# BRIDGE REPLACEMENT STEEL GIRDER, BRIDGE NO. 0317400 ON PUTTY HILL AVENUE OVER I-695 BALTIMORE COUNTY

## T E C H N I C A L  P R O P O S A L

Contract No. BA1455180


Kiewit

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# B. Capability of the Proposer

# Jeremy Regan
## Project Manager

## Why Jeremy?

Jeremy has the project management experience required to make Putty Hill an exceptional project for SHA. His background includes being project manager for CMAR projects, highly phased project bridge and highway projects and a technical bridge reconstruction project in Maryland for SHA. Jeremy has expertise in the higher risk elements of this project, such as planning and coordinating critical utility relocations, carefully reviewing phasing and optimizing MOT design, and developing detailed plans for demolition and girder erection over highways.

SHA and the stakeholders can have confidence Jeremy will safely manage Putty Hill and meet the schedule we commit to, just as he has on all projects he has managed.

**Education:** B.S., Civil Engineering; Lehigh University **Years of Experience:** 15

### Project Manager (2016-17) | Carroll Avenue Bridge Deck Replacement | $9M

Maryland State Highway Administration | Takoma Park, MD

Jeremy provided oversight of construction operations, work planning, management of personnel and equipment, as well as the management of an aggressive schedule that finished early and earned its full incentive. The project involved the full demolition of the bridge superstructure and partial demolition of the substructure on this historic arch bridge. To maintain pedestrian traffic, a temporary truss bridge was constructed adjacent to the project.

**Relevant items of work similar to the Putty Hill Avenue project.**

Early utility relocations and coordination with Verizon and BGE, accelerated construction, bridge demolition and reconstruction over active roadway, temporary design to support construction, public outreach, stakeholder coordination, maintenance of traffic, pedestrian access, storm drainage, asphalt, striping, signage.

### Project Manager (2011-13) | SR-90 Tamiami Trail Bridge | $104M

U.S. Army Corps of Engineers, Jacksonville District | Miami, FL

Jeremy managed all aspects of project management on this highly phased project to construct a new 1-mile long bridge and reconstruct 9-miles of highway through Everglades National Park. Jeremy worked with the client, designer and stakeholders to develop an alternate phasing and MOT plan that minimized daily impacts to local residents, businesses and visitors and also reduced the construction schedule by nearly one year. The new bridge was built in an extremely tight LOD to minimize environmental impacts, which led to difficult site access constraints as the project team was demolishing the roadway and building the new bridge on virtually the same footprint, all the while maintaining traffic on the Tamiami Trail. Despite these challenges, the project was completed ahead of schedule and with raving reviews from the multiple stakeholders involved in the project.

**Relevant items of work similar to the Putty Hill Avenue project.**

MOT, bridge construction, utility relocations, design coordination, value engineering, constructability reviews, grading, demolition, storm drainage, utilities, live traffic, asphalt, accelerated construction, public outreach, stakeholder coordination.

### Project Manager (2015-16) | Orlando South Airport Intermodal Terminal, CMAR | $188M

Greater Orlando Aviation Authority | Orlando, Florida

As Kiewit's project manager Jeremy managed the preconstruction phase including the development of cost estimates, value engineering studies, negotiating GMP's, procuring subcontractors including, creating risk registers, managing the overall preconstruction schedule, and coordination with the adjacent $200 million automated people mover contract that tied into Kiewit's work. During preconstruction, the designer fell behind schedule, which resulted in potential impacts to construction. Jeremy and his team mitigated this risk by resequencing the schedule to construct the structures by area, versus linearly across the entire station area. This approach mitigated the schedule risk and they maintained the original schedule. During construction, Jeremy managed the allocation of resources including the hiring of over 100 craft, mobilizing several lattice boom cranes, and complex formwork for the structures.

**Relevant items of work similar to the Putty Hill Avenue project.**

CMAR, constructability reviews, design coordination, utility relocations, value engineering, OPCC and GMP Development, bridges, retaining walls, grading, storm drainage, utilities, asphalt, MOT, public outreach, stakeholder coordination.

# Luke Silvus
## Construction Manager

## Why Luke?

Luke joined Kiewit in 1994 and since then, he has progressed to increasing levels of responsibility on projects ranging from $2 million to over $500 million. Luke specializes in bridge and elevated structures. He has extensive industrial experience in heavy highway and bridge construction involving major structural steel and reinforced concrete structures. Luke is our premier bridge builder, and has spent the last 20 years working as a construction manager on our most complex projects. He will be responsible for managing construction activities, coordination and schedule and ensuring that the construction is completed in accordance with the project requirements.

**Years of Experience:** 23

### Construction Manager (2009-10) | Intercounty Connector, Contract B | $566M

Maryland State Highway Authority | Baltimore, MD

This project consisted of the design and construction of approximately 7 miles of new 6-lane toll road, 20 retaining walls, and 15 bridges totaling over 600,000 SF of deck over environmentally sensitive land. Luke was responsible for all bridge construction, including the design coordination and constructability reviews, access planning, subcontractors, and critical crane picks for the mainline girder bridges.

**Relevant items of work similar to the Putty Hill Avenue project.**

Alternate delivery, bridge construction, design coordination, constructability reviews, earthwork, SWM/drainage systems, retaining walls, lighting, asphalt, striping, signage.

### Construction Manager (2011-12) | SR-90 Tamiami Trail Bridge | $104M

U.S. Army Corps of Engineers, Jacksonville District | Miami, FL

Reporting to Jeremy Regan, Luke managed all construction field operations on this highly phased project to construct a new 1-mile long bridge and reconstruct 9-miles of highway through Everglades National Park. Luke led the operations planning, performed constructability reviews, scheduled and directed crews, monitored safety and quality, and coordinated with local business and residents during construction. Jeremy and Luke worked together to develop a plan to build the new bridge in an extremely tight LOD to minimize environmental impacts, which led to difficult site access constraints as the project team was demolishing the roadway and building the new bridge on virtually the same footprint, all the while maintaining traffic on the Tamiami Trail.

**Relevant items of work similar to the Putty Hill Avenue project.**

MOT, bridge construction, utility relocations, design coordination, value engineering, constructability reviews, grading, demolition, storm drainage, utilities, live traffic, asphalt, accelerated construction, public outreach, stakeholder coordination.

### Construction Manager (2016-16) | Orlando South Airport Intermodal Terminal CMAR | $188M

Greater Orlando Aviation Authority | Orlando, FL

Luke's responsibilities included overseeing all construction aspects of the work and ensuring that all activities remain on schedule and within budget. He also supervised budget development, partnering coordination and managed subcontractors. Duties also included managing a team of approximately 100 craft and staff responsible for fieldwork for the installation of viaduct bridge, columns, and caps, as well as coordination of five crawler cranes needed to build the work. He also coordinated the MOT, site grading, MSE walls, utility and storm drainage, and material laydown areas.

**Relevant items of work similar to the Putty Hill Avenue project.**

CMAR, constructability reviews, design coordination, utility relocations, value engineering, OPCC and GMP Development, bridges, retaining walls, grading, storm drainage, utilities, asphalt, MOT, public outreach, stakeholder coordination.

# Donnie Arant
## Cost Estimator

## Why Donnie?

Donnie's experience includes working primarily on alternative delivery projects, including three design-builds and six CMAR contracts. He has perfected many of the tools that we use in collaboration with clients to effectively get the contract to construction.

With more than 16 years of construction estimating experience, Donnie brings a wealth of knowledge relating to budget development and oversight, issue resolution, project scheduling and phasing, operations management, and DBE outreach assistance. His experience with similar projects will be leveraged to provide value engineering ideas and design optimization. He is responsible for developing OPCCs and GMPs and participating in key meetings where price, risk, and assumptions are discussed.

**Education:** B.S., Construction Management University of Nebraska-Lincoln **Years of Experience:** 16

### Cost Estimator (2016-17) | Greenbelt Metro Interchange CMAR | $550K Preconstruction $130M Anticipated Construction Value

Maryland State Highway Administration | Beltsville, MD

This 1.5-mile-long freeway widening project includes numerous curved girder steel bridges over the Capital Beltway to improve WMATA station access. Led by Donnie, Kiewit provided extensive coordination with WMATA and a critical 96" WSSC water line located adjacent to a new bridge. In addition, Kiewit coordinated with an adjacent developer, the local community, and several permitting agencies.

**Relevant items of work similar to the Putty Hill Avenue project.**

CMAR, constructability reviews, design coordination, permitting, value engineering, public outreach, stakeholder coordination, OPCC and GMP development

### Cost Estimator (2008-10) | Cotton Lane Bridge CMAR | $51.8M

Maricopa County. Department of Transportation | Tempe, AZ

Donnie provided oversight for major design and construction operations. Donnie managed field operations including bridge construction, and roadway widening on the MC-85 freeway and Estrella Parkway. As the only entrance to Estrella Mountain Ranch, Donnie scheduled the critical roadway widening to be completed in less than 100 days, all while under active traffic. Through value engineering in preconstruction, the team utilized test shafts to cut over $3.1 million of cost from the production drilled shafts. This multi-phase, 3.25-mile bridge project spanning over the Gila River was both the largest single contract in MCDOT's history and their first project delivered as Construction Manager at Risk. Working with the design team, this project became a signature bridge for Maricopa County.

**Relevant items of work similar to the Putty Hill Avenue project.**

CMAR, constructability reviews, design coordination, permitting, bridge construction, minimal traffic disruptions, rapid construction, excavation, grading, asphalt, storm drainage, utility relocations, public outreach, stakeholder coordination, OPCC and GMP development

### Cost Estimator\Preconstruction Manager (2016-17) | BR 3-150N&S on SR1 | $8M

Delaware Department of Transportation | Rehoboth Beach, DE

Donnie led the preconstruction services and cost estimating on this bridge rehabilitation project. The scope of work includes deck replacement, joint replacement, barrier reconstruction, guardrail replacement, bearing replacements, realigning the concrete girders, substructure repairs and strengthening, sealing all exposed concrete, and correcting the profile and replacing the approach slabs. Work will have to be done such that traffic impacts are kept to an absolute minimum. Public outreach will be a key component of the project, both during design and construction.

**Relevant items of work similar to the Putty Hill Avenue project.**

CMAR, bridge demolition and reconstruction, utility relocations, accelerated construction, constructability reviews, design coordination, permitting, value engineering, public outreach, stakeholder coordination, OPCC and GMP development

# CARROLL AVENUE BRIDGE DECK REPLACEMENT

Bid-Build | Takoma Park, MD

## RELEVANCIES

- ✓ Utility Relocation
- ✓ Demolition over Line Pedestrian and Roadway
- ✓ Complex
- ✓ Temporary Bridge
- ✓ MOT
- ✓ SWM Ponds and ESC
- ✓ Bridge Demo
- ✓ Asphalt Paving
- ✓ Signing
- ✓ Traffic Barrier
- ✓ Striping
- ✓ Constructability Reviews
- ✓ Estimating
- ✓ Stakeholder Coordination
- ✓ Public Outreach
- ✓ Accelerated Bridge Construction
- ✓ Retaining Walls
- ✓ Pedestrian and Bicycle Accessibility
- ✓ Landscaping
- ✓ Storm Drainage

## BRIEF PROJECT DESCRIPTION:

This historic bridge rehabilitation project included the complete replacement of the existing bridge deck, beams, columns above the concrete arches, sidewalks, railings, ornamental lighting and utility relocation. The work was completed in an accelerated closure window. The overall project limits along Carroll Avenue extend from the intersection at Jefferson Avenue to the entrance for the Washington Adventist Hospital. The project also included constructing a new sidewalk along the east side of Carroll Avenue between Old Carroll Avenue and the bridge, upgrading existing sidewalks and ramps to meet ADA standards, and roadway drainage improvements.

As the existing bridge was a vital pedestrian avenue to a nearby hospital and university, pedestrian traffic had to be maintained at all times. Prior to the demolition work, a temporary pedestrian bridge approximately 300 feet long was installed directly adjacent to the existing structure. This temporary, three-span bridge was a prefabricated system that was built on one side of the creek and rolled out, or launched, to the other side. Once the new bridge deck and parapet were completed, pedestrian traffic was shifted off the temporary bridge, and the whole structure was removed. Kiewit Infrastructure Engineers (KIE) was the lead designer for the temporary bridge including, the foundations, piers, and erection/removal sequence.

Since there was a pedestrian trail running below the bridge along the creek, Kiewit worked with local stakeholders to develop a plan to keep the trail open throughout construction. KIE assisted with the design of a protective shield for pedestrian traffic below. This shield was engineered into the scheme for the access platform as well. By KIE coming up with this combined concept, our project team was able to keep the popular public trail that ran beneath the bridge open during the length of construction.

