



RESPONSE TO MARYLAND
DEPARTMENT OF
TRANSPORTATION STATE
HIGHWAY ADMINISTRATION
REQUEST FOR PROPOSALS

**Areawide Total Maximum Daily Load
Design-Build, Contract No. AX7665D82**

Technical Proposal

FROM

Corvias
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TO

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DIGITAL COPY



STATE HIGHWAY
ADMINISTRATION



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2.

2. DESIGN-BUILDER CAPABILITY

I. KEY STAFF

TROY HUNT, PE, Corvias

Design-Build Project Manager

Troy is a Registered Professional Engineer (PE) with 27 years of relevant experience to the Design-Build Project Manager role. Experience includes:

The Clean Water Partnership (CWP). *Design-Build Project Manager.* Troy provides direct management of all planning, design, construction, and maintenance activities, including managing a team of more than 100 personnel from 30 different consultants, contractors, sub-consultants and subcontractors on this “first of its kind” innovative stormwater Partnership in Prince George’s County, MD. During the last 24 months, nearly 100 projects contributing nearly 2,000-acre credits have been completed and certified according to MDE guidelines, with another 2,000-acre credits to be completed by summer of 2021. The CWP is a 30-year partnership between the County and Corvias developed to help the County satisfy its Chesapeake Bay Total Maximum Daily Load (TMDL) and Municipal Separate Storm Sewer System (MS4) restoration requirement in a more efficient and predictable way. Within the CWP, Troy is responsible for the guaranteed delivery (project identification, design, and construction) and long-term Operations and Maintenance (O&M) of stormwater retrofits. Troy is responsible for delivering the projects through a highly efficient, progressive design-build structure with multiple engineering design firms, general contractors, and innovative technologies, including OptiRTC’s continuous monitoring and adaptive control (CMAC) of stormwater facilities. Troy is ultimately responsible for meeting all key performance metrics including on-time, on-budget delivery and meeting the program’s very aggressive DBE goals and requirements. Troy oversees countywide planning, project-site identification and prioritization, design, including topographic and bathymetric surveys, geotechnical investigations, ROW and property acquisition/access, MOT and roadway improvement. A wide variety of permits were acquired, including Maryland Department of Environmental (MDE) Wetlands and Waterways, United States Army Corps of Engineers (USACE), MDE Dam Safety, and local County permits. The program includes a variety of stormwater Best Management

Education: BS / Civil Engineering

Registration, Certification, Training: PE / CO, #248604; PE / NV, # 12179; PE / UT, # 179997

Practices (BMPs) including Stormwater Management (SWM) pond retrofits, outfall and stream restoration, bioretention, sand filters and other green infrastructure (GI) and low-impact development (LID) BMPs.

Stormwater Authority of the City of Chester, PA. *Design-Build Project Manager.* Troy provided direct management of all planning, design, construction, and maintenance activities, including managing a team of 10 consultants, contractors, sub-consultants and subcontractors for this program in Chester, PA. Troy provided management of a \$50 million budget to deliver a variety of stormwater BMPs through a design-build approach, including ponds, outfalls, bioretention cells, permeable pavement, bioswales, and other green stormwater infrastructure practices. It also included the use of OptiRTC’s CMAC innovative technology. Troy was ultimately responsible for meeting all key performance metrics including all DBE goals and requirements.

Southern Nevada Water Authority Water Supply Program. *Design-Build Project Manager.* Troy held a variety of roles including design engineer during the early facility conceptual planning stage, project manager, design-build manager, and ultimately, manager of the joint venture between two engineering firms providing the lead design services. To keep pace with the exploding growth of the Las Vegas Valley, the Southern Nevada Water Authority (SNWA) initiated a massive infrastructure program to bring a new water supply system into the Valley from Lake Mead. The \$1.2 billion public works program included a new intake and pump station, aqueducts, booster-pump stations, a tunnel, a water treatment facility, distribution pipelines and transportation improvements. The new water supply system and subsequent expansions were planned, designed, and constructed over 15 years. The projects were delivered through various methods, including traditional design-bid-build, design-build, and construction management at-risk. At its peak, the program had 30 major design packages and 45 separate construction packages running simultaneously.

SEAN PUNTE, PE, KCI

Project Design Manager

Sean is a Maryland Registered PE (#27055) with 21 years of relevant experience to the Project Design Manager key staff role. Experience includes:

TMDL Stormwater Project Implementation Management, MDOT SHA. *Project Design Manager.* Sean directed the planning, design, and construction of all stormwater BMPs that were constructed to help satisfy MDOT SHA's TMDL and MS4 restoration requirements. He formulated the overall approach for stormwater implementation, which included SWM facility retrofits, new SWM facilities, and impervious area removal. He assisted MDOT SHA with developing strategies for the planning of watershed improvements and the design of stormwater projects that maximize water quality treatment, minimize project engineering/construction cost and time, streamline permit acquisition, and minimize future maintenance. Sean developed program budgets and spending projections and coordinated with MDOT SHA divisions/offices. He served as the stormwater technical expert in the development of MS4 program documents, including BMP planning and design protocols, water quality modeling approaches, and geodatabase structure to track restoration progress. During the construction phase of SWM projects, Sean attended pre-construction and partnering meetings with MDOT SHA District Construction and Quality Assurance (QA) Program personnel and contractors. He oversaw development of green line and red line plan revisions and permit modifications through the QA toolkit and submitted SWM as-built certification packages and reported final credits to the MDOT SHA geodatabase.

MD 32 Total Maximum Daily Load Services, MDOT SHA. *Project Design Manager.* Investigated a 10-mile long corridor for SWM retrofit and outfall stabilization opportunities in order to comply with Chesapeake Bay TMDL limits and MS4 restoration requirements. The SWM retrofits will provide water quality treatment for nine acres of MDOT SHA-owned impervious areas that currently have no treatment. Managed a team of engineers who designed the proposed SWM retrofit BMPs. Oversaw the development of the contract documents, SWM report, and baseline stormwater pollutant load and removal analysis. Oversaw the assessment of over 270 existing inflows and outfalls (I/O) within the corridor, which were inspected for channel stability, assessed for outfall stabilization potential, and prioritized for future restoration projects to be constructed to help meet TMDL/MS4 goals.

Education: BS / Civil Engineering

Registration, Certification, Training: PE / MD, #27055; MDE / Approved Expedited Sediment and Stormwater Plan Reviewer; MDE E&SC Green Card; Rosgen Level I and II; MDOT-SHA: SHA E&SC Designers; MDOT-SHA: E&SC Yellow Card

Design-Build Purple Line Light Rail Transit System, MDOT MTA. *Project Design Manager.* Managed and directed the water resources design efforts used to develop the 30% design bridging documents for a 6-mile section of the Purple Line in Montgomery and Prince George's Counties, MD. Managed team of engineers that designed the drainage, stormwater management, and erosion and sediment control systems. Oversaw the hydrologic/hydraulic analysis and scour study for a proposed transit bridge crossing over the Northeast Branch and associated floodplain, and formulated the stormwater management strategy for the project lead and the research effort to develop innovative BMPs including the investigation of low-impact development practices such as green tracks, planter boxes, and tree trenches. Worked with urban design/landscape architecture teams to develop a sustainable design for all modes of transportation. Managed the planning and design of offsite stormwater pond retrofits and new BMPs in urbanized areas that have no existing water quality treatment. Coordinated with surrounding counties to identify SWM ponds to potentially retrofit, determined ponds to retrofit, and managed the design of retrofits to increase water quality treatment.

Full Delivery Stream Restoration Services, MDOT SHA. *Project Manager.* Managing 20 Full Delivery Stream Restoration contracts in which Contractors are responsible for restoring degraded streams on private land and delivering completed credits to help satisfy SHA's Chesapeake Bay TMDL and NPDES MS4 restoration requirements through a Design-Build approach. Coordinating with Office of Environmental Design (OED), OHD, OEO, and ORE to manage project milestones and ensure property acquisition is completed in accordance with the Uniform Act to secure FHWA funding.

Michael Blose, PE, MBA, Straughan

Water Resources Engineer

Michael is a Maryland Registered PE (#30704) with 18 years of experience related to the Water Resources Engineer Key Staff position. Project experience includes:

MS4/TMDL Program Management Support Services, Maryland State Highway Administration (MDOT SHA).

Water Resource Project Manager. Responsible for providing TMDL program management support services to the OED. Serves the role of TMDL/MS4 Retrofits Manager, which oversees MDOT SHA projects (including design-build projects in Anne Arundel, Prince George's and Montgomery Counties) related to the retrofitting of existing MDOT SHA SWM facilities within the Phase I and II NPDES jurisdictions to comply with MDOT SHA's TMDL obligations administered by MDE. Project management responsibilities include: coordinated activities for multi-disciplinary team, leveraging multiple contracts, and consultants; aggressive schedule management to meet MS4/TMDL permit timelines; responsible for site selection, prioritization, and integration with program activities; alternative/cost-benefit analyses; milestone review plan distribution to MDOT SHA divisions and review meeting conductor; state, federal, and local permit coordination including submissions to the Office of Highway Development – Plan Review Division (PRD), MDE Dam Safety, JPA- MDE/ACOE, environmental clearance (MHT, DNR, FWS), and TMDL general tree permit; contract advertisement document production (plans, specs, and estimates); and Phase V services. Responsibilities also included close coordination with other local MS4 jurisdictions (including Cecil County) and other TMDL implementation strategies, such as stream restoration, outfall stabilizations, tree plantings, impervious removal, new SWM locations, and using GIS for site selection. In 2014, Michael was given the Outstanding Consultant Support award from MDOT SHA OED.

