



**HOPEWELL REGIONAL WASTEWATER TREATMENT FACILITY  
ALTERNATIVE 4A-1 LIGHT PHASE 2  
DESIGN-BUILD SERVICES**



**Exhibit A**

**SCOPE OF WORK and BASIS OF DESIGN**

Sections:

1.0 DEFINITIONS AND ABBREVIATIONS	5.0 DESIGN AND PRECONSTRUCTION
2.0 CONSTRUCTION DOCUMENTS	6.0 CONSTRUCTION
3.0 BASE PROJECT SOW SUMMARY	7.0 GENERAL ASSUMPTIONS AND CLARIFICATIONS
4.0 ITEMS FURNISHED BY OWNER	8.0 MECHANICAL AND PROCESS GUARANTEES FOR THE MBBR + DAF UNITS

**1.0 DEFINITIONS AND ABBREVIATIONS**

- BMP – Best Management Practices
- Cx – Startup, Testing, and Commissioning
- eO&M – Electronic Operations & Maintenance Manual
- GRPS – Gravelly Run Pump Station
- HRWTF – Hopewell Regional Wastewater Treatment Facility
- I&C – Instrumentation & Controls
- MOPO – Maintenance of Plant Operations
- O&M – Operation & Maintenance
- RFI – Request for Information
- SOW – This Scope of Work Document
- TM – Technical Memo
- VE – Value Engineering

Other capitalized terms, words and phrases used in this SOW for the Project shall have the meanings given them in the Contract Documents and the General Conditions of Contract.

**2.0 CONSTRUCTION DOCUMENTS**

Design-Builder’s SOW for the design, preconstruction, construction and commissioning of the Project is defined herein and based on the following Exhibits in the Contract Documents:

- A. Appendices to Exhibit A –
  - 1. Base Project Scope of Work.
  - 2. Technical Memorandum PPEA Design Basis\_05-02-14.
  - 3. Alternative 4A-1 Light Phase 2 Conceptual Design Drawings\_03-18-14 Set, as modified by the other Appendices to Exhibit A.
  - 4. Conceptual Design Drawing Y-100 Revision D.
  - 5. Report Hopewell Geotechnical Primary Site WM13-136G-10-23rev2 10-15-2013.
  - 6. Hopewell Electrical Equipment Schedule.
  - 7. Pipe Schedule\_03-18-2014.
  - 8. Valve Schedule\_03-18-2014.
  - 9. Results of the Value Engineering Exercise conducted April 30, 2014.

**3.0 BASE PROJECT SOW SUMMARY**

Design-Builder’s SOW for the Project Improvements will provide a segregated treatment system for nitrogen reduction to include the following components: Gravelly Run Pump Station and Forcemain Improvements, replacement of UNOX first stage aerators with mixers, Moving Bed Biofilm Reactor



## HOPEWELL REGIONAL WASTEWATER TREATMENT FACILITY ALTERNATIVE 4A-1 LIGHT PHASE 2 DESIGN-BUILD SERVICES



(MBBR) Influent Pump Station, MBBR Tanks, Blower Building, Dissolved Air Flotation (DAF) Building, Sodium Hydroxide Facility, Chlorine Contact Tank and Re-aeration Improvements (the BASE PROJECT).

The Project Enhancements, which include the UNOX stages 2-4 Aeration Tank surface aerator replacement, Secondary Clarifier No. 9 and Centrifuge No. 3, are not included in the Base Project SOW.

### 4.0 ITEMS FURNISHED BY OWNER

- Provide a complete and current backup of the existing SCADA system, including HMI graphics.
- Apply for and obtain DEQ VPDES permit in the City of Hopewell's name.
- Funding of the project costs through Water Quality Improvement Fund (WQIF) grants and other sources.
- Conduct public hearings per city, county and state regulations, ordinances and laws.

### 5.0 DESIGN AND PRECONSTRUCTION

#### A. Design Documents

1. Prepare and submit 30%, 60%, "Permit Design" and "Issued For Construction" (IFC) design deliverables to Owner. Provide written response to all Owner review comments within agreed time period.

