PART 1 GENERAL

1.0 Section includes

A. A refrigerated sampler for the representative collection of liquid water samples to monitor influent and effluent waters from municipal and industrial NPDES facilities, monitor effluent waters from indirect industrial dischargers for compliance with pre-treatment regulations, and environmental monitoring including CSO and SSO studies and storm water run-off.
B. The sampler shall be a Hach Model AS950 All Weather Refrigerated sampler with options outlined below as manufactured by Hach Company, Loveland, CO.
C. The naming of a manufacturer is to define minimum acceptable performance and functionality. Other manufacturers may be approved as an equal if they meet the specifications. Alternate manufacturers shall submit equipment specifications to the engineer ten (10) business days prior to the bid date including a written description of the alternate offering and any exceptions to the specifications. Acceptable alternate vendors will be listed by Addendum.
D. Suitable for indoor or outdoor use.
E. UL certified.

1.1 Measurement Procedures

A. The method of sample collection shall be via high-speed peristaltic pump for collection of the sample liquid.
B. The method of sample detection shall be ultrasonic.

1.2 Alternates

A. Other samplers that do not use a high-speed peristaltic pump are not acceptable.
B. Other samplers that are not configured with the compressor at the top of the cabinet are not acceptable.
C. Sampler temperature control systems that rely on a knob to set "colder or warmer" are not acceptable.
D. Units that are not UL certified are not acceptable.

1.3 System Description

A. Performance Requirements
   1. Sample cooling: maintain sample liquid at 4°C (39°F) in ambient temperature to 50°C (122°F) maximum; accurate to ±0.8°C (±1.5°F).
   2. Sample volume: programmable in 10 mL increments from 10 to 10,000 mL.
   3. Sample volume repeatability ±5% of 200 mL sample volume with: 4.6 m (15 ft.) vertical lift, 4.9 m (16 ft.) of 3/8- in vinyl intake tube, single bottle, full bottle shut-off at room temperature and 1524 m (5000 ft.) elevation.
   4. Pacing intervals: selectable in single increments from 1 to 9,999 flow pulses or 1 to 999 hours in 1 minute increments. Accepts 4-20mA input from an external device to pace the sampler.
   5. Vertical lift: 8.5 m (28 ft.) using 8.8m (29 ft.) maximum of 3/8-in. vinyl intake tube at sea level at 20 to 25°C (68 to 77°F).
   6. Sample volume accuracy: ±5% of 200 mL sample volume with: 4.6 m (15 ft.) vertical lift, 4.9 m (16 ft.) of 3/8- in. vinyl intake tube, single bottle, full bottle shut-off at room temperature and 1524 m (5000 ft.) elevation.
   7. Sample transport velocity: 0.9 m/s (2.9 ft./s) at 4.6 m (15 ft.) vertical lift (16 ft. of 3/8-in. vinyl intake tubing at 70°F at 5000 ft. elevation).

8. Pump flow rate: 4.8 L/min (1.25 gpm) at 1 m (3 ft.) vertical lift with 3/8-in intake tube typical.

1.4 Certifications

A. Controller: CE
B. Cabinet: UL/CSA/CE

1.5 Environmental Requirements

A. Operational Criteria
   1. Operating temperature: 0 to 50°C (32 to 122°F)
   2. Operating temperature with optional controller compartment heater: -40 to 50ºC (-40 to 122ºF)
   3. Storage temperature: -30 to 60°C (-22 to 140°F)

1.6 Warranty

A. The product includes a one-year warranty from date of shipment.

1.7 Maintenance Service

A. Scheduled maintenance: monthly: visual inspection, if necessary, clean
B. Unscheduled maintenance:
   1. Pump tube replacement
   2. Rotor removal and cleaning
   3. Distributor arm tubing replacement
   4. Desiccant replacement

PART 2 PRODUCTS

2.0 Manufactured Unit

A. The Hach AS950 AWRS consists of a controller and All Weather Refrigerator.
B. Tubing:
   1. Pump tube: 0.95 ID x 0.16 OD cm (3/8 ID x 5/8 in. OD)
   2. Intake tube: 9.5 mm (3/8 in.) ID vinyl or Teflon® lined polyethylene in 10- , 25- , or 100-ft. lengths
C. Weighted strainer constructed of 316 stainless steel and Teflon

2.1 Equipment

A. The controller housing of the AS950 sampler is submersible, watertight, dust-tight, corrosion- and ice-resistant to NEMA 4X, 6, IP68 standards.
B. The Graphics Display is 1/4 VGA, Color; self-prompting/ menu-driven program.
C. The desiccant cartridge, which prevents moisture from accumulating inside the controller electronics area, shall be visual and accessible externally from the side of the controller; the replacement of the desiccant shall not require tools or disassembly of controller from base.
D. The pump shall use spring loaded rollers and be accessible by a clear hinged cover with single thumbscrew.
E. Refrigerated cabinet is insulated with 3-inch rigid foam insulation on the walls, 6 inches on the bottom and 5 inches on top. The cover for the controller compartment shall also be insulated.