Design-Build Purple Line Light Rail Transit System, Atkins North America/Purple Line Transit Partners.

Water Resources Project Manager. Responsible for hydrology, hydraulics, and SWM design for Segment 1 (3.5 miles) and Segment 6 (2 miles) of the proposed Purple Line Light Rail alignment and the Montpelier SWM pond retrofit (14.5 impervious acre credit) needed for water quality debit mitigation. Design responsibilities included: field drainage area delineation, SWM hydrologic and hydraulic calculations, SWM water quality and quantity calculations, SWM plans and details incorporating MD Pond Code 378 criteria, dam

Education: MBA / Finance; BS / Agricultural and Biological Engineering (minor, Environmental Engineering)

Registration, Certification, Training: PE / Maryland Registered (30704); PE / DC Registered (PE907569); PE / Delaware Registered (19340); Approved Expedited Sediment and Stormwater Plan Reviewer; Rosgen Level I-IV

breach analyses, outfall stability evaluation, downstream hydraulic flooding analyses using HEC-RAS, and SWM report preparation.

MS4/TMDL Outfall Stabilization Design, MDOT SHA.

Water Resources Project Manager. Responsible for overall project management and the preliminary design of two TMDL outfall stabilization construction contracts, in Prince George's and Baltimore County, that will provide over 3,000 LF of channel stabilization for 18 outfall sites. Stabilization projects will result in impervious area treatment credits as well as nutrient reduction credits by using regenerative stormwater conveyance, natural channel design, and, where required, more traditional bank stabilization techniques.

MS4/TMDL Point of Rocks Stream Restoration and Pond Retrofit, Frederick County DPW.

Project Manager. Responsible for design and coordination of 4,000 LF of stream restoration and a SWM pond retrofit with a 240-acre drainage area for MS4/TMDL impervious credit of over 40 acres. Project involves geomorphic assessment, hydrology/hydraulic analyses (including 2D hydraulic modeling using SMS/SRH-2D), MDE non-tidal and dam safety permit coordination, erosion and sediment control, and preparation of contract documents. The proposed design is 90% complete and the stream achieves ecological uplift through a combination of regenerative stream channel (RSC) and natural channel design (NCD) principles.

Contee Road at I-95 Preliminary Engineering, MDOT SHA.

Water Resources Project Engineer. Involved in: H/H analyses; stormwater management design including over 150 ESD and 18 structural BMPs (Dry and Wet/ED Ponds, Wetlands) drainage; culvert analyses; outfall/channel stability; environmental impacts; permitting; and preparation of design/build advertisement contract documents.

KWABENA OFORI-AWUAH, PE, D.GE, ENV SP, KCI *Geotechnical Design Engineer*

Kwabena is a Maryland Registered PE (#25981) with 32 years of experience related to the Geotechnical Engineer Key Staff position. Project experience includes:

Barbados Farmers Dam & Impoundment, Stantec Consulting Caribbean Ltd. *Geotechnical Engineer.* Geotechnical investigation and testing, modeling, final design, and construction phase services for this 24-FT high and approximately 1,200-FT long earth-embankment dam and impoundment. Kwabena served as the engineer-in-charge during construction for this Class C dam and was responsible for subsurface exploration, seepage, bearing capacity, settlement, stability analyses, and the final design and construction oversight. He also authored the Dam Owner's Operation and Safety Manual.

Columbia Gateway Stormwater Management Dam - Geotechnical Engineering Studies, Howard County DPW. *Geotechnical Engineer.* Kwabena performed engineering evaluation and design services for the Columbia Gateway Dam. Responsibilities included performing inspection services and preliminary geotechnical exploration studies to identify problems, provide recommendations and cost estimates to address the problems. Based on KCI's preliminary studies, the County requested a remedial design to address dewatering issues at the downstream existing wing walls and remedial grouting of the existing reinforced concrete spillway pipe joints. Kwabena supervised geotechnical studies and instrumentation for the source of seepage, performed remedial design, and was in charge of the remedial design construction of this Class B dam.

Red Clover Lane Dam Inspection and Slope Instability Evaluation, Howard County DPW. *Geotechnical Engineer.* This project involved geotechnical engineering services to assess an existing slope failure at a stormwater management pond dam. Kwabena visually inspected the dam and identified items that needed repair in accordance with Maryland Dam Safety Inspection Checklist. Additionally, he performed drilling within the dam embankment to explore the cause of the slope failure. Kwabena was responsible for managing KCI's inspection and assessment of the dam.

Irrigation Pond Dam Upgrade at Rattlewood Golf Course, Chesapeake Environmental Management, Inc. *Geotechnical Engineer.* KCI was contracted by CEM to perform engineering evaluation, design and construction inspection services for the irrigation pond dam upgrade

Education: MS / Civil Engineering; BS / Geodetic Engineering and Highway Engineering

Registration, Certification, Training: PE / Maryland Registered (25981); Envision Sustainability Professional (ENV SP)

at Rattlewood Golf Course, Mt. Airy, Maryland. The project involved replacing the existing Corrugated Metal Pipe (CMP) riser with a new cast-in-place concrete riser structure, providing toe drain and filter diaphragm and outlet end wall with riprapped channel on downstream side, and performing minor grading and restoration of the emergency spillway crest elevation to satisfy the 100-year stormwater surface requirements in the pond. Three design options were investigated for final design and permitting to address drainage and irrigation issues at the golf course. Responsibilities included design services, development of construction documents, construction observation, site meetings to coordinate geotechnical and contractual issues, subcontractor management, and construction coordination.

St. Mary's River State Park - Dam Repairs and Rehabilitation, Maryland DGS. *Geotechnical Engineer.* Kwabena completed a dam inspection, subsurface investigation, seepage analysis, remedial design, construction specifications, and cost estimates, as well as construction oversight of this Class C high hazard dam.

Shipley's Choice SWM Pond Assessment - Earthen Embankment Dam, Anne Arundel County DPW. *Geotechnical Engineer.* This project involved inspection, analysis, and repairs of this 400-FT long, 20-FT high earthen high hazard dam. Services included a remedial alternatives analysis, preparation of interim repairs for the structure to address short-term stability, preparation of conceptual plans to decommission the dam, replaced the downstream culvert at West Benfield Road, and restored Bear Branch stream channel from the dam to the culvert. Work included subsurface investigation, hydrologic and hydraulic analyses, stream assessment, and quarterly inspection of the dam following implementation of interim dam repairs.

Lake Elkhorn Dam Assessment and Emergency Action Plan, Howard County. *Geotechnical Engineer.* Kwabena is the Geotechnical and Dam Owners Engineer for the 650-FT long and 32-FT high earthen dam with a 145-FT wide concrete spillway. He prepared an Emergency Action Plan for this dam and is in charge of yearly safety inspection using Maryland Dam Safety Checklist.

JEFF TIRSCHMAN, PMP, KCI

Geographic Information Systems (GIS) Specialist

Jeff is a registered Project Management Professional (PMP) with 19 years of experience related to the GIS Specialist Key Staff position. Project experience includes:

NPDES Services, Statewide (BCS 2010-12), MDOT SHA.

GIS Project Manager. Provides on-going onsite TMDL IT/GIS data management support and oversight, specifically supporting the development of business processes, data, applications, and reporting functions. Leads a team of 10+ IT professionals and coordinates the data management and application development in support of all aspects of the program, from planning and modeling, site selection, implementation through monitoring and reporting. Develops compliance reporting and establishes and tracks the ongoing Key Performance Indicators (KPIs) within the official SHA Business Plan Reporting system for the TMDL program. Designed the NPDES/TMDL geodatabase in accordance with the MDE guidance and analyzed the requirements of the MS4 MDE geodatabase for reporting and compliance. Responsible for the impervious accounting and automated modeling solutions that measure compliance and report progress to MDE, specifically accounting for the credit accomplishments and regulatory compliance achievements for documentation in the MDE geodatabase submittal and Annual Report. Supports the Highway Hydraulics Division (HHD) with the field data inspections, engineering review, rating, prioritization, and maintenance planning for remediation and retrofit of Stormwater BMPs. Leads the data management, process development and tracking efforts, while managing scope, cost, and schedule associated with all of SHA's TMDL data management tasks. GIS software utilized on the program include ArcGIS 10.4, ArcSDE 10+, and other GIS software.