## COST

**Initial** - $9,291,636
**Final** - $9,875,987

**Reason for Difference:**
Spall repair overruns and additional scope requested

## OWNER CONTACT

Maryland State Highway Administration
Usman Khan
(215) 776-4606

## COMPLETION

**Initial** - July 2017
**Final** - July 2017

**Reason for Difference:**
None

**Discussion of what work, including any successful methods, approaches, and innovations, on the project is relevant to this contract and why:**

**Utility Relocations –** One of the early challenges encountered was the relocation of the Verizon and BGE utilities off of the existing bridge and onto newly installed utility poles 50 ft. upriver from the bridge. Kiewit was responsible for coordination with and establishing access for these companies by constructing a utility access bridge across Sligo Creek. This task was made challenging by the fact we had no laydown area other than one lane of traffic, and the other side of Sligo Creek had one of Montgomery County's most popular trails, Sligo Creek Trail. Despite these hazards and the confined space, Kiewit successfully installed the utility bridge and established a sufficient work zone for the utility companies. This was completed without any safety issues for crews and the traveling public, and built a foundation for a great working relationship with SHA during these early tasks.

The coordinated schedule allowed utility companies to relocate their lines off of the bridge months before the planned bridge demolition, however we still faced delays in starting the bridge demolition due to a Verizon strike in April 2016. This strike prevented Verizon from removing their fiber-optic lines from the bridge for a period of roughly three months and set our demolition back from June to August 2016. SHA had tasked us to have the road closed for 350 days, so accepting a 90 day delay at the beginning of the project was not something anyone wanted to do. The team immediately began resequencing work, planning for added resources, and coordinating with our demolition subcontractor to reduce the duration of their work. Overall, we completed the rebuilding of Carroll Ave Bridge in July 2017 after only 324 days, beating the original schedule by nearly 1 month.

**Bridge Demolition –** We demolished and successfully removed the bridge over a roadway and pedestrian trail in a well-planned and safe manner. In close coordination with our subcontractor, United Demolition, we were able to remove the bridge two weeks faster than originally planned. We also successfully maintained the work platform below, never overloaded any temporary structures, kept our crews and the traveling public safe, and established a great working relationship with SHA. We also were able to work with SHA and the designer to modify the demolition plan from seven phases to three based on input and analysis from KIE.

## SR-90 TAMIAMI TRAIL BRIDGE

Bid-Build | Miami, FL

### RELEVANCIES

- ✓ Utility Relocation
- ✓ Early Utility Relocations
- ✓ Coordination with Verizon and BGE
- ✓ Accelerated Construction
- ✓ Bridge Demolition
- ✓ Reconstruction over Active Roadway
- ✓ Temporary Design to Support Construction
- ✓ Public Outreach
- ✓ Stakeholder Coordination
- ✓ Maintenance of Traffic
- ✓ Pedestrian Access
- ✓ Storm Drainage
- ✓ Asphalt
- ✓ Striping
- ✓ Signage

### BRIEF PROJECT DESCRIPTION:

SR-90 Tamiami Trail is a two-lane undivided highway that runs through the Everglades National Park connecting Miami to Tampa. The project was to demolish a 1-mile section of the existing highway, construct a new 1-mile-long bridge, and reconstruct and raise 9.75 miles of the existing roadway. Traffic and access to local business and residents had to be maintained at all times during construction. After the bridge was completed the original roadway was removed, which allowed for water to naturally flow back into the Everglades and assist in the restoration effort.

This project was constructed in a very tight right of way with limited access due to the environmentally sensitive area. The project also required intricate phasing to maintain traffic flow and complete the work in a timely manner. The project team coordinated with the local airboat business, the Miccosukee Indian Resort and residents for access and special events. Additionally, this was a high-profile project that had been in the planning stages for over 25 years. It garnered high-media attention and frequently had VIP visitors from Washington D.C., including Vice President Joe Biden. Kiewit worked closely with USACE to ensure we met their needs for this important project.

### COST

**Initial** - $81,000,000
**Final** - $103,724,300

**Reason for Difference:**
See Following Page

### OWNER CONTACT

US Army
Corps of Engineers,
Jacksonville District
J.A. Jettinghoff, PE
(904) 232-1177

### COMPLETION

**Initial** - May 2013
**Final** - December 2013

**Reason for Difference:**
See Following Page

### Discussion of what work, including any successful methods, approaches, and innovations, on the project is relevant to this contract and why:

Tamiami Trail would have been an ideal project for CMAR. This project was a best value, bid build project where qualifications were a substantial part of award. However, the project was fully designed and the contractor did not have input into the design along the way.

In addition to similar work such as bridge construction, MOT and roadway work, this project is very relevant to Putty Hill due to similar challenges that will be encountered

during the preconstruction phase. From this project and many others, Jeremy and Luke know what it takes during preconstruction to develop and implement a thorough utility identification program, manage utility relocations, improve the MOT and phasing of a project to dramatically reduce schedule and impacts to local residents, and they know where to identify risk in the design, such as geotechnical, and ensure the proper investigations and reviews are completed early in the design phase so that budget and schedule can be maintained once construction begins. Finally, Jeremy and Luke know what it takes to be a good partner. They were able to lead the team to overcome the early project challenges and maintained very good relations with the client and received extremely high marks from the USACE on the final contractor evaluation.

**Reason for Cost Difference:** Early in this bid build project, utility conflicts and substantial settlement were discovered in the roadway that required an entire redesign, work stoppage, and significant additional materials and work to mitigate the utilities and soft soils.

**Reason for Late Schedule:** Due to the redesign and work stoppage early on, the projected project completion date was going to move to late 2014. Kiewit worked with the USACE and stakeholders to develop an alternate MOT and phasing plan, and worked on an accelerated 24/7 basis in order to mitigate the utility and settlement impacts and complete the project in December 2013, nearly one year earlier than the original MOT and phasing would have achieved.

## ORLANDO SOUTH AIRPORT INTERMODAL TERMINAL CMAR

CMAR | Orlando, FL

### RELEVANCIES

- ✓ Utility Relocation
- ✓ CMAR
- ✓ Constructability Reviews
- ✓ Design Coordination
- ✓ Utility Relocations
- ✓ Value Engineering
- ✓ OPCC and GMP Development
- ✓ Bridges
- ✓ Retaining Walls
- ✓ Grading
- ✓ Storm Drainage
- ✓ Utilities
- ✓ Asphalt
- ✓ MOT
- ✓ Public Outreach
- ✓ Stakeholder Coordination
- ✓ Piling
- ✓ Steel Girders

### BRIEF PROJECT DESCRIPTION:

This $188 million CMAR project was for the Greater Orlando Aviation Authority (GOAA) at the Orlando International Airport. This was one of the early projects in GOAA's program to develop an entirely new South Terminal complex and selected the Kiewit team to successfully deliver this complex project. The Intermodal Terminal Facility (ITF) is a 200,000 SF, four-story building providing rail passenger's easy access to and from the All Aboard Florida rail system, the airport and a five-story parking garage. The three 1,400 LF long Elevated Rail Bridges run through the building and brings the All Aboard Florida trains into the ITF to deliver and pick up passengers on two raised platform bridges located within the facility. The building is essentially a complex structure constructed around five major bridges running the length of the building and then existing onto large retained earth structures.

### COST

**Initial** - $180,000,000
**Final** - $188,529,715

**Reason for Difference:**
Additional Scope Requested

### OWNER CONTACT

Greater Orlando Aviation Authority
Davin D. Ruohomaki
(407) 825-3105

### COMPLETION

**Initial** - January 2018
**Final** - January 2018

**Reason for Difference:**
N/A

The project spent nearly two years in preconstruction fine tuning the design, performing value engineering, performing utility relocations, permitting, DBE outreach, and site access planning. The team was able to save GOAA $25 million though constructability and value engineering, with a substantial portion of that savings in the bridges and retaining walls.

Near 50% complete on the ITF construction, GOAA awarded the Kiewit team an additional $700 million CMAR contract for the next phase of the South Terminal development. This additional contract was due in large part to the performance on the ITF contract in which all of our proposed key staff including Jeremy, Luke and Donnie, all played key roles on the ITF project.

**Discussion of what work, including any successful methods, approaches, and innovations, on the project is relevant to this contract and why:**

**Collaboration –** The collaboration between GOAA, the designers, and the Kiewit team made this project a success. Our key staff proposed for this Putty Hill Avenue know how critical collaborating as team, focusing on common goals, and establishing trust is to a successful project. One relevant example of this was early during construction when one of the GMP's was delayed due to funding availability. This two-month delay was mitigated by mobilizing another crane and resequencing the critical path bridge and structures work to be built in areas instead of a linear fashion. This creative thinking by Jeremy and Luke mitigated what could have been a lengthy and costly delay to the project.

The experiences and lessons learned by our key staff (Jeremy, Luke and Donnie) on the ITF project with will be transferred to the Putty Hill project.

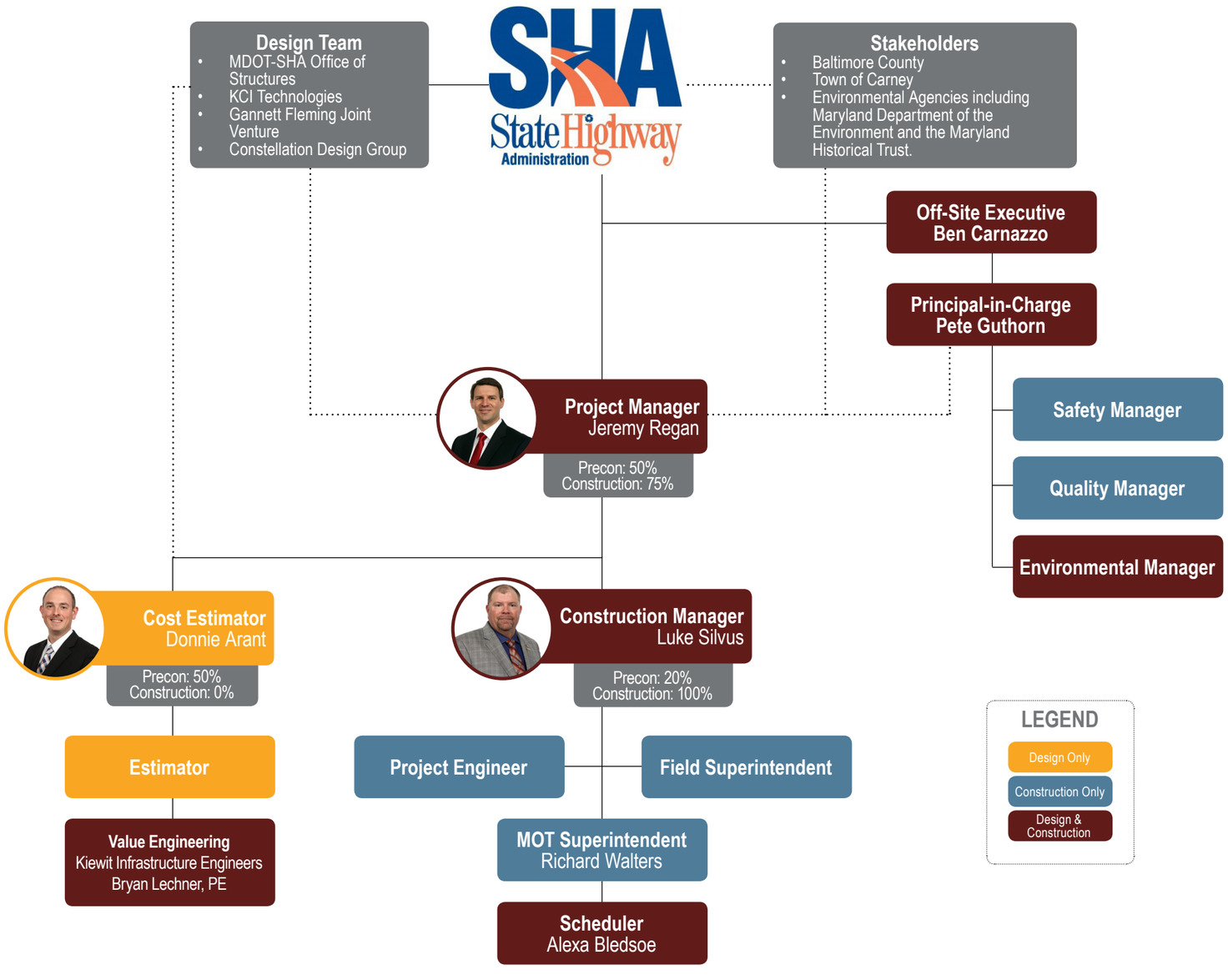
**Pre-Construction – –** The ITF spent nearly two years in preconstruction and it proved to be time well spent since the project was completed on schedule and within budget, even allowing for some of the unused risk register to fund several scope additions. During this time, our key staff learned where time should be spent to generate the most value engineering savings for a client and also to identify and focus on the high risk items. For example, the single largest value engineering savings in Orlando was by replacing bridges where possible with MSE walls and slope embankments. While this may sound relatively easy on some projects, this project required substantial coordination with multiple future rail line operators that needed to approve these changes, which proved to be a large obstacle in addition to making our ideas work with the overall transportation program for the new terminal.