#### B. Management

1. Workshops  
Facilitate the following workshops with the Owner:
  - a. Project Kick-off.
  - b. 30% Design Review Workshop (1-day).
  - c. 30% Functional Description Workshop (1-day).
  - d. 60% Design Review Workshop (2-days).
  - e. 60% Functional Description Workshop (2-days).
  - f. Permit Design Review Workshop (2-days).
2. Prepare and execute the Project Execution Plan (PEP).

#### C. Permitting Requirements

1. Permits  
Design-Builder will prepare and submit applications for the following permits to the appropriate regulatory authority. Then, evaluate and respond to reasonable review comments, and revise applications and re-submit as required to obtain regulatory approvals.
  - a. City of Hopewell Site Plan Approval.
  - b. City of Hopewell Fire and Life Safety Approval.
  - c. Virginia Department of Environmental Quality – Certificate to Construct (CTC) and Certificate to Operate (CTO).
  - d. Virginia Department of Environmental Quality - Coordinate wetland permitting and obtain permit.
  - e. Permit application will be submitted for early site preparation/foundation package. This will include a Final Engineering Report submittal to DEQ to obtain CTC and early site plan review by the Owner.
2. Wetland Impact Permitting
  - a. Perform wetland delineation at the existing Gravelly Run pump station and force main.



**HOPEWELL REGIONAL WASTEWATER TREATMENT FACILITY  
ALTERNATIVE 4A-1 LIGHT PHASE 2  
DESIGN-BUILD SERVICES**



- b. Prepare and submit application to permitting authorities to obtain authorization to impact wetlands.
- 3. Special Inspections & Permits
  - a. Prepare and submit Statement of Special Inspections to the City of Hopewell Building Code Official.
  - b. Prepare Stormwater Pollution Prevention Plan (SPPP) to obtain City of Hopewell Land Disturbing Permit and DEQ Stormwater Management Permit.
- D. Other Services
  - 1. Land Surveying
    - a. Perform topographic survey at the GRPS.
    - b. Perform topographic survey along the existing 24-inch North Interceptor Force Main alignment traversing cross country from GRPS to the HRWTF property line.
    - c. Survey will include baseline staking and elevation bench mark control points for the Gravelly Run pump station and force main.
    - d. Perform record survey of as-built conditions at final completion.
  - 2. Geotechnical Investigation
    - a. Perform soil borings and laboratory analysis at the GRPS and along the Gravelly Run force main.
    - b. Soil classification testing, consolidation testing, proctor tests and CBR tests.
    - c. Use geotechnical investigation to establish foundation requirements for new features of work.
  - 3. Easement Plats
    - a. Prepare easement plats for the Gravelly Run pump station and force main.
    - b. Evaluate easement requirements along the force main alignment and at the pump station.
- E. Design deliverables to Owner.

NO.	ITEM	QTY
1	30% Half-Size Design Drawings <sup>1</sup>	7
2	60% Half-Size Design Drawings, Specifications, and Reports <sup>2</sup>	7
3	“Permit Design” Half-Size Design Drawings, Specifications, and Reports <sup>2</sup>	7
4	IFC Design Half-Size Design Drawings & Specifications <sup>3</sup>	7
5	Record Design Drawings & Specifications <sup>4</sup>	2
6	Minutes; 30%, 60%, and “Permit Design” Review Workshop Meetings <sup>1</sup>	1
7	30% and 60% Functional Description Workshop Meeting Minutes <sup>1</sup>	1
8	Stormwater Pollution Prevention Plan	1
9	Geotechnical Reports <sup>1</sup>	1
10	Set of Easement Plats <sup>3</sup>	3
11	Joint Permit Application <sup>5</sup>	1
12	Short-Circuit Study, Arc Flash Analysis, and Protective Device Coordination Study <sup>2</sup>	2

<sup>1</sup> Submitted electronically

<sup>2</sup> Submitted electronically (one set, typical) and hard copy half-size (as indicated above, typical)

<sup>3</sup> Submitted electronically, hard copy half size, and full size

<sup>4</sup> AutoCAD (.dwg) file format, Half-Size Design Drawings (.pdf) file format, Full-Size Design Drawings (.pdf) file format, Specifications in Word (.pdf) file format

<sup>5</sup> Item is contingent on wetland delineation.



