Pennsylvania Department of General Services
DGS C-0402-0064 Phase 1
California University of Pennsylvania
PASSHE Science Building Construction

Response to Request for Quote
February 18, 2022

ITQ for Statewide Collaborative Cost Estimating Services
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A. Understanding the Project Scope
A. Understanding the Project Scope

Provide a detailed Work Statement that accurately assesses the project scope and your understanding of the project requirements stated in the SOW.

Detailed Work Statement

Understanding the Project
We understand that a Strategic Plan was developed to align California University of Pennsylvania with an initiative across the entire State System of Higher Education to increase enrollments in science and technology programs to satisfy unmet workforce needs in the Commonwealth of Pennsylvania.

A key outcome of this Strategic Plan was the proposal to construct a new Science Building that would meet planned program initiatives in engineering technology, nanotechnology, and bioinformatics and incorporate spaces needed for projects in technology transfer, workforce training & development, and industry research.

As described in your RFQ, this new facility will be between 70,000 and 90,000 square feet and 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 may include chemical, specimen, animal care, greenhouses, instrumentation, walk-in cooler, and others, as required.

The proposed new Science Building will be situated between Watkins Hall and Eberly Hall in the area now occupied by Parking Lot 5. This project will also include the demolition of Frisch Hall and the existing New Science Building. According to the 2018 Science Building feasibility study, the site also includes the existing main campus electrical substation. The new building footprint will allow the substation to remain. Existing underground electrical feeders/ductbanks to surrounding campus buildings will fall within the footprint of the new Science Building. These feeders will need to be relocated around the new building.

In response to the challenging nature of this project, DGS is looking for an experienced construction and cost estimating firm that can provide cost certainty for the new Science Building and the demolition of two existing campus buildings. 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**

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. Our collaborative approach to cost estimating will include leadership during the Target Value Design process. 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. We also use Excel for cash flow management and earned value analysis.

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.

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.

As a result, we are capable of producing accurate and durable estimates at any point in the project development process, from conceptual planning onward. The benefit for our clients is that they do not have to request additional funding as projects move forward into design and construction.

**Data from Similar Projects: Skanska Metriks™**

We are well aligned with the requirements of this project 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. Metriks™ includes construction costs for higher educational science buildings.

Because it contains data from similar projects, Skanska Metriks™ will enable an understanding of the costs and cost drivers in the new Science Building.

We will use our cost benchmarking capabilities during the initial phases of this project 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 and to establish the Target Value Design budget.

**Target Value Design**

Skanska will use the Target Value Design (TVD) process to ensure that your project remains within the established budget, while providing the best value for DGS and California University of Pennsylvania. 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.

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**Table: Expected Range of Accuracy**

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<thead>
<tr>
<th>AACE Class</th>
<th>ANSI Classification</th>
<th>Typical Use</th>
<th>Project Definition</th>
<th>Low Expected Actual Cost</th>
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<th>Other Terms</th>
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DGS Public Works, DGS C-0402-0064 Phase 1, California University of Pennsylvania/PASSHE Science Building Construction

A. Understanding of the Project
The objectives of conducting TVD on a Multiple-Prime project include the following:

1. Open communication
2. Scope/Cost Control
3. Scope refinement/buildability/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.

**Multiple-Prime Lean Case Study**

A founding member of the Lean Construction Institute, Skanska has successfully developed and applied Lean methods and tools that mitigated/eliminated many risks typically encountered with the multiple prime delivery system.

In addition to Target Value Design (TVD), Lean methods and tools that we have utilized include: Development of Project Charter, A3 decision making, Lean Last Planner (Design and Construction), Prefabrication, just-in-time delivery, and Morning Huddles.

The graphic shown below illustrates our Lean journey through the Target Value Design process on the One Montgomery Plaza Reskin Project, a Multiple-Prime project. Our approach included:

1. Prior to conceptual design, utilizing a project charter, define what the client values and project constraints.
2. Continually refining design and estimates until the client’s pre-defined values were met.
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.

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 cost estimate (BCE).

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.

Escalation: Promoting team-wide understanding of escalation creates awareness of the urgency of timely decision making.