We also learned on the ITF, the design team works efficiently to not slow the process down by evaluating changes that may ultimately end up costing the client more money on the designer and overall time than they would benefit during construction.

Due to these lessons learned on the ITF, we minimized our Proposed Technical Concept (PTC) list to focus on those that could result in the largest impact to cost and schedule. The current bridge design closely matches the recently completed Old Harford Road Bridge and due to the relatively short pre-construction window outlined by SHA, we would not propose any significant bridge redesigns in order to keep the design on track. We would propose spending the first few months of pre-construction vetting our PTC with SHA and focusing on the utilities. We believe this approach would result in the project staying on schedule and budget.

## B.3. Organizational Chart

*Provide an organizational chart showing the lines of communication and identifying participants who are responsible for major functions to be performed, and their reporting relationships in Preconstruction and Construction.*




## Value-Added Staff

### Off-Site Executive – Ben Carnazzo

Ben is currently the Senior Vice President responsible for executive oversight of all Kiewit Construction operations in the Southeastern and Mid-Atlantic U.S. With over 25 years of Kiewit experience, he has successfully led numerous alternative delivery projects including the successful delivery of more than 20 CMAR projects. Ben will provide senior leadership to the project and ensure all necessary resources are available to ensure all project goals are met

### Principal-in-Charge – Pete Guthorn

Pete has 38 years of heavy civil construction experience in the Eastern United States and is currently the Area Manager for the Mid-Atlantic region in Hanover, MD. He reports directly to Ben Carnazzo and has diverse project management and engineering expertise. He also has experience in major grading, structures and environmental disciplines. Pete will ensure that the project team is executing the project at a high-level and will provide regular oversight of the project team.

### Scheduling – Alexa Bledsoe

Alexa is a trained schedule professional and a Certified Scheduling Technician (CST). She has been involved in all areas of all types of construction projects across the country. Most recently, Alexa helped develop and regularly maintain the Greenbelt CMAR preconstruction schedule. Working with the adjacent developer and design team, Alexa helped incorporate the developers schedule into our schedule, along with identifying key design and permitting milestones. This schedule has been a powerful communication tool at our bi-weekly meetings.

### Value Engineering – Bryan Lechner, P.E.

Bryan has 15 years of experience in the analysis, design and optimization of bridges. He specializes in long-span and complex bridges including precast segmental span-by-span viaducts, long-span cast-in-place (CIP) and precast segmental balanced cantilever, cable-stayed (steel and concrete superstructures), suspension, precast segmental extradosed, and post-tensioned concrete pontoon structures for floating bridges. He also has designed temporary traffic bridges, tall retaining walls, and structures designed in compliance with AASHTO and CAN/CSA S6 highway and pedestrian loading, Eurocode's light rail, and AREMA.

### MOT Superintendent – Richard Walters

Richard is a certified Temporary Traffic Control Traffic Manager (TTCTM), who has wide-range experience managing MOT operations in Maryland and Washington D.C. projects. Richard was the MOT manager on the Carroll Ave. Bridge Rehab project for Maryland SHA, and completed the 18-month project with no traffic incidents. During this project, Richard oversaw the installation of two traffic signal systems alongside live traffic, the installation and implementation of two traffic detours, numerous asphalt paving and striping operations, and managed the flow of vehicles driving beneath an active bridge demolition. These operations required various flagging setups, road closures, detours, and continuous coordination with the city of Takoma Park, MD, and the traveling public.

# C. Project Approach



# C.1. Preconstruction Approach

## C.1.a Collaboration

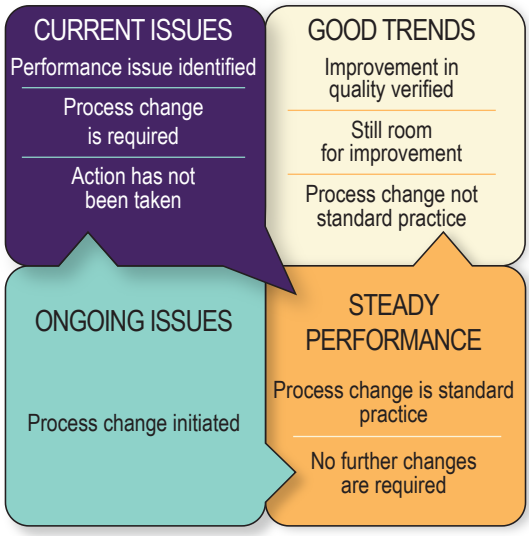
*The CMAR process is based on principles of collaboration, cooperation, and trust between MDOT SHA, the design team, and the Contractor. Describe the Proposer's approach to accomplishing this objective. Discuss how you would support the Administration in involvement with stakeholders during the Preconstruction phase.*

### Proposer's Approach To Collaboration

Building a professional and collaborative team starts with a history of performance and trust. From our experience with SHA on the Greenbelt CMAR project, we strongly believe partnering begins with the understanding that open communication and teamwork are essential to achieving the objectives. On Greenbelt, our Cost Estimator, Donnie Arant, built a true partnership with SHA, Wallace Montgomery, Rennard Development, and Hensel Phelps, meeting bi-weekly at SHA's office. Our team has traveled to the Hensel Phelps's office several times for impromptu brainstorms and coordination meetings, to promote collaboration and cooperation. We know the best way to build a professional and collaborative team is to partner with you and the stakeholders from day one. On all of our projects, communication is not stifled through a cumbersome chain of command, rather, all team members collaborate directly with each other to ensure project challenges are resolved in a timely fashion and in the best interest of SHA and the stakeholders. We have provided timely input at every step, and attended numerous critical meetings or tackled a technical challenge in a moment's notice to resolve a stakeholder or permit concern. Trusting does not happen by chance, but is based on a sincere effort to build relationships, invest time into a project, and tackle issues that arise. We will bring the same commitment and leadership to the Putty Hill Avenue project.

We will begin the project participating in a Project Kickoff to gain understanding of the project status, constraints, stakeholder concerns and schedule and will establish counterpart relationships and set goals for what we aim to achieve. We understand the impact that a construction project can have on a community, and we want to understand everyone's goals from day one and shape the entire project around those goals.

During construction, we will include stakeholders in our Construction Progress Meetings and take them on monthly field tours to discuss the progress of the project and discuss any concerns. In addition, we hold a monthly Four-Square review meetings, as seen to the right, with all project team members during both preconstruction and construction where everyone can see the hot issues at-a-glance. As seen to the right, the four square matrix is developed in collaboration with SHA, and any key team members, to candidly discuss positive and negative trends. This matrix allows the entire team to focus on current and ongoing issues, while building upon positive trends. Lastly, we hold weekly progress meetings and daily/weekly quality inspections. In the progress meetings, we discuss the challenges of the week ahead.




THE FOUR-SQUARE MATRIX
is a monthly performance snapshot.

- ✓ Increases communication of project trends
- ✓ Develops a better understanding of issues
- ✓ Results in prompt resolution

Everyone participates and contributes to the plan and schedule, which reduces risk, time and money. Our approach to CMAR projects is to set up a scheduling meeting early in the preconstruction phase, to brainstorm all of the activities and critical items that must occur prior to the start of construction. By working with SHA and the design team, we all know the path to success and the roadblocks that could prevent us from getting to construction. We will use these same

best practices on the Putty Hill Avenue project. To provide assured synergy, we are bringing a team that has worked successfully together for years. Jeremy has worked with Donnie on three projects and many estimates over the past 10 years. Additionally, Jeremy and Luke have worked closely in the same capacities as proposed for Putty Hill for nearly 7 years and two projects ranging in size from $100-200M.

To build a professional and collaborative team, you need a team that has the experience, knowledge, history, and commitment to build this job safely. Our project team will put the Putty Hill Avenue project first—no matter what the task or challenge is. Whether it means driving to the site to meet with SHA's project manager, or take a look at a conceptual design to provide comments at a moment's notice, our team is available at any time to ensure this project is a success.

## Stakeholder Involvement

Prior to construction, we will work with SHA's public involvement team to go door-to-door, and meet many of the stakeholders along the corridor. We will hear the communities concerns, and work with the design team to incorporate comments into the design. We will continue to work with the adjacent residents and businesses during construction to provide timely and accurate project phasing and scheduling updates throughout preconstruction and construction phases.


Several key utilities located at project location.

Monthly, during preconstruction, we will hold a Partnering Meeting to give the team ample opportunities to track preconstruction progress, set action items, discuss design progress and collaborate to find innovative ways to meet project goals. We invite stakeholders such as local governments, utility companies, adjacent property owners, local businesses, and emergency responders so that we can understand their concerns and ensure that they are addressed from the beginning. This has been a best practice on both of our past SHA CMAR contracts, and we know our stakeholders on a first name basis.

As seen to the right, we have identified several key utilities including Baltimore Gas & Electric (BGE), Verizon, and Baltimore County, along with private residences that rely on septic and well systems. During preconstruction we recommend setting up monthly meetings at a minimum to work with these utility companies on potential conflicts, relocation needs, design status, and relocation schedules. Frequent communication can help keep the project schedule on track and build strong stakeholder relationships. Our project manger, Jeremy Regan, has been working closely with Baltimore County on a current project involving the relocation of a major 42" utility. The project is going extremely well and the positive working relationship we have built with Baltimore County will be an asset to SHA on Putty Hill. Our team, led by Jeremy will immediately begin coordinating with Mike Mizurek and his team at Baltimore County.

## C.1.b. Design and Constructability Review

*The Contractor's involvement during the Preconstruction phase of the project should help streamline the design process, reduce errors and omissions, improve constructability and quality, reduce the cost of construction to ensure it is within budget, and optimize the project delivery schedule. Describe the Proposer's approach to accomplishing these objectives on this project.*

## Contractors Involvement during Preconstruction

One of the greatest benefits of the CMAR delivery method is the early involvement of the contractor in the design process. We are able to work out constructability issues with the designer and make the best plan to address both quality and risk.

Jeremy will also act as the construction team's design coordinator and will utilize his extensive D-B and CMAR experience to fill this role. With several agencies, design firms, and stakeholders involved in a project, it can be a challenge to continuously advance the design while accommodating the needs of all parties involved. By having one person champion the overall design coordination, we ensure that the design stays on schedule, within budget, and priority is given to activities that provide the most benefit to the overall project. Jeremy has built relationships throughout SHA's organization, and will further expand upon them to make this project a success.

Jeremy and our Scheduler Alexa Bledsoe, will lead the team in developing a preconstruction schedule, which includes design milestones, constructability review meeting dates, OPCC estimate dates, and any other pertinent milestones needed to manage the design phase. This approach has proven successful on other CMAR projects where the preconstruction schedule has aided the team in identifying the critical path, promoted accountability to critical activities, and generated understanding of long-lead items such as permits or stakeholder approvals that could impact the start of the project. Alexa is familiar with SHA's expectations, and has been performing preconstruction schedules on other SHA CMAR projects. The benefit to you is a project that has a streamlined design process.

During every phase of the design, we conduct a formal process to provide innovative constructability and value engineering ideas. Our experienced superintendents and engineers review all design submittals to confirm the plans are constructible and compatible with planned construction methods. They also identify areas to improve the overall design through frequent, informal constructability review meetings.

We have already reviewed the information provided, and have begun developing constructability comments and ideas into the construction sequence. At each design milestone, our entire team will provide formal constructability comments on our *Constructability Comment Form*. For a value added approach, we have included Kiewit Infrastructure Engineers (KIE) as part of the team. On the Greenbelt CMAR, we flew in professionals from our KIE team to work with the designer on the critical structures and MOT portion of the project. They provided tremendous value to this brainstorm and have assisted in the direction of the design. For this proposal, Bryan Lechner, PE, from KIE, has already been assisting our team with alternate phasing and the use of a temporary bridge for this proposal, and **will improve constructability and quality** on the Putty Hill Avenue project.