## HOPEWELL REGIONAL WASTEWATER TREATMENT FACILITY ALTERNATIVE 4A-1 LIGHT PHASE 2 DESIGN-BUILD SERVICES



### 6.0 CONSTRUCTION

Design-Builder's SOW for the Project's Construction Phase includes furnishing and installation of the systems and materials noted herein for the following project elements.

#### A. General Requirements

Design-Builder will provide project and construction management planning, execution, control, and closeout. General requirements include the following.

4. Project Kickoff Meeting.
5. Mobilization.
6. Temporary facilities.
7. Stormwater BMP's.
8. Other direct costs of the Work.

#### B. Design-Build Services during Construction

1. Facilitate the Project Kickoff Meeting.
2. Facilitate progress reporting.
  - a. Facilitate weekly field meetings and monthly "Owner/Design-Builder" meetings.
  - b. Prepare and submit monthly progress reports.
3. Manage and Administer Specialized Services.
  - a. Administer and coordinate material testing services and other required testing. Special inspections will be performed to meet the current building codes
  - b. Provide coordination for MOPO and planning meetings for shutdowns and major construction tie-ins.
  - c. Prepare a Startup and Commissioning plan (Cx Plan) to integrate the new features of work with the existing facility, bring the improvements on line, and turnover the improved facility to trained COH operations staff. Review Submittals, Shop Drawings and O&M Manuals, including integration of new features with Owner's existing eO&M system.
  - a. Design-Builder will prepare a submittal register for the Project and review and approve all major equipment submittals, critical submittals and submittals required by the Statement of Special Inspections. All submittals requiring the Owner's decision on functionality or aesthetics will be shown on the register. Other submittals will be furnished to Owner "For Information Only" (FIO). Submittals in conformance with the Contract Documents will be transmitted.
  - b. Update HRWTF's existing eO&M Manual content incorporating revisions, additions, and changes constructed in the project. HRWTF will provide a Virtual Private Network (VPN) with permissions set to allow access into the eO&M application and the Uploads Folder on HRWTF's network. New content will be added to the system remotely using the VPN. Specific components will include:
    - 1) Up to 52 figures, defined as 2D drawings, isometric drawings, and/or 3D graphics. Figures will present graphic information to assist in the operation of the treatment plant.
    - 2) Up to 50 color photographs, obtained after equipment and process areas qualified for final acceptance.
    - 3) As-built drawings formatted as Adobe PDF files.
    - 4) Up to 30 equipment O&M manuals in PDF format. A vendor-supplied equipment O&M manual is defined as a single binder for equipment or a process area and may include information from multiple suppliers. The files will be processed, if necessary, to make the textual content searchable within the individual PDF file (dependent on the quality of the final submittals).



## HOPEWELL REGIONAL WASTEWATER TREATMENT FACILITY ALTERNATIVE 4A-1 LIGHT PHASE 2 DESIGN-BUILD SERVICES



5. Field Engineering & Inspection
    - a. Provide one Design Coordinator on site for field engineering and coordination of submittal reviews, RFI, field engineering, and participation in meetings.
    - b. The Design Coordinator will be 30-hour OSHA trained prior to field mobilization.
  6. Site Observation  
The design discipline leads will make periodic visits to the site. Design discipline leads will be 10-hour OSHA trained prior to an initial site visit.
- C. General Sitework
1. Waste Site.
  2. Yard Piping.
  3. Site Electrical.

D. GRPS and Forcemain Improvements

The existing GRPS will be replaced with a new pump station having a firm pumping capacity of 7,500 gpm and having the capacity to divert Honeywell flow to both the segregated treatment system and the industrial headworks. The new pump station will include submersible pumps and a channel grinder. The Honeywell flow will be segregated from the VAWCO and RockTenn flows by constructing new force mains parallel to the existing North Interceptor. A new force main will be installed between the GRPS and the RockTenn connection to convey the VAWCO flow. A flow control station will be installed near the RockTenn connection to split flow between the North Interceptor (industrial treatment side) and the 48-inch RWI line (domestic treatment side). A new force main will be installed between the RockTenn connection and the 48-inch RWI line in the vicinity of Hummel Ross Road to convey the Honeywell flow to the domestic treatment side.