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.
B. Contractor Prior Experience
Swarthmore College, Singer Hall
Swarthmore, PA

Project Description
Singer Hall (formerly Biology, Engineering and Psychology or BEP building) expanded Swarthmore College’s academic facilities and combined three separate academic departments to provide a collaborative learning environment. Located on the north side of campus, the 165,000-SF Singer Hall building is adjacent to the Unified Science Center and replaces Papazian and Hicks Halls. The project is four floors above-grade with a full basement and mechanical penthouse. It will provide future capacity for growth within each department. Also included in the project is the renovation of the ground floor of Pearson Hall (5,700-SF) into new classrooms along with significant alterations to utilities, parking and access roadways around the site. Pearson Hall is located near several buildings that remained occupied and in service throughout the project and included a nursery school and daycare center for the Friends Meeting House, which hosts religious services on Sundays. The new Singer Hall building was designed and constructed in accordance with Swarthmore College’s sustainability framework guidelines with the campus goal of net zero energy by 2035. This project includes a high performance building envelope, storm water management methods that exceed LEED standards, storm water reclamation, chilled beams and several other energy and water preservation strategies.

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 Concept, Schematic, Design Development and 50% Construction Documents. We engaged in extensive Value Management throughout the design of the project. We identified Design Assist opportunities along the way and brought those partner onboard to help with design details and constructability. That occurred mostly with the façade and some of the MEP trades. 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.

Lean Project Experience
Lean Tools utilized on the Singer project included:

- Last Planner System
- Just In Time Delivery Strategies
- A3 Problem Solving
- Huddle Meetings
- Pareto Analysis
- Visual Management and Visual Mockups
University of Delaware, Worrilow Hall Renovation
Newark, Delaware

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

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 MEPFP 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.

Lean Project Experience
Lean Tools utilized on the Singer project included:

- Last Planner System
- Just In Time Delivery Strategies
- Pareto Analysis
- Visual Management and Visual Mockups
Children’s Hospital of Philadelphia, KOP Inpatient Building
King of Prussia, Pennsylvania

Project Description
The project consisted 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 included renovation of approximately 54,000-SF of the existing Specialty Care Center (SCC). In addition to the new Inpatient Buildings and the SCC renovations, the project also included 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 orthopedics, plastic surgery and ear, nose and throat
- 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; transitional care for chronic complex patients with assisted breathing; and lab facilities. The new hospital has the capacity to expand to 100 inpatient beds.

Description of CE Work Engaged In
Skanska provided constructability analysis, schedule development, availability of materials and labor, logistics planning and sequencing and cost consulting during design and construction.

Lean Project Experience
Lean Tools utilized on the Singer project included:

- Pull-planning
- Last Planner
- Material Management
- A3 Reporting

Project Information
Start date: 9/16/2019
End date: 8/16/2021
Cost
Gross construction cost: $221,800,000
Amount responsible for: $221,800,000
Firm’s fees:
Total Fee: $6,300,000
Preconstruction & Cost Estimating Fee: $178,964

Reference
Children’s Hospital of Philadelphia
550 S. Goddard Blvd.
King of Prussia, PA 19406
Joshua Fischer
Senior Project Manager
Phone: 267.426.2067
Email: fischerj@email.chop.edu
Additional Relevant Project Experience

CUNY, Advanced Science Research Center
New York, NY

Collin College, Wiley Campus
Wylie, TX

Duke University, (FCIEMAS)
Durham, NC

Duke Health, Chesterfield Laboratory and Office Fit-Up
Durham, NC

Florida Polytech University
Lakeland, FL

George Washington University Clean Room
Washington, DC

James Madison University CISAT Bioscience Building
Harrisonburg, VA

New York University
370 Jay Street
Brooklyn, NY

Virginia Tech Carilion School of Medicine & Research Institute
Roanoke, VA

Virginia Tech, Undergraduate Science Laboratories Facility
Blacksburg, VA

University of Delaware, Nanofabrication Projects
Newark, DE

University of New Hampshire Spaulding Hall
Durham, NH
C. Contractor Personnel and Qualifications
Christopher Anderson, CEA, LEED AP  |  Principal-in-Charge

University of Delaware, Nanofabrication Program Projects, Newark, DE
Skanska provided program management services in support of $3 million of work for several complex projects related to the University of Delaware’s Nanofabrication Program. These include NF Research and Teaching Lab Retrofit Planning, NF Cleanroom Tool Installation/Hook-up, Cleanroom Air Handler Humidity and Chiller Controls and sequencing Modifications, and Phase II Toxic Gas Monitoring Systems implementation.