Informal, over-the-shoulder reviews, are used to focus on more discipline-specific design reviews where we contribute value-engineering ideas. This approach ensures comments are "designed-in" rather than "reviewed-in." This ultimately reduces the design schedule and overall design man-hours. On the Greenbelt CMAR, Kiewit participated in several over-the-shoulder reviews. For example, on Edmonston Road, there is a critical box culvert replacement that is under the only access point to the Franklin Park Apartments. Kiewit worked with the designer, and Franklin Park Apartments management, to develop the optimal phasing and construction scheme to rebuild this box and roadway, while maintaining resident access. This was done prior to a design milestone to ensure the correct design is included in the submittal. Putty Hill is a perfect candidate for over-the-shoulder reviews, due to the nature reconstructing a bridge in a neighborhood, over a busy interstate, with tight access. We will invite input from several roadway superintendents and engineers within our company to provide every possible idea that can improve cost and schedule on this project. Donnie will track all comments on an easy to use constructability comment form and will distribute the comments at each design milestone, or at additional intervals, as needed. Once the comments are transmitted, responses from the design team will be tracked, and he will verify that the constructability comments have been addressed and incorporated into the revised plans.

The constructability review team reviews each drawing in detail, focusing on:

- A design that optimizes material properties and results in efficient construction methods to ensure constructability
- A finished product that meets all of the specified design criteria

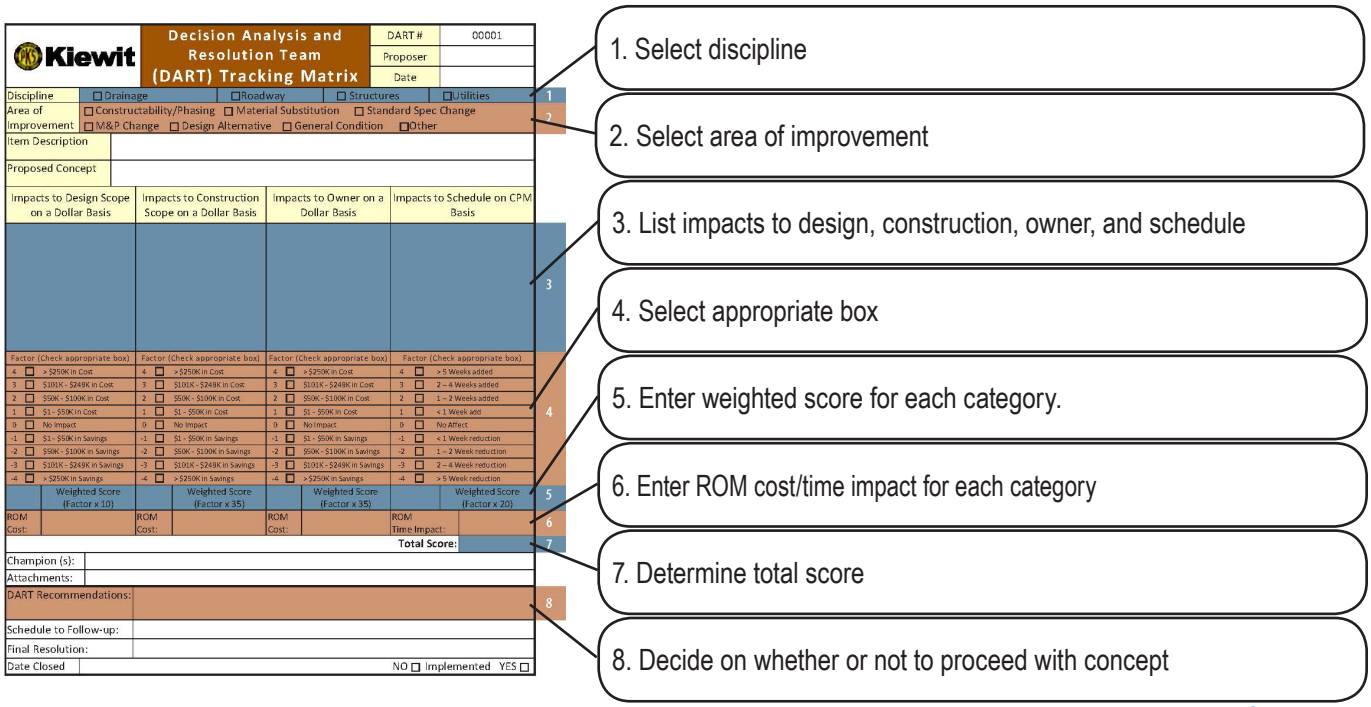
- A design that has been coordinated with all disciplines and avoids conflicts during construction providing swift and efficient operations that exceed schedule requirements
- Design and construction best management practices incorporated from previous projects to improve the finished product quality
- Cross-checking details across design packages, providing a second set of eyes to reduce errors

Our constructability review process **streamlines the design process, reduces errors and omissions, improves constructability and quality, reduces the cost of construction, and optimizes the project delivery schedule.**

For value engineering, each suggestion will be provided to the team and evaluated to decide whether to further advance the idea. Advancing a suggestion may result in the need for cost estimating, value analysis or exploring a design for feasibility. To accomplish this, we utilize Decision Analysis and Resolution Team (DART) tracking as shown in Figure 1. The DART matrix organizes and quantifies innovations developed during design to help the team evaluate the overall change. Each innovation is evaluated based on impacts to design, construction, schedule, the client, and overall project goals.

Weighted scores are entered for each category. This allows the team to make an informed decision whether we move forward with an innovation by analyzing redesign cost and schedule impact. On the BR-3 Bridges CMAR for DelDOT, our team utilized the DART matrix to evaluate barrier wall design to minimize schedule on this very fast paced reconstruction. The analysis helped DelDOT realize $180,000 in savings and 3 months on the critical path, which was significant on an $8M project that has a 6 month construction window. Several of our innovative ideas listed in the construction plan portion of this proposal would be ideal candidates for a DART analysis. We believe that the DART process reduces the cost of construction and optimizes the project delivery schedule. We look forward to sharing and vetting these ideas with your team.

Figure 1: DART Tracking Matrix




A valuable tool that we will use during the design phase is the DART tracking matrix, which has been successfully used to objectively evaluate multiple options using project-specific criteria.

After reviewing the information provided on this project, we have found several specific design coordination activities that we will focus on with your team, including:

**Maintenance of Traffic.** We will work closely with the design team and SHA representatives to determine working room requirements, project access points, resident access, coordinate a phasing workshop and develop a phasing plan. This will provide an opportunity for everyone's feedback and "buy in" for the final plan. By developing the optimal phasing scheme, we will reduce the duration of the project and minimize temporary work.

Kiewit has already began exploring innovative MOT strategies that will be outlined further in the Technical Concepts section.

**Utilities Coordination.** Utilities coordination is of critical importance since they are often long lead items and require extensive coordination. During preconstruction, we identify all utility agencies with facilities within the corridor, ensure utility owners attend regular project meetings, acquire as-built information and verify with physical pothole data as needed, work with the CMAR task forces and utility owners to identify potential conflicts, and assist with conflict resolution and coordination. Our number one goal is utility relocation avoidance and to minimize utility impacts and relocations.

## C.1.c. Risk Management

*Discuss the Proposer's approach to assisting the Project Team in managing risks. Describe the Proposer's approach to assisting the Project Team develop and evaluate potential innovations.*

### Managing Risks

Reducing risk is critical to the success of any project. Risk management begins by defining the risks associated with the project and by understanding a risk's potential impact which is essential to managing and mitigating it. We will work in partnership with the SHA and the designer to identify, analyze, innovate, and manage any potential risks that may occur on the project. Working closely together, we will develop a plan and strategy that:

- Identifies all potential risks that may arise on the project
- Separates any risk out of the cost models
- Determines the correct contingency amounts for those risks that cannot be eliminated
- Regardless of ownership, develops approaches that either eliminate or minimize those risks
- Determines which party "owns" each risk item

We will develop a Risk Analysis and Mitigation Plan that identifies all potential risks associated with the project and that includes the following information:

- Risk description
- Ownership
- Mitigation measures
- Risk level (high, medium, low)
- Risk probability

Assigning a risk level and probability will enable the project team to focus on those items that represent the largest risks to the project and the best opportunity for cost reduction. By starting with the elimination/minimization of the largest risk items first and then working down to the smaller risk items, the team will minimize the amount of contingency needed for construction. Also, by separating the cost component associated with risk from the cost model, the team will quickly see how risk is affecting the project cost, while the individual bid items within the cost model remain transparent.

During design development on the Putty Hill Avenue Project, the risk register will be discussed at our formal meetings. Along with constructability reviews, our team will discuss the risk register along with innovative suggestions to mitigate

the risk. These ideas will be provided by all team members, including KIE, a group of highly qualified bridge engineers. They have already been highly invested in this project, and will continue throughout the remainder of the project.

As part of this proposal, our team has taken an in-depth look at the potential risks that are associated with the project. To develop the additional potential risks associated with this project, we will utilize a collaborative approach. First, we will brainstorm potential risks by performing an initial plan flip with all team members involved including the client, designer, estimators, superintendents, internal professional engineers and managers. During this plan flip, we are familiarizing everyone with the project, but also diving into the details of each plan sheet. Every potential risk is added to the initial risk register. Next, each team member spends individual time getting deeper into the details of the project plans. Many times, our engineers, estimators and superintendents are able to find additional risks by performing takeoffs, running calculations, and developing the project schedule. To capture each team member's thoughts, we ask individuals to maintain their own individual risk registers and then hold a formal meeting to discuss every idea, and enter it on the master list. For this project, we focused on items such as:

- **MOT:** There are several traffic switches and access requirements that are critical to the success of this project. We will pay special attention to conflicts between roadway construction and key access points for residents.
- **Utility locations:** Focus on several key utilities including the Baltimore County waterline, Verizon's communication lines, and BGE electrical lines to consider during roadway and drainage design that can reduce schedule and cost.
- **Surrounding residents:** The majority of the grading work take place adjacent to side streets and local residents. Focusing on property damage mitigation will be key to reduce risk.
- **Geotechnical conditions:** Reviewing the geotechnical data will be critical as we evaluate pavement types and subgrade drainage solutions, to provide the best possible solution.
- **Schedule:** There are several approaches to the MOT phasing. Each approach can greatly effect cost and schedule.
- **Environmental:** With most of the existing stormwater management facilities being affected by the project, we will focus on temporary conditions of the site to ensure no sedimentation occurs in surrounding areas.

All of these items and many others are added to the initial risk matrix on the following pages.

## Developing and Evaluating Potential Innovations

After the identification of the risk is on the matrix, our team will go through a process of analyzing risk that leads to appropriate innovations and developing mitigation and innovative strategies, along with efficient allocation of risks. As a team, we will compare costs, schedule, and risk between different design alternatives and construction practices to develop the best overall approach that eliminates or reduce risk. Advancing an innovation that reduces risk can result in cost estimating, value analysis or exploring a design for feasibility. A task lead would be assigned to champion each suggestion to ensure full evaluation is performed with the proper personal involved and resolution obtained. Our Cost Estimator, Donnie Arant, will lead the development and management of the risk register, along with support from Jeremy Regan and Luke Silvus. This team successfully implemented this process on CMAR projects such as Greenbelt, DelDOT BR-3 Bridges, and Orlando Intermodal; and several other alternative delivery projects.

At the beginning of preconstruction, members of the management team will also meet with SHA to identify potential risks to the project's schedule. A detailed risk analysis will be conducted on both the design and construction processes, and mitigation measures implemented congruent with the level of risk and potential for occurrence. Our team can run several "what if" scenarios during preconstruction to identify potential issues if a key preconstruction activity gets delayed or if we experience a differing site condition during roadway construction. This project is highly phased, and it is important to play out several different scenarios. By ensuring that there are several "Plan B" options, we can develop the optimal phasing plan that maintains the completion date if an issue were to arise. Since the risks can change as the

team decides which concepts and approaches will be adopted, we will utilize the risk register as a living document to prioritize and track progress during design and construction to mitigate risk.