SWM BMP Inventory & Inspection Services (BCS 2011-09G), MDOT SHA. *GIS Project Manager.* Coordinated and managed the scope, budget, and schedule for GIS tasks associated with the field data inventory and field inspection of NPDES stormwater management infrastructure including BMPs for Anne Arundel and Harford Counties. Focused on performing modifications to the inventory based on the construction and inspection of BMPs. Coordinated the activities of inspection teams leveraging the NextGen ArcGIS Collector and Survey123 field tool. Field data collection includes GPS and photos along with other artifacts from the field efforts. Manages the scope, schedule, and costs of the projects and ensures compliance with MDOT SHA's BMP Inspection protocol.

Education: MS / Applied IT (2003); BS, Geography (1999)
Registration, Certification, Training: Project Management Professional / #219287; IT Infrastructure Library (ITIL) Cert. (v3)

NextGen MDOT SHA Field Inspection Toolkit

(JO2B5400067), MDOT SHA. *GIS Project Manager.* Re-engineered, designed, and deployed a Next Generation BMP Inspection application for MDOT SHA leveraging the enterprise technologies and ArcGIS Collector and Survey123. Provided project management for the IT development effort leveraging a rapid application development methodology. Managed the scope, cost, and schedule for the development effort facilitating all activities throughout the phases including requirements, design, and implementation. Provided project management for the IT development effort leveraging a rapid application development methodology. Provided training and documentation for multiple consultant firms to implement the use of the field tool for data collection, quality control, and the full BMP inspection process.

Impervious Accounting Baseline and Tracking, MDOT-SHA.

GIS Project Manager. KCI created an impervious area tracking process based on spatial data management to track, update, and report SHA's progress in meeting the requirements of their NPDES permit. The program requires that applicants identify the amount of impervious area within the applicable jurisdiction, determine the baseline impervious area treated for water quality with BMPs approved by MDE, and implement retrofits and other strategies to treat 20% of the baseline untreated impervious area. Jeff oversees the technical GIS aspects of BMP inspection workflows and data management, as well as BMP maintenance data management. Provides subject matter expertise, project management, and coordination services.

NPDES Consultant Services, Frederick County, MD.

GIS Project Manager. Provided project management and systems analysis to prepare a data inventory, facilitated stakeholder meetings exploring the MDE requirements, designed a comprehensive geodatabase model, and evaluated the source-to-target data migration options to establish a data gap analysis. Jeff and the KCI team supported the NPDES annual reporting for Frederick County and provided services to assist with report development, pollutant modeling, and impervious accounting. Provided subject matter expertise in terms of load reduction requirements, impervious restoration requirements, and the data needs to support tracking and reporting the restoration efforts in the MS4 MDE geodatabase.

NEAL STALKER, Total Civil Construction *Construction Manager*

Neal possesses 16 years of experience related to the Construction Manager Key Staff position. Project experience includes:

TMDL SWM New Design – Group 1A in Baltimore County. *Construction Manager.* Included the mass excavation and earthwork operations for the construction of three SWM areas and treating approximately twelve acres of land. Additional work included, but not limited to, clearing and grubbing, stone channels, MOT, and new utilities.

Bicycle Retrofit on MD 187 from Lincoln Drive to Charles Street in Montgomery. *Construction Manager.* Included construction of three SWM areas and working approximately five acres of land. Additional work included, but not limited to, clearing and grubbing, MOT, erosion and sediment controls, demolition of existing concrete and obstructions, earthwork/grading, storm installation, installing new concrete sidewalks, asphalt pavement, and landscaping.

Reconstruction of MD 2/4 from Fox Run Boulevard to MD 231 (Phase II) in Calvert County. *Construction Manager.* Included the construction of five SWM as well as stream restoration over approximately 24 acres. Additional work included, but not limited to, clearing and grubbing, demolition of existing utilities, pavement, signage and miscellaneous items, installing and/or making significant modifications to erosion and sediment controls, excavation, grading and earthwork operations, installing new wet and dry utilities, new asphalt paving, and landscaping.

University of Maryland, Capital Regional Medical Center. *Construction Manager.* Included the earthwork operations needed to support the construction of a new hospital facility, including construction of several SWM ponds and stream restoration. The site was cleared and grubbed, installed the dikes/berms for the site drainage. The ponds contained numerous gabion baskets for inflow, draw down sections as well as regular maintenance, especially post-rain events. Upon installation of the underground stormwater detention system(s), the traps were cleaned and terminated. In addition, a ~400-FT cantilever retaining wall was constructed parallel to an existing stream that required special attention to mitigate the impact to the surrounding area.

CSX – Virginia Avenue Tunnel. *Construction Manager.* Included mass excavation and earthwork operations for the replacement of a dual rail system tunnel in Washington D.C.

Education: BS / Business Management
Registration, Certification, Training: MDE Green Card, 1st Aid/CPR, Occupational Safety and Health Administration (OSHA) 10, USACE CQM for Contractors and Confined Space

The work consisted of installing and maintaining significant E&S controls in preparation for the excavation and disposal of over 300,00 CY of soil. The site, located in an extremely congested section of D.C., required detailed oversight for stormwater management to ensure the surrounding area complied. Examples included using numerous devices to mitigate run-off, regular maintenance of the SWM systems, and swift response to non-compliance.

Capitol Crossing. *Construction Manager.* Included the earthwork operations to support several block systems of above and below ground building structures in Washington D.C., NW. The work consisted of constructing access roads, new roads, and tunnel access points. In addition to constructing E&S controls, the project required bulk excavation of over 250,000 CY of soil to depths that exceeded 45'. This required site dewatering, management of the onsite SWM system, installation of a new tunnel system connecting Massachusetts Avenue to 395, supporting numerous trades as well as constructing a stair egress tower.

Phase I Silver Line. *Construction Manager.* Included the design-build for eleven electrical substations to support phase I. Each site was independent and the SWM systems were designed based on individual governing factors. In addition to the excavation, SOE, electrical grounding and building installation, each site also contained a SWM system, constructed in accordance with the owner guidelines. The ponds were constructed based on several factors and were regularly verified for compliance.

Montgomery College Bioscience Center. *Construction Manager.* Included the installation of new utilities, constructing new roads, six bioretention ponds, two sediment traps, E&S controls, and earthwork operations in Montgomery County, MD.

Holmes Run Sanitary Sewer Crossing & Stream Restoration. *Construction Manager.* Included installation of a 36" above ground sewer line in Fairfax County, VA. The stream was fed by Lake Barcroft. To perform the scope, a temporary dam was constructed in the active waterway while the flow went uninterrupted using several temporary culverts. With existing condition surveys and regular monitoring, the project was completed, and the stream was restored.

II. FIRM PAST PERFORMANCE

Firm Doing the Work: Corvias, LLC.		
Project Name and Location: Clean Water Partnership, Prince George's County, MD		
Owner/Client: Prince George's County		
Client Contact: Adam Ortiz, Director, DOE, p:301-883-5812, e:aortiz@co.pg.md.us		
Project Delivery Method: Design-Build		
Environmental Permit(s) Required	Permit Name: MDE Wetlands Permit	Permittee: Prince George's County
		Involvement of the firm: Wetland delineation, permit application and agency coordination
	Permit Name: DPIE/DOE Permit	Permittee: Prince George's County
		Involvement of the firm: Design, build, and agency coordination services
	Permit Name: PGSCD Green Stamp/Soil Conservation	Permittee: Prince George's County
		Involvement of the firm: Design, build, and agency coordination services
Overall Construction Cost of the Project: Initial Contract Value: \$210M Final Contract Value: \$210M		
Specific Reasons for Difference or N/A: N/A		
Overall Schedule Performance: Initial/Agreed Completion Date: March 2018 Final/Actual Completion Date: March 2021		
Specific reasons for the Difference or N/A: N/A		
<p>Brief Description: In March 2015, Prince George's County, Maryland and Corvias entered into a partnership to deliver 4,000 TMDL Credit Acres in order to achieve compliance with their TMDL and MS4 requirements through a design-build delivery method. The first phase of the Partnership, completed in 24 months, consisted of 91 projects sites with approximately 250 BMP devices certified to provide approximately 2,000 Credit Acres. A highly efficient progressive design-build structure using multiple engineering design firms, general contractors, and innovative technologies, including OptiRTC's CMAC, was utilized to deliver a variety of project types, including pond retrofits, outfall restoration, bioretention, sand filters, rain gardens, and other green infrastructure BMPs. Corvias' progressive design-build structure, the same structure that is being contemplated for the MDOT SHA project, was effective in achieving an average of 55 Credit Acres per month, which is nearly double the amount of credit acres per month that will be required to satisfy MDOT SHA's requirements.</p> <p>The Partnership, occurring throughout Prince George's County, was developed to help the County satisfy its Chesapeake Bay TMDL and MS4 restoration requirement in the most efficient manner possible. Within the partnership, Corvias guarantees the delivery (project identification, design, and construction) and long-term O&M of stormwater retrofits. More than 30 different consultants, contractors, subconsultants, and subcontractors, including Soltesz and Total Civil (Total Civil is the Lead Construction Firm and Soltesz is providing design support services on this MDOT SHA project) are involved in the program. The second phase is slated to complete an additional 2,000 Credit Acres by summer of 2021. The program involves countywide planning, project site identification and prioritization, design and permitting of GI and LID BMPs, construction and maintenance. As the design-builder and guarantor, Corvias has ultimate responsibility for on-time and on-budget delivery of the credit acres.</p>		
<p>What work, including any successful methods, approaches, and innovations, on the project is relevant to this contract and why: This project is relevant since it was a SWM retrofit and outfall restoration task, with a goal of obtaining impervious area restoration credit.</p>		