Demolition & removal of the existing GRPS includes demolition of the structure above 3-ft below grade, filling and capping of in-ground structures. The existing stand-by diesel generator and fuel tank will be re-used to furnish an alternate source of power for the GRPS. Owner will be responsible for any reconditioning or repair that may be required for its continued operation.

E. MBBR Influent Pump Station

The combined Honeywell and domestic wastewater (segregated wastewater) will be conveyed to the MBBR treatment system by a new MBBR Influent Pump Station. The pump station will have a firm capacity of 33.3 mgd and will consist of vertical turbine solids handling pumps. The segregated primary effluent will flow to the MBBR Influent Pump Station wetwell. The wetwell also receives flow from the MBBR tanks during tank draining through the MBBR tank drain line. A new 750 kW standby generator will be installed to provide emergency power for the MBBR influent pumps to insure continuous disinfection of the domestic flows.

F. MBBR Tanks

The new MBBR system includes sufficient capacity to treat estimated 2040 flows and loads. The treatment volume is divided into five tanks and each tank is provided with four treatment cells. The first cell is an anoxic cell, provided with submersible mixers in each tank. The second cell is for BOD removal and is provided with a diffused aeration grid. The third and fourth cells are for nitrification and are also provided with aeration grids. MBBR effluent is recycled to the head of the tank using axial flow pumps of quantity and size to provide a capacity of 2Q. This recycle flow will increase denitrification and reduce, but not eliminate, alkalinity addition requirements. The air supply to the MBBR tanks will be controlled by dissolved oxygen (DO).



## HOPEWELL REGIONAL WASTEWATER TREATMENT FACILITY ALTERNATIVE 4A-1 LIGHT PHASE 2 DESIGN-BUILD SERVICES



### G. DAF Building

Excess biological solids discharged from the MBBR tanks must be captured and sent to the solids handling system. To accomplish this, three DAF units will be provided. MBBR effluent will be equally split and will flow by gravity through dedicated lines to the DAF units. Air bubbles are introduced into the unit using aspirating pumps. DAF effluent will flow through a combined effluent header and discharge to a new Chlorine Contact Tank. Solids are drawn from a connection below each unit and returned to the Solids Holding Tanks using progressing cavity pumps.

The DAF Building will house a polymer system used to feed polymer to the DAF units. This system will use dry polymer from super sacks and wet, mix and age the polymer for feed into the DAF units.

### H. Blower Building

To provide air and mixing in the MBBR process, new blowers will be installed. To span the range of flows anticipated, multiple blowers are provided. The blowers will be located in the Blower Building adjacent to the MBBR tanks.

### I. UNOX Modifications

The existing denitrification basin does not have sufficient capacity to treat the nitrate load expected under the Project Improvements design basis. The first stage of the UNOX aeration tanks will be converted to an anoxic zone to increase denitrification capacity and meet these expected loads. This will entail removal of the existing aerators and installation of mixers. Existing wires and starters will be used on the new equipment.

### J. Chlorine Contact Tank

The DAF effluent, which will contain all the domestic flow and a portion of the Honeywell flow, will be disinfected with sodium hypochlorite. A new chlorine contact tank will be constructed. The existing sodium hypochlorite feed system will be modified to include new, smaller pumps to meet the reduced dosage requirements and a new control system will be installed. I

### K. Sodium Hydroxide Facility

Addition of sodium hydroxide for alkalinity is required for the MBBR system. This new facility will include storage tanks and feed pumps.

### L. Oxycharger

The facility currently has four OxyCharger units installed to provide reaeration for the final effluent. The re-aeration structure includes space for a fifth unit. To meet the increase flows under the Project Improvements design basis, the fifth OxyCharger unit will be installed.

### M. Electrical

Design-Builder will furnish and install all labor, equipment, materials, and supplies to complete the electrical scope of work associated with the work elements 6.1 through 6.13. Also, installation and terminations for instrumentation & controls systems will be performed under the electrical scope. Fiber Optic Cable will be furnished and pulled under the electrical scope. Fiber Optic terminations will be made by under the I&C scope.



