator	Site/ Civil / Architectural Estimator	Sr. Electrical /Technology Estimator	Sr. Mechanical Estimator	Sr. Plumbing/Fire Protection Estimator
Phase 1 Bidding Stage Services:							
When a project's procurement method is determined to be based on the Best Value (rather than Low bid), review contractor's proposals for scope and responsiveness to the project.	8		8				
Confirm accuracy of proposed project schedule and work force requirements with contractor's labor hours. Review base bid scope submissions for completeness and understanding.	16						
Provide cost consulting services to assist in a post-bid value engineering process, as needed if Base Bid #1 is above the base construction allocation.	2		12		8	8	4
Phase 1 Construction Stage Services:							
Engage with the Prime contractors in careful and collaborative cost control. Utilize forecasted expenditure established during the Construction Documents with the actual expenditure. Assume 3.5 hours a week for 38 weeks		133					
Establish milestones within the construction schedule to review costs and update the budget template. Assume 7 hours a month for 8 months		56					
Review and advise the DGS APC/PC team on change order requests including costs for material, labor, equipment, overhead, profit, taxes, bonds, and any sub-contracted work when requested. Assume 8 hours a month for 8 Months		64	16				
Provide the Department with a document detailing the forecasted costs in Design and Construction along with the actual incurred costs during Design and Construction of the Project. This information will be incorporated into a cost database that will be utilized by the Department for future planning purposes. Assume 6 hours a month for 8 months		48					
(*) The total PM hours equates to one day a week for the duration of 38 weeks of construction							

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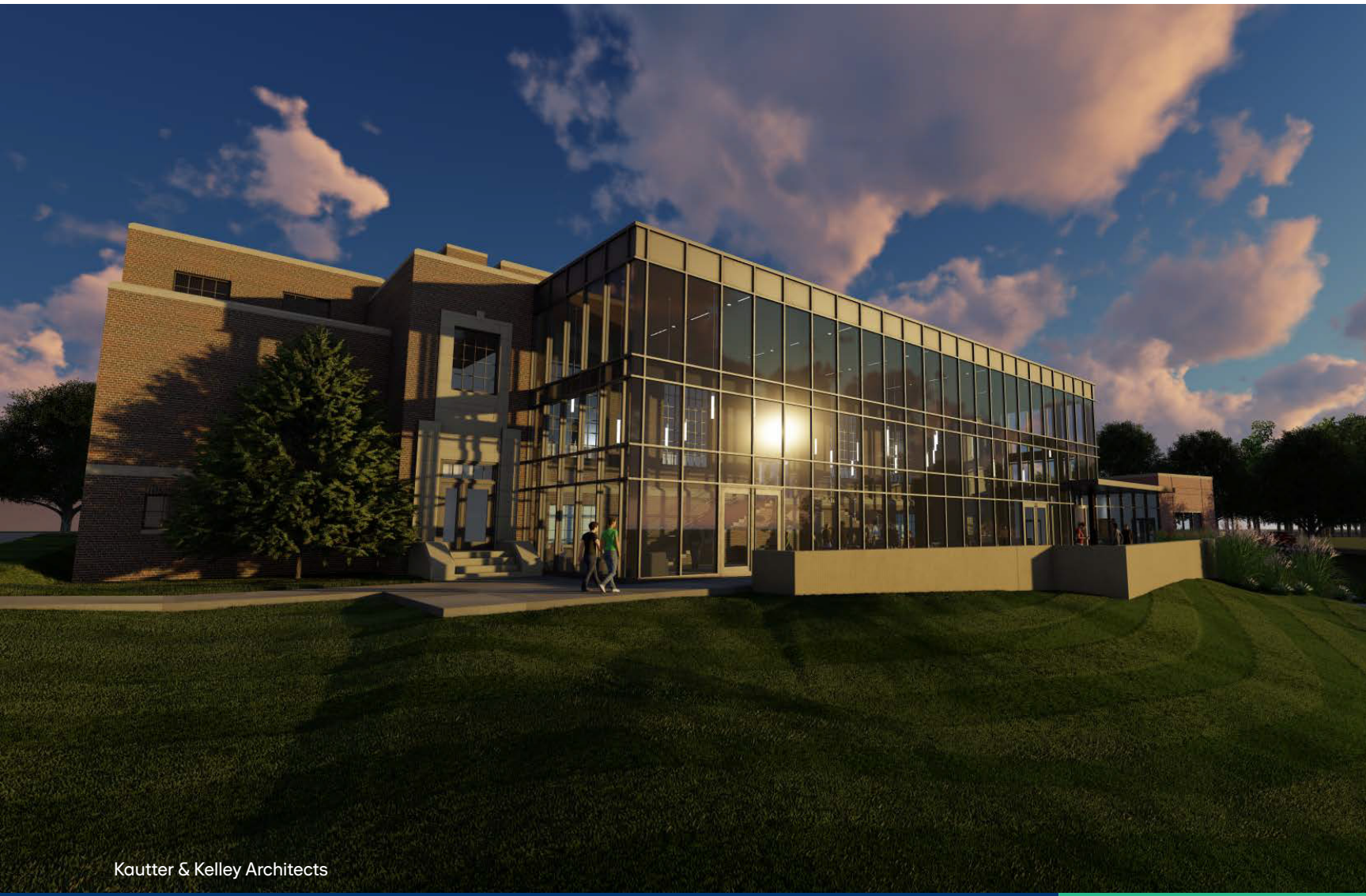

Kautter & Kelley Architects