Firm Doing the Work: KCI Technologies, Inc.	
Project Name and Location: Private Ponds Maritime, Anne Arundel County, MD	
Owner/Client: Anne Arundel County Department of Public Works (DPW)	
Client Contact: Greg LeBlanc, Anne Arundel DPW, Project Manager, p:(410) 222-0043, e: pwlebl89@aacounty.org	
Project Delivery Method: Design-Bid-Build	
Environmental Permit(s) Required	Permit Name: Grading
	Permittee: Anne Arundel County DPW
	Involvement of the firm: Design services and agency coordination
	Permit Name: MDE/USACE Joint Permit
	Permittee: Anne Arundel County DPW
	Involvement of the firm: Wetland delineation, permit application, and agency coordination
Overall Construction Cost of the Project: Initial Contract Value: \$4.46M Final Contract Value: \$4.46M est.	
Specific Reasons for Difference or N/A: In Progress	
Overall Schedule Performance: Initial/Agreed Completion Date: January 2017 Final/Actual Completion Date: October 2018 Specific reasons for the Difference or N/A: County opted to coordinate large portions of the project with an adjacent stream restoration project. Joint project schedule is on track.	
Brief Description: The County is required to improve water quality treatment as part of its Chesapeake Bay TMDL requirements. Currently, the County is pursuing the retrofit of existing stormwater management ponds and outfalls to improve water quality treatment.	
BMP 97 consists of two small dry ponds providing limited stormwater management for the Maritime Institute of Technology campus. KCI is proposing to decommission these facilities, remove the existing riser and barrel, and construct these as a regenerative step pool storm conveyance with underlying sand filter to provide water quality. A large storm drain is currently bypassing these facilities; this will be rerouted into the larger of the ponds. The ponds will ultimately be hydraulically connected within the SPSC before discharging from the project limits. Coordination with the Maritime Institute, Maryland State Highway Administration, and Baltimore Gas and Electric was required to obtain permission, clear right-of-way, and relocate an electric line. This project will treat 85% of the required water quality volume for the watershed, or 7.82 acres of impervious at \$45,735 / acre.	
BMP 685 is an existing infiltration basin that is holding water (failed). The proposed work will convert this facility to an innovative surface sand filtration basin, while maintaining the existing riser, barrel, and embankment in place. The barrel will be sliplined. This project will treat 141% of the required volume for the watershed, or 57.96 acres at \$17,278 / acre.	
BMP 717 is an existing dry pond that is currently providing no water quality treatment. Analysis of the facility indicates that it is not adequately sized for existing hydrology, and the 100-year freeboard is inadequate. Since the embankment is serving as a roadway (Concorde Circle), the County is not easily able to adjust the hydraulics and correct the situation. To address this, KCI is converting the BMP and the upper channel to a regenerative step pool storm conveyance. 1600 LFI will be restored. This project will treat 216% of the required volume for the watershed, or 19.64 acres at \$77,643 / acre.	
BMP 8823 is a large regional facility that was determined through KCI's inspection to be failing. This facility has a large storage volume and its failure could pose a risk downstream to private property, Maritime Boulevard, and possibly MD 295. KCI recommended a temporary sliplining of the pipe which was implemented in May 2017. KCI is designing the decommission of this facility, and converting the pond area into a series of tiered wetland systems. Walking trail access is incorporated throughout the project, a picnic area is being proposed at the top of the abandoned dam, and landscaping will be designed to provide maximized aesthetics for this area. Continuous Monitoring and Adaptive Control (CMAC) systems are being proposed at some of the tiered weir structures to track weather patterns and manage outflow from the wetlands. The intent is to drain the wetland pools prior to large events to allow this storage to be used as replacement for the lost storm attenuation the regional pond was providing. Coordination with MDE Dam Safety, Maryland State Highway Administration, the Maritime Institute of Technology, and the County was necessary to address concerns associated with these downstream stakeholders. This project will treat 18% of the required water quality volume for the watershed, or 13.97 acres at \$112,460 / acre.	
What work, including any successful methods, approaches, and innovations, on the project is relevant to this contract and why: This project is relevant since it was a SWM retrofit and outfall restoration task, with a goal of obtaining impervious area restoration credit.	

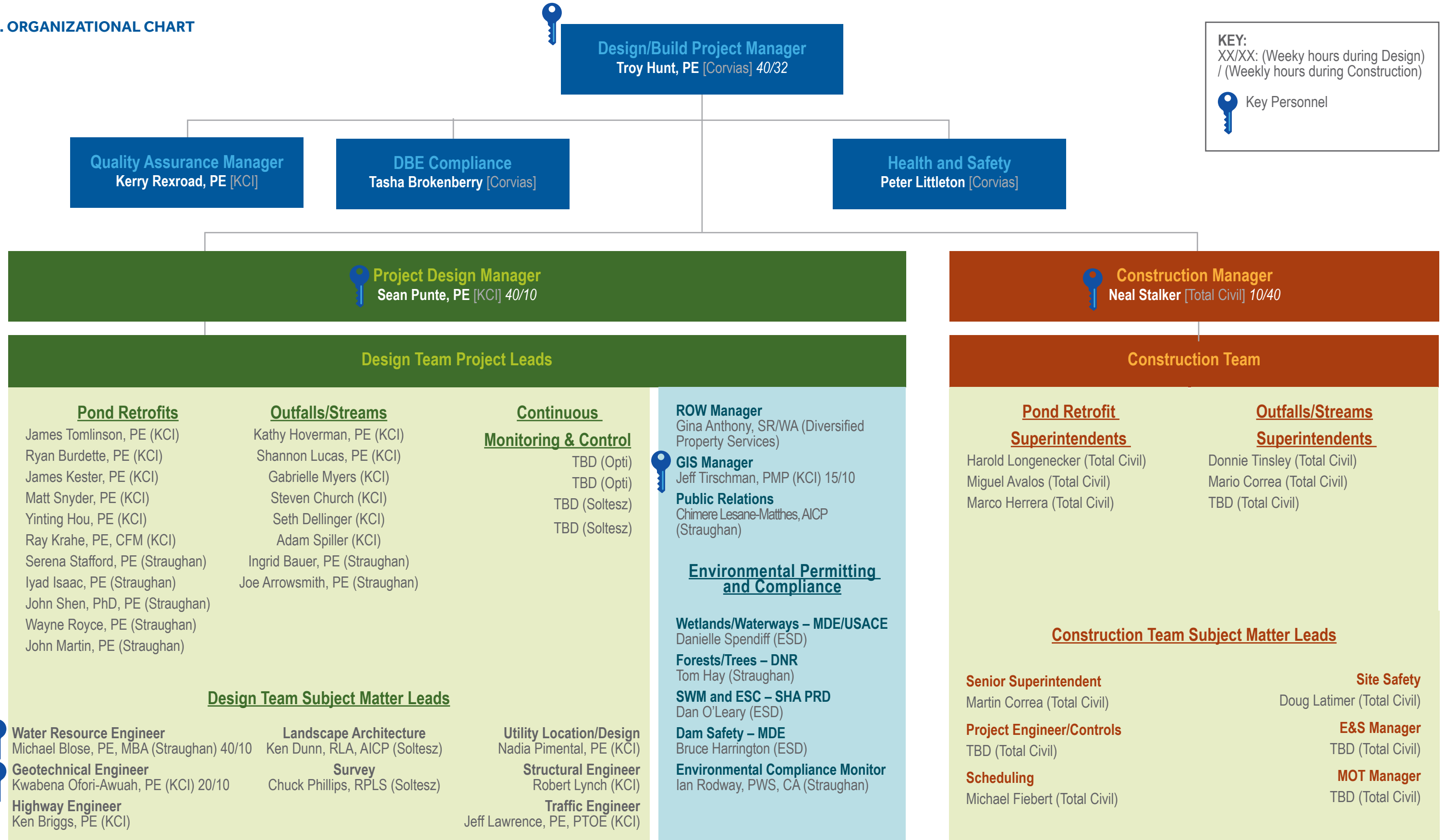
Firm Doing the Work: KCI Technologies, Inc.		
Project Name and Location: Brampton Hills Stream Restoration, Howard County, MD		
Owner/Client: Howard County DPW		
Client Contact: Mark Richmond, Chief, DPW, p: 410-313-6413, e: markrichmond@howardcountymd.gov		
Project Delivery Method: Design-Build		
Environmental Permit(s) Required	Permit Name: SWM/E&SC	Permittee: Howard County DPW
		Involvement of the firm: Design services and agency coordination
	Permit Name: MDE/USACE Joint Permit	Permittee: Howard County DPW
		Involvement of the firm: Wetland delineation, permit application, and agency coordination
Overall Construction Cost of the Project: Initial Contract Value: \$599,257.20 Final Contract Value: \$599,257.20		
Specific Reasons for Difference or N/A: N/A		
Overall Schedule Performance: Initial/Agreed Completion Date: January 2016 Final/Actual Completion Date: January 2016		
Specific reasons for the Difference or N/A: N/A		
Brief Description: Under a Design/Build open-end contract, KCI has been performing planning, surveying, design, environmental permitting, and construction phase services for various countywide project assignments focusing on all aspects of environmental enhancement, urban channel restoration and SWM retrofit projects. The Brampton Hills task is an example of the many stream restoration projects completed under this contract.		
<p>KCI completed the survey, assessment, PS&E design, permitting, post-construction monitoring services and provided a designated specialist for 2,100 LF of stream restoration at Red Hill Way and stabilization of a severely eroded MDOT SHA drainage ditch adjacent to MD 100. The geomorphic assessment included a longitudinal profile and cross-sections utilizing a laser level, sinuosity estimates, and pebble counts. KCI developed concept (30%) plans using GIS and MicroStation to show sections for bank and toe of slope treatments including bioengineering (live stakes). KCI developed a semi-final (65%) design that included H&H analysis, bank grading and specialized bank stabilization and bioengineering techniques; construction access areas and limits of disturbance; landscape plans using MDOT SHA's Category 700 Specifications; E&SC plans, profile, and typical sections; notes and details, specifications, and an engineered cost estimate. KCI developed the JPA package and impact plates, attended site visits with MDE and USACE, and addressed agency comments in the 100% PS&E packages. During the Ad stage, KCI attended the pre-bid meeting to answer questions, responded to RFIs, and prepared addendums for the County Project Manager, including minor Invitation for Bid (IFB) insertions and plan revisions. KCI submitted the NPDES Construction Permit, provided daily construction oversight, prepared daily inspection reports (IDRs), tracked material tickets/quantities, reviewed invoices, served as a designated specialist for stream structure installation and coordinated with MDOT SHA and MDE on monthly bookkeeping inspections in support of Transportation Enhancement Program (TEP) funding. KCI reviewed and certified as-built plans and is performing annual post-construction monitoring/reporting to MDE.</p>		
What work, including any successful methods, approaches, and innovations, on the project is relevant to this contract and why: This project is relevant since it was a restoration task, with a goal of obtaining impervious area restoration credit. In addition, this was a Design-Build project. KCI worked directly with the contractor and regulatory agencies.		