**Utility Relocation Delays and Utility Conflicts** *(Potential for Impact: HIGH):* Currently there is a 24" Baltimore County waterline, 2" BGE gas line, and Verizon fiber optic cables embedded or attached to the Putty Hill Avenue Bridge that will require relocation. While these utilities will be planned for in the project schedule, any delays to their relocations would delay the start of construction and likely increase project costs. In addition, any unknown utilities that conflict with construction activities can add as much as 12-18 months to the schedule and result in significant additional costs.

| MITIGATION PLAN TO AVOID COST / SCHEDULE IMPACTS | |
|---|---|
| **Preconstruction** | **Construction** |
| ▶ Conduct thorough utility investigations to identify all known and unknown utilities.<br>▶ Develop a fully-integrated preconstruction schedule to manage the utility schedule.<br>▶ Create 3D models of all utility locations to perform clash detection.<br>▶ Hold value engineering workshops with the design team and utility companies to find innovative ways to avoid clashes.<br>▶ Begin working through design/permitting with utility companies early in preconstruction and assist with utility redesign.<br>▶ Utilize temporary bridge as a temporary utility raceway. | ▶ Have utility relocations performed by utility companies prior to the start of construction.<br>▶ Implement a phased approach to the project to allow ample time for utility relocations. |

**Hazardous Materials** *(Potential for Impact: MEDIUM):* There is a potential for lead paint and asbestos on the existing bridges. Removing contaminants could cause schedule delays and result in additional costs.

| MITIGATION PLAN TO AVOID COST / SCHEDULE IMPACTS | |
|---|---|
| **Preconstruction** | **Construction** |
| ▶ Perform testing and additional borings to identify any contaminants early and avoid delays to the permanent work. | ▶ Perform onsite monitoring of all excavations. |

**Impacts to Local Residents and Businesses** *(Potential for Impact: MEDIUM):* Prior to construction, there could be opposition to the project from local businesses and residents that could impact the start of the project.

| MITIGATION PLAN TO AVOID COST / SCHEDULE IMPACTS | |
|---|---|
| **Preconstruction** | **Construction** |
| ▶ Implement an extensive preconstruction public information campaign to manage requests for project features that add to the scope | ▶ Install additional business access signs.<br>▶ Keep detour and haul routes off of local streets by developing innovative MOT strategies.<br>▶ Perform sound and vibration monitoring during demo and pile driving operations. |

**Scope Growth After GMP** *(Potential for Impact: LOW):* Scope growth that occurs after the final GMP will increase construction costs and potential time delays.

| MITIGATION PLAN TO AVOID COST / SCHEDULE IMPACTS | |
|---|---|
| ▶ Get stakeholders involved during preconstruction to clearly understand the project scope and prevent future scope growth based on their needs. | ▶ Implement an extensive preconstruction public information campaign to ensure local residents and businesses do not request additional project features that add to scope. |

## C.1.d. Proposed Technical Concepts

*Your team may have some innovative ideas or technical concepts that could increase the likelihood of success and help balance the project goals. Describe these innovative ideas or technical concepts and how they may further improve reaching project goals including impacts on time, cost, and quality.*

The proposed replacement of the Putty Hill Avenue Bridge consists of tried and true design elements, made complex by several surrounding factors that must be addressed and managed to ensure project success.

Our planned approach helps balance the unique needs of the project through careful analysis of the available information, but as the project develops during design and preconstruction, we anticipate that many enhancements can be made as a team to further improve the plan. Our initial plan focused on the following elements to determine the optimal approach for construction:

- Minimizing inconvenience and impacts to the local community and traveling public
- Shortening overall project delivery time
- Long-lead third party utility relocations
- Recognizing efficiencies to deliver the project ahead of schedule and within budget

To maintain traffic on Putty Hill Avenue, the Preliminary Investigation Plans propose that the bridge demolition and construction occur in phases. One half of the bridge is to be demolished and constructed while traffic continues on the remaining half. Once one half of the new bridge is complete, Putty Hill Avenue traffic will move to the new half, while the remaining old bridge is demolished and reconstructed. A time consuming, yet effective method for maintaining traffic during the bridge replacement.

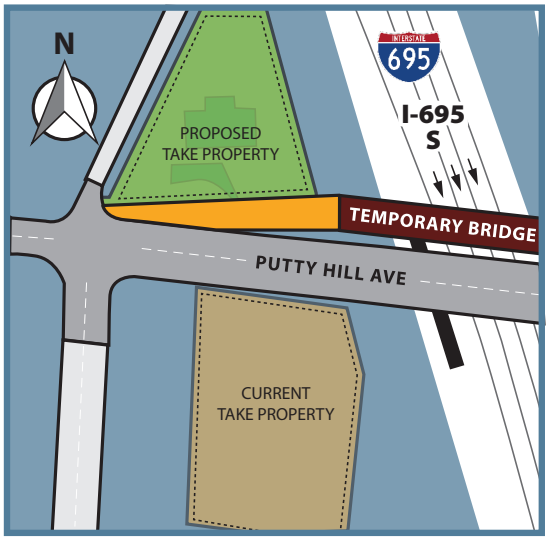



Figure 2: Current and Proposed Take Properties

The proposed phased sequencing is a prime opportunity for innovation.

As shown in Figure 2, the preliminary plans propose the take of a property on the southwest corner of the bridge to initially provide a staging area for construction and then later a stormwater management pond. We would propose the taking of a similar property on the northwest corner of the bridge as shown in Figure 3 on the following page. This is a corner lot and would reduce impacts to neighboring residents and would more importantly create right of way for a temporary bridge for bypass traffic.

As detailed in our project pages in Section B, we successfully installed temporary bridges on the Carroll Avenue project. Benefits to using these structures are listed below:

- **SCHEDULE -** The use of temporary bridge for Putty Hill Avenue traffic cuts a significant amount of time off the overall project.
  - » With the traffic using the bypass, the entire bridge can be demolished and reconstructed as one unit.
  - » Time consuming support of excavation work at the abutments would no longer be necessary.
  - » The median pier strengthening work would not be needed.
  - » Structure pours would be combined instead of split with costly bulkheads and key ways.
  - » Traffic impacts to I-695 could be cut in half.

- » Efficiencies in the demolition and bridge reconstruction work could be realized while still maintaining Putty Hill Avenue traffic.
- » Through these efficiencies and elimination of the work needed to construct in phases, as much as six months could be cut off the schedule.

► **COST -** Related to the time savings, cost savings would be realized with the implementation of this concept.

- » With the shortened project duration, overhead and equipment costs would be reduced.
- » The efficiencies with completing the whole bridge as a cohesive whole would yield lower production unit rates.
- » The costs of significant, expensive temporary shoring work at the abutments and median piers would be completely eliminated.
- » The overall project cost reductions will far outweigh the initial investment of the temporary bridge installation.

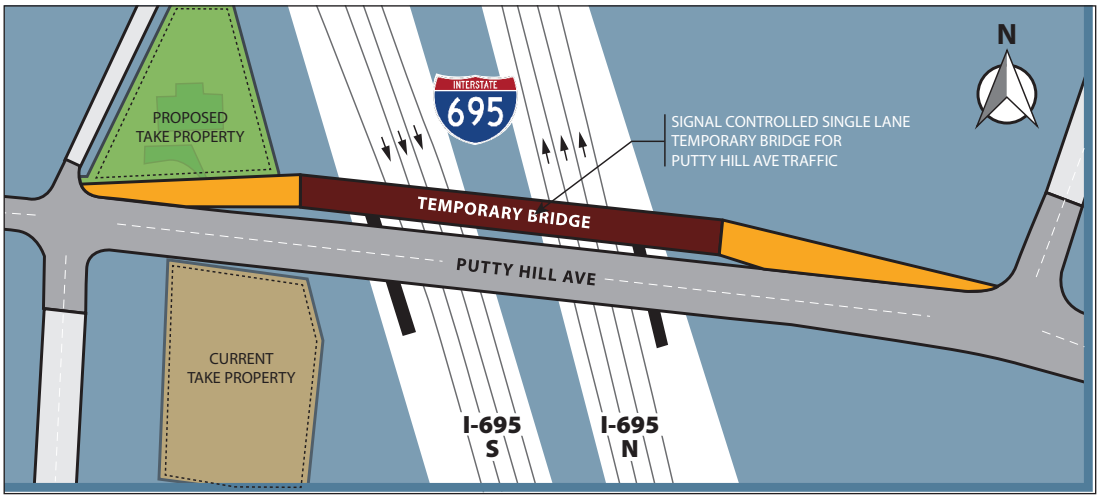
► **UTILITY RELOCATIONS -** Beyond cost and schedule reductions, the installation of a temporary bridge also provides a solution to the many utility relocations that must occur prior and during the reconstruction of the bridge.

- » The preliminary plans detail 11 known utility relocations that will need to occur. The temporary bridge could be used essentially as a raceway for all or several of these utilities to be temporarily housed.
- » Providing a ready-made solution for the utility owners to employ, would eliminate the need for the utility owners to conduct time consuming in-house design for new poles or extensive reroutes.

Through the preparation of this proposal, we evaluated dozens of alternate schemes to find the best method to address the aforementioned project goals. Across North America, Kiewit has performed nearly every type of accelerated bridge construction, the design of which is almost solely self-performed through KIE. This experience gives us the ability review all possible options, evaluate each benefit and drawback using actual past cost data, to develop the best solution.

For this project, the attributes of the proposed bridge and surroundings eliminate other alternate bridge construction concepts. The variable depth girders shown in the preliminary plans would prevent the bridge superstructure from being prefabricated on the approaches and mechanically launched into position. The overall length of the two spans and the lack of open areas near the bridge site would prevent any schemes of an offline fabrication and heavy mover roll-in. In addition to those factors, the lack of any viable detour for I-695 would make any “Super Weekend” demo and replacement options not feasible.

Figure 3. Temporary Bridge Location



# C.2. Construction Approach

## C.2.a Construction Sequencing

*Discuss your proposed construction sequencing including, but not limited to, maintenance of traffic, utility relocation and staging, construction phasing, and independent work packages.*

Kiewit is a one of a kind company, full of the resources and inventive thinking needed to produce innovative and cost saving schemes and we believe this project has opportunities that can be capitalized on for all parties involved. The utilization of a temporary bridge has the potential to reduce both the schedule and overall project cost. Though we feel strongly about the benefits of the scheme we throughly discussed in the proposed technical concepts section would bring, we are prepared to efficiently execute the project construction in the phasing proposed in the preliminary design if required.

### Phase 1: Replace North Segment

Phase 1 construction will begin with installing the erosion and sedimentation controls per the design drawings and all MDE requirements. Kiewit has extensive experience with the installation and proper maintenance of these controls from the Carroll Avenue Bridge and ICC - Contract B projects, and most recently on the Bloede Dam Removal project.

On these similar projects we worked proactively with stakeholders such as MDE, SHA, MD DNR, and Montgomery County to problem solve and provide resolution to situations that arise with a changing jobsite and unpredictable weather. Being laser-focused on details and providing effective communication can eliminate concerns before they occur. Following the installation of all Phase 1 Erosion and Sedimentation controls, MOT devices, markings, barrier, and signs will be installed per plan to restrict Putty Hill Avenue to a single lane, controlled by a temporary traffic signal. Once all MOT is in place the Phase 1 demolition can begin.

The demolition of the existing Putty Hill Avenue Bridge will be a complex operation. Detailed planning is required when working directly above and adjacent to live interstate traffic. The temporary conditions and stability of structures and members must be evaluated at all stages of demolition. We have extensive experience in this type of complex engineering. During the partial demolition of the 85-year-old original Carroll Avenue Bridge, shown on the right, KIE provided daily input and evaluation of the structure's condition to ensure that main concrete arches, that were to remain, were in proper loading conditions.

Erosion and Sedimentation Control Measures in Patapsco State Park

The first step of the demolition will be the installation of timber shielding between the girders and overhang access. The overhang access will also support vertical plywood and timber shielding to protect the roadway below. The shielding installation will be accomplished during night-time, incremental lane shifts on I-695 to provide underdeck access. As few lanes as possible will be taken in low volume periods and all MOT operations conducted per MdMUTCD requirements.

With all protection in place, the existing bridge superstructure concrete will be mechanically broken and hauled away. The superstructure steel will then be picked out with cranes. The superstructure steel over I-695 traffic lanes will be removed during night, low volume times, using coordinated slowdowns and traffic releases to minimize traffic impacts.

If the temporary bridge scheme for Putty Hill Avenue traffic were to be implemented, the whole superstructure could be demolished at once, reducing I-695 impacts and production efficiencies could be realized.

The removal of the existing concrete substructure has added complexity with the proposed phased nature of the project. Prior to any superstructure demolition, the existing median pier must be strengthened to enable one of the columns to support half of the cap that will carry the single lane of Putty Hill Avenue traffic. The two concrete abutments will also need to be split and stabilized so the remaining traffic lane will not be undermined when the Phase 1 Section of the abutment and backfill is removed. This stabilization will be accomplished with driven H-pile and timber lagging that will be removed later as the Phase 2 abutment backfill progresses. Once the median pier is strengthened, abutment stabilized, and the superstructure removed, the concrete substructure will be mechanically broken and hauled away.

The costly piling, stabilization, and pier strengthened could all be eliminated if the Putty Hill Avenue traffic was diverted onto a temporary bridge, allowing the existing bridge to be removed at once.