## HOPEWELL REGIONAL WASTEWATER TREATMENT FACILITY ALTERNATIVE 4A-1 LIGHT PHASE 2 DESIGN-BUILD SERVICES



1. Electrical Equipment  
Reference the Exhibit A, Appendix document "Hopewell Electrical Equipment Schedule" for a list electrical equipment. The list of potential suppliers & manufacturers that fit Design-Builder's pricing and scope to provide electrical switchgear includes:
  - a. Square D/Schneider.
  - b. GE Industrial.
  - c. Siemens.
  - d. Cutler Hammer.
2. Electrical Cx  
Electrical SOW will also include certification of proper installation and termination, calibrations, adjustments, documentation, testing, training and starting up of the complete electrical work for a complete and functional system.

### N. Instrumentation & Controls

Observation and supervision of instrumentation & controls will be performed under the I&C scope; to include certification of proper installation and termination, calibrations, adjustments, documentation, testing, training and starting up of the complete instrumentation and SCADA work for a complete and functional system.

1. Programming (PLC & HMI)  
The existing facility has a functioning SCADA system. Design-Builder will integrate the new features with the existing SCADA system, to include hardware, wiring, and programming modifications to Owner's existing PLC panels identified as PLCs 3, 7, and Gravelly Run on block diagram Y-300, solely to incorporate new equipment and Inputs/Outputs on this project. The extent of integration is shown in Exhibit A, Appendix document "The Project - Conceptual Design Drawings\_03-18-14".

Programming Modifications to the existing PLC and SCADA System to integrate the new process equipment PLC, network equipment between new PLC's, and up to four HMI graphic displays for each new major process.

2. Instrumentation  
Reference Exhibit A, Appendix documents "Design Basis TM for PPEA\_03-18-14" and "The Project - Conceptual Design Drawings\_03-18-14" for the control strategy and P&ID sheets for five MBBR trains, MBBR Influent PS, three DAF units, DAF solids pumps, GRPS, Chlorine Contact Tank, Sodium Hydroxide Facility, and Blower Building. A general list of instruments includes:
  - a. 6 DO probes.
  - b. 2 pH probes.
  - c. Flow meters (range 1-in to 36-in).
  - d. Pressure gages.
  - e. Pressure transmitters.
  - f. Thermal transmitters.
  - g. Ultrasonic level transmitters.
  - h. D/P switches.

The list of potential suppliers & manufacturers that fit Design-Builder's pricing and scope to provide instruments includes:

- a. Rosemount/Emerson.
- b. Seimens.
- c. Hach.
- d. Modicon/Schneider.
- e. AB/Rockwell.



**HOPEWELL REGIONAL WASTEWATER TREATMENT FACILITY  
ALTERNATIVE 4A-1 LIGHT PHASE 2  
DESIGN-BUILD SERVICES**



3. Panels  
DAF System and Blower System PLC panels will be provided by the equipment supplier. Modifications to existing panel PLC-3 UNOX 1 will be made on site. Other panels include:
  - a. PLC-13, MBBR Influent PS, one panel, 72"x48"x24", Nema 12.
  - b. PLC-14, Blower Building/MBBR Trains, one panel. 72"x72"x24", Nema 12.
  - c. PLC-15, DAF Building, one panel, 72"x48"x24", Nema 12.
4. Fiber Optic Cable, Patch Panels & Connectors will include terminations of the Fiber Optic Cable under the I&C scope of work. Fiber Optic cable will be furnished and pulled under the electrical scope.
5. SCADA Cx  
Install and test the new SCADA prior to commencing Acceptance testing and do not adversely impact the existing SCADA system. Provide up to 2 Weeks or 80 hours Training. A spare parts allowance of up to \$10,000 is included.