Firm Doing the Work: KCI Technologies, Inc.		
Project Name and Location: Whitworth Way SWM Pond, Howard County, MD		
Owner/Client: Howard County DPW		
Client Contact: Mark Richmond, Chief, DPW, p: 410-313-6413, e: markrichmond@howardcountymd.gov		
Project Delivery Method: Design-Build		
Environmental Permit(s) Required	Permit Name: SWM/E&SC	Permittee: Howard County County DPW
		Involvement of the firm: Design services and agency coordination
	Permit Name: MDE Dam Safety/Approval	Permittee: Howard County County DPW
		Involvement of the firm: Engineer in Charge of Construction
	Permit Name: MDE/USACE Joint Permit	Permittee: Howard County County DPW
		Involvement of the firm: Engineer in Charge, wetland delineation, permit application, and agency coordination
Overall Construction Cost of the Project: Initial Contract Value: \$432,923.20 Final Contract Value: \$432,923.20		
Specific Reasons for Difference or N/A: N/A		
Overall Schedule Performance: Initial/Agreed Completion Date: January 2016 Final/Actual Completion Date: January 2016		
Specific reasons for the Difference or N/A: N/A		
Brief Description: Under a Design/Build open-end contract KCI has been performing planning, surveying, design, environmental permitting, and construction phase services for various countywide project assignments focusing on all aspects of environmental enhancement, urban channel restoration, and stormwater management (SWM) retrofit projects. The Whitworth Way task is an example of the many retrofits completed under this contract.		
<p>KCI performed engineering design, permitting, and construction services for the retrofit of the existing pond located in the forested area adjacent to Whitworth Way. The project involved converting an existing in-stream detention basin into a proposed shallow wetland for water quality restoration credit. Tasks included field investigations, environmental impact permitting, H&H engineering analysis, preparation of contract documents, engineering services during construction, construction monitoring, post construction survey, and as-built certification. During the design phase, a pond breach analysis revealed that the Maryland Department of the Environment Water Management Administration Dam Safety Division (MDE DS) required regulatory authority to evaluate the hazard classification of the pond dam. KCI worked directly with MDE DS to ensure that the project plans and design elements were developed in accordance with MDE dam safety regulations. Also, there were approximately 30 mature trees located within the woody free zone of the embankment that required removal. KCI worked closely with the contractor to ensure that the tree and roots were removed properly. Other construction activities included temporarily bypassing the contributing stream channel, adjusting the emergency spillway, replacing the existing control structure, landscaping, post-construction monitoring, and as-built certification that was completed in January 2016.</p>		
What work, including any successful methods, approaches, and innovations, on the project is relevant to this contract and why: This project is relevant since it was a SWM retrofit task, with a goal of obtaining impervious area restoration credit. In addition, this was a Design-Build project. KCI worked directly with the contractor and regulatory agencies.		

Firm Doing the Work: Straughan Environmental, Inc		
Project Name and Location: NPDES MS4 TMDL Program Management Support Services, MD		
Owner/Client: State Highway Administration		
Client Contact: Karen Coffman, Chief, Water Programs Division, P: 410.545.8407, E: kcoffman@sha.state.md.us		
Project Delivery Method: Design-Build		
Environmental Permit(s) Required	Permit Name(s): (1) MDE Non-Tidal Wetlands and Waterways, (2) CWA Section 404	Permittee: SHA Involvement of the firm: Oversight and Ensured Compliance
	Permit Name(s): (3) MDE Stormwater Management and Erosion and Sediment Control (SHA PRD), (4) MDE Dam Safety, (5) Roadside Tree, Reforestation, or FCA, (6) Critical Area Commission Approval	Permittee: SHA Involvement of the firm: Oversight and Negotiation, Preparation of Submittals
	Permit Name(s): (7) MDE for Storm Water Associated with Construction Activity and AA SCD	Permittee: SHA Involvement of the firm: Completed Application Package, Coordination with SHA Hydraulics Division
Overall Construction Cost of the Project: Initial Contract Value: \$24.2M est. Final Contract Value: \$24.2M est. Specific Reasons for Difference or N/A: N/A		
Overall Schedule Performance: Initial/Agreed Completion Date: N/A Final/Actual Completion Date: N/A Specific reasons for the Difference or N/A: Ongoing Project and Program Management		
Brief Description: Straughan is providing TMDL program management, project management, and public outreach services to the OED of MDOT SHA., which is required to bring MD highways into compliance with Maryland's Watershed Implementation Plan for the Chesapeake Bay TMDL, NPDES Phase I and II MS4 permits, and local TMDLs by implementing BMPs.		
MS4/TMDL Implementation Manager–BMP Retrofits Strategy: As an accepted TMDL implementation strategy, MDOT SHA is addressing opportunities to retrofit existing structural SWM facilities to provide water quality management for untreated impervious areas and enhance pollutant removal efficiencies to the maximum extent possible. Straughan is the overall implementation manager for the TMDL/MS4 Retrofits strategy which coordinates the selection, design, and construction of projects (including design-build) related to retrofitting hundreds (200+) of existing MDOT SHA SWM facilities within the Phase I and II NPDES jurisdictions. Straughan is also responsible for the cost/benefit/feasibility evaluation of 3,000 SHA existing BMPs for site selection and planning for future BMP retrofit design/construction contracts. For the past five years, Straughan has been leading a retrofit design team consisting of 12 consultant firms and MBE sub-contractors on seven design projects with design fees totaling over \$6M and construction costs estimated at over \$20M. In 2014, MDOT SHA honored Straughan with an Outstanding Consultant Support award for services under this contract.		
MS4/TMDL Design-Build Project Manager–Stormwater Retrofits: As a representative of OED Water Programs Division, Straughan provided project management services for two stormwater retrofit design-build contracts in Anne Arundel County and MDOT SHA District 3 (Montgomery and Prince George's County) consisting of 24 individual BMP sites that provided a total credit of 113 impervious acres. Responsibilities included: design (plans/computations/reports) review for compliance with the contract documents and performance specifications; close coordination with many SHA Offices including: Innovative Contracting Division, District 3 and 5 Construction and Right-of-Way, Plan Review Division, Highway Hydraulics Division, and Environmental Programs Division; regulatory coordination with MDE Plan Review (Sediment, Stormwater, and Dam Safety), and MD DNR (Fisheries); schedule tracking, leading regular project/partnering meetings, evaluating contractor change order requests, advising field modifications, and overall project team coordination.		
MS4/TMDL Project Manager–Stormwater Outfall Restoration: Straughan's role includes site screening, selection, and investigation; property owner coordination; design management and review; coordination of design support services (e.g., parcel research, survey, geotechnical investigation, etc.); and construction support. The goal of these stabilization projects is to improve the stability and function of each outfall, while protecting private property and public roadways. Straughan is currently overseeing 18 TMDL outfall stabilization designs throughout Prince George's and Baltimore County, totaling over 3,000 LF of channel stabilization. Stabilization projects will result in impervious area treatment credits as well as nutrient reduction credits by using RSC, natural channel design, and more traditional bank stabilization techniques.		
What work, including any successful methods, approaches, and innovations, on the project is relevant to this contract and why: This project is relevant since it was a SWM retrofit and outfall restoration task, with a goal of obtaining impervious area restoration credit.		