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.

Montgomery County, One Montgomery Plaza Reskin Project, Norristown, PA
Skanska provided construction management agency 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. Lean construction principles were a central driver in all aspects of project delivery.

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.

James Lane, ASPE  |  Vice President - Preconstruction

Swarthmore College, Singer Hall, Swarthmore, PA
$115.9 million, 170,700-SF Singer Hall (formerly Biology, Engineering and Psychology or BEP building) expanded Swarthmore College’s academic facilities, allowing the college to meet important program needs and future growth. The new building includes LEED initiatives and aligns with Swarthmore’s goals to be a carbon neutral campus.

Children’s Hospital of Philadelphia, Inpatient Building, Philadelphia, PA
$221.8 million, 252,000-SF inpatient hospital, spread over seven stories with an additional 22,000-SF penthouse in King of Prussia, PA. This project also includes renovation of approximately 54,000-SF of the existing Specialty Care Center (SCC). In addition to the new inpatient building and the SCC renovations, the project will also include an expansion to the existing loading dock and a 192-vehicle precast parking garage.

GlaxoSmithKline, SMART Lab West Project, Collegeville, PA
$41.7 million, 107,160-SF project, which included selective demolition and reconstruction of four floors of existing labs. The building’s capacity was doubled by reconfiguring each floor to include one large glazed-wall lab and modern, open-concept offices and conference rooms. The project featured 100,000-SF in SMART labs that can transition from one discipline to another in just two days, renovated restrooms, upgraded air handling units and heavy MEP systems renovations.
Gary Warren, EIT  |  Project Lead

**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.

**Montgomery County, One Montgomery Plaza Reskin Project, Norristown, PA**
Skanska provided construction management agency 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. Lean construction principles were a central driver in all aspects of project delivery. One Montgomery Plaza Temporary Courts Project: Skanska provided construction management agency services in support of the interior renovation of existing office space on the ninth and tenth floors of One Montgomery Plaza for temporary family courts. The $5 million, 23,000-SF new facility includes six courtrooms, a law library, and new court reporter offices. The new space serves as the temporary location for the family courts while the new Justice Center across Swede Street is constructed.

**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.

**Northampton County, New Regional Forensic Center, Nazareth, PA**
$10.9 million, 24,000-SF, 2-story facility. Skanska provided construction management and inspection services for the County of Northampton for a new Forensic Center. It is located at the Gracedale nursing home campus next to the county’s 911 center in Upper Nazareth Township. The project consists of the construction of the Forensic Center, with associated parking lot, driveway, stormwater detention facilities, and utility connections. The building is two stories, with all office, storage, garage and public areas located on the first floor. A partial second floor was constructed to house mechanical and electrical equipment. The building is steel framed, constructed on shallow strip and spread foundations with slab-on-grade flooring.

**Montgomery County Pennsylvania Emergency Operations Center (EOC), Eagleville, PA**
Construction Management Services for buildings at the EOC Center which includes a new garage and warehouse facility. The proposed facilities will include: 1. A new garage and warehouse facility. The proposed facilities will include a 15,000 square foot warehouse and 24,000 square foot garage/storage building. Both buildings will be pre-engineered. 2. A new coroner’s facility and archives building. The coroner’s facility will be a stick-built 20,000+/SF building, and the archives building will be pre-engineered at 39,000+/SF.

**County of Lehigh Cedarbrook Senior Care & Rehabilitation Center, Allentown, PA**
Skanska is the program manager for this new $57 million facility. Construction will include but not limited to all mechanical systems, electrical systems and interior construction of spaces. The new facility will include all systems and facility infrastructure associated with the operation of a Skilled Nursing Home.