O. List of construction deliverables

NO.	ITEM	QTY
1	Observation Reports <sup>1</sup>	TBD
2	Special Inspection and Testing Reports <sup>1</sup>	TBD
3	Minutes, Weekly Field Meetings <sup>1</sup>	TBD
4	Minutes, Monthly Owner/Design-Builder Meetings <sup>1</sup>	TBD
5	Minutes, MOPO and Coordination Meetings <sup>1</sup>	TBD
6	Submittals and Shop Drawings <sup>1</sup>	TBD
7	Record Drawings & Specifications <sup>4</sup>	3
8	eO&M <sup>1</sup>	1
9	Set of O&M manuals printed and bound	1

<sup>1</sup> Submitted electronically

<sup>2</sup> Submitted electronically (one set, typical) and hard copy half-size (as indicated above, typical)

<sup>3</sup> Submitted electronically, hard copy half size, and full size

<sup>4</sup> AutoCAD (.dwg) file format, Half-Size Design Drawings (.pdf) file format, Full-Size Design Drawings (.pdf) file format, Specifications in Word (.pdf) file format

**7.0 GENERAL ASSUMPTIONS AND CLARIFICATIONS**

- A. Design-Builder will work with the Owner to start early procurement of major equipment and material to advance the project schedule, assist in the design process and provide early coordination of design and construction work.
- B. The project schedule assumes that Design-Builder will have site access to perform early project set up activities and sitework to prepare the project for immediate construction activity once the design and permitting has sufficiently progressed.
- C. The Owner will make appropriate plant staff available to Design-Builder to identify how plant operations will impact design and construction.
- D. While Builder's Risk insurance is included Design-Builder's price, loss of use coverage is not included.
- E. Design-Builder has based construction labor rates on Open Shop Wage Base and has excluded Davis-Bacon or Prevailing Wage rates. In the event that the Owner seeks Federal funding



## HOPEWELL REGIONAL WASTEWATER TREATMENT FACILITY ALTERNATIVE 4A-1 LIGHT PHASE 2 DESIGN-BUILD SERVICES



- assistance, any associated wage rate increases will be the subject of an equitable adjustment to Design-Builder's contract price.
- F. The Owner will maintain Facility Operators with the necessary qualifications and certifications to operate the plant, collection, and discharge systems.
  - G. Design-Builder assumes that all utilities for temporary facilities, construction, testing and startup uses are available at the site and sufficient to support these activities. Connection fees will be provided by the Owner.
  - H. Design-Builder assumes that the existing NPW pumping system and potable water system are adequate to supply water to the new services required by this project. No costs have been included by Design-Builder to upgrade or augment pressure or volume to the existing NPW pumping and potable water systems.
  - I. Design-Builder has not included any costs for modifications or upgrades to the Dominion Virginia Power service feed or substation required for tie-in of new loads or any needed load capacity increase to the Facility. Design-Builder assumes that all general building systems within the work areas (HVAC, Electrical, and Communication systems) are in working order and will require no further efforts on our part for them to remain operational within the project.
  - J. Design-Builder will rely on the existing perimeter fencing and security systems as sufficient. No costs have been included to repair, replace, or otherwise upgrade these. If a portion of fence must be removed for construction, Design-Builder will reinstall that portion to at least its pre-existing condition.
  - K. In order for Design-Builder to maintain the schedule on equipment procurement for process equipment and other long lead equipment, Design-Builder has assumed Owner review and decision on design documents, submittals and other technical documents within 10 (ten) working days of the Owner's receipt of the document unless a different time period is mutually agreed to.
  - L. Design-Builder will only remove or disconnect and return to a pre-existing level of service those existing facilities, systems, devices, equipment or appurtenances as necessary for the installation of complete and functional new work. Replacement of these existing items is not included.
  - M. Design-Builder has not included any costs associated with remediation, upgrading or repair of existing facilities, systems, devices, equipment or appurtenances not expressly included within the scope of this project.
  - N. Design-Builder has not included costs for an Environmental Assessment (including a Phase 1 cultural resources survey) or for any wetland mitigation that may be required by regulatory authorities.
  - O. Design-Builder has not included any costs associated with draining and cleaning of the existing tanks and structures. Design-Builder's scope excludes all sludge removal and disposal.
  - P. Startup and testing of the work will necessarily require treatment chemicals that the Facility presumably routinely purchases pursuant to negotiated best prices. Design-Builder will provide the chemicals for the initial "first fill" of the tanks needed for startup and testing of the new processes. Any additional chemicals required during start-up, testing and operation shall be provided by the Owner.
  - Q. The current scope, schedule and pricing are based upon the "Report of Subsurface Exploration and Geotechnical Engineering Services, Hopewell Regional Alternative 4A-1 Light the Project PER (Primary Site), Hopewell, Virginia, GET Project No: WM13-136G" and no additional borings are necessary at the HRWTF.
  - R. LEED® or Envision™ project administration and certification is not included.
  - S. Impact fees at the Federal, State, or Local levels have not been determined and are not included.
  - T. Process performance guarantees are exclusive of process upsets resulting from slug loads, toxic compounds or compounds inhibitory to the biological nitrification/denitrification process.
  - U. Site grading and restoration is limited to that required to construct the proposed facilities
  - V. Design-Builder assumes that the ductbank between the existing clarifiers and aeration tanks is abandoned and does not need to be relocated or demolished.
  - W. A VE study has been completed by Owner's Engineer. No additional VE studies are included in the scope of work.