Firm Doing the Work: Total Civil Construction and Soltesz		
Project Name and Location: Muirkirk Pond, Prince George's County, MD		
Owner/Client: Prince George's County, MD		
Client Contact: Adam Ortiz, Director, DOE, p:301-883-5812, e:aortiz@co.pg.md.us		
Project Delivery Method: Modified Design-Build		
Environmental Permit(s) Required	Permit Name: (1) MDE Individual Wetland permit, (2) USACE permit, (3) Prince George's county permit, (4) PGSCD Green Stamp	Permittee: Prince George's County
		Involvement of the firm: Design-Builder
Overall Construction Cost of the Project: Initial Contract Value: \$12M (Construction) Final Contract Value: \$12M (Construction) Specific Reasons for Difference or N/A: N/A		
Overall Schedule Performance: Initial/Agreed Completion Date: May 2018 Final/Actual Completion Date: April 2018 Specific reasons for the Difference or N/A: Early substantial completion.		
Brief Description: Under Corvias at the Clean Water Partnership (CWP), and working within a modified Design-Build delivery method, Soltesz and Total Civil Construction worked together to deliver several stormwater retrofit projects for Corvias in Prince George's County.		
<p>Muirkirk Pond is a large pond located in an industrial area in Beltsville, MD. It was originally constructed in 1996 as a water quantity control pond, without water quality treatment. Based on its size, age, and condition, it was estimated to yield 230 Credit Acres when properly retrofitted. Starting in October 2016 Soltesz, Total Civil, and the outreach team met with three property owners, whose property is adjacent to the pond, to request access through their property. At the time access was not granted. One property owner requested that Total Civil agree to repave and repair the lot and pay a monthly fee of \$25,000 in order to access Muirkirk pond - this exceeded the program's budget. The County did have an easement, but using only the County's easement for access significantly increased construction time. In order to reduce construction time, Total Civil and the outreach team reconnected with property owners to request permission to access Muirkirk pond through a separate parking lot. Access was provided to the team within budget for the project and allowed construction to proceed on schedule. During construction, there were 30 - 35 trucks a day carrying 200 loads of material from the pond. On-site mitigation measures were taken by Total Civil to avoid and minimize construction-related impacts to environmental resources. Total Civil was committed to keeping the roads clean and had a sweeper truck and wash racks as needed to clean up behind trucks carrying sediment and other material from the pond. During the course of construction, no equipment or machinery was refueled within 25 FT of any wetland or watercourse and off-site disposal locations were utilized for materials and debris.</p> <p>Total Civil utilized a stringent Health, Safety, Environment and Quality (HSEQ) program to evaluate, review, and systematically document all facets of the construction. The HSEQ plan also ensured that all construction was completed in strict compliance with the approved design documents and contractual requirements, as well as all applicable federal, state, and local rules and regulations.</p>		
What work, including any successful methods, approaches, and innovations, on the project is relevant to this contract and why: This project is relevant since it was a SWM retrofit task, with a goal of obtaining impervious area restoration credit. In addition, this was a Design-Build project where Total Civil and Soltesz worked directly as the contractor.		

III. ORGANIZATIONAL CHART



PROJECT UNDERSTANDING AND
DESIGN-BUILD APPROACH

3.

3. PROJECT UNDERSTANDING AND DESIGN-BUILD APPROACH

I. UNDERSTANDING OF SCOPE

The **Corvias Design-Build Team (Corvias, The DB Team)** will complete a suite of water quality projects, including traditional SWM retrofits, outfall stabilization/stream restoration projects, and other innovative site upgrades utilizing OptiNimbus technologies (as presented in ATC 1 and 2) to deliver the proposed number of credits by October 1, 2020. OptiNimbus' technology was reviewed by MDOT SHA through the Alternative Technical Concept (ATC) process and has been conditionally approved—which allows the DB Team a unique advantage to achieve more acres than using only traditional approaches. With a planned notice to proceed (NTP) date of January 23, 2019, Corvias will only have 618 calendar days to deliver the required credits. However, based on our track record, we are highly confident in our team's ability to meet this schedule. We have organized our Team around the five major goals of this RFP and these goals guided the site-selection process outlined below. MDOT SHA's goals will drive our construction implementation as well as our risk and change management approach throughout the project.

Corvias will maximize TMDL Credit. The Corvias DB Team has developed a project sourcing and prioritization matrix that allows us to quickly assess candidate sites for traditional SWM retrofit or outfall stabilization. We focused on maximizing cost-effectiveness and minimizing environmental permitting and Right of Way (ROW) acquisition to the greatest extent practicable. Lead Design Firm, KCI Technologies, Inc. (KCI), supported by Straughan Environmental, Inc. (SE) (MDOT DBE # 97-190), Soltesz, LLC, and OptiRTC reviewed the site specific material information included in the solicitation material to identify dry ponds, dry-extended detention ponds, outfalls, undersized wet ponds, undersized infiltration basins, and facilities built prior to the 2000 MDE Stormwater Management Design Manual. These sites were then prioritized based on factors such as cost effectiveness, current treatment and net credit potential, site constraints (right-of-way, utility conflicts, proximity to other SHA infrastructure, site access, steep slopes, maintenance, etc.), as well as potential environmental permitting requirements, specifically MDE/USACE Nontidal Wetlands and Waterways, MDE Small Pond (378) Approvals, and MDE Dam Safety Division

requirements, among others. Further, we have applied the following approach to maximize credit potential:

- Focus on large, high credit acre yield sites, as the cost per credit acre decreases with project size.
- Avoid small (low credit acre yield) sites, thereby reducing the design costs, potential burden on regulatory agencies for review and also MDOT SHA in terms of construction administration and inspection.
- Minimize proposed ROW acquisition so available funding can be dedicated to credit delivery.
- Utilize team member OptiRTC for SWM "Innovation" facilities, as described previously in approved ATC 1 and 2, including developing projects that utilize OptiNimbus.
- Review all selected traditional retrofit sites to determine if additional safety and/or maintenance benefits, and increased credit potential exists if OptiNimbus technology (ATC 1 and 2) was applied.

The result is a suite of projects, presented later in this section, that maximize MDOT SHA's credit potential. We have also developed a list of alternative project sites that are not included in our proposed credit acre total, in order to prepare for unexpected changes that may come up. In short, we have options to deliver the required credits and capability to ensure MDOT SHA meets its goals.

EXPECTED ROLES

Corvias' philosophy when structuring the team was to select firms with specific expertise and knowledge—primarily experience working on MDOT SHA stormwater and outfall/stream projects and working with Corvias.

The roles and responsibilities of the team fall into several main categories and functions in order to quickly address the stormwater design-build requirements. A description of the primary roles and responsibilities of each functional group is described below:

- **MDOT SHA (Client):** MDOT SHA functions as the Client and establishes the aligned goals and outcomes of the Project (as stated in the RFP) and will provide general

oversight through the partnering arrangement described in the RFP to ensure that goals and outcomes are being met through transparent information sharing. Partnering will not change the legal relationship and obligations of the parties to the Contract. The Partnering Project Team that will be developed upon contract award will consist of SHA's Assistant District Engineer of Construction, Troy Hunt (Corvias Design-Build Project Manager), Sean Punte (KCI Project Design Manager), Neal Stalker (Total Civil Construction Manager), and other members as deemed appropriate by MDOT SHA and Corvias.

•**Corvias (Major Participant):** Corvias functions as the Manager of the Project and will be the primary point of contact for SHA. Corvias has the primary responsibility, and assumes the associated risks, to deliver the TMDL Credits by October 1, 2020. Corvias establishes and executes the process and procedures required to meet the goals including cost accounting, scheduling and forecasting, financial controls, project database/GIS tracking, and macro program planning. Corvias can provide long-term maintenance for this project and other MDOT SHA facilities, as negotiated at a later date.

•**KCI (Lead Design Firm):** KCI functions as the Lead Designer and has the primary responsibility for GIS and database development and management, stormwater facility and stream restoration planning and design, credit tracking, project scheduling, field inspection services, reporting, program management, consultant/contractor coordination and management, permit processing, and construction administration services for the Program.