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13 years in industry
11 years with Skanska

The Pennsylvania State University
B.S., Structural Engineering

EIT (Engineer in Training)

OSHA Hazmat 40

Choose to Save a Life (Fall Protection) Training

CPR and First Aid Training
**Rich Hylinski, AVS | CSA Chief Estimator**

**Swarthmore College, Singer Hall, Swarthmore, PA**
$115.9 million, 170,700-SF Singer Hall (formerly Biology, Engineering and Psychology or BEP building) expanded Swarthmore College's academic facilities, allowing the college to meet important program needs and future growth. Located on the north side of campus, Singer Hall is adjacent to the Unified Science Center and included the phased construction of the new facility and demolition of two existing buildings in order to maintain the college's science-based academic programs in the same region of campus. The new building includes LEED initiatives and aligns with Swarthmore's goals to be a carbon neutral campus.

**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, Inpatient Building, Philadelphia, PA**
$221.8 million, 252,000-SF inpatient hospital, spread over seven stories with an additional 22,000-SF penthouse in King of Prussia, PA. This project also includes renovation of approximately 54,000-SF of the existing Specialty Care Center (SCC). In addition to the new inpatient building and the SCC renovations, the project will also include an expansion to the existing loading dock and a 192-vehicle precast parking garage.

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**Western Carolina University, Tom Apodaca Science Building, Cullowhee, NC**
$88 million, 184,700-SF new STEM facility that will contain teaching labs, research labs, laboratory support space, active learning spaces, offices, and informal learning/collaboration spaces. Modern, efficient and robust systems for lab exhaust and utilities will complement the spaces designed for long-term flexibility, creating a truly interdisciplinary, state-of-the-art facility.

**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.

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Steven Gobac | Estimator

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Southern Connecticut State University, School of Health and Human Services, New Haven, CT
$49 million, 81,000-SF new four-story building to accommodate program elements from the School of Health and Human Services including: Dean's office suite, the Departments of Public Health, Health Education, Nursing, Center for Communications Disorders, Marriage and Family Therapy, Recreation and Leisure, Exercise Science, Physical Therapy and Social Work.

Northampton County, New Regional Forensic Center, Nazareth, PA
$10.9 million, 24,000-SF, 2-story facility. Skanska provided construction management and inspection services for the County of Northampton for a new Forensic Center. It is located at the Gracedale nursing home campus next to the county's 911 center in Upper Nazareth Township. The project consists of the construction of the Forensic Center, with associated parking lot, driveway, stormwater detention facilities, and utility connections. The building is two stories, with all office, storage, garage and public areas located on the first floor. A partial second floor was constructed to house mechanical and electrical equipment. The building is steel framed, constructed on shallow strip and spread foundations with slab-on-grade flooring.
Colleen Demark, LEED AP, AVS | Electrical Senior Estimator

Swarthmore College, Singer Hall, Swarthmore, PA
$115.9 million, 170,700-SF Singer Hall (formerly Biology, Engineering and Psychology or BEP building) expanded Swarthmore College's academic facilities, allowing the college to meet important program needs and future growth. Located on the north side of campus, Singer Hall is adjacent to the Unified Science Center and included the phased construction of the new facility and demolition of two existing buildings in order to maintain the college's science-based academic programs in the same region of campus. The new building includes LEED initiatives and aligns with Swarthmore's goals to be a carbon neutral campus.

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, Inpatient Building, Philadelphia, PA
$221.8 million, 252,000-SF inpatient hospital, spread over seven stories with an additional 22,000-SF penthouse in King of Prussia, PA. This project also includes renovation of approximately 54,000-SF of the existing Specialty Care Center (SCC). In addition to the new inpatient building and the SCC renovations, the project will also include an expansion to the existing loading dock and a 192-vehicle precast parking garage.

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.

Montgomery County Pennsylvania Emergency Operations Center (EOC), Eagleville, PA
Construction Management Services for buildings at the EOC Center which includes a new garage and warehouse facility. The proposed facilities will include: 1. A new garage and warehouse facility. The proposed facilities will include a 15,000 square foot warehouse and 24,000 square foot garage/storage building. Both buildings will be pre-engineered. 2. A new coroner's facility and archives building. The coroner's facility will be a stick-built 20,000+/- SF building, and the archives building will be pre-engineered at 39,000+/- SF.