## HOPEWELL REGIONAL WASTEWATER TREATMENT FACILITY ALTERNATIVE 4A-1 LIGHT PHASE 2 DESIGN-BUILD SERVICES



- X. NEPA type environmental assessment is an additional service and is not included in this scope of work.
- Y. Design-Builder assumes the Owner is responsible for all air and VPDES permitting.
- Z. Exterior pipe support materials will be concrete, galv. steel, or combinations of same.
- AA. Metal buildings: Structural steel will be galvanized. Wall and Roof panels will be galvanized or coated with a corrosion-inhibitor.
- BB. Design-Builder will evaluate the impacts of the Gravelly Run PS and force main improvements on the existing VAWCO and RockTenn pump stations that currently feed into the North Interceptor. This evaluation will be based on pump station information provided by VAWCO and RockTenn. The cost for design and construction of any required improvements to the VAWCO or RockTenn pump stations or force mains are not included in the scope or pricing.
- CC. The Gravelly Run Pump Station and Forcemain Improvements include the following assumptions:
  - 1. Bore and jack up to 80 linear feet under Hummel Ross Road.
  - 2. Up to three new tie-ins into the existing Forcemain.
  - 3. The existing pipe is structurally sufficient to accept tie-ins.
  - 4. The existing 300 kW generator will be reused.
  - 5. Owner will be responsible for any reconditioning or repair required for continued operation of the existing stand-by diesel generator, fuel, and fuel tank.
- DD. Insulation for the air supply piping from the Blower Building to the MBBR Tanks is not included.
- EE. A chemical foam control system is not included.
- FF. The scope and pricing is based on the Owner pre-paying the sum of \$4,000,000 for the MBBR media upon execution of a contract.
- GG. Cover hoods will not be provided for the DAF units.
- HH. The existing Re-aeration structure will accommodate a fifth Oxycharger unit.
- II. Upgrades and programmatic fixes to existing SCADA and modification of existing HMI graphic displays not associated with new features of work is not included.
- JJ. Witness travel & accommodations for Factory Acceptance Testing (FAT) are not included.

### **8.0 MECHANICAL AND PROCESS GUARANTEES FOR THE MBBR + DAF UNITS**

#### **A. MBBR + DAF MECHANICAL WARRANTY**

Equipment will be warranted from defects in materials, workmanship and design for a period of 12 months from the date of substantial completion. The polypropylene DAF vessel will be warranted from defects in materials, workmanship and design for a period of 10 years from the date of shipment. Warranty is contingent upon the system being operated and maintained in accordance with Design-Builder's instructions.

#### **B. MBBR + DAF PERFORMANCE GUARANTEE**

**SCOPE AND TIME LIMITATIONS:** Design-Builder guarantees the process results specified below for the performance of the combined MBBR and DAF treatment system for a period of one (1) year from successful completion of the Acceptance Test, and if the system(s) is(are) operated under conditions and loads that meet the contracted design and is operated in accordance to Design-Builder's operational guidance. This will include a limitation on MEKO and/or other inhibitory compounds at levels low enough to maintain complete nitrification. Successful completion of the Acceptance Test shall be sufficient evidence that the process meets all discharge requirements, as specified herein, and shall release any outstanding monies held. After one (1) year of operation under conditions and at loads for which sold and handling water, liquid or material conforming to the analysis furnished by Design-Builder, or the samples submitted, or as described in the specifications shall be sufficient evidence that this process has met all discharge requirements, as



**HOPEWELL REGIONAL WASTEWATER TREATMENT FACILITY  
ALTERNATIVE 4A-1 LIGHT PHASE 2  
DESIGN-BUILD SERVICES**



specified herein, and shall release Design-Builder from further obligations under this Process Guarantee.