•**Straughan (Design Support/DBE Firm):** Straughan functions as a professional services provider to perform site planning, environmental permitting, sediment and erosion control, stormwater design, outfall and stream restoration design, and technical support to construction management.

•**Soltesz (Design Support):** Soltesz also functions as a professional services provider to perform site planning, environmental permitting, sediment and erosion control, stormwater design, outfall and stream restoration design, and technical support to construction management.

•**Total Civil (Lead Construction Firm):** Total Civil functions as the Lead Construction firm and has the primary responsibility for general contracting, construction and other construction-related services for the Project.

APPROACH TO ENVIRONMENTAL PERMITS AND ENVIRONMENTAL COMPLIANCE

The implementation of this Project will require unavoidable impacts to sensitive environmental resources. Projects with impacts to wetlands, wetland buffers, waterways, floodplains, and forests, as well as within the Critical Area, will undoubtedly take more time to complete. The Corvias Team has included team member ESD (MDOT DBE # 16-355), whose personnel have decades of regulatory experience, both in the public realm as regulators and as consultant expeditors. Specifically, Dan O'Leary, PE (former Senior Hydraulic Engineer, MDE Sediment and Stormwater Plan Review Division), Bruce Harrington, PE (former Chief, MDE Dam Safety Division) and Danielle Spendiff (former reviewer, MDE Nontidal Wetlands and Waterways Division) have supported our site selection and concept development process to ensure that we have considered impacts and are therefore, minimizing permit review times to the greatest extent practicable. Upon NTP, ESD will serve as the Design Quality Management (DQM) Firm, providing QC review for all design packages prior to submittal to MDOT SHA and the regulatory agencies. As such, avoidance and minimization will continue throughout the entire engineering phase.

All of these efforts are focused on an overall more efficient permitting process and environmentally sensitive construction experience that:

- Reduces the time and effort of the reviewers
- Ensures a more complete and easier to permit project
- Results in fewer environmental impacts and better environmental compliance

Innovation sites using OptiNimbus will require a substantially smaller project footprint as opposed to traditional retrofits, potentially even eliminating ESC review if limits of disturbance are under 5,000 SF. Once operational, Opti sites are adaptable to future climatic conditions or changes in site characteristics without newly built infrastructure and with only operation/logic adjustments. This simple adaptation could reduce the frequency of flooding events through pre-event drawdown and/or peak shaving.

We have considered stream Use Class and closure period and the impact that would have on permitting and also available construction windows, but our Avoidance and Minimization procedures will be further refined when construction begins. Prior to any activity on the job site, we will review and present the major elements of any permit conditions to the construction crews and labor force working

on the project. The demarcation and flagging system established for wetlands, specimen trees, tree save areas, LOD and other features will be clear to all Team members prior to land disturbance activities to ensure that resources are identified and additional impact is not accrued. This Awareness Training will be reinforced periodically through informal “toolbox talks” and field reviews as work progresses into sensitive areas or the real-time conditions surrounding the project change. We will involve MDOT SHA inspection staff and any Independent Environmental Monitors assigned by SHA to reinforce any Partnering commitments.

II. UNDERSTANDING OF RISKS

The DB Team members have the experience and programmatic understanding of MDOT SHA to manage project risks and deliver the required credits on time. The DB Team’s Key Staff and support personnel have extensive experience working with MDOT SHA on SWM and stream stabilization projects and have been active participants in large-scale water quality programs in Maryland. **Table 3.1.** below summarizes the most significant potential risks identified for the Project, as well as provides several mitigation strategies for each.

III. APPROACH TO DESIGN-BUILD DESIGN AND CONSTRUCTION DEVELOPMENT

As previously mentioned, Corvias’ primary focus and overall approach to this Project is to optimize the credit acres by focusing on the most valuable projects in each of the three categories (SWM retrofits, Innovation sites, and outfalls). Typically, the most valuable projects are those that provide the most credit acres for the cost, while requiring no or minimal ROW acquisition, having the lowest site hazard and environmental issues, the safest and easiest access, the least construction disturbance, and that are easy to maintain. By evaluating and selecting projects from all three lists, MDOT SHA benefits from a diversification of project types.

For SWM retrofit projects we reviewed the 178 projects provided by MDOT SHA, initially focusing on improvements to existing Chapter 3 wet ponds, which typically provide the highest value and require the least amount of maintenance compared to other BMP types such as stormwater infiltration systems and proprietary media filter systems. We used a set of evaluation criteria to rank the projects to determine which projects are viable and should be evaluated further. Approximately 30 projects were considered viable. For those

Table 3.1. Anticipated Risks and Mitigation Strategies.

Identified Risk	Potential Impact	Corvias DB Team Mitigation Strategy
MDOT SHA Can Reject Sites or Unexpected Issue Reduces Site Credit Acre Count	<ul style="list-style-type: none"> • Corvias Required to Replace Credits • Credit Delivery Date Missed 	<ul style="list-style-type: none"> • Maximize Credit Delivery via OptiNimbus Technologies • Utilize Alternate Projects or Augment Credit Acre Count • Adopt the Partnering Approach as Described in TC-2.13 in the Solicitation. Corvias has extensive experience adopting this approach in Prince George’s County, MD.
Complex State/Federal Permitting Processes- MDE Nontidal Wetlands, USACE, MDE Dam Safety, SHA-PRD	<ul style="list-style-type: none"> • Projects Delayed Due to Time Consuming Reviews • Permits Denied • Credit Delivery Date Missed 	<ul style="list-style-type: none"> • KCI, Straughan, and ESD Employ MDE-Certified Reviewers that will Ensure Permit Requirements are Included in Projects from the Start. • DQM Firm ESD to Pre-Screen All Projects for Permit Considerations • ESD to Complete QC Reviews for All Plan/Permit Submittals • Early Regulatory Coordination Shortly After NTP to Ensure Stakeholder Buy-in
ROW Acquisition	<ul style="list-style-type: none"> • Projects Delayed or Eliminated • Credit Delivery Date Missed 	<ul style="list-style-type: none"> • Project Selection Focused on Sites with Ample ROW or Minimal Needs • Highly Qualified ROW Firm Diversified Property Services (MDOT DBE # 02-105) to Support the Corvias DB Team • Alternate Projects that can be Implemented if ROW is Stalled (Avoid Condemnation) • Adopt the Partnering Approach as Described in TC-2.13 in the Solicitation.
In-Stream Construction Closure Periods	<ul style="list-style-type: none"> • Limited Construction Windows • Credit Delivery Date Missed 	<ul style="list-style-type: none"> • Site Selection Focused on Use I Watersheds to Maximize Available Construction Windows • Weekly Evaluation of Project Prioritization and Scheduling (CPM, P6) • Diversification of Project types
Contract Time (619 Days)	<ul style="list-style-type: none"> • Credit Delivery Date Missed 	<ul style="list-style-type: none"> • Non-Working Days are Built in to Our Schedule to Account for Weather and Other Contingencies • Corvias Will Manage all Trade Contractors to Assess Labor Force and Suggest Additional Manpower as Needed

projects, we visited the sites, performed conceptual design, identified any ROW needs, did a cursory geotechnical review, performed constructability reviews and developed cost estimates. Ultimately, those 30 projects were reduced to 16 and separated into two categories: 1) projects included in our bid, and 2) alternate projects not included in the bid but that could be substituted if one of the bid projects is removed. See **Table 3.2.** for the list of selected sites and **Table 3.3.** for the list of alternate sites.

For “Innovation” sites, the Corvias Team performed a similar evaluation, reviewing the sites to determine their viability, specifically related to the application of the OptiNimbus technology that was approved as part of ATC 1 and 2. In addition to reviewing the “Innovation” sites, we also reviewed the SWM retrofit sites to see if the application of the OptiNimbus technology could make any of those sites more cost-effective. As noted in ATC 1 and 2, all projects that employ the OptiNimbus technology include a 20-year O&M commitment for all OptiNimbus related hardware components at no additional on-going cost. MDOT SHA District maintenance personnel will not have to take on any new maintenance in the short term beyond what is already required. Standard maintenance practices may also be reduced with OptiNimbus sites, since pond performance is actively monitored remotely and therefore site visits only occur when necessary. OptiNimbus also allows for the automatic generation of performance data, potentially reducing inspection and verification frequency. The list of Innovative Opti Retrofits sites is also included in **Table 3.2.** and **Table 3.3.**

Since the outfall list provided by MDOT SHA contained nearly 3,000 potential sites, the evaluation of those sites required a slightly different approach that still focused on determining the most valuable sites. A desktop review of the entire list was completed including a review of all photos and site data and the list was reduced to about 700 sites. The number of sites was further reduced by focusing on outfalls and adjoining streams contained mostly within the SHA ROW. Once the number of sites was reduced to about 50, physical site inspections were conducted to evaluate the stream condition, topography, tree cover, and access. The result is a list of about 13 outfalls that were carried forward for conceptual design and cost estimating. The list of outfall sites is also included in **Table 3.2.** and **Table 3.3.**

COORDINATION AND DECISION MAKING

Corvias’ business is solely focused on working in large, complex partnerships with public clients. We currently have more than 30 such partnerships across the U.S. with the Federal government, universities, and municipal

governments. Each of these partnerships requires a sophisticated level of coordination because of the number and type of stakeholders and team members involved. Our approach to this Areawide TMDL project, related to coordination, is based on our experience with other partnerships and starts with a strong communications framework. Being able to effectively communicate is fundamental to coordination. We will communicate and coordinate regularly and effectively to ensure all stakeholders are aware of issues and progress. Because this project has a short schedule filled with many activities, coordination and communication will be even more important.