County of Lehigh Cedarbrook Senior Care & Rehabilitation Center, Allentown, PA
Skanska is the program manager for this new $57 million facility. Construction will include but not limited to all mechanical systems, electrical systems and interior construction of spaces. The new facility will include all systems and facility infrastructure associated with the operation of a Skilled Nursing Home.

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.
Mary Judge, AVS | Estimator

Swarthmore College, Singer Hall, Swarthmore, PA
$115.9 million, 170,700-SF Singer Hall (formerly Biology, Engineering and Psychology or BEP building) expanded Swarthmore College's academic facilities, allowing the college to meet important program needs and future growth. Located on the north side of campus, Singer Hall is adjacent to the Unified Science Center and included the phased construction of the new facility and demolition of two existing buildings in order to maintain the college's science-based academic programs in the same region of campus. The new building includes LEED initiatives and aligns with Swarthmore's goals to be a carbon neutral campus.

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Western Carolina University, Tom Apodaca Science Building, Cullowhee, NC
$88 million, 184,700-SF new STEM facility that will contain teaching labs, research labs, laboratory support space, active learning spaces, offices, and informal learning/collaboration spaces. Modern, efficient and robust systems for lab exhaust and utilities will complement the spaces designed for long-term flexibility, creating a truly interdisciplinary, state-of-the-art facility.

Montgomery County Justice Center and Hancock Square Expansion, Norristown, PA
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Inspira Health Network, Mullica Hill Campus, Mullica Hill, NJ
$230 million, five-story, 466,000-SF new hospital with 204 beds. The main tower consists of operating rooms, an emergency department, imaging suites, as well as administrative, dining and support services. The project also includes constructing a new central utility plant, which provides electrical power, steam and chilled water to the new hospital. Sitework included demolition of three small farm buildings, grading, underground and overhead utilities to the site as well as surface parking for the new hospital and future medical office buildings. The new hospital was built under an integrated project delivery (IPD) contract.

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Pennsylvania State University, Life Sciences Building, University Park, PA  
$41 million new life sciences building at the University Park campus that houses state-of-the-art classrooms, teaching/research laboratories, auditorium, videoconference rooms and administrative spaces. The construction of a glass-enclosed physical link from the upper floors of the life sciences building to the upper floors of the adjacent chemistry building adds to the uniqueness of this project.

Montgomery County Pennsylvania Emergency Operations Center (EOC), Eagleville, PA  
Construction Management Services for buildings at the EOC Center which includes a new garage and warehouse facility. The proposed facilities will include: 1. A new garage and warehouse facility. The proposed facilities will include a 15,000 square foot warehouse and 24,000 square foot garage/storage building. Both buildings will be pre-engineered. 2. A new coroner’s facility and archives building. The coroner’s facility will be a stick-built 20,000+/- SF building, and the archives building will be pre-engineered at 39,000+/- SF.
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.

### Approach to Deliverables

#### Target Value Delivery and Cost Modeling

**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 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, review the Project Charter and established Target Values. These documents will be used to measure project success and help guide the decision-making process throughout the design and construction phases. Additionally, our team will work towards 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 stages. Skanska will work with the team to develop lines of communication so that our estimators are kept informed of all potential design changes. This will allow Skanska to conduct timely cost modeling that is needed to compare design alternatives. 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. At each milestone, Skanska’s project manager will conduct
lessons learned meetings that will promote continuous improvement throughout the life of the project.

Business Case Evaluation

Order of Magnitude Estimate (Cost Benchmarking)

Based on the information gained from the Gemba site walk and the available project information along with our experience
and database of higher education construction costs, we can validate cost projections quickly and ensure that the estimate
remains valid throughout the project.

Skanska's benchmarking capabilities are unique in that we not only
provide clients with cost and efficiency metrics from comparable projects,
but also provide qualitative “data” from this same set of projects and
space types. The former is critical to budget validation, evaluation of
alternative design approaches, and cost control. The latter is essential
for communicating how qualitative parameters factor into the larger
equation of creating projects that support a given organization's mission,
goals, and priorities.

Our process will begin with the identification in our database, Skanska
Metriks”, of recently completed Higher Education Science Buildings
and other relevant projects that are comparable in scale, space types and
complexity to the proposed facility. For each project deemed to be truly
comparable, we will review final costs to determine the total reported cost
of construction.