Partial Demolition of the Carroll Avenue Bridge

Following the substructure demolition, construction of the new bridge Phase 1 can begin. The footing and substructure concrete work will proceed with virtually no traffic impacts. The pier work will be conducted inside of a barrier-protected median closure and the abutment work will not affect the Putty Hill Avenue traffic due to the H-pile and lagging stabilization of excavation (SOE).

Once the Phase 1 substructure concrete is complete, girder erection and superstructure work can commence. With the total span of 230 feet, for stability needs the girders will be erected in thirds allowing the traffic to proceed on restricted lanes, away from the work. All of the girder erection will occur during night-time, low volume periods of traffic. Coordinated slowdowns will be used for the time between when the girder is picked and set to ensure the public is clear during the pick.

To ensure the traveling public on I-695 is protected during superstructure construction, timber shielding and overhang access, similar to the demolition phase, will be installed on the girders once in place. The balance of superstructure work will then proceed without traffic interference until the completion of Phase 1.

## Phase 2: Replace South Segment

The Phase 2 work will proceed in the same manner as Phase 1, starting with the installation of erosion and sedimentation controls and MOT. Putty Hill Avenue traffic will shift to the new bridge segment completed during Phase 1. The Phase 2 segment of the new bridge will then be constructed in a similar manner as Phase 1. Following completion of Phase 2, the bridge will be opened to full traffic, site stabilized, and finishes installed.

The additional traffic impacts, temporary shoring measures, additional schedule duration, and increased cost from inefficiencies that are a product of a phased bridge replacement could be eliminated with the implementation of the temporary bridge as previously outlined. As your partner, we would be committed to finding the best construction solutions to fulfill the project goals.

## C.2.b Construction Schedule

*Describe the Proposer's construction schedule. Discuss factors that would affect schedule such as outside constraints, seasonal work, materials, equipment and labor availability, etc. Include a schedule graphic outlining the major activities and their associated timeframes.*

### Proposer's Construction Schedule

For the Putty Hill Avenue Project, Kiewit has proposed a schedule approach that will minimize inconvenience and impacts to the local community and traveling public, shorten project delivery time, aid in third-party utility relocations, and reduce overall project cost.

Figure 4 on the following page details the schedule savings the implementation of a temporary bridge for Putty Hill Avenue traffic will have on the overall project duration.

To further maximize these benefits, we propose performing the initial erosion and sedimentation control installation, temporary bridge erection, and any required utility relocation support as Early Work Packages. This would facilitate an immediate start of demolition once a Construction Notice to Proceed is issued. In addition to starting field operations, long-lead procurement items, such as steel girders will also be progressed through Early Work Packages.

### Factors Affecting Schedule

To start construction in June 2019, the two most scheduled critical items to manage during preconstruction will be the property take or ROW acquisition and the utility relocations. These activities will be on the critical path and of primary importance to the construction schedule.

During construction, weather has the potential to delay work and slow down productions. To address those impacts, Kiewit has scheduled the work using a five-day work week, allowing for Saturdays to make up for days lost to weather. We will apply lessons learned from working in extreme cold climates to keep the project moving through the winter, while also being proactive and completing sensitive work during favorable weather months. With much of the work over I-695 requiring night-time or other off-shift work, additional crews can be brought in to progress other work headings during the day, taking advantage of favorable weather months along with idle equipment and other resources.

To deliver this project in the shortest duration possible, resources need to mobilize seamlessly. Kiewit has unmatched capability to mobilize people and equipment to a project quickly, wherever the need. Being the owner of the largest construction equipment fleet in North America and possessing an experienced staff of wide-ranging expertise, gives Kiewit the ability to put resources where needed as soon as the need arises.

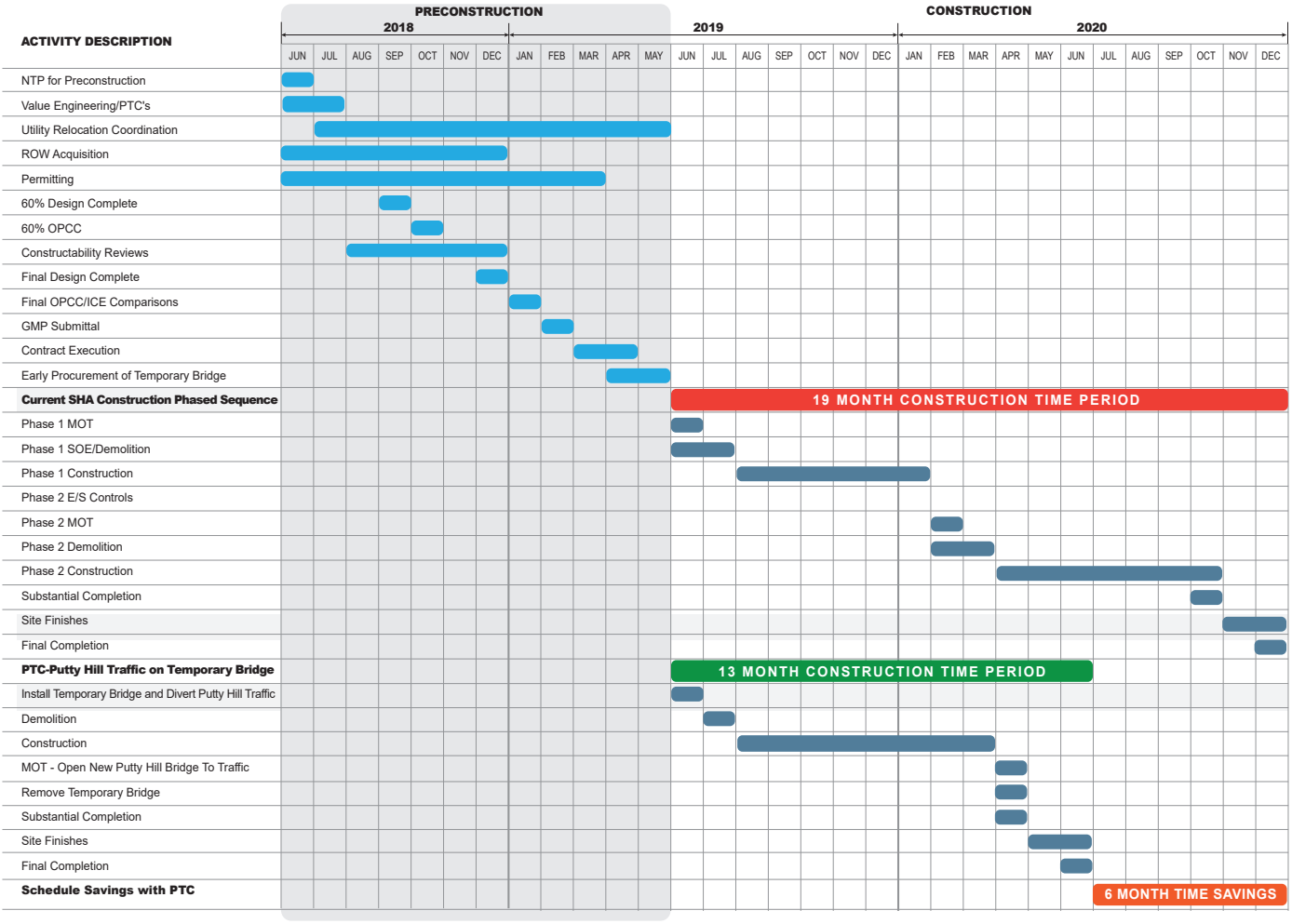



Figure 4: Proposed Schedule

## C.2.c Stakeholder Coordination

*Discuss how you will communicate with and minimize impacts to the various stakeholders throughout the construction of the project.*

Kiewit will work with SHA to comprehensively coordinate with utility companies, property owners, local businesses, governmental districts such as the Town of Carney, Baltimore County, permitting agencies, and other stakeholders involved with this project. Each supporting outreach tactic will be tailored to best educate and inform all of these stakeholders both before and during construction. These tactics include:

- **Project Kick-off.** After award, we will start work with the District Community Liaison and other SHA staff to coordinate, refine and schedule execution of a stakeholder outreach plan. All stakeholders will be identified and a matrix will be with detailed contact information and their role in the project. This matrix will ensure we can easily contact all important parties including residents, permitting agencies, utility companies, local governments and businesses. This contact matrix will be a living document throughout the entire project. Once created, we recommend holding a stakeholder kickoff meeting to get the relevant parties up to speed with the current project status and gain valuable feedback. This meeting will allow the team to develop a better preconstruction schedule and identify any additional project risks.

- **Partnering Meetings.** We encourage each stakeholder to attend the monthly partnering meetings that are held on the projects. These meetings are a forum for the stakeholders to voice their opinions on the design as it progresses. Stakeholder input results in action items that improve stakeholder goals. Throughout the life of the Carroll Avenue Bridge Project, the City of Takoma Park was a regular attendee at project team meetings leading to an effective partnership. Through discussions at these meetings, the project team was able to address local hot buttons. From placing extra fencing around the job site for a weekend charity marathon, to adjusting project parking, the project team was able to work hand-in-hand with the city through the relationships developed.
- **Effective Informational Materials.** Maximizing effectiveness of our messages will be key to our success. We will support SHA with the review and messaging of any printed and digital informational materials including a project brochure/fact sheet, FAQs, PowerPoint presentations, display boards, graphics, website and social media content, press releases, traffic advisories or alerts, progress photographs and low-cost videos.
- **Public Forums or Meetings.** Regular public meetings will be scheduled during key milestones allowing SHA and our project team to follow-up on any issues and concerns while creating a better public understanding of the project moving forward. The meeting will be structured to help us share the latest design and construction details and schedule, solicit feedback, further introduce how we will work with stakeholders during the design-build process and set expectations for traffic configurations and project work. On the Greenbelt CMAR, we frequently participated in local and agency public meetings where the public would ask questions to the contractor, and our expertise provided key information regarding means and methods, construction schedules, and other constructability concerns.
- **Project Office, Phone Number, Email Address and Other Correspondence.** We know that our effectiveness responding to stakeholders that contact us, SHA, or other local and state officials will be just as important to customer satisfaction as how well we reach out to them. We will publicize a branded email account and phone number to which we will promptly respond. The hot-line will have recorded information about the project while allowing callers to leave messages. Sensitive complaints will be flagged immediately for SHA.
- **Emergency Preparedness.** In coordination with SHA and building on existing protocols, our team will proactively work with local, county and state law enforcement and emergency response agencies to identify situations that could arise and develop contingency plans for most effectively working together to address and mitigate them. Emergency contact mechanisms such as phone and email trees will be established for use in emergencies. In addition, we will establish SHA templates to be used for providing information it needs to communicate to motorists via traditional media and its social media, traffic information systems or other tools such as CHART and MD511.
- **Coordination with Property Owners, Emergency Services, and other local Stakeholders.** Thousands of motorists travel Putty Hill and I-695 throughout the year. Accordingly, we will work with SHA to coordinate proactive and effective communication with all motorists. Each supporting outreach tactic will be tailored to educate and inform these motorists before and during their travel. This will minimize surprises and help them make informed decisions on how and when to travel through our project area to avoid delay, particularly during peak travel times.

For the most part, key messages and information for motorists living both near and far from the project area will be similar including a brief overview of the project, its benefits and planned duration; the updates on traffic configurations and work schedule; pending configuration changes and potential impacts; and the tools available to them to follow our progress and plan their trips. We will establish with SHA an approved, comprehensive notification package of static signs and variable message boards to provide advanced notice of project work, potential travel delays, detour routes and, as possible, emergency information. What will be different, mostly due to their proximity to and frequency using Putty Hill Avenue, is the greater potential for impacting local/regional compared to non-local motorists on a daily basis. We will offset this by capitalizing on the increased methods and opportunities available to us for communicating with local/regional motorists, as well as the frequency with which we do so.

In this regard, local/regional motorists certainly will be more apt than non-local motorists to subscribe to our contact lists, attend project public meetings, and use tools available to help them plan their travel. They can be more easily specifically segmented and targeted for outreach through mailings and periodic one-on-one or small group meetings for stakeholders. We will build relationships with these stakeholders and more directly communicate with them throughout the project about aspects of our work and traffic configurations that could impact their mobility and access.

Acknowledging that some project stakeholders are concerned about more than just traffic, we will similarly communicate, work and build relationships with residents whose properties could be impacted by project design and construction. We will work through the design to minimize these impacts, but developing a design and phasing scheme that has resident input. Potential impacts may include utility interruptions or relocations, access to driveways, replacement of storm water management facilities and various other construction-related activities.