Parameter	2040 Design Basis at 40% Honeywell	
	Max Month Influent (lbs/day)	Max Month Effluent (mg/L)
Flow (mgd)	19.7	
BOD5	38,757	
CBOD5	34,881	<30
TSS	20,631	<30
COD	92,859	
TKN	9,516	
NOx-N	285	<30
Alkalinity	28,855	
TVSS	17,856	
sCBOD	30,611	
gfCOD	67,221	
ffCOD	52,226	
TP	588	
Ortho-P	361	
STKN	8,252	
NH3-N	6,913	<1
Temperature	14-37°C	
pH	6.5-9 s.u.	

- C. **NOTICE REQUIREMENT AND REMEDY:** Design-Builder shall, upon prompt written notice of any breach of this guarantee, determine whether Design-Builder is responsible for the Product's failure to fulfill this guarantee. If it is determined that Design-Builder is responsible, Design-Builder shall correct the failure at its expense.
- D. **EXCLUSIONS:** If changes in load or composition of the material being treated occur, or if the Products are not maintained and operated in accordance with Design-Builder's written instructions, this guarantee shall be null and void.
- E. **ACCEPTANCE TESTS:** Upon completion of the treatment facilities and sufficient time for bioacclimation (approx. 2-3 months) (if applicable), a 30-day acceptance test shall be run by Design-Builder on the system. All sampling and analytical support will be the responsibility of the Owner. The Owner shall supply supplemental labor, and all necessary chemicals, utilities, and other services necessary for operation of the equipment in accordance to the Operation & Maintenance Manuals and procedures provided with the system and conduct of the testing program. The Design-Builder shall prepare and submit for review and approval by the Owner an Acceptance Test Plan at least 30 days prior to the commencement of the acceptance test.



## HOPEWELL REGIONAL WASTEWATER TREATMENT FACILITY ALTERNATIVE 4A-1 LIGHT PHASE 2 DESIGN-BUILD SERVICES



The acceptance test shall commence at a date which is mutually agreeable between all parties, but no longer than three months after initial startup. Initial startup shall include filling the units with water, adjustment of chemical feed systems, adjustment of any equipment or systems, electrical checkout of chemical and treatment systems, and electrical checkout of control panels or loops. After the equipment has been “debugged” and the bacterial population is allowed time to mature and all parties agree the plant is ready for service, the acceptance test period shall be scheduled.

The acceptance test shall be conducted over a 30-day period. The proposed process guarantee is based on the wastewater influent characteristics and flow not exceeding the values stated in Section 8.2 in order to achieve the effluent values stated in the same table.

1. The BOD, COD, TSS, NH<sub>3</sub>, NO<sub>2</sub>, NO<sub>3</sub>, TN and/or other sample(s) required by the contracted design shall be 24 hour composite of influent and effluent to the system.
2. Results obtained from the 30 days of testing will be averaged to obtain the Average Daily results.
3. The following chemicals will be used in the treatment process in dosages required for adequate treatment:
  - a. PH Adjustment Chemicals.
  - b. Alkalinity.
  - c. Phosphorus.
  - d. Coagulant (of type previously determined appropriate).
  - e. Polymer (of type previously determined appropriate).

During the performance test, Design-Builder shall have the capability to adjust all chemicals in order to optimize their performance of the treatment system. If the Process unit(s) meets the guarantee requirements, the Owner will accept the process unit(s).

If, during the initial 30-day performance test, the equipment fails to perform to the process requirements, then the Design-Builder shall be given reasonable time to perform corrective action, after which a second 30-day performance test will be granted under the conditions specified for the initial test.