Perhaps most importantly, benchmarking also saves time and money
by enabling the Project Team to “model” costs of various design options
while all team members are present in the same room. This approach is
preferable to expending design fees to study options and pricing each
option on a case-by-case basis and is a highly effective tool in an efficient
decision-making environment.

Skanska Metriks™ is a benchmarking tool that harvests and compares
close to 400 specific, quantifiable attributes from every project we build.
Unlike traditional cost benchmarking, Skanska Metriks™ incorporates
quantified program and systems information enabling teams to better
understand final building product and develop a more accurate cost
model. Being able to evaluate the efficiency of building systems relative to similar institutions, teams can also identify
attributes.

Program Development Study

In conjunction with the Business Case Evaluation (BCE), we will formalize and prepare the preliminary cost model. The
cost model will be based on available information and Skanska’s previous experience with similar types of facilities. We will
conduct a cost model review workshop with all design team partners to review the cost model and assumptions utilized in
the development.

Following PDS workshops, our team will provide updates to the model, recommendations on specific scope items and
possible value decisions. Any changes to the cost model including significant design decisions will be tracked within the cost
model.

Skanska will actively participate in risks analysis discussions. Our team will provide valuable insight to project risk from
our experience constructing similar facilities. These items include constructability concerns, schedule recommendation,
site existing conditions, cost factors such as market volatility and procurement to name a few examples. We will assist the
development of a formal risk register detailing potential risks and mitigation strategies.

Our team will assist the development final PDS document. This includes the attendance of PDS report meetings to review
comments submitting a final version of the cost model.

Design Stage: Cost Modeling and Target Value Delivery

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. As mentioned in section A, 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.

**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.

During the on-site Gemba walk and throughout the design phase, Skanska will advise on constructability risks the project should avoid or mitigate and determine which construction methods and types are most feasible. Our team will review the design documents at each milestone and make recommendations to address constructability risks.

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

1. **Interdisciplinary coordination.** Interdisciplinary coordination seeks to identify clashes between design disciplines, such as structural engineering and mechanical engineering.

2. **Build-ability.** 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 the California University of Pennsylvania Campus.

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.

**Target Value Design and Continuous Cost Modeling**

As mentioned in section A, 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. We regularly collaborate with design partners on streamlining the model-to-estimate process in order to provide real-time 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.

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

- Open communication
- Scope/Cost Control
- Scope refinement/build-ability/contingency reduction
- Proactive value engineering
- Design for what is constructible vs. evaluate the constructability of a design after it is designed
- 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 pre-design stage of this project, a TVD process can be effective in solidifying DGS's and each user group's 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 California University of Pennsylvania of applying TVD principles to the design stage is that it leads to enhanced collaboration, transparency and, most importantly, avoiding surprises downstream.

Throughout the design phase, we will use our cost estimating skills for continuous budget validation and estimate reconciliation as part of the TVD process. Our team will work closely with DGS and the design team to identify, recommend, and price alternative design concepts, systems and material recommendations that provide benefits to the new Science Building 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 program quality. 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. This provides value as the team evaluates final decisions and formalizes the TVD process.

**Bidding Stage Approach**

Following the receipt of prime contractor bid proposals, our team will review the bids for completeness and conformance 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 de-scope meetings will be scheduled with multiple vendors in each prime bid package. Discussion topics will include, but not be 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 de-scope 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**

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 item if the change is truly “out of scope”, quantities of labor and material, labor rates, equipment rates, allowance markups, schedule impact and time request and the necessary supporting documents are included. 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.

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, 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 the DGS team.

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.

In order to mitigate inefficiencies and/or risks to successful implementation. Skanska plans on holding all meetings virtually and conducting all 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).