F. The cabinet shall have a heavy duty compressible gasket on controller compartment lid, compressor compartment lid and refrigeration compartment door.
G. The refrigeration components and copper plumbing shall be corrosion protected with conformal coating.
H. The thermal control system is digital microprocessor-based and responds to a system of temperature sensors that continually monitor the evaporator plate, controller compartment air temperature, and refrigerated compartment air temperature.
I. An air sensing thermostat is capable of maintaining sample liquid within specified limits.
J. The power requirement is 115 Vac, 60 Hz (230 Vac optional)
K. Communication choices include:
    1. USB and optional RS485 (Modbus)
    2. Permits embedded software upgrades in the field
    3. FSData data management software used to download, analyze, and report data, save templates, download sample history and event logs, create graphs for reports and presentations. Link directly to PC A to A USB cable.
L. The membrane switch keypad user interface is self-prompting/menu driven program with 2 multiple function soft keys.
M. Sampling pacing modes shall include Time Weighted, Flow Weighted, Time Table, Flow Table, and Event.
N. Internal software shall be protected by a 7 amp fuse.
O. Diagnostics: View event and alarm logs.
P. A program lock shall be provided for access code protection to prevent tampering of program and system settings.
Q. The sampler is convertible to composite operation by installing a composite container and full bottle shut off.
R. Sample containers include choice of:

Composite:	(Qty) 2.5 gallon polyethylene bottle
	(Qty) 2.5 gallon glass bottle
	(Qty) 5.5 gallon polyethylene bottle
Discrete:	(Qty) set of (8) 2.3 liter polyethylene bottles
	(Qty) set of (8) 1.9 liter glass bottles
	(Qty) set of (12) 2 liter polyethylene bottles
	(Qty) set of (24) liter polyethylene bottles
	(Qty) set of (24) 350 ml glass bottles
	(Qty) set of (2) 2.5 gallon polyethylene bottles
	(Qty) set of (2) 2.5 gallon glass bottles
	(Qty) set of (4) 2.5 gallon polyethylene bottles
	(Qty) set of (4) 2.5 gallon glass bottles

S. Sampling features include:
    1. Dual programming: Up to 2 sample programs can be run sequentially, in parallel, or according to day of week scheduling; enabling a single sampler to function like multiple samplers
    2. Cascade sampling: for two samplers in combination—the first sampler, at the completion of the program, initiates the second.
    3. Status Screen: Communicates what program is running, if there are any missed samples, when the next sample will be taken, how many samples remain, number of logged channels, time of last measurement, memory available, number of active channels, if alarms were triggered, when alarms were triggered, active sensors and cabinet temperature
T. Datalogging

1. Sample History: Stores up to 4000 entries for sample time stamp, bottle number and sample status (success, bottle full, rinse error, user abort, distributor error, pump fault, purge fail, sample timeout, power fail and low main battery)
2. Measurements: Stores up to 325,000 entries for selected measurement channels in accordance with the selected logging interval
3. Event Log: Stores up to 2000 entries. Records Power On, Power Fail, Firmware Updated, Pump Fault, Distributor Arm Error, Low Memory Battery, Low Main Battery, User On, User Off, Program Started, Program Resumed, Program Halted, Program Completed, Grab Sample, Tube Change Required, sensor communication errors, cooling failed, heating failed, thermal error corrected

U. Automatic shutdown modes:
1. Multiple bottle mode: after complete revolution of distributor arm (unless continuous mode is selected).
2. Composite mode: after preset number of samples have been delivered to composite container, from one to 999 samples, or upon full container.

V. Sample distribution modes include single bottle composite, multi-bottle composite, multi-bottle discrete, bottles per sample, samples per bottle or a combination of bottles per sample and samples per bottle

W. Manual grab sample can be made with the AS950 sampler to deliver a grab sample to a specific bottle location

X. The high-speed peristaltic sample pump uses four rollers with spring tension.

Y. The intake air purge is made automatically before and after each sample. The duration automatically compensates for varying intake line lengths.

Z. The intake line is optionally rinsed with source liquid prior to each sample from one to three times.

AA. The sample collection cycle is optionally repeated from one to three times if a sample is not obtained on the initial attempt.

2.2 Factory Installed Options

A. Two Sensor Ports: Sampler accepts Hach digital Differential pH, Hach digital AV9000 analyzer with submerged area velocity flow and/or Hach digital US9000 ultrasonic level sensors.

B. Rain/RS485 Port: Sampler accepts Hach Rain Gauge (not included) or can be used as RS485 communications.

2.3 Components

A. Standard equipment shall be:
1. Controller: high impact injection-molded ABS/PC plastic
2. All weather cabinet: linear low density polyethylene with UV-inhibitors
3. Pump enclosure: corrosion-resistant polycarbonate door, high impact-resistant plastic, polyphenylene sulfide track
4. Intake strainers in standard size, high velocity, or low profile for shallow depth applications. Choice of:
   a. Teflon and 316 stainless steel construction
   b. All 316 stainless steel
5. Exterior dimensions shall not exceed 51” H x 30” W x 32” D.

2.4 Accessories

A. Controller compartment heater

B. Bottle kits

C. Tubing and strainers
D. AC battery back up
E. Cables and interfaces
F. Anchor brackets
G. FSData software
H. IO9000 Input/Output Module

PART 3 EXECUTION

3.0 Preparation

A. The AS950 AWRS is designed for indoor and outdoor use.
B. For areas with sub-zero temperatures, the optional controller compartment heater is recommended.