During construction, our team has weekly operations meetings to generate a three-week look-ahead work schedule, which includes any MOT changes or potential road/lane closures affecting residents and commuters. This schedule is distributed to interested third parties. Stakeholders are notified two weeks in advance of the initial MOT installation or any major MOT traffic switches. In addition, we notify the traveling public of major traffic changes or lane closures through message boards. In the event of a traffic emergency, local emergency responders are notified immediately in accordance with our Emergency Response Plan submitted after NTP. Our team continually monitors the effectiveness of our outreach plan and each of its elements. The program performance is based on feedback from stakeholders. We establish a monthly formal evaluation process that measures the performance of our stakeholder interaction, and use the feedback from those evaluations to modify and improve upon the initial programs.

Numerous environmental agencies and stakeholders, such as Baltimore County and MDE, will need to partner and coordinate with on a regular basis to monitor compliance and perform joint inspections. Figure 5 details specific interactions between our team and stakeholders.

Figure 5: Stakeholder Interactions

| | |
|---|---|
| **County Governments** | ▶ Minimize Impacts to emergency services<br>▶ Maintain clear consistent messaging and information on upcoming work |
| **Utility Companies**<br>BGE, Verizon, Baltimore County | ▶ Discuss early on relocations or impacts to facilities<br>▶ Confirm any potential restrictions on shutdowns<br>▶ Coordinate any proposed planned improvements to its infrastructure<br>▶ Regularly communicate to minimize impact to existing facilities |
| **Resource Agencies**<br>MDE, Maryland Department of Natural Resources, EPA, Maryland Historical Trust | ▶ Assist SHA in obtaining required permits<br>▶ Meet all permit requirements and procedures<br>▶ Suggest Alternative designs, means, and methods that minimize environmental impacts to wetlands, steams, flood plains, and RTE species. |
| **EMS (Police, Fire, and Hospitals)** | ▶ Coordinate Changes in MOT and Traffic patterns prior to implementation<br>▶ Assist EMS responders, as appropriate, to incidents along the roadway |
| **Local Residents** | ▶ Maintain safe access to homes at all times for local residents and pedestrians<br>▶ Minimize impacts to emergency services and local transit routes<br>▶ Maintain clear consistent messaging and information on potential impacts |

# D. Cost Estimating Approach

# D.1. Estimating Environment

*Discuss the Proposer's approach to providing an open and transparent estimating environment that will assure MDOT SHA is receiving a fair price for the work*

## Open and Transparent Estimating

Kiewit's approach to developing construction cost estimates for our clients is based on methodologies that have proven successful in delivering jobs at the lowest possible price while still providing a high quality and durable project that meets all of the project goals.

To ensure that SHA receives a fair and competitive price for the construction of the project, we anticipate that an independent cost estimate will be developed at each design milestone and compared with the Kiewit's Opinion of Probable Construction Cost (OPCC) estimate developed for the Putty Hill Avenue Project.

Kiewit proposes that a cost model based on 50% design documents be developed to establish an OPCC for the team. This initial cost model will verify that the project progresses from the start within budget. The 50% Cost Model would provide valuable information to the SHA and the project team in terms of anticipated project costs and assist all team members in evaluating various design options and decisions. Without the 50% Cost Model, it would not be until the semi-final or roughly 90% design stage when a complete cost model was in place, at which point, there would be potentially significant tradeoffs between making design changes to save money in the construction phase with cost and schedule impacts to the design effort.

The Cost Model Evolution Log (CMEL) is the cornerstone to Kiewit's Open Book approach to developing a project's cost estimate that allows an owner to see all cost elements of the project and how the estimated project costs are developed from conception to the final GMP. The foundation of the CMEL is customarily the 50% design deliverable that, as discussed above, Kiewit would propose on developing at the start of the Preconstruction Phase.

Throughout the Preconstruction Phase, the CMEL provides detailed cost and quantity tracking for each item of work to show cost evolution of that work item. A change to the cost of one item of work may be from a VE proposal that was accepted as well as the added cost due to a stakeholder request. Other changes tracked in the CMEL would include quantity changes and changes in subcontract or material unit costs resulting from market fluctuations.

Another function of the CMEL is to compare the adjusted cost of the previous cost model with the new cost model developed at the next design milestone. In the case of the example shown, we are able to document the various cost differences for a bid item that changed from the originally estimated 40% design stage. As the project approached the 70% design milestone, a new cost model would be developed based on the 70% design documents. This 70% cost model would then be compared to the adjusted 40% cost model. Theoretically, all design and associated cost changes made between the 40% and 70% design

Figure 6. Cost Model Evolution Log

COST MODEL EVOLUTION LOG (CMEL)

The reason for each change is captured and summarized by the bid item as well as by the overall project

| Bid Item Number and Description | | | | | Structural Concrete (Class S, f'c=4500 PSI) | | | Independent Cost Estimate | | Cost Model Difference | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Cost Model Storage | Change Category | Quantity | Equipment & Maint. | Labor | Materials & Subs | Total | Difference Between Models | Quantity | Total | Quantity | Total |
| **40% Cost Model** | | **3,544 CY** | **$216,922** | **$665,954** | **$620,545** | **$1,503,421** | | 3,478 CY | $1,486,782 | 66 CY | $16,719 |
| Added pipe block-outs... | SI | - CY | $3,412 | $22,320 | $2,107 | $27,839 | | | | | |
| Stand all bridge pier... | VE | - CY | $(13,866) | $(42,913) | $(5,227) | $(62,006) | | | | | |
| Thin bridge deck at... | QA | (38) CY | $(2,326) | $(7,141) | $(6,654) | $(16,120) | | | | | |
| Adjust 40% Cost Model | | 3,506 CY | $204,142 | $638,220 | $610,771 | $1,453,134 | $(18,573) | | | | |
| 70% Cost Model | | 3,492 CY | $203,409 | $616,506 | $614,646 | $1,434,561 | | 3,492 CY | $1,492,686 | 0 CY | $(58,125) |
| Incr. concrete buy price $3... | UP | 3,508 CY | $- | $- | $10,524 | $10,524 | | | | | |
| VE/cost reduction | VE | (36) CY | $(5,358) | $(19,794) | $(6,336) | $(31,488) | | | | | |
| Lth. of abut. wall changed | QA | 52 CY | $3,029 | $9,181 | $9,153 | $21,362 | | | | | |
| Adjust 70% Cost Model | | 7,016 CY | $201,080 | $605,893 | $627,987 | $1,434,959 | $(21,695) | | | | |
| 90% (FINAL) Cost Model | | 3,477 CY | $209,525 | $590,819 | $612,920 | $1,413,264 | | 3,477 CY | $1,426,275 | 0 CY | $(13,011) |

The CMEL provides the differences between the 40% cost model that has evolved up through the 70% design stage with the 70% cost model

At each design milestone, the CMEL provides the cost and quantity difference between our cost model and the independent cost estimate

| Bid Item Changes by Change Types | | 40% | 70% | Total |
|---|---|---|---|---|
| SI/SD | Project Scope Increase/Decrease | $27,839 | $- | $27,839 |
| VE | Value Engineering | $(62,006) | $(31,488) | $(93,494) |
| UP | Unit Price Adjustments | $- | $10,524 | $10,542 |
| QA | Quantity Adjustments | $(16,120) | $21,362 | $5,242 |
| QT | Other | $- | $- | $- |
| | Total Adjustments | $(50,287) | $398 | $(49,889) |

The CMEL summarizes the cost changes to each bid item by category

would result in an adjusted 40% cost model that would be approximately the same amount as the new 70% cost model. Any large discrepancies between the two cost models would be quickly identified and allow the team to determine the cause for the large variance.

The CMEL also provides the capability to compare Kiewit's cost model with the independent cost estimate. Similar to its ability to determine variances with previous cost models, the CMEL determines the cost difference between Kiewit's cost models and the Independent Cost Estimate, allowing prompt identification of large variances within the two estimates.

To maximize the benefit of the independent cost estimate, a substantial amount of coordination must occur throughout the development of the cost model. The purpose of this coordination effort is to produce two estimates that can be compared on an "apples to apples" basis. Without this coordination, the time and effort to perform an effective comparison increases substantially and introduces doubt into the process on the accuracy of the cost estimates. Prior to estimate development, we have found tremendous value in including the Independent Cost Estimator (ICE) in all project partnering and update meetings. When the ICE is fully engaged in the preconstruction process, there is a less learning curve, better understanding of project scope and constraints, better partnering, and the overall process is streamlined. On both the MD-97 and Greenbelt CMAR projects, we have developed a great relationship with our ICE counterparts, and this partnership has greatly aided in the development of the independent cost models. We are bringing the same key staff to this project that will build upon our experiences and lessons learned. As part of our coordination effort, we typically meet with the ICE prior to the development of the initial cost estimate to discuss and agree on:

- The timing and process of reconciling the estimated quantities prior to completing a cost estimate
- Subcontractor and supplier unit prices that will be used, which reflect current market conditions, as plug numbers, prior to receiving firm quotes
- Understanding how certain "support" bid items (e.g. survey, quality control, construction water) will be priced within each party's estimate
- Collaboratively developing the necessary bid items for the project, and the unit of measure for each item.

The two estimating teams will hold similar coordination meetings prior to the development of subsequent cost estimates. By performing these coordination functions, the estimate comparison meetings are much more productive, and both teams can devote their time in identifying cost discrepancies and the reasons behind the discrepancies, in lieu of reconciling plug differences.

For estimating, our team uses an InEight Software, called Hard Dollar. Our estimating program is extremely effective and well suited for the CMAR model. After agreeing to the bid items, quantities, and structure of the estimate, our team will create an estimating template for the entire team to review. Hard Dollar generates a report showing the entire bid item structure without cost, to retain independence. This structure can be reviewed with the entire team to ensure that both teams utilize a similar bid structure. Once the estimate is complete, Hard Dollar can generate a comparison report as discussed above, which extremely effective when performing the estimate comparisons.

Once the teams are coordinated, each team independently develops their estimate and submits them to SHA on an agreed to date. We then schedule a cost comparison and review each item for similarities and differences. Our estimating software can import the ICE's estimate into our estimate, and generate a comparison report. This report breaks down all of the costs into the different T-Totals (Labor, equipment, supplies, materials, subcontractors), man-hours, quantity deltas, and several other comparison factors. This report allows the team to focus on the major deltas, and better understand each team's approach to the work. Each difference is discussed to see if the two teams utilized different assumptions, productions, equipment, or crew makeup, or if one of the estimates contains an error. We then address action items, perform any needed adjustments, and update the estimate in preparation for the next estimate milestone.

During each estimating milestone, our team will develop and transmit subcontractor bid packages to the market, to input accurate pricing into the subcontracted scopes of work into the estimate. Each quote (minimum 3 per package) will be placed into a quote book, and shared with SHA and the ICE. We will collaboratively select the subcontractors and suppliers that we want to carry in our estimates, which will further ensure cost accuracy in our estimates.

All subcontractor quotes are entered into the program, and SHA, the ICE, and Kiewit can collaboratively award each subcontractor package in real time on the screen, which automatically updates cost in the estimate. Lastly, Hard Dollar keeps track of every change from each estimate milestone, and easily generates to the Cost Model Evolution Log as discussed in the preconstruction section of the proposal. This allows the project team to track any changes in cost as the design progresses, and react quickly to any cost increases

# D.2. Sample Estimate

*Provide a sample estimate for Substructure Concrete and for Maintenance of Traffic showing how the Contractor will break down direct costs such as labor, equipment, material, trucking, small tools and supplies, etc. Provide the approach to applying indirect costs and markup associated with the items and any other detailed costs used to develop a fully loaded cost for the items for OPCC reviews and bid analysis*

## Applying Indirect Costs and Markups

Our approach to estimating on CMAR projects is to provide a complete estimate of the direct costs separate from the indirect costs. This gives SHA and the ICE the opportunity to review and compare every item in our directs and indirects separately, instead of reviewing indirect costs that are spread throughout the estimate. We then apply overall project markup to the entire project cost, which is also shown as a separate line item. Once the teams agree on the appropriate direct, indirect, and markup costs, we will spread the indirects and markups across the direct bid items similar to any traditional bid build project. This will be used as the schedule of values for payment during construction. Our goal is to provide an estimate that is transparent, open book, easy to review, and improves final GMP negotiations. A sample estimate can be found below on Figure 7.