<table>
<thead>
<tr>
<th>Name / Staff Assignment</th>
<th>Task</th>
<th>Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td><strong>Program Development Study (PDS)</strong></td>
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<td></td>
<td>Prior to the PDS workshop, participate in the on-site Gemba walk with the Project team.</td>
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<tr>
<td></td>
<td>Develop a preliminary cost model and BCE based on all available project information. The estimate is to be prepared, submitted, and reviewed with the DGS Agency Liaison and Design Project Manager prior to the PDS workshop.</td>
<td>12</td>
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<tr>
<td></td>
<td>Actively participate in the two (2)-day Program Development Study (PDS) workshop and breakout groups. Using continuous estimating, provide order of magnitude values on the spot to assist in evaluating scope items and value decisions as they are presented and discussed by the project team.</td>
<td>16</td>
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<td></td>
<td>Participate in a risk analysis. Advise the project team on constructability risks and develop strategies to mitigate risks. Develop a list of design or construction opportunities the team should consider maximizing value.</td>
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<tr>
<td></td>
<td>Participate in the development of the PDS report via virtual meetings, phone calls, and/or emails and provide an updated cost model to reflect any scope changes during this process. Provide a review of the final PDS report to ensure it accurately reflects the results of PDS cost estimating activities.</td>
<td>8</td>
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<tr>
<td></td>
<td>Provide a final PDS cost model and BCE organized by Uniformat (Level II or III). The final PDS cost estimate and BCE includes a summary of the value decisions and discussions, a report on the risk and opportunities discussed and their impacts on the project costs, and a thorough documentation on the assumptions included in the estimate.</td>
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<tr>
<td></td>
<td><strong>Design Stage: Cost Modeling and Target Value Delivery</strong></td>
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<tr>
<td></td>
<td>Participate in the initial Design Kick-Off meeting.</td>
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<tr>
<td></td>
<td>Participate in approximately one (1) weekly meeting with the management team (1 hour in duration). (Assume 50 Meetings)</td>
<td>25</td>
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<td></td>
<td>Participate in two (2) weekly cluster group meetings to provide cost input &amp; feedback to aide in design development of each cluster group. Work to ensure that cluster groups stay attentive to TVD target values while making design decisions (1 hour in duration). (Assume 50 meetings each)</td>
<td>50</td>
</tr>
<tr>
<td>Name / Staff Assignment</td>
<td>Gary Warren, Project Lead</td>
<td>James Lane, VP Preconstruction</td>
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<tr>
<td><strong>Task</strong></td>
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<tr>
<td><strong>Design Stage: Cost Modeling and Target Value Delivery (continued)</strong></td>
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<tr>
<td>Participate in <strong>one (1) Teaming Events</strong>, <strong>occurring each month for a full day (4-6 hours)</strong> in duration throughout the anticipated design phase. 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. <em>(Anticipated 10 Teaming events)</em></td>
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<td>50</td>
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<tr>
<td>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.</td>
<td>4</td>
<td>4</td>
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<tr>
<td>With the project team develop, maintain, and track the multiple Base Bid options adhering to the DGS base bid requirements.</td>
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<td>4</td>
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<tr>
<td>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. As the evaluation of the design sets continues and more detail is provided, the estimate moves to conceptual (assume 1 conceptual estimate) and production estimates (assume 2 production estimates) as the design solution becomes integrated into the production design.</td>
<td>16</td>
<td>60</td>
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<tr>
<td><strong>Bidding Stage Services</strong></td>
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<tr>
<td>Review bids for scope and responsiveness</td>
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<tr>
<td>Review base bid scope submissions for completeness and understanding.</td>
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<tr>
<td>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.</td>
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<tr>
<td><strong>Construction Stage Services</strong></td>
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<tr>
<td>Engage with the Prime contractors in careful and collaborative cost control.</td>
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<tr>
<td>Establish milestones within the construction schedule to review costs and update the budget template.</td>
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</tr>
<tr>
<td>Name / Staff Assignment</td>
<td>Task</td>
<td>Hours</td>
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<tr>
<td>Gary Warren, Project Lead</td>
<td>Review and confirm change order requests including costs for material, labor, equipment, overhead, profit, taxes, bonds, and any sub-contracted work. <em>(Assume 1 day a week for 65 weeks)</em></td>
<td>520</td>
</tr>
<tr>
<td>James Lane, VP Preconstruction</td>
<td>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.</td>
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</tr>
<tr>
<td>Rich Hulikski, CSA Chief Estimator</td>
<td>If necessary, provide a list of items where savings were missed, or costs were unnecessarily incurred with a description and suggested resolution for a Lessons Learned document.</td>
<td>8</td>
</tr>
</tbody>
</table>