Corvias has structured the DB Team in order to facilitate and expedite decision making and issue resolution at the lowest possible organizational level, where implications of the issue are best and most quickly recognized. Only if these concerns

Table 3.2. Selected Projects.

TYPE	SITE NUMBER OR NAME	ROW REQ'D
Traditional Retrofits	030269	X
	060321	
	120008	X
	020229	
	020247	
	160728	
	020801	
	120011	X
	130007	X
Innovative Opti Retrofits	020259	
	020524	
	020548	
	150063	
	150671	
*Outfalls	BA_I-83 at Little Falls	
	BA_I-83 at Warren Road	
	PG_MD 5 at Deer Pond Lane	
	HO_I-70 at MD 32	
	HO_MD 32 at Amberwoods Way	X
	PG_MD 4 at Federal Spring Branch	X
	PG_MD 210 North of Farmington Road	
	PG_I-95 at I-495	
	PG_I-495 at Ritchie Marlboro Road	
	PG_MD 214 at US 301	
*Outfall names in this table are representative of an area that includes multiple outfall sites.		

cannot be resolved at the primary level are they elevated to the next level. This procedure ensures that issues are addressed quickly, thereby minimizing the risk of adverse impacts on cost, schedule, and quality.

PERMITTING

The Corvias DB Team includes ESD (MDOT DBE # 16-355), whose personnel have decades of regulatory experience, both in the public realm as regulators and as consultant expeditors. The project schedule has made adequate time for the development review and approval of several permit processes associated with design plan packages. We will use MDOT SHA's process for "rolling submissions" by individual site, with these delivered and tracked by ESD Associates after QC review. These submissions will equal the requirements for a semi-final and final design milestone. Specialized in-house environmental teams from each firm, as well as ESD, will use "over the shoulder" (OTS) reviews to ensure compliance with commitments and provisional/final permit conditions, as well as to identify and obtain any additional permits or permit modifications. We have identified the following critical path permits and process for the selected sites:

- MDOT SHA Plan Review Division: Review/approve stormwater management and ESC for Concept, Site Development, and Final Submissions, including initial MDE 378 small pond review and embankment classification (exempt, special embankment design – roadways, full Code 378).
- MDE Sediment & Stormwater Plan Review Division: Review/approve MDE 378 Small Pond (Hazard Class A embankments), with a focus on dam breach analysis, freeboard requirements, and 100-year impoundment ownership/easement protection.
- MDE Dam Safety Division: Review/approve for Hazard Class B embankments (Significant Hazard, 1/2 PMF design storm) and Class C embankments (High Hazard Risk, PMF design storm) with Emergency Action Plan preparation and approval.
- MDOT SHA Highway Hydraulics Division: Coordinate/review for Stormwater Site Development criteria compliance and stormwater asset maintenance
- MDE and US Army Corps of Engineers Approvals (aka the Joint Permit): Section 404 Individual Permit, 401 Water Quality Certification, and Nontidal Wetlands & Waterways Permits, utilizing MDOT SHA's consultant reviewers and USACE's SHA project review team.
- MD DNR: Coordinate/review for Maryland Forest

Conservation Act (FCA), Maryland Reforestation Law and Roadside Tree Permits.

- NPDES Stormwater Associated with Construction Activity Permit: NOI submission to MDE.
- MDOT SHA Quality Assurance Division: Construction phase environmental compliance.

SAFETY

Corvias focuses on maximizing site safety for the DB Team and MDOT SHA. The safety of Team members, MDOT SHA personnel, and the traveling public is paramount to the success of this project. The site-selection process has a detailed accounting of required pond upgrades, including enhancing the retrofit designs to ensure they meet current 378 pond embankment and dam safety requirements. This reduces the risk of a dam breach and protects downstream property and communities. The selected outfall projects address undermining and other stability considerations to protect the outfall and adjacent SHA infrastructure. The installed technology associated with our OptiNimbus (Innovation) sites can drastically reduce pre-event emergency preparedness costs for MDOT SHA, since the asset can be checked remotely prior to large storm events and will have a history of site performance on which to base decisions. During preliminary field investigations and construction, Corvias will prepare and follow all required MOT standards, including planning for crash attenuation vehicles and other safety measures that are standard for MDOT SHA. Further, we will ensure compliance with site distances as part of any lane closures.

ROW ACQUISITION

Property acquisition has been minimized when selecting sites. Selecting sites with minimal or no property acquisition required has allowed the Corvias Team to reallocate funds towards project design and construction, thereby maximizing credit delivery. In some instances, ROW acquisition is proposed to allow for more efficient maintenance or to correct some pre-existing safety issue. The Corvias Team will not rely on complex Memorandums of Understanding (MOU) or other agreements with local governments, since our experience shows that these agreements cannot be completed within specified schedules and are not always cost effective. Where ROW takes cannot be avoided, Corvias has included team member Diversified Property Services (MDOT DBE # 02-105) to support the ROW acquisition process in accordance with the performance specification TC 3.23.

For retrofit sites, we have selected projects where space exists between the current ROW limits and existing pond

footprints to allow expansion, or have chosen sites where grading improvements can be done within the current pond footprint. The conceptual designs have incorporated steeper pond side slopes (up to 2:1) to minimize grading to stay inside current ROW. We understand the geotechnical considerations of steep slides slopes and will complete the necessary evaluations when prudent, and will incorporate an appropriate landscape plan that will not require mowing. For outfall projects, the Team identified sites that maximized LF restoration potential within the ROW specifically within interchanges, or those channels that run parallel to the roadway. This approach minimizes land acquisition, maximizes project visibility to the public, and in some instances, corrects historic practices of channelizing streams, and enhancing MDOT SHA's environmental stewardship initiatives. Innovation sites utilizing OptiNimbus technology have very little or no ROW acquisition since the technology makes more efficient use of the existing pond storage to provide greater water quality treatment of impervious area without the need for pond expansion.

DESIGN QUALITY MANAGEMENT

KCI, as the Lead Design Firm, is tasked with total accuracy and completeness for their designs including calculations, file keeping, and other key points. Each team member has the responsibility for carrying out the functions associated with their assigned position and implementing all procedures correctly to carry out the design to the highest level of quality possible. Overseeing the design to ensure a high level of quality is the responsibility of the Design Quality Management Firm, ESD.

Peer, MDOT SHA, and independent technical reviews will all occur for the project designs. All of the reviews will be designed to minimize errors, highlight/resolve design scope conflicts, highlight/resolve constructability issues, and ensure the package is complete. In other words, these reviews are an important means of ensuring that designs are of the highest level of quality.

As the Design Quality Management Firm it will be ESD's responsibility to ensure that:

- The design matches the scope.
- Meets the applicable codes and engineering practice.
- Concepts, features, methods, analyses, details and project costs are appropriate, valid, fully coordinated, and correct.
- All relevant engineering and scientific disciplines have been effectively integrated.

- Appropriate computer models and methods of analysis were used and basic assumptions are valid and used for the intended purpose.
- The source, amount, and detail of the data used in the analysis are appropriate for the complexity of the project.
- Content is sufficiently complete for the applicable design milestone of the project and provides an adequate basis for future development effort.
- Project documentation is appropriate and adequate for the design milestone.
- Any deviation from guidance and standards are identified and properly approved.

CHANGE MANAGEMENT

Corvias' approach to change management is centered on communication. Corvias will establish forums and activities to ensure all stakeholders are continuously updated on project progress and key issues. Additionally, the Corvias DB Team has planned for unforeseen circumstances, in the event that we are not able to deliver the projects we previously outlined in this section. If any of those projects are not executable, the Corvias DB Team has developed a list of "alternate" sites that can be delivered to still meet the stated TMDL Credit Acres. Utilizing multiple paths to deliver the project ensures the highest level of confidence that MDOT will successfully achieve the maximum Number of TMDL Credit Acres as cost-effectively as possible. Additionally, the DB Team will continue to pursue information and revisit sites not selected to ensure a healthy and growing list of "alternate" sites. **Table 3.3.** details the Corvias DB Team's "alternate" sites.

Table 3.3. Additional "Alternate" Sites.

SITE NUMBER OR NAME	ROW REQ'D
030270	
020162	
150062	
030042	
030265	
080005	
160731	
150264	
160304	
AA_Inflow Channels to 020247	
BA_I-83 at MD 439	
BA_I-83 at Belfast Road	



WHAT SETS CORVIAS APART?

Our innovative partnership structure and customized financial model. We put your best interests at the heart of our business decisions, and we work side-by-side with you to surpass your expectations.