**431110 Substructure Concrete (CY)**

| Description | Quantity | UOM | Labor | Equipment | STS | Subcontractors | Materials | Subtotal | Manhours |
|---|---|---|---|---|---|---|---|---|---|
| Fabricate Formwork | 2445 | SF | $ 10,290.00 | $ 2,824.00 | $ 1,470.00 | | | $ 14,584.00 | 245 |
| Erect and Strip Formwork | 7403 | SF | $ 62,202.00 | $ 12,020.00 | $ 8,886.00 | | | $ 83,108.00 | 1,481 |
| Place/Finish/Cure Concrete | 476 | CY | $ 19,992.00 | $ 7,462.00 | $ 2,856.00 | | | $ 30,310.00 | 476 |
| Dry Finish | 7403 | SF | $ 12,432.00 | $ 2,239.00 | $ 1,776.00 | | | $ 16,447.00 | 296 |
| Purchase Formwork | 2445 | SF | | | $ 23,227.50 | | | $ 23,227.50 | |
| Oil, Nails, Ties | 7403 | SF | | | $ 7,403.00 | | | $ 7,403.00 | |
| Purchase Concrete | 500 | CY | | | | | $ 63,500.00 | $ 63,500.00 | |
| Purchase and Install Rebar | 40.5 | Tons | | | | $ 28,350.00 | $ 38,475.00 | $ 66,825.00 | |
| Pump Truck | 476 | CY | | | | $ 5,712.00 | | $ 5,712.00 | |
| **Subtotal Direct Cost** | | | | | | | | **$ 311,116.50** | **2,498** |
| Indirects | 20% | | Indirects Spread Evenly Among Bid Items | | | | | $ 62,223.30 | |
| Markup | 10% | | Markups Applied Evenly Among Bid Items | | | | | $ 37,333.98 | |
| **Grand Total** | | | | **Unit Price** | **476** | **CY** | **$ 862.76** | **$ 410,673.78** | **2,498** |

**120500 Maintenance of Traffic (LS)**

| Description | Quantity | UOM | Labor | Equipment | STS | Subcontractors | Materials | Subtotal | Manhours |
|---|---|---|---|---|---|---|---|---|---|
| Daily Traffic Maintenance | 78 | WK | $ 65,520.00 | $ 10,075.00 | $ 3,900.00 | | | $ 79,495.00 | 1,560 |
| Install Lane Closures | 35 | EA | $ 58,800.00 | $ 7,860.00 | $ 3,500.00 | | | $ 70,160.00 | 1,400 |
| Flagging | 1 | PLS | $ 20,160.00 | $ 2,190.00 | $ 1,200.00 | | | $ 23,550.00 | 480 |
| Buy Signs/Barricades | 1250 | SF | | | $ 18,750.00 | | | $ 18,750.00 | |
| Setup Traffic Signals | 1 | PLS | | | | $ 87,000.00 | | $ 87,000.00 | |
| Install Signage | 412 | SF | | | | $ 5,356.00 | | $ 5,356.00 | |
| **Subtotal Direct Cost** | | | | | | | | **$ 284,311.00** | **3,440** |
| Indirects | 20% | | Indirects Spread Evenly Among Bid Items | | | | | $ 56,862.20 | |
| Markup | 10% | | Markups Applied Evenly Among Bid Items | | | | | $ 34,117.32 | |
| **Grand Total** | | | | **Unit Price** | **1** | **LS** | **$ 375,290.52** | **$ 375,290.52** | **3,440** |

Figure 7: Sample Estimate

# D.3. Contracting Plan

*The Contractor has a minimum self-performance requirement of 50 percent. Discuss the approach to developing a subcontractor selection plan that will allow for the competitive solicitation of bids from quality subcontractors. How will the Proposer demonstrate the subcontractor's prices are competitive? What specific commitments will the Proposer provide to enhance DBE participation? Include discussion on how the Proposer will comply with COMAR 21.05.10.05.*

## Subcontractor Selection Plan

The subcontractor selection process starts during the early stages of preconstruction with the creation of bid packages, prequalification of subcontractors and the identification of long-lead items. In addition to making sure the most qualified subcontractors have the opportunity to bid the project, the prequalification process also guarantees that both local and DBE-certified subcontractors have multiple opportunities to participate. We will use the SHA MBE Directory to identity MBE's for our solicitation.

Our subcontractor selection criteria, as illustrated below, is based on both qualifications and competitive bid criteria. We believe it is critical to establish a detailed procurement plan with SHA at the onset of the project, and our plan is in full compliance with COMAR 21.05.10.05. If several alternatives for qualified subcontractors or suppliers are available, we implement our selection plan to pre-qualify and evaluate bids that provide the best value to this project. SHA staff will be involved throughout the subcontractor selection process, including the prequalification stage, to ensure that all subcontractors meet SHA's qualification requirements. Subcontractor selections are based on a combination of qualifications and price, and are subject to concurrence between SHA and Kiewit based on project-specific criteria. Some of the criteria we utilize in the prequalification includes:

- **Safety.** Subcontractors must provide their Experience Modification Rate (EMR) for the past three years. Have they had any fatalities over the last 5 years?
- **Quality.** Does the Subcontractor utilize a formal written Quality Plan? Have there been any major rework issues on past projects?
- **Past Performance.** Each subcontractor's past performance is evaluated on: shop drawings, procurement, change order response, schedule response, work quality, safety, clean-up, punch list and any other appropriate categories specific to the project.
- **Capability.** References are requested from three past projects to verify the subcontractor's ability to complete projects satisfactorily (within budget, on time, quality and safety).
- **Management / MBE.** Each subcontractor is asked to provide a list of their firm's principal parties and their specific State Contractor's
- **License numbers.** Additionally, the company's ownership as it relates to DBE status and the company's minority status as it relates to County, City or State applications.
- **Capacity.** Provide information on past annual sales (revenues) and a statement as to their total bonding capacity. This information is analyzed to provide the most relevant data as to whether the subcontractor can perform on a specific task and a subcontract amount at which they will be able to perform.
- **Financial Stability.** If the subcontractor's scope of work is likely to exceed $50,000, an annual financial statement is required as well as a letter from the subcontractor's Surety Company stating bonding availability.

Each prequalified subcontractor receives a copy of the invitation to bid, and calls are placed to all prospective bidders to confirm they are bidding the work. After establishing a list of confirmed bidders (lists are used to track their bid status), we make sure that we have a minimum of three bidders per trade and report to the SHA Division of Innovative Contracting about the status of the bid process.

## Subcontractor Competitive Pricing

Obtaining competitive subcontractor and supplier pricing will be a key component in delivering the Putty Hill Avenue project on budget. Attracting interest and maximizing the number of qualified bidders is the most important step in the process for obtaining competitive pricing. We will communicate through media such as eMaryland Marketplace, newspapers, and the Governor's Office of Minority Affairs. We will also utilize our existing relationships with subs and suppliers to garner interest in this project and increase the number of bidders. Our goal will be to obtain as many as five quotes for each major subcontractor and supplier package, with three being our minimum for scopes that may have fewer subcontractors in the market. We will then hold pre-bid meetings at our office to ensure all bidders are pricing the work on a level playing field. We have found that this collaboration results in more competitive pricing, better scope coverage, and reduces project risk.

Once quotes are received, the bids are posted to our estimating software, so that a simple comparison can be performed in a live estimating environment.

In many cases, Kiewit subcontracts out work that we typically self-perform, in an effort to achieve subcontracting goals on CMAR projects or MBE participation goals. In each case, Kiewit is able to prepare a self-performed estimate for a particular scope of work, and then compare it to quotes that are received from subcontractors. This comparison

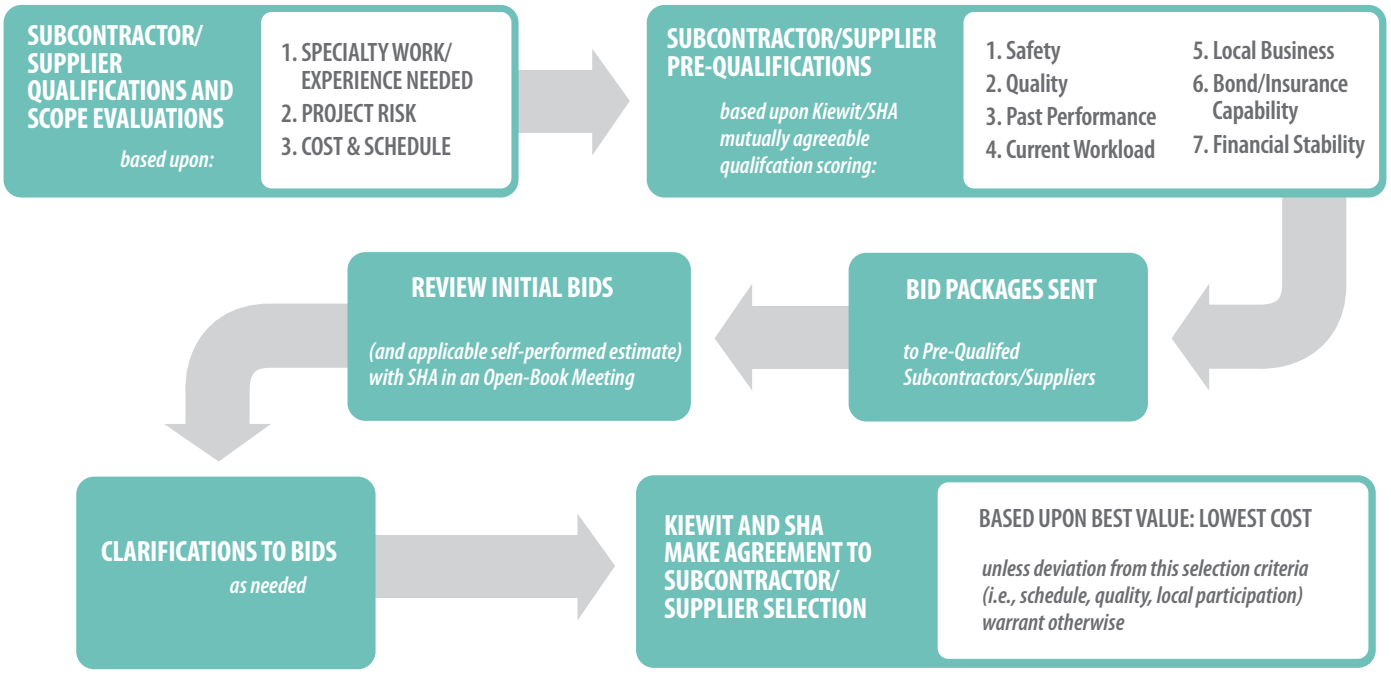



Figure 8. Subcontractor Competitiveness

is shared with SHA, which helps ensure that the pricing that we are receiving is competitive. In addition, due to our local presence, we are constantly receiving pricing for similar scopes of work on similar projects in the state. During subcontractor closeout, we are able to compare current quotes to recent pricing on other projects. If there is a particular scope of work that is quoted above the recent averages, we can quickly identify the increase, and meet with subcontractors and suppliers to better understand the difference. After all quotes are deemed to be reasonable, they are and awarded with SHA and the ICE's input to the firm with that provides the best value. The ability to perform comparison estimates and compare to recent averages ensures that subcontractor pricing is competitive.

## Commitments to Enhancing DBE Participation

We maintain an active database of subcontractors and suppliers that includes small business/small disadvantaged firms. This database is maintained in SmartBIDNET, which is continually updated to broaden small business firm resources and to reflect additional information learned in the solicitation of small business involvement on other contracts. This database is maintained to add new firms and to remove firms that are no longer in business or have lost their small business/small disadvantaged status. To ensure thorough outreach, the SmartBIDNET database will be updated with subcontractors specializing in needed scopes that are identified through the SHA Directory. This ensures new DBE contractors are identified and contacted during our outreach process.

SmartBIDNET is updated with each new solicitation for bid or execution of an agreement. When contacts are made with vendors of all size classifications, they are entered into our database and included in future solicitations. All staff employees involved with procurement have access to our in-house database, and are instructed to search it as well as outside source lists prior to solicitations or awards for products and services to ensure complete coverage of small business firms. In addition, all staff members have annual compliance training to ensure that everyone in the procurement process understands and complies with public law and the subcontracting plan.

We will also maintain the following:

- List of organizations contacted in an attempt to locate small business firms
- Records to support outreach efforts, e.g., contacts with minority and small business trade associations, business development organizations, veterans service organizations and attendance at small business procurement conferences and trade fairs
- Records of all internal workshops, seminars and training provided regarding small business firms and subcontracting plan obligations
- Periodic compliance reviews to monitor performance and evaluate compliance with the program's requirements.

As mentioned above, we schedule pre-bid meetings with every interested subcontractor. In the meeting, we discuss the CMAR process, the scope included in their specific package, the prequalification process, and the critical dates for the project. These face-to-face meetings have improved scope coverage, increased DBE participation, and greatly improved our subcontracting efforts in the field.

Once all of the quotes are received, DBE participation is tracked in a detailed DBE spreadsheet, which ensures we are meeting SHA's prescribed goals. This tool further increases collaboration between Kiewit, SHA, and